Board of Public Utilities

Regular Meeting Agenda

Monday, July 29, 2013
4:00 p.m., DPW Conference Room, 1199 8th Avenue

City of South Haven

1. **Call to Order**

2. **Roll Call**

3. **Approval of Agenda**

4. **Acceptance of Minutes for the Record** - June 24, 2013 Regular Meeting Minutes
   July 11, 2013 Special Meeting Minutes

5. **Interested Citizens in the Audience Will be Heard on Items Not on the Agenda**
   A. Plug-In Electric Vehicle Electric Rates from various electric utilities are provided as background information for the Board in anticipation of a citizen attending the meeting regarding this subject.

REPORTS

6. **Cost of Energy from Indiana-Michigan Power Company (AEP)**
   A. 2013 Billings – All Charges
   B. 2012 Billings – All Charges
   C. AEP Rate change information

7. **Financial Reports**
   A. Water Fund CuFt Comparisons
   B. Water Fund Financial Statement
   C. Sewer Fund Financial Statement
   D. Electric Fund KWH Comparisons
   E. Electric Fund Financial Statement
   F. Memo regarding financial reports

8. **Indian Grove Infrastructure Project**
   A. Sewer Study Progress Report
   B. MDEQ Notice of Grant Application Approval
   C. S2 Grant Press Release

9. **Unresolved Issues Report**

10. Electric Outage Report, 2nd Quarter 2013

OLD BUSINESS

11. Board will be presented additional, requested information regarding Bulk Water Sales, and requested to pass a motion recommending that Council adopt new Bulk Water Sales by Resolution.

NEW BUSINESS

12. Board will be presented the Electric Distribution System Study & Five-Year Plan prepared by GRP Engineering, Inc.

13. Board will be requested to approve a recommendation to enter into a contract with Fishbeck, Thompson, Carr and Huber. Inc. for Professional Services for the 2013 Water System Reliability Study.

14. Next meeting is scheduled for Monday August 26, 2013 at 4:00 pm in the DPW Conference Room, 1199 8th Avenue, South Haven, Michigan.

15. Director's Comments

16. Board Member Comments

17. Adjourn

RESPECTFULLY SUBMITTED,

Roger Huff
Public Works Director

South Haven City Hall is Barrier-free and the City of South Haven will provide the necessary reasonable auxiliary aids and services for persons with disabilities, such as signers for the hearing impaired and audio tapes of printed materials being considered at the meeting to individuals with disabilities at the meeting upon seven (7) days notice to the South Haven City Clerk. Individuals with disabilities requiring services should contact the City Clerk by writing or calling South Haven City Hall at (269) 637-0750.

Board of Public Utilities

Regular Meeting Minutes

Monday, June 24, 2013
4:00 p.m., DPW Conference Room, 1199 8th Avenue

City of South Haven

1. **Call to Order by Stickland at 4:00 p.m.**

2. **Roll Call**

   Present: Burr, Henry, Overhiser, Stein, Stickland, Winkel
   Absent: Rose (Arrived a few minutes late)

3. **Approval of Agenda**

   Huff requested that items 7 B, C and E be removed from the June 24, 2013 regular meeting agenda.

   Motion by Burr, second by Henry to approve the June 24, 2013 regular meeting agenda as amended.

   All in favor. Motion carried.

4. **Acceptance of Minutes for the Record** – March 25, 2013

   The March 25, 2013 Special Meeting minutes and Regular Meeting minutes were accepted for the record by Burr.

5. **Interested Citizens in the Audience Will be Heard on Items Not on the Agenda**

   There were none.

REPORTS

6. **Cost of Energy from Indiana-Michigan Power Company (AEP)**
   A. 2013 Billings – All Charges
   B. 2012 Billings – All Charges

   Discussion occurred on this item.
   Burr inquired why monthly payments were not being made to AEP.
   Finance Director Hochstedler said that there was a fund balance on our account so no additional payment was needed. Regular monthly payments applied toward the true-up have resumed.

7. Financial Reports

A. Water Fund CuFt Comparisons
B. Water Fund Financial Statement

Discussion occurred on this item, it was noted by Stickland that the water usage from 2012 to 2013 was fairly steady.
Rose inquired whether the valve turning machine was being used in Covert. City Engineer Halberstadt explained that it has not been used much this year due to staffing issues but it is intended that it will get more use in the future.

C. Sewer Fund Financial Statement

Discussion occurred regarding the status of water and sanitary sewer extension in Miami Park.

D. Electric Fund KWH Comparisons
E. Electric Fund Financial Statement

Stickland stated that the BPU is selling over 95% of the Electricity that it buys.

8. Indian Grove Infrastructure Project

A. Sewer Study Progress Report

Dan Dombos and Chris Cook from Abonmarche presented a power point highlighting the progress and initial findings for the S2 Sewer Study. Dombos explained that the SRF Final Plan will be submitted by July 1, 2014.

9. Unresolved Issues Report

No discussion occurred on this item.

NEW BUSINESS

10. Board will be requested to approve a recommendation to amend the utility policy for Hydrant Water Sales.

Discussion occurred on this item.
Burr requested that Huff change the word “installation” to “use” (last sentence under “Location of Hydrant Meters”).
Stein inquired whether farmers could have a hydrant meter for more than seven days. Stein suggested that if there are no meters available that a customer should be able to purchase a meter to use.
Halberstadt stated that he had no problem if someone wanted to buy a meter, however the meter would be the property of the City.
Stein suggested that the phrase “high demand” be changed to “high demand for hydrant meters” in reference to the 7 day limitation on the use of hydrant meters.

Overhiser suggested that the rates be adjusted so that there would be enough revenue generated to purchase additional hydrant meters.
Burr inquired into how the Standby rate was established.
Halberstadt explained that he took the monthly standby rate that customers pay and divided it by the average number of days in a month, to come up with the suggested daily standby rate for hydrant meters.
Burr asked if the standby rate could be increased and how the usage rates were determined.
Halberstadt explained that the usage rates were based on the current water policy usage rates, with the exception of the first 2,500 cubic feet where a flat rate was established.
Stickland suggested that the BPU could have a policy that would allow a farmer to be able to purchase a meter that would be then owned by the City. Stickland also suggested that the standby rate be raised in order to supplement the purchase of additional hydrant meters.
Rose asked if Huff could obtain the number of hydrant meter requests from last year.
Huff suggested that the 7 day limitation be removed and that the language in the hydrant meter policy be changed to state that during times of high demand for hydrant meters the city has the right to limit the numbers of days a customer can use the hydrant meter.
Stickland suggested that the City purchase 3 or 4 additional hydrant meters.
Burr suggested that we find out what standby fees for hydrant meters are in other communities.
Stickland said that this item would be tabled until next month.

All in favor. Motion carried.

11. Board will be requested to consider the Monroe Boulevard Sewer Main Extension

Halberstadt provided background information on this request.
Discussion occurred on this item.
Motion by Henry, Second by Winkel to adhere to current policies and ordinances regarding the Monroe Boulevard sanitary sewer extension.

All in favor. Motion carried.

12. Next meeting is scheduled for Monday, July 29, 2013 at 4:00 pm in the DPW Conference Room, 1199 8th Avenue, South Haven, Michigan.
No discussion occurred.

13. Director's Comments
Huff stated that GRP Engineering forwarded their report for staff review and that the report would be presented at the July BPU meeting.
Halberstadt explained that House Bill 284 recently passed for low income Energy Assistance. The BPU needs to either add $1 to everyone's electric bill or agree to not shut off electricity to low income customers during a specified time period of the year.
Discussion occurred and the Board was in favor of adopting the no shut off policy during a specified time period of the year, because this is already the policy of the BPU during most of the specified time period in the Bill.

14. Board Member Comments

Stein: Said that there is a standing water issue at Aylworth Avenue and Bailey Avenue that needs to be addressed.

Stickland: Asked that the church reclassification to "residential" for the Summer Sewer Credit be taken before the City Council for Approval.

15. Adjourn

Meeting adjourned at 6:27 p.m.

RESPECTFULLY SUBMITTED,

Ryan Bosscher
GIS Technician

Board of Public Utilities

Special Meeting Minutes

Thursday, July 11, 2013
9:00 a.m., DPW Conference Room

City of South Haven

1. **Call to Order by Stickland at 9:00 a.m.**

2. **Roll Call**

   Present: Burr, Henry, Winkel, Stickland
   Absent: Overhiser, Rose, Stein

3. **Approval of Agenda**

   Motion by Winkel, second by Burr to approve the July 11, 2013 Special Meeting Agenda as presented.

   All in favor. Motion carried.

4. **Interested Citizens in the Audience Will be Heard on Items Not on the Agenda**

   None at this time.

UNFINISHED BUSINESS

5. **Board will be requested to review Public Act 95 of 2013 and make a recommendation to City Council.**

   Halberstadt gave an overview of Public Act 95 of 2013 which was passed to provide assistance for low income energy customers in Michigan. The purpose of the act is to establish a $50 million annual fund which low income customers can access to pay any kind of energy bill. The legislation places a surcharge on electric customers only and the surcharge is not to exceed more than $1 per customer, with the actual amount calculated by the Michigan Public Service Commission (MPSC).

   The board discussed where the low income funding will come from other than the surcharge and whether, if half of the utilities opt out, would there be enough money. Halberstadt explained that the two largest electric providers in the state, Consumers Energy and DTE, supported the legislation and will not be opting out.

   According to Halberstadt, the first option is to collect the surcharge from our customers and send the money to the state on a monthly basis. Optionally, the city can opt out and will not

be permitted to shut off electric customers between November 1st and April 15th for nonpayment of a delinquent account. Halberstadt noted that the date for utilities to let the state know will be July 1st but since the legislation was not signed until July 1st we have been given until July 24, 2013 to provide this information to the state.

Huff explained that the board is being requested to take formal action today so that City Council can consider the matter on Monday, July 15th at their regular meeting.

Winkel asked how the shut-off period stipulated in PA 95 compares to the City's current practice. Huff responded that there is a fifteen (15) day difference from current practice, with an extension in the spring from March 31 to April 15.

Burr noted that the City places a tax lien on properties with delinquent utility bills so the utility does have a mechanism to collect bad debt. Typically in the Detroit area the utility companies write off 2% of their gross billing for bad debt. Consumers, who serves outside the Detroit area, writes off 0.5%. So there is four times as much bad debt write-off in major cities.

Burr said our write off is considerably less because we put the delinquent bills on tax bills. Burr noted that we can shut people's water off and we can shut people off if they are stealing electricity from us.

Stickland pointed out that in reality this legislation does not really change what we are doing. Huff asked if there had been an update from the Michigan Municipal Electric Association (MMEA) which will be performing a joint filing on July 24th for its 41 members, including South Haven. Halberstadt said he has not heard anything since he wrote the report.

Burr said the geographical area is not really defined. Huff noted that even if we opt out low income customers can still access the assistance.

Motion by Burr, second by Henry to opt out of Senate Bill 284 creating Public Act 95 of 2013 because it penalizes electric customers to subsidize gas customers and because geographic area is not defined by PA 95, we have no assurance that they money collected will be returned to South Haven electric customers.

All in favor. Motion carried.

6. Next meeting is scheduled for Monday July 29, 2013 at 4:00 p.m. in the DPW Conference Room.

The board discussed issues that may appear on the next agenda.

7. Board Member Comments

Stickland called for comments. There were none at this time.

8. Adjourn

Motion by Winkel, second by Henry to adjourn at 9:25 a.m.

All in favor. Motion carried.

RESPECTFULLY SUBMITTED,

Marsha Ransom
Recording Secretary

Rates for Electric Car Charging

Free Electric Vehicle Charging Station at 410 Blue Star Hwy, Casco MI at Consumers Energy Building.

1. **Holland BPW**
   There are over 20 Public charging stations in the Holland Area which where funded by the Department of Energy and are free to use. There are no discounted rates for residential vehicle charging stations.
   Interactive Map of Charging Stations: https://na.chargepoint.com/index.php/charge_point

2. **Zeeland BPW**
   Link: Electric Rates
   There is a lower electric rate for public electric vehicle charging stations, there is no discounted rate for residential charging stations.

3. **AEP / Indiana-Michigan Power Company**
   The first 250 qualified plug-in electric vehicle owners in the Michigan service area can receive $2500 to offset the cost of installing a home charging station.

   There are no discounted electric rates for residential electric vehicle charging stations.
   Link: Home Charging Station Incentive

4. **Coldwater**
   There is a free car charging station downtown but no discounted residential rates for car charging stations.

5. **Lowell MI Light & Power**
   There is no charge for someone to use a public vehicle charging station.
   There are no discounted rates for residential vehicle charging stations.

6. **Niles, MI**
   There are no discounted rates for Electric Vehicle Charging Stations.

7. **Consumers Energy**
   PEV Rates - Consumers Energy offers a residential Home and Plug-In Electric Vehicle time-of-Day Rate (REV-1) combines charging your electric vehicle with all of your other household electric use (such as lighting, cooking and water heating). This rate provides a low-cost option for off-peak electric use (such as lighting, cooking and water heating). This rate provides a low-cost option for off-peak electric use, including charging your vehicle at night (see schedule below for specific timeframes). No additional metering is required. Time of day rates for your electric vehicle provide you the opportunity to manage your monthly electricity costs.

Summer (June - September)	**Times**	**Cost per kWh (approximately)**
Off-Peak Hours	11 p.m. - 7 a.m.	7 cents
Mid-Peak Hours	7 a.m. - 2 p.m. and 6 p.m. - 11 p.m.	14 cents
On-Peak Hours	2 p.m. - 6 p.m.	22 cents
Winter (October - May)		
Off-Peak Hours	11 p.m. - 7 a.m.	7 cents
On-Peak Hours	7 a.m. - 11 p.m.	13 cents

Plug-in Electric Vehicle Incentive Program
To help customers make the transition to using plug-in electric vehicles in Michigan, Consumers Energy is offering a limited incentive program for home charging stations.
Qualified customers who enroll in the program will be able to receive a reimbursement of up to $2,500 from Consumers Energy to help cover the purchase, installation and required home wiring of a level 2 charging station. Any cost or

expenses beyond $2,500 are the responsibility of the customer. This program is limited only to the first 2,500 participants.

http://www.consumersenergy.com/content.aspx?id=3363
http://www.consumersenergy.com/content.aspx?id=3367

8. Detroit Edison (DTE)

Link: DTE Plug-In Electric Vehicle Rates

Plug-In Electric Vehicle Rates
Save up to 40% off the regular residential rate when you enroll in this rate and charge your vehicle at night or on weekends. The Electric Vehicle Rate, D1.9, offers two rate options: Time of Use rate or Monthly Flat bill. The rate requires the installation of a separate meter* and a Level 2 Electric Vehicle charger.

PEV Rate Option 1
Time of Use (TOU) On-Peak**
9:00 a.m. - 11:00 p.m.
Monday to Friday
$0.18195 per kwh
Off-Peak**
11:00 p.m. - 9:00 a.m.
Monday to Friday & All Day Saturday and Sunday
$0.07695 per kwh

PEV Ration Option 2
Flat Monthly Bill
$40 a month per vehicle
Limited to 250 customers

DTE Energy will provide up to $2,500 for charging station, installation and separate meter wiring. Limited to first 2,500 customers that enroll by Dec. 2014.

CITY OF SOUTH HAVEN

Cost of Electric Energy from Indiana-Michigan Power Company (AEP)

2013

	ACTUAL				BILLING			COST					PJM Open Access Transmission Tariff							
Date	KW Demand	KVAR Demand	KVA	Power Factor	KW Demand	KVAR Demand	KWHRS	$ KW Demand	$ KWHR	$ Fuel Charge	$ Fuel Adjust	Actual Fuel True-up	Sch 1A $ KWHRS	$ Network	RTO Start-up $	Other	Credits	Total PJM	Total Cost	cts/ KWHR
Main	14,830	4,272	15,433	0.9609	14,830	4,272	6,741,714	$243,834.78	$64,857.99											
Welder	298	322	439	0.6792	298	322	102,884	$4,901.36	$989.78											
Phoenix	10,721	3,707	11,343	0.9451	10,721	3,707	4,734,771	$176,269.67	$45,550.39											
Welder	19	37	41	0.4645	19	37	14,096	$315.69	$135.61											
Jun-13	**25,868**	**8,337**	**27,178**	**0.9518**	**25,868**	**8,337**	**11,593,465**	**$425,321.49**	**$111,533.77**	**$174,493.25**	**$63,031.35**	**$51,836.92**	**$770.88**	**$54,110.29**	**$199.87**	**$8,339.01**	**($879.14)**	**$62,540.91**	**$888,757.69**	**7.666**
Main	13,029	3,332	13,448	0.9688	13,029	3,332	6,455,809	$183,239.86	$78,302.51											
Welder	382	403	555	0.6878	382	403	172,669	$5,366.82	$2,094.30											
Phoenix	9,812	3,161	10,308	0.9518	9,812	3,161	4,524,171	$137,988.94	$54,873.67											
Welder	19	44	48	0.4065	19	44	15,359	$272.84	$186.29											
May-13	**23,242**	**6,939**	**24,255**	**0.9582**	**23,242**	**6,939**	**11,168,009**	**$326,868.46**	**$135,456.78**	**$169,279.09**	**($846.54)**	**($20,309.17)**	**$742.59**	**$55,913.96**	**$206.53**	**$7,741.19**	**($905.80)**	**$63,698.47**	**$674,147.09**	**6.036**
Main	10,379	1,565	10,496	0.9888	10,379	1,565	6,014,325	$145,970.61	$72,947.75											
Welder	310	366	480	0.6455	310	366	144,533	$4,355.62	$1,753.04											
Phoenix	7,106	1,507	7,264	0.9782	7,106	1,507	4,059,293	$99,944.76	$49,235.16											
Welder	21	58	62	0.3419	21	58	15,181	$296.75	$184.13											
Apr-13	**17,816**	**3,497**	**18,156**	**0.9813**	**17,816**	**3,497**	**10,233,332**	**$250,567.74**	**$124,120.08**	**$155,111.73**	**$22,709.81**	**$22,668.66**	**$680.44**	**$54,110.29**	**$199.87**	**$7,727.55**	**($862.24)**	**$61,855.91**	**$637,033.93**	**6.225**
Main	11,123	1,244	11,192	0.9938	11,123	1,244	6,608,087	$156,434.29	$80,149.49											
Welder	391	357	529	0.7388	391	357	139,920	$5,500.43	$1,697.08											
Phoenix	7,222	917	7,280	0.9920	7,222	917	4,346,681	$101,570.63	$52,720.90											
Welder	22	51	55	0.3957	22	51	15,969	$306.60	$193.68											
Mar-13	**18,758**	**2,569**	**18,933**	**0.9908**	**18,758**	**2,569**	**11,110,656**	**$263,811.95**	**$134,761.15**	**$168,409.77**	**$19,466.98**	**$32,019.07**	**$738.78**	**$55,913.96**	**$206.53**	**$7,727.55**	**($865.41)**	**$63,721.41**	**$682,190.33**	**6.140**
Main	11,561	1,160	11,619	0.9950	11,561	1,160	6,250,121	$162,593.97	$75,807.72											
Welder	130	305	332	0.3914	130	305	137,266	$1,825.51	$1,664.90											
Phoenix	7,514	864	7,563	0.9935	7,514	864	4,148,351	$105,675.56	$50,315.35											
Welder	22	45	50	0.4456	22	45	14,696	$313.63	$178.25											
Feb-13	**19,227**	**2,374**	**19,373**	**0.9925**	**19,227**	**2,374**	**10,550,434**	**$270,408.67**	**$127,966.22**	**$159,918.21**	**$744.86**	**$9,033.45**	**$701.53**	**$50,502.94**	**$186.55**	**$7,727.55**	**($899.26)**	**$58,219.31**	**$626,290.72**	**5.936**
Main	7,956	1,231	8,051	0.9882	7,956	1,231	6,835,812	$111,896.42	$82,911.57											
Welder	24	351	352	0.0687	356	351	170,192	$5,006.78	$2,064.25											
Phoenix	11,518	926	11,555	0.9968	11,518	926	4,535,845	$161,990.98	$55,015.26											
Welder	356	46	359	0.9918	24	46	18,216	$340.35	$220.94											
Jan-13	**19,855**	**2,554**	**20,018**	**0.9918**	**19,855**	**2,554**	**11,560,064**	**$279,234.53**	**$140,212.02**	**$175,221.67**	**($11,764.68)**	**$18,342.99**	**$768.66**	**$55,913.96**	**$206.53**	**$7,727.55**	**($1,124.11)**	**$63,492.59**	**$664,739.12**	**5.750**
Year to Date 2013:							**66,215,961**												**$4,173,159**	**6.302**

	ACTUAL				BILLING			COST					PJM Open Access Transmission Tariff							
Date	KW Demand	KVAR Demand	KVA	Power Factor	KW Demand	KVAR Demand	KWHRS	$ KW Demand	$ KWHR	$ Fuel Charge	$ Fuel Adjust	Actual Fuel True-up	Sch 1A $ KWHRS	$ Network	RTO Start-up $	Other	Credits	Total PJM	Total Cost	cts/ KWHR
Main	11,992	1,726	12,116	0.9898	11,992	1,726	7,258,601	$175,538.81	$88,450.41											
Welder	309	328	451	0.6861	309	328	153,255	$4,526.07	$1,867.50											
Phoenix	7,708	874	7,757	0.9936	7,707	874	4,477,882	$112,822.34	$54,565.67											
Welder	38	62	73	0.5264	38	62	23,707	$559.17	$288.88											
Jan-12	**20,047**	**2,990**	**20,269**	**0.9891**	**20,047**	**2,990**	**11,913,444**	**$293,446.39**	**$145,172.46**	**$195,737.44**	**($1,504.66)**	**$18,840.08**	**$1,130.95**	**$81,705.56**	**$274.86**	**$7,764.31**	**($1,605.84)**	**$89,269.84**	**$740,961.55**	**6.220**
Main	11,246	1,489	11,344	0.9913	11,246	1,489	6,660,702	$164,619.02	$81,164.65											
Welder	356	420	550	0.6466	356	420	170,777	$5,208.20	$2,081.02											
Phoenix	7,083	787	7,127	0.9939	7,083	787	4,106,471	$103,685.35	$50,039.81											
Welder	10	30	31	0.3085	10	30	6,689	$140.52	$81.51											
Feb-12	**18,695**	**2,726**	**18,892**	**0.9895**	**18,695**	**2,726**	**10,944,640**	**$273,653.09**	**$133,367.00**	**$179,820.02**	**($35,803.12)**	**($36,698.09)**	**$1,038.98**	**$76,434.23**	**$257.13**	**$7,764.54**	**($1,303.19)**	**$84,191.69**	**$598,530.59**	**5.469**
Main	11,229	2,433	11,490	0.9773	11,229	2,433	6,659,854	$164,369.52	$81,154.32											
Welder	245	291	380	0.6442	245	291	180,979	$3,581.92	$2,205.34											
Phoenix	7,798	2,001	8,050	0.9686	7,798	2,001	4,202,080	$114,142.73	$51,204.86											
Welder	11	34	36	0.2995	11	34	7,398	$158.09	$90.15											
Mar-12	**19,282**	**4,759**	**19,861**	**0.9709**	**19,282**	**4,759**	**11,050,311**	**$282,252.26**	**$134,654.67**	**$181,556.19**	**($16,811.90)**	**$3,379.59**	**$1,049.01**	**$81,705.56**	**$274.86**	**$7,768.31**	**($1,217.13)**	**$89,580.61**	**$674,611.42**	**6.105**
Main	10,627	1,593	10,746	0.9890	10,627	1,593	6,305,565	$155,559.49	$76,837.09											
Welder	332	293	443	0.7501	332	293	147,837	$4,859.82	$1,801.48											
Phoenix	6,679	902	6,739	0.9910	6,679	902	3,935,313	$97,765.55	$47,954.14											
Welder	9	32	34	0.2802	9	32	7,231	$137.60	$88.11											
Apr-12	**17,647**	**2,820**	**17,871**	**0.9875**	**17,647**	**2,820**	**10,395,945**	**$258,322.45**	**$126,680.83**	**$170,804.99**	**($14,733.10)**	**$40,292.41**	**$986.89**	**$79,069.90**	**$265.99**	**$8,032.02**	**($1,177.43)**	**$87,177.37**	**$668,544.95**	**6.431**
Main	14,868	3,529	15,281	0.9730	14,868	3,529	6,982,457	$217,637.42	$85,085.43											
Welder	9	22	23	0.3633	9	22	161,210	$124.42	$1,964.44											
Phoenix	11,010	3,754	11,633	0.9465	11,010	3,754	4,593,576	$161,166.94	$55,975.48											
Welder	9	23	25	0.3638	9	23	7,021	$133.21	$85.56											
May-12	**25,896**	**7,328**	**26,913**	**0.9622**	**25,896**	**7,328**	**11,744,265**	**$379,061.99**	**$143,110.91**	**$192,957.82**	**$12,775.38**	**$48,832.40**	**$1,114.88**	**$81,705.56**	**$274.86**	**$7,731.13**	**($1,641.24)**	**$89,185.19**	**$865,923.69**	**7.373**
Main	16,941	5,210	17,724	0.9558	16,941	5,210	7,846,934	$238,261.81	$95,175.47											
Welder	295	108	314	0.9388	295	108	153,300	$4,148.88	$1,859.38											
Phoenix	12,351	4,745	13,231	0.9335	12,351	4,745	5,260,728	$173,700.24	$63,807.37											
Welder	9	24	25	0.3571	9	24	6,972	$127.98	$84.56											
Jun-12	**29,596**	**10,087**	**31,268**	**0.9465**	**29,596**	**10,087**	**13,267,935**	**$416,238.92**	**$160,926.78**	**$201,108.72**	**$48,449.19**	**($309,170.24)**	**$1,259.53**	**$79,069.90**	**$265.99**	**$9,839.06**	**($1,359.24)**	**$89,075.24**	**$606,628.61**	**4.572**
Main	20,496	6,532	21,512	0.9528	20,496	6,532	10,295,162	$288,255.60	$124,870.02											
Welder	8	22	23	0.3253	8	22	128,982	$105.48	$1,564.42											
Phoenix	15,340	6,482	16,653	0.9212	15,340	6,482	7,035,099	$215,745.84	$85,328.72											
Welder	9	19	21	0.4242	9	19	6,927	$125.17	$84.01											
Jul-12	**35,853**	**13,054**	**38,155**	**0.9396**	**35,853**	**13,054**	**17,466,170**	**$504,232.09**	**$211,847.17**	**$264,743.47**	**($19,193.57)**	**($40,623.32)**	**$1,161.37**	**$78,298.01**	**$274.86**	**$10,546.62**	**($1,585.43)**	**$88,695.43**	**$1,009,701.27**	**5.781**
Main	18,275	5,807	19,175	0.9530	18,275	5,807	8,491,292	$257,020.09	$102,990.88											
Welder	396	292	492	0.8050	396	292	177,889	$5,572.16	$2,157.62											
Phoenix	13,609	5,565	14,703	0.9256	13,609	5,565	5,682,143	$191,397.47	$68,918.72											
Welder	9	22	23	0.3831	9	22	7,129	$126.58	$86.46											
Aug-12	**32,289**	**11,686**	**34,339**	**0.9403**	**32,289**	**11,686**	**14,358,453**	**$454,116.29**	**$174,153.68**	**$217,638.25**	**($35,392.15)**	**($81,153.32)**	**$954.73**	**$78,298.01**	**$274.86**	**$11,047.37**	**($1,692.02)**	**$88,882.95**	**$818,245.70**	**5.699**
Main	14,899	4,209	15,482	0.9623	14,899	4,209	6,811,660	$209,539.40	$82,618.62											
Welder	168	282	328	0.5108	168	282	133,197	$2,355.72	$1,615.54											
Phoenix	10,722	3,804	11,377	0.9424	10,722	3,804	4,529,165	$150,796.94	$54,934.24											
Welder	9	28	30	0.3142	9	28	7,124	$132.20	$86.40											
Sep-12	**25,798**	**8,323**	**27,108**	**0.9517**	**25,798**	**8,323**	**11,481,145**	**$362,824.25**	**$139,254.81**	**$174,025.46**	**$9,809.49**	**$50,997.46**	**$763.41**	**$75,772.27**	**$265.99**	**$10,863.70**	**($1,487.44)**	**$86,177.93**	**$823,089.40**	**7.169**
Main	10,168	1,680	10,306	0.9866	10,168	1,680	6,194,885	$143,002.86	$75,137.76											
Welder	317	308	441	0.7173	317	308	134,487	$4,452.66	$1,631.19											
Phoenix	7,222	1,552	7,387	0.9777	7,222	1,552	4,209,479	$101,574.54	$51,056.77											
Welder	9	32	33	0.2720	9	32	7,059	$127.98	$85.62											
Oct-12	**17,716**	**3,572**	**18,072**	**0.9803**	**17,716**	**3,572**	**10,545,910**	**$249,158.05**	**$127,911.34**	**$159,849.63**	**($4,356.52)**	**$29,460.67**	**$701.23**	**$78,298.01**	**$274.86**	**$10,244.30**	**($1,395.97)**	**$88,122.43**	**$650,145.60**	**6.165**
Main	10,566	781	10,595	0.9973	10,566	781	6,216,737	$148,600.36	$75,402.80											
Welder	368	417	556	0.6616	368	417	126,491	$5,170.00	$1,534.20											
Phoenix	7,089	1,514	7,249	0.9780	7,089	1,514	4,108,928	$99,699.70	$49,837.19											
Welder	23	37	43	0.5233	23	37	14,002	$317.85	$169.83											
Nov-12	**18,045**	**2,748**	**18,253**	**0.9886**	**18,045**	**2,748**	**10,466,158**	**$253,787.90**	**$126,944.03**	**$158,640.78**	**($28,994.40)**	**($41,615.71)**	**$695.92**	**$75,772.27**	**$265.99**	**$9,303.79**	**($1,436.03)**	**$84,601.94**	**$553,364.54**	**5.287**
Main	10,705	1,261	10,779	0.9931	10,705	1,261	6,787,395	$150,555.96	$82,324.31											
Welder	377	415	560	0.6720	377	415	148,364	$5,295.10	$1,799.51											
Phoenix	7,343	655	7,372	0.9961	7,343	655	4,178,180	$103,277.02	$50,677.15											
Welder	23	50	55	0.4172	23	50	17,856	$323.47	$216.57											
Dec-12	**18,448**	**2,381**	**18,601**	**0.9918**	**18,448**	**2,381**	**11,131,795**	**$259,451.55**	**$135,017.54**	**$168,730.19**	**($8,247.55)**	**($3,456.95)**	**$740.18**	**$78,298.01**	**$274.86**	**$9,295.18**	**($1,651.61)**	**$86,956.62**	**$638,451.40**	**5.735**
Total for 2012:							**144,766,169**												**$8,648,199**	**5.974**

Roger Huff

From: Bill Conklin
Sent: Tuesday, July 16, 2013 11:51 AM
To: Roger Huff
Cc: Wendy Hochstedler
Subject: June I&M Electric Bill 2013
Attachments: 06-13 South Haven Invoice_WBI.pdf; AEP Electric Bill-All Charges 2013.xls; AEP Electric Bill-All Charges 2013.pdf

Roger,

I've reviewed the bill for June and recommend that it be paid. The rates have changed as follows:

	Demand	Energy
New	$16.442/kw	.96204 cents/ kWhr
Old	$14.064/kw	1.21290 cents/kWhr

Bill

CITY OF SOUTH HAVEN
WATER FUND
CuFt COMPARISONS
ROLLING TWELVE MONTHS

		GALLONS PUMPED TO MAINS	CuFt PUMPED TO MAINS	CuFt PLANT TAP UNBILLED	CuFt WATER QUALITY FLUSHING	CuFt BILLED	PERCENTAGE BILLED PLUS PLANT TAP TO PUMPED TO MAINS (ROLLING 12 MOS)	PERCENTAGE BILLED PLUS PLANT TAP TO PUMPED TO MAINS CURRENT MONTH
FISCAL 2011								
July	2010	71,789,000	9,597,460	76,067	26,738	7,160,179	89.90%	75.40%
August	2010	70,411,000	9,413,235	79,151	17,647	8,560,179	89.47%	91.78%
September	2010	53,052,000	7,092,513	82,706	246,830	7,497,785	88.65%	106.88%
October	2010	40,104,000	5,361,497	75,128	213,904	5,242,069	87.99%	99.17%
November	2010	30,513,000	4,079,278	82,706	213,904	3,856,631	88.94%	96.57%
December	2010	34,709,000	4,640,241	76,248	213,904	3,452,281	88.54%	76.04%
January	2011	32,649,000	4,364,840	70,210	213,904	3,232,165	88.34%	75.66%
February	2011	33,847,000	4,525,000	66,376	213,904	3,209,045	87.74%	72.38%
March	2011	35,054,000	4,686,364	74,020	213,904	3,124,071	87.00%	68.24%
April	2011	30,789,000	4,116,176	76,855	213,904	2,952,560	87.03%	73.60%
May	2011	42,942,000	5,740,909	54,069	202,504	3,571,271	86.49%	62.21%
June	2011	54,884,000	7,337,433	77,139	119,736	5,758,969	85.43%	78.49%
		530,743,000	70,954,947	890,676	2,110,782	57,617,205		
FISCAL 2012								
July	2011	68,313,000	9,132,754	0	190,312	7,441,256	85.55%	81.48%
August	2011	59,907,000	8,008,957	103,610	244,928	7,402,180	84.90%	93.72%
September	2011	50,823,000	6,794,519	19,658	231,936	6,658,175	85.02%	98.28%
October	2011	38,457,000	5,141,310	23,888	231,936	4,862,072	85.07%	95.03%
November	2011	30,875,000	4,127,674	4,273	231,936	3,573,435	85.44%	86.68%
December	2011	30,441,000	4,069,652	17,174	231,936	3,191,493	85.57%	78.84%
January	2012	32,467,000	4,340,508	14,319	68,972	3,074,589	85.44%	71.16%
February	2012	29,495,000	3,943,182	23,262	68,972	3,219,167	85.84%	82.23%
March	2012	30,150,000	4,030,749	38,320	65,764	3,450,952	86.13%	86.57%
April	2012	32,927,000	4,402,005	31,678	68,972	3,378,738	86.74%	77.47%
May	2012	50,646,000	6,770,856	37,087	78,956	4,537,251	86.12%	67.01%
June	2012	72,150,000	9,645,722	41,402	144,360	6,461,594	84.46%	66.99%
		526,651,000	70,407,888	354,672	1,858,980	57,250,902		
FISCAL 2013								
July	2012	97,223,000	12,997,727	42,043	149,172	9,601,173	81.95%	74.19%
August	2012	73,095,000	9,772,059	40,244	227,566	10,549,444	83.36%	108.37%
September	2012	51,928,000	6,942,246	36,348	218,946	7,875,634	84.80%	113.97%
October	2012	37,774,000	5,050,000	27,350	259,447	4,949,605	85.50%	98.55%
November	2012	28,082,000	3,754,278	16,894	255,838	3,275,439	86.15%	87.70%
December	2012	27,941,000	3,735,428	34,835	160,400	3,150,827	86.30%	85.28%
January	2013	29,090,000	3,889,037	35,639	83,007	3,204,712	86.22%	83.32%
February	2013	27,257,000	3,643,984	25,791	72,180	3,368,685	86.69%	93.15%
March	2013	28,716,000	3,839,037	30,416	75,789	2,955,708	87.40%	77.78%
April	2013	27,256,000	3,643,850	38,784	79,398	3,120,869	88.84%	86.71%
May	2013	44,617,270	5,964,876	52,314	342,855	3,962,497	88.14%	66.43%
June	2013	52,158,000	6,972,995	57,485	312,780	5,366,701	91.24%	76.96%
		525,137,270	70,205,517	438,141	2,237,378	61,381,294		
Prior Year-to-Date		526,651,000	70,407,888	354,672	1,858,980	57,250,902		
Two Years Prior		530,743,000	70,954,947	890,676	2,110,782	57,617,205		

City of South Haven
Water Fund - Fund 591
For the period ended June 30, 2013

Col 6 & 11

Revenues:	*Month Actual*	*Monthly Budget*	*Prior year MTD*	*MTD Variance to Budget*	*MTD Variance to Prior Year*	*YTD Actual*	*YTD Budget*	*Prior YTD Actual*	*Variance to Budget*	*Variance to Prior Year*	*2012-13 Amended Budget*	*% of Annual Budget*
Sales	$ 179,614	$ 169,533	$ 228,024	$ 10,081	$ (48,410)	$ 2,044,254	$ 2,034,395	$ 1,765,021	$ 9,859	$ 279,233	$ 2,034,395	100%
Debt Service Charges	$ 120,014	$ 122,607	$ 192,194	$ (2,593)	$ (72,180)	$ 1,448,166	$ 1,471,279	$ 1,232,560	$ (23,113)	$ 215,607	$ 1,471,279	98%
Charges for Service	-	7,625	72,190	(7,625)	(72,190)	60,391	91,500	121,229	(31,109)	(60,839)	91,500	66%
Interest Income	6	208	231	(203)	(226)	1,098	2,500	2,077	(1,402)	(980)	2,500	44%
Special Assessment Revenue	38,571	1,154	-	37,417	38,571	59,437	13,844	20,601	45,593	38,836	13,844	429%
Other Revenue	2,665	3,917	3,443	(1,252)	(779)	45,403	47,000	38,609	(1,597)	6,794	47,000	97%
Total Revenues	$ 340,869	$ 305,043	$ 496,083	$ 35,826	$ (155,214)	$ 3,658,748	$ 3,660,518	$ 3,180,097	$ (1,770)	$ 478,651	$ 3,660,518	

	1	2	3	4	5	6	7	8	9	10	11	
Expenses:	*Month Actual*	*Monthly Budget*	*Prior year MTD*	*MTD Variance to Budget*	*MTD Variance to Prior Year*	*YTD Actual*	*YTD Budget*	*Prior YTD Actual*	*Variance to Budget*	*Variance to Prior Year*	*2012-13 Amended Budget*	*% of Annual Budget*
Operating Expenses	$ 139,829	$ 118,641	$ 126,710	$ 21,188	$ 13,119	$ 1,222,672	$ 1,423,690	$ 1,193,586	$ (201,018)	$ 29,086	$ 1,423,690	86%
Property Tax Equivalents	7,103	7,103	7,103	0	-	85,238	85,238	85,238	-	-	85,238	100%
Capital Outlay	28,941	23,417	7,244	5,524	21,697	231,159	281,000	48,121	(49,841)	183,038	281,000	82%
Debt Service	-	117,291	-	(117,291)	-	1,407,007	1,407,486	1,318,003	(479)	89,003	1,407,486	100%
Transfers Out	-	2,917	-	(2,917)	-	29,181	35,000	44,882	(5,819)	(15,700)	35,000	83%
Depreciation	47,917	47,917	16,307	-	31,610	575,000	575,000	195,684	-	379,316	575,000	100%
Administrative Expenses	17,296	17,421	15,106	(125)	2,190	209,300	209,056	206,058	244	3,242	209,056	100%
Total Expenses	$ 241,086	$ 334,706	$ 172,470	$ (93,620)	$ 68,616	$ 3,759,557	$ 4,016,470	$ 3,091,572	$ (256,913)	$ 667,984	$ 4,016,470	
						0						
Net Fund Change	$ 99,783	$ (29,663)	$ 323,613	$ 129,446	$ (223,830)	$ (100,809)	$ (355,952)	$ 88,524	$ 255,143	$ (189,333)	$ (355,952)	

Special Assessment Revenue includes 100% of Kalamazoo St. - Phase 1 assessments recognized when project completed, $47,084 plus current year interest of $12,352
Capital Outlay for FY 13 includes $231,159 which includes $26,000 BSA software upgrade, $4,399 equipment and Kalamazoo St. Phase 1 balance of $200,760

City of South Haven
Sewer Fund - Fund 592
For the period ended June 30, 2013

Col 6 & 11

Revenues:	*Month Actual*	*Monthly Budget*	*Prior year MTD*	*MTD Variance to Budget*	*MTD Variance to Prior Year*	*YTD Actual*	*YTD Budget*	*Prior YTD Actual*	*Variance to Budget*	*Variance to Prior Year*	*2012-13 Amended Budget*	*% of Annual Budget*
Sales	$ 175,557	$ 181,731	$ 259,379	$ (6,173)	$ (83,822)	$ 2,027,086	$ 2,180,766	$ 2,094,234	$ (153,680)	$ (67,148)	$ 2,180,766	93%
IPP Revenues	12,943	8,402	1,509	4,541	11,435	85,638	100,824	80,372	(15,186)	5,266	100,824	85%
Interest Income	15	625	1,712	(610)	(1,697)	2,335	7,500	5,808	(5,165)	(3,473)	7,500	31%
Special Assessment Revenue	22,991	1,423	-	21,569	22,991	41,798	17,071	34,985	24,727	6,813	17,071	245%
Grant Revenue	-	22,500	-	(22,500)	-	268,849	270,000	88,378	(1,151)	180,471	270,000	100%
Other Revenue	515	292	311	223	204	2,615	3,500	3,765	(885)	(1,150)	3,500	75%
Total Revenues	$ 212,021	$ 214,972	$ 262,910	$ (2,951)	$ (50,889)	$ 2,428,321	$ 2,579,661	$ 2,307,541	$ (151,340)	$ 120,780	$ 2,579,661	

	1	2	3	4	5	6	7	8	9	10	11	
Expenses	*Month Actual*	*Monthly Budget*	*Prior year MTD*	*MTD Variance to Budget*	*MTD Variance to Prior Year*	*0* *YTD Actual*	*YTD Budget*	*Prior YTD Actual*	*Variance to Budget*	*Variance to Prior Year*	*2012-13 Amended Budget*	*% of Annual Budget*
Operating Expenses	$ 131,487	$ 113,267	$ 137,788	$ 18,220	$ (6,301)	$ 1,210,912	$ 1,359,204	$ 1,068,878	$ (148,292)	$ 142,034	$ 1,359,204	89%
Grant Expense-SSES	15,625	21,996	53,167	(6,371)	(37,542)	279,916	263,957	151,364	15,959	128,552	263,957	106%
Property Tax Equivalents	7,317	7,317	7,317	0	-	87,800	87,800	87,800	-	-	87,800	100%
Capital Outlay	25,126	25,383	-	(258)	25,126	276,575	304,600	79,025	(28,025)	197,550	304,600	91%
Transfers Out	-	20,542	150,074	(20,542)	(150,074)	241,732	246,500	269,210	(4,768)	(27,478)	246,500	98%
Depreciation	22,083	22,083	20,379	-	1,705	265,000	265,000	244,545	-	20,455	265,000	100%
Administrative Expenses	25,935	25,460	22,280	475	3,655	299,802	305,522	291,239	(5,720)	8,563	305,522	98%
Total Expenses	$ 227,573	$ 236,049	$ 391,004	$ (8,476)	$ (163,431)	$ 2,661,738	$ 2,832,583	$ 2,192,062	$ (170,845)	$ 469,676	$ 2,832,583	

Net Fund Change	$ (15,552)	$ (21,077)	$ (128,093)	$ 5,525	$ 112,542	$ (233,417)	$ (252,922)	$ 115,480	$ 19,505	$ (348,896)	$ (252,922)	

Special Assessment Revenue includes 100% of Kalamazoo St. - Phase 1 assessments recognized when project completed, $27,330 plus current year interest of $14,468

Capital Outlay for FY 13 totals $281,134 which includes $25,887 BSA software upgrade, $13,255 equipment and Kalamazoo St. Phase 1 balance of $241,992

CITY OF SOUTH HAVEN
ELECTRIC FUND
KWH COMPARISONS
ROLLING TWELVE MONTHS

		KWH PURCHASED	KWH BILLED	KWH STREET LTS	STREET LTS 12 MO AVE.	TOTAL KWH BILLED AND STREET LTS	PERCENTAGE BILLED AND STREET LTS TO PURCHASED (ROLLING 12 MOS)	PERCENTAGE BILLED AND STREET LTS TO PURCHASED CURRENT MONTH
FISCAL 2011								
July	2010	16,257,328	13,438,394	37,192	49,323	13,475,586	92.44%	82.89%
August	2010	15,694,344	14,821,889	41,506	49,424	14,863,395	93.19%	94.71%
September	2010	11,066,633	12,074,098	47,613	49,507	12,121,711	93.30%	109.53%
October	2010	10,969,854	10,132,196	54,196	49,608	10,186,392	93.13%	92.86%
November	2010	10,510,315	10,391,582	61,923	50,014	10,453,505	93.96%	99.46%
December	2010	10,683,209	10,002,716	67,037	50,217	10,069,753	94.60%	94.26%
January	2011	11,953,507	11,068,303	64,924	50,660	11,133,227	94.10%	93.14%
February	2011	10,550,180	11,250,292	61,029	51,221	11,311,321	94.78%	107.21%
March	2011	11,124,090	9,519,380	57,044	51,539	9,576,424	94.28%	86.09%
April	2011	10,242,312	10,338,916	48,737	51,775	10,387,653	94.20%	101.42%
May	2011	11,028,132	9,957,130	44,762	51,986	10,001,892	94.81%	90.69%
June	2011	12,229,714	12,173,212	38,326	52,024	12,211,538	95.42%	99.85%
		142,309,618	135,168,108	624,289		135,792,397		
FISCAL 2012								
July	2011	15,964,582	12,755,514	37,013	52,009	12,792,527	95.31%	80.13%
August	2011	14,632,086	15,136,722	42,500	52,092	15,179,222	95.19%	103.74%
September	2011	11,307,801	12,319,850	47,553	52,087	12,367,403	95.87%	109.37%
October	2011	10,969,854	9,722,952	56,849	52,308	9,779,801	95.46%	89.15%
November	2011	10,739,972	10,221,480	61,585	52,280	10,283,065	95.52%	95.75%
December	2011	11,617,747	9,798,051	68,085	52,367	9,866,136	95.17%	84.92%
January	2012	11,913,417	11,146,773	65,812	52,441	11,212,585	94.66%	94.12%
February	2012	10,944,615	10,940,177	58,568	52,236	10,998,745	95.24%	100.49%
March	2012	11,050,285	10,825,582	58,568	52,363	10,884,150	95.14%	98.50%
April	2012	10,395,921	10,227,215	47,347	52,247	10,274,562	95.46%	98.83%
May	2012	11,744,237	10,681,872	44,415	52,218	10,726,287	95.09%	91.33%
June	2012	13,267,935	10,895,095	38,072	52,197	10,933,167	93.60%	82.40%
		144,548,453	134,671,283	626,367		135,297,650		
FISCAL 2013								
July	2012	17,466,170	14,702,549	38,276	52,303	14,740,825	93.26%	84.40%
August	2012	14,358,453	15,845,089	43,385	52,376	15,888,474	93.50%	110.66%
September	2012	11,481,145	12,211,557	48,595	52,463	12,260,152	94.22%	106.79%
October	2012	10,545,910	9,741,443	54,699	52,284	9,796,142	94.11%	92.89%
November	2012	10,466,158	10,312,656	61,617	52,287	10,374,273	94.68%	99.12%
December	2012	11,131,795	9,798,623	69,065	52,368	9,867,688	94.46%	88.64%
January	2013	11,560,064	10,621,867	68,768	52,615	10,690,635	94.14%	92.48%
February	2013	10,550,434	10,544,686	59,658	52,705	10,604,344	94.21%	100.51%
March	2013	11,110,656	10,170,132	53,004	52,242	10,223,136	93.95%	92.01%
April	2013	10,233,332	9,906,424	48,201	52,313	9,954,625	94.19%	97.28%
May	2013	11,168,009	10,537,176	44,120	52,288	10,581,296	94.78%	94.75%
June	2013	11,593,465	10,064,318	37,708	52,258	10,102,026	95.35%	87.14%
		141,665,592	134,456,520	627,096		135,083,616		
Prior Year-to-date		144,548,453	134,671,283	626,367		135,297,650		
Two Years Prior		142,309,618	135,168,108	624,289		135,792,397		

City of South Haven
Electric Fund - Fund 582
For the period ended June 30, 2013

Col 6 & 11

Revenues:	*Month Actual*	*Monthly Budget*	*Prior year MTD*	*MTD Variance to Budget*	*MTD Variance to Prior Year*	*YTD Actual*	*YTD Budget*	*Prior YTD Actual*	*Variance to Budget*	*Variance to Prior Year*	*2012-13 Amended Budget*	*% of Annual Budget*
Electric Sales	$ 1,130,406	$ 1,227,993	$ 1,262,067	$ (97,586)	$ (131,660)	$ 14,400,321	$ 14,735,913	$ 13,640,040	$ (335,592)	$ 760,281	$ 14,735,913	98%
Charges for Service	$ -	$ 27,083	$ 22,267	$ (27,083)	$ (22,267)	$ 229,407	$ 325,000	$ 181,140	$ (95,593)	$ 48,267	$ 325,000	71%
Interest Income	$ 5,947	$ 4,167	$ 3,846	$ 1,780	$ 2,101	$ 40,092	$ 50,000	$ 47,170	$ (9,908)	$ (7,079)	$ 50,000	80%
Other Revenue	$ (1,396)	$ 4,583	$ (10,672)	$ (5,979)	$ 9,276	$ 42,313	$ 55,000	$ 32,331	$ (12,687)	$ 9,982	$ 55,000	77%
Transfers In	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Total Revenues	$ 1,134,957	$ 1,263,826	$ 1,277,508	$ (128,869)	$ (142,550)	$ 14,712,133	$ 15,165,913	$ 13,900,681	$ (453,780)	$ 811,452	$ 15,165,913	

	1	2	3	4	5	6	7	8	9	10	11	
Expenses	*Month Actual*	*Monthly Budget*	*Prior year MTD*	*MTD Variance to Budget*	*MTD Variance to Prior Year*	*YTD Actual*	*YTD Budget*	*Prior YTD Actual*	*Variance to Budget*	*Variance to Prior Year*	*2012-13 Amended Budget*	*% of Annual Budget*
Purchased Power	$ 888,758	$ 729,167	$ 606,629	$ 159,591	$ 282,129	$ 8,666,157	$ 8,750,000	$ 9,086,858	$ (83,843)	$ (420,701)	$ 8,750,000	99%
Other Operating Expenses	$ 183,617	$ 152,505	$ (188,392)	$ 31,112	$ 372,008	$ 1,786,827	$ 1,830,056	$ 1,569,701	$ (43,229)	$ 217,126	$ 1,830,056	98%
Property Tax Equivalents	$ 54,821	$ 54,821	$ 52,312	$ -	$ 2,508	$ 657,849	$ 657,849	$ 627,748	$ -	$ 30,101	$ 657,849	100%
Energy Optimization Costs	$ 21,917	$ 21,738	$ 21,684	$ 179	$ 233	$ 242,983	$ 260,854	$ 213,057	$ (17,871)	$ 29,926	$ 260,854	93%
Capital Outlay	$ 6,501	$ 27,000	$ 530,480	$ (20,499)	$ (523,979)	$ 162,769	$ 324,000	$ 167,558	$ (161,231)	$ (4,789)	$ 324,000	50%
Transfer Out	$ -	$ -	$ 13,688	$ -	$ (13,688)	$ 167,018	$ 167,018	$ 167,456	$ -	$ (438)	$ 167,018	100%
Depreciation	$ 40,500	$ 40,500	$ 39,510	$ -	$ 990	$ 486,000	$ 486,000	$ 474,124	$ -	$ 11,876	$ 486,000	100%
Administrative Expenses	$ 61,613	$ 57,969	$ 52,557	$ 3,644	$ 9,056	$ 680,503	$ 695,627	$ 660,015	$ (15,124)	$ 20,488	$ 695,627	98%
Total Expenses	$ 1,257,726	$ 1,083,699	$ 1,128,468	$ 174,027	$ 129,258	$ 12,850,106	$ 13,171,404	$ 12,966,518	$ (321,298)	$ (116,412)	$ 13,171,404	

Net Fund Change	$ (122,769)	$ 180,127	$ 149,040	$ (302,896)	$ (271,808)	**$ 1,862,027**	$ 1,994,509	$ 934,163	$ (132,482)	$ 927,864	$ 1,994,509	

Other Operating Expenses for FY 13 includes Tree Work of $181,663 vs. FY 12 at $79,471.

Capital Outlay for FY 13 totals $162,769 which includes Blue Star Line Build $64,150, Power Analyzer $6,501, BSA software upgrade $25,888, Meijer Project $66,230

City of South Haven

City Hall • 539 Phoenix Street • South Haven, Michigan 49090-1499
Telephone (269) 637-0700 • Fax (269) 637-5319

July 22, 2013

TO: Board of Public Utilities Members

FROM: Wendy Hochstedler, Finance Director

SUBJECT: Utility Financials

Last month's financial reports were pulled from the agenda due to a suspicion that revenue may be overstated. A problem was identified while preparing for audit that determined that the November, 2012 billings in the old system and the new system were both posted to revenues and accounts receivable. To insure that none of the other billing cycles were doubled up, all twelve months of postings to the General Ledger were compared to the monthly billing registers. The problem was isolated to the month of November, which was when the conversion to the new financial software occurred. The appropriate adjustment for the month of November has been made and the June revenue and expenditure reports reflect the correct activity for the Fiscal Year 2013.

Please note that these financials are unaudited and there will be changes made during the audit for interest receivable, accrued payroll & related liabilities, etc., and the capitalization of assets that are now included in expense.

Thank you for your patience.

ABONMARCHE
Confidence By Design

Engineering
Architecture
Land Surveying
Marina/Waterfront
Community Planning
Landscape Architecture
Development Services

MEMORANDUM

DATE: July 22, 2013

TO: Brian Dissette, City of South Haven
Roger Huff, City of South Haven
Amanda Morgan, City of South Haven

FROM: Christopher J. Cook, PE

CC: Cindy Clendenon, MDEQ
Marcus Tironi, MDEQ
Timothy R. Drews, P.E., PTOE, Abonmarche
Tony McGhee, Abonmarche
Daniel A. Dombos, PE, Abonmarche

RE: City of South Haven – Sewer Study Progress Report

The following will summarize our progress to-date on the City of South Haven Sewer Study:

UTILITY MAPPING

We have completed this work. This task entailed compiling City record drawings, maps and field data into a comprehensive sanitary sewer system map. We added data fields such as reference drawing; installation/rehabilitation date; and length, material and slope of pipe. We converted city GIS information into AutoCAD for presentation, modeling, field investigation and study purposes.

FIELD INVESTIGATION AND DATA REVIEW

We have completed field work on the sewer lines to determine the size and slope of key runs and mapping that information for the modeling effort. We completed further investigation of the sewers in the Peterson Ravine Interceptor upstream of Clinton Street to the city limits. A significant portion of the I/I appears to be coming from the Peterson Ravine interceptor and this is the basis for additional metering along the interceptor and its tributaries. An amendment to the S2 Grant was awarded to complete this work.

COMPUTER MODELING AND FLOW MONITORING

Computer modeling, using calibration methods to adjust and fine tune the model will ensure that the results closely match actual flows observed during metering. The results will be used to predict the system response during certain large scale wet weather events (25 year, 24 hour storm). Meters have been reset and have been measuring both dry weather and wet weather flows since June. After additional metering is completed the model will be recalibrated and re-run. That will be in the fall of 2013.

SMOKE TESTING

We completed smoke testing of several key areas in the south-central portion of the City in June 2012 and presented the results to the BPU at that time. With the recent reaction of the Kalamazoo St., Main and other Lift Stations to the recent rains we are proposing to complete additional smoke testing in the LS tributary areas to further identify connection points for Inflow. Generally, the west central portion of the city will be smoke tested. This was also part of the S2 amendment approval for completion this fall.

SEWER TELEVISING

This work has been completed. We have reviewed the results and prepared a summary of the findings for inclusion in the SRF Project Plan.

SRF PROJECT PLAN

We are roughly 70% complete with this task with the remaining work expected to be completed following the additional metering/modeling. It is expected that the final plan will be submitted to DEQ in the spring of 2014.

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

July 5, 2013

Mr. Brian Dissette, City Manager
City of South Haven
539 Phoenix Street
South Haven, Michigan 49090

Dear Mr. Dissette:

SUBJECT: Notice of Grant Application Approval
City of South Haven
Project Plan Development with SSES (Continuation of 9133-01 Scope)
Grant Project Number 9133-02

The Michigan Department of Environmental Quality (DEQ), pursuant to Parts 52 and 53, Clean Water Assistance, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), has reviewed your S2 Grant Application received on June 18, 2013, and determined that the application was administratively complete effective as of June 19, 2013. The DEQ certifies that the City of South Haven is eligible to receive grant assistance as provided by Part 5204a(3), of the NREPA and hereby approves the application. Exhibit A, attached, identifies the DEQ approved grant amount along with the approved project scope, budget items with approved project costs, effective grant period (start/end dates), and ineligible services if any.

By copy of this letter, we are requesting the Michigan Finance Authority (MFA), who will also receive a copy of your S2 Grant Application, to prepare a grant agreement for the amount stated in the attached exhibit for signature under the provisions set forth in Part 5204a(3), of the NREPA.

You may anticipate grant award in October 2013. Should you have any questions about this project, please contact the project manager, Ms. Cindy Clendenon, by phone at 517-241-3444, e-mail at ClendenonC@michigan.gov, or by mail at DEQ, P.O. Box 30241, Lansing, Michigan 48909-7741, or you may contact me.

Sincerely,

Sonya T. Butler

Sonya T. Butler, Chief
Revolving Loan Section
Office of Drinking Water and Municipal Assistance
517-373-2161

Attachment
cc/att: Mr. Joe Fielek, Executive Director, MFA (w/copy of seven-page S2 Grant Application)
cc: Mr. Chris Cook, Abonmarche Group, Benton Harbor
Mr. Alan J. Lambert, Assistant Attorney General, Office of Attorney General
Mr. Marcus Tironi, DEQ-Water Resources Division, Kalamazoo District Office
Ms. Cindy Clendenon and Ms. Debbie Martinson, DEQ-ODWMA

S2 Grant Program

Exhibit A

Grantee: City of South Haven

Project Name: Project Plan Development with SSES (Continuation of 9133-01 Scope)

DEQ Approved Grant Amount: $125,100 (One Hundred Twenty-five Thousand One Hundred Dollars)

Time Period for Eligible Costs: Start Date December 2010

End Date September 2014

Description of Approved Project Scope:

Preparation of a State Revolving Fund Project Plan, including a Sewer System Evaluation Survey.

DEQ Approved Project Costs	
1. Planning Costs	$139,000
2. Revenue System Development Costs	$0
3. Design Engineering Costs	$0
4. Eligible Cost Subtotal	$139,000
5. LESS (≥10%) Local Match	$13,900
6. Approved S2 Grant Amount (Line 4 minus Line 5)	$125,100

PRESS RELEASE

City of South Haven
539 Phoenix Street, South Haven, MI 49090
Fax: 269-637-5319
Web: www.south-haven.com

City of South Haven

Local Media DATE: July 18, 2013

MDEQ APPROVES ADDITIONAL FUNDS FOR S2 GRANT PROGRAM

FOR IMMEDIATE RELEASE – (South Haven, Michigan) The City of South Haven has been notified by the Michigan Department of Environmental Quality that it has approved additional funds in the amount of $125,100 for planning costs associated with the Indian Grove Infrastructure Improvement Project and the Sewer System Evaluation Survey (SSES) with the City match amount of $13,900. The City was initially awarded a grant in the amount of $360,000, with the City of South Haven providing a local match of $40,000, bringing a total of $485,000 in grant funding for the design and engineering work of the project.

The SSES is part of an overall plan to address infrastructure deficiencies that exist within the southwesterly portion of the City commonly referred to as the “Indian Grove Area.”

Further explanation of the Indian Grove Infrastructure Improvement Project emphasizes the importance of the S2 grant award. Specifically, the City of South Haven Engineering Staff developed a conceptual design of the area which provides improved sanitary sewer, water, and storm sewer services, and improved roadways to properties in the area. The conceptual design assists in developing ways to improve pumping capacity of the Indian Grove pump station in order to reduce sanitary sewer overflows which have occurred in area residential basements; identifies roadways and other utilities within the project area that should be reconstructed; and calls for full or partial reconstruction of areas of Monroe Boulevard, Lovejoy, and Kalamazoo Streets.

The S2 grants provide reimbursement to local municipalities for up to 90% of eligible costs associated with planning, design, and user charge system development for potential State Revolving Fund (SRF) and Strategic Water Quality Initiatives Fund (SWQIF) applicants.

For more information, contact Brian Dissette, City Manager, City of South Haven, bdissette@south-haven.com or 269-637-0750.

----------END ----------

City of South Haven

Agenda Item # 9

Unresolved Issues

New items shown in **bold** text.

Completed items shown with single ~~strikethrough~~ text for one meeting, then double ~~strikethrough~~ text for the next meeting, then removed from the list.

ACTION ITEMS

- 6/2/10 – Security light costs (material, labor, O & M). File located, under review.
- 5/23/11 – Welder transformer. Addressed under agenda item 11 at the July meeting. GRP Engineering has been requested to perform an analysis of the cost of the "no load losses" associated with these transformers, and to evaluate alternatives. City staff has compiled data and forwarded to GRP. GRP is proceeding with the analysis.
- 2/27/12 – October 31, 2011 meeting requested staff pursue possible contract language change not limiting liability to the amount of the contractor's insurance; and remove statement that the contractor is not liable for making sure the sub-contractors do the work properly.
- 3/26/12 – Stickland requested that staff provide the utility policy concerning tampering fees for review at the next meeting. Addressed under agenda item 15 at the April 30, 2012 meeting. MMEA was contacted requesting their assistance in contacting fellow members for their policies regarding meter tampering, disconnection or tampering with service feeders/pipes, theft of service, and unsealed meter showing consumption. No response has been received from MMEA. City staff is contacting fellow IMMDA members plus Holland, Lowell, and Coldwater. Policies have been received from Bluffton, IN; Coldwater, MI; Holland BPW; Lowell Light & Power; Niles, MI; Sturgis, MI; Zeeland BPW. These policies will be compiled and summarized and distributed to staff and the BPU for review and comment.
- 4/30/12 – As a result of the tamper fee discussion with a resident, staff was requested to compile a list of electrical and plumbing contractors licensed to work in South Haven for the purpose of sending notification letters concerning the tamper policy. City staff contacted the State of Michigan and Michigan Township services, but they could not provide specific information. City of South Haven Building Services has a bulletin board available for posting notices. Suggestion was made to add it to the building permit form or instructions. Start with the City and then work with the townships.

- ~~2/26/13 – Burr requested that tree trimming be added to the report as an ongoing issue. Huff will add Burr to the distribution of the 515 Report which includes the Arborist weekly tree report.~~

City of South Haven, MI

Electric Outage Report
2nd Quarter 2013

South Haven Electric Distribution System **MONTHLY OUTAGE REPORT** **April 2013**

General Information				Cause		Time & Duration				Customers	
#	Date	S/U	Address/Location	Description	#	Ints	T off	T on	Mins	# Out	Cust Min
1	4/4/2013	U	20777 Lakeshore Dr	Bad Connection	10	1	4/14/13 10:50 AM	4/14/13 1:10 PM	140	1	140
2	4/10/2013	U	10844 66th St	Fuse - Squirrel	4	1	4/10/13 6:05 AM	4/10/13 7:00 AM	55	3	165
3	4/14/2013	U	315 Elkenburg St	Bad Connection	10	1	4/14/13 11:15 AM	4/14/13 1:40 PM	145	3	435
4	4/15/2013	U	659 Phillips St	Bad Connection	10	1	4/15/13 2:50 PM	4/15/13 3:55 PM	65	1	65
5	4/16/2013	U	1020 6th Ave #215	Bad Connection	10	1	4/16/13 12:00 AM	4/16/13 12:00 AM	0	1	0
6	4/17/2013	U	11230 Park Meadows Dr	Bad Connection	10	1	4/17/13 3:05 PM	4/17/13 4:10 PM	65	1	65
7	4/18/2013	U	728 Willow St	Bad Connection	10	1	4/18/13 8:12 PM	4/18/13 10:05 PM	113	1	113
8	4/19/2013	U	20388 72nd St	Bad Connection	10	1	4/19/13 12:00 AM	4/19/13 12:00 AM	0	1	0
9	4/26/2013	U	314 Indiana Ave	Bad Connection	10	1	4/26/13 3:45 PM	4/26/13 5:10 PM	85	1	85
10	4/27/2013	U	401 Walnut St	Down Service - Tree limb	5	1	4/27/13 1:30 PM	4/27/13 4:15 PM	165	1	165

S/U - Scheduled or Unscheduled
Ints - # of Interruptions
Long - >1 min; Short - <1 min
Cause # - see table on page 3

Total Customers this Month	**8,116**	**Days of Month**
Total Customer Minutes this Month	350,611,200	**30**

Outage Totals

		This Month	This Month Last Year
Unscheduled Outages			
Long	# Outages	8	38
	# Customers Out	12	2858
	# Minutes Out	833	5785
	# Customer Minutes Out	1,233	204875
	# Within City System	8	38
	# Supply to City Minutes	0	0
Short	# Outages (Blinks)	2	0
	# Customers Affected	2	0
	# Within City System	2	0
	# Supply to City Minutes	0	0
Scheduled Outages			
Long	# Outages	0	0
	# Customers Out	0	0
	# Minutes Out	0	0
	# Customer Minutes Out	0	0
	# Within City System	0	0
	# Supply to City Minutes	0	0
Short	# Outages (Blinks)	0	0
	# Customers Affected	0	0
	# Within City System	0	0
	# Supply to City Minutes	0	0
Totals			
Total Long Outages		8	38
Total Short Outages (Blinks)		2	0
Total Customers Out (Long)		12	2858
Total Customers Affected (Short- Blinks)		2	0
Total Customer Minutes Out		1,233	204875
Total Outages Within City System		8	38
Total Outages in Supply to City		0	0

Number of Outages (by Cause)

Cause #	Description	Total This Month	This Month Last Year	Rolling AT	% AT
0	Electric Supply Disruption to City	0	0	0	0%
1	Fallen Line / Rotted Pole	0	0	8	2%
2	Bad U/G Cable	0	3	14	4%
3	Lightning	0	1	3	1%
4	Animal Contact	1	6	59	18%
5	Tree Contact	1	11	103	32%
6	Contamination / Foreign Debris	0	0	0	0%
7	Human	0	2	7	2%
8	Other	0	0	2	1%
9	Undetermined	0	0	0	0%
10	Failed Device	8	15	126	39%
	Total	10	38	322	

AT - Annual 12 Month Total

12 Month Outage Statistics

Index	As of This Month	As of This Month Last Year
ASAI (%)	99.9480	99.9516
CAIDI (Long) (min)	302.01	185.59
SAIDI (Long) (min)	22.78	21.25
SAIFI (Long) (ints/tot cust)	0.08	0.11
SAIFI (Short) (ints/tot cust)	0.00	0.00

ASAI - Average Service Availability Index
(customer minutes available/total customer minutes, as a %)
CAIDI - Customer Average Interruption Duration Index
(average minutes interrupted per interrupted customer)
SAIDI - System Average Interruption Duration Index
(average minutes interrupted per customer for all customers)
SAIFI (Long) - System Average Interruption Frequency Index
(# of long interruptions per customer for all customers)
SAIFI (Short) - System Average Interruption Frequency Index
(# of short interruptions per customer for all customers)

S/U - Scheduled or Unscheduled
Ints - # of Interruptions
Long - >1 min; Short - <1 min
Cause # - see table on page 3

South Haven Electric Distribution System **MONTHLY OUTAGE REPORT** **May 2013**

General Information				Cause		Time & Duration			Customers	
#	Date	S/U	Address/Location	Description	#	Ints	T off	T on	Mins	# Out	Cust Min
1	5/8/2013	U	1500 Kalamazoo St	Fuse - Squirrel	4	1	5/8/13 5:45 AM	5/8/13 7:10 AM	85	1	85
2	5/10/2013	U	11250 Park Meadows Dr	Bad Connection	10	1	5/10/13 4:05 PM	5/10/13 5:10 PM	65	1	65
3	5/11/2013	U	76854 CR 380	Bad Fuse	10	1	5/11/13 2:50 PM	5/11/13 6:40 PM	230	6	1380
4	5/11/2013	U	71418 8th Ave	Bad Connection	10	1	5/11/13 5:45 PM	5/11/13 7:10 PM	85	1	85
5	5/12/2013	U	74845 14th Ave	Bad Connection	10	1	5/12/13 8:10 PM	5/12/13 9:35 PM	85	1	85
6	5/15/2013	U	72555 Baseline Rd	Primary line down - trees down	5	1	5/15/13 2:50 AM	5/15/13 8:40 AM	350	41	14350
7	5/16/2013	U	912 Saint Joseph St	Primary line down - tree limb	5	1	5/16/13 10:50 AM	5/16/13 2:05 PM	195	17	3315
8	5/21/2013	U	743 Kalamazoo Ave	Bad underground service	2	1	5/21/13 1:35 PM	5/21/13 6:10 PM	275	1	275
9	5/21/2013	U	70103 CR 380	Secondary line down - tree limb	5	1	5/21/13 4:20 PM	5/21/13 8:30 PM	250	7	1750
10	5/22/2013	U	850 Phillips St	Bad fuse in power bank	10	1	5/22/13 2:50 AM	5/22/13 10:30 AM	460	1	460
11	5/23/2013	U	525 Huron St	Bad Breaker	10	1	5/23/13 7:10 PM	5/23/13 8:40 PM	90	1	90
12	5/23/2013	U	401 Erie St	Bad Connection on Secondary line	10	1	5/23/13 7:40 PM	5/23/13 9:45 PM	125	7	875
13	5/24/2013	U	120 Baseline Rd	3 line fuses on primary feed - tree limbs	5	1	5/24/13 5:45 AM	5/24/13 8:50 AM	185	1	185
14	5/25/2013	U	70107 CR 380	Down Service - Tree limb	5	1	5/25/13 4:20 PM	5/25/13 6:35 PM	135	1	135
15	5/25/2013	U	330 Michigan Ave	Bad Connection	10	1	5/25/13 5:10 PM	5/25/13 7:05 PM	115	1	115
16	5/25/2013	U	76648 11th Ave	Bad Connection	10	1	5/25/13 8:30 PM	5/25/13 10:05 PM	95	1	95
17	5/26/2013	U	57 Promenade	Bad Connection	10	1	5/26/13 2:40 PM	5/26/13 3:45 PM	65	1	65
18	5/25/2013	U	1010 6th Ave #59	Bad Breaker	10	1	5/26/13 4:05 PM	5/26/13 5:10 PM	65	1	65

S/U - Scheduled or Unscheduled
Ints - # of Interruptions
Long - >1 min; Short - <1 min
Cause # - see table on page 3

Total Customers this Month	**8,116**	**Days of Month**
Total Customer Minutes this Month	362,298,240	**31**

Outage Totals

		This Month	This Month Last Year
Unscheduled Outages			
Long	# Outages	18	36
	# Customers Out	91	621
	# Minutes Out	2,955	20855
	# Customer Minutes Out	23,475	343575
	# Within City System	18	36
	# Supply to City Minutes	0	0
Short	# Outages (Blinks)	0	0
	# Customers Affected	0	0
	# Within City System	0	0
	# Supply to City Minutes	0	0
Scheduled Outages			
Long	# Outages	0	0
	# Customers Out	0	0
	# Minutes Out	0	0
	# Customer Minutes Out	0	0
	# Within City System	0	0
	# Supply to City Minutes	0	0
Short	# Outages (Blinks)	0	0
	# Customers Affected	0	0
	# Within City System	0	0
	# Supply to City Minutes	0	0
Totals			
Total Long Outages		18	36
Total Short Outages (Blinks)		0	0
Total Customers Out (Long)		91	621
Total Customers Affected (Short- Blinks)		0	0
Total Customer Minutes Out		23,475	343575
Total Outages Within City System		18	36
Total Outages in Supply to City		0	0

Number of Outages (by Cause)

Cause #	Description	Total This Month	This Month Last Year	Rolling AT	% AT
0	Electric Supply Disruption to City	0	0	0	0%
1	Fallen Line / Rotted Pole	0	1	7	2%
2	Bad U/G Cable	1	4	11	4%
3	Lightning	0	2	1	0%
4	Animal Contact	1	12	48	16%
5	Tree Contact	5	1	107	35%
6	Contamination / Foreign Debris	0	0	0	0%
7	Human	0	0	7	2%
8	Other	0	0	2	1%
9	Undetermined	0	0	0	0%
10	Failed Device	11	16	121	40%
	Total	18	36	304	

12 Month Outage Statistics

Index	As of This Month	As of This Month Last Year
ASAI (%)	99.9554	99.9454
CAIDI (Long) (min)	278.64	206.90
SAIDI (Long) (min)	19.52	23.98
SAIFI (Long) (ints/tot cust)	0.07	0.12
SAIFI (Short) (ints/tot cust)	0.00	0.00

ASAI - Average Service Availability Index
(customer minutes available/total customer minutes, as a %)
CAIDI - Customer Average Interruption Duration Index
(average minutes interrupted per interrupted customer)
SAIDI - System Average Interruption Duration Index
(average minutes interrupted per customer for all customers)
SAIFI (Long) - System Average Interruption Frequency Index
(# of long interruptions per customer for all customers)
SAIFI (Short) - System Average Interruption Frequency Index
(# of short interruptions per customer for all customers)

S/U - Scheduled or Unscheduled
Ints - # of Interruptions
Long - >1 min; Short - <1 min
Cause # - see table on page 3

South Haven Electric Distribution System **MONTHLY OUTAGE REPORT** **June 2013**

General Information				Cause		Time & Duration			Customers	
#	Date	S/U	Address/Location	Description	#	Ints	T off	T on	Mins	# Out	Cust Min
1	6/1/2013	U	14784 72nd St	Bad Connection	10	1	6/1/13 11:05 AM	6/1/13 12:45 PM	100	1	100
2	6/3/2013	U	264 Hubbard St	Bad Connection	10	1	6/3/13 11:20 AM	6/3/13 12:50 PM	90	1	90
3	6/3/2013	U	Erie St & Pearl St	Secondary line down - tree limb	5	1	6/3/13 2:40 PM	6/3/13 4:10 PM	90	17	1530
4	6/4/2013	U	1001 Monroe blvd	Secondary line down - tree limb	5	1	6/4/13 2:20 PM	6/4/13 4:10 PM	110	3	330
5	6/4/2013	U	210 Michigan Ave	Down Service - Tree limb	5	1	6/4/13 6:10 PM	6/4/13 8:20 PM	130	1	130
6	6/5/2013	U	19031 M-140	Bad Connection	10	1	6/5/13 5:40 PM	6/5/13 6:40 PM	60	1	60
7	6/6/2013	U	64016 8th Ave	Bad Connection	10	1	6/6/13 2:50 PM	6/6/13 5:05 PM	135	1	135
8	6/7/2013	U	70901 8th Ave	Fuse - Squirrel	4	1	6/7/13 2:10 AM	6/7/13 4:20 PM	850	6	5100
9	6/7/2013	U	73100 CR 388 #63	Bad Connection	10	1	6/7/13 3:40 PM	6/7/13 4:35 PM	55	1	55
10	6/8/2013	U	10573 Pinecone Trail	Bad Breaker	10	1	6/8/13 10:05 PM	6/8/13 11:25 PM	80	1	80
11	6/9/2013	U	05924 68th St	Bad underground service	2	1	6/9/13 1:05 PM	6/9/13 5:50 PM	285	1	285
12	6/10/2013	U	10844 66th St	Bad Fuse	10	1	6/10/13 10:05 PM	6/11/13 6:50 AM	525	3	1575
13	6/10/2013	U	62nd St & Baseline Rd	Primary down - car/pole accident	7	1	6/10/13 10:45 PM	6/11/13 3:10 AM	265	32	8480
14	6/12/2013	U	Phillips St & Lagrange St	Primary fuse's out - trees	5	1	6/12/13 10:10 PM	6/13/13 1:45 AM	215	69	14835
15	6/12/2013	U	76550 11th Ave	Primary line down - tree down	5	1	6/12/13 10:40 PM	6/13/13 3:50 AM	310	56	17360
16	6/12/2013	U	AEP Citywide Outage	Lost power from AEP	0	1	6/12/13 10:45 PM	6/13/13 7:40 PM	1255	7,236	9081180
17	6/13/2013	U	07642 CR 687	Fuse - wind and tree limbs	5	1	6/13/13 7:10 PM	6/13/13 8:40 PM	90	1	90
18	6/13/2013	U	509 Indiana Ave	Fuse - tree limbs	5	1	6/13/13 7:35 PM	6/13/13 8:55 PM	80	14	1120
19	6/13/2013	U	19 Beaver Ct	Down Secondary Line - Tree Limbs	5	1	6/13/13 7:40 AM	6/13/13 9:05 AM	85	11	935
20	6/13/2013	U	70478 CR 384	Service Down - Tree Limbs	5	1	6/13/13 7:50 PM	6/13/13 9:05 PM	75	1	75
21	6/13/2013	U	513 Humphrey St	Service Down - Tree Down	5	1	6/13/13 7:55 PM	6/13/13 10:10 PM	135	17	2295
22	6/13/2013	U	77702 20th Ave	Service Down - Tree Limbs	5	1	6/13/13 7:50 PM	6/13/13 11:15 PM	205	21	4305
23	6/13/2013	U	97 Elkenburg St	Service Down - Tree Limb	5	1	6/13/13 8:30 PM	6/13/13 10:10 PM	100	1	100
24	6/13/2013	U	65 Elkenburg St	Line Fuse - Tree Limbs	5	1	6/13/13 8:58 PM	6/13/13 11:50 PM	172	37	6364
25	6/13/2013	U	76670 14th Ave	Fuse - Tree Limbs	5	1	6/13/13 9:00 PM	6/13/13 11:45 PM	165	3	495
26	6/13/2013	U	09639 CR 687	Fuse - Tree Limbs	5	1	6/13/13 9:20 PM	6/13/13 11:50 PM	150	3	450
27	6/13/2013	U	09580 73rd St	Fuse - Tree Limbs	5	1	6/13/13 9:35 PM	6/14/13 12:30 AM	175	16	2800
28	6/13/2013	U	6755 Baseline Rd	Fuse - Tree Limbs	5	1	6/13/13 9:45 PM	6/14/13 1:10 AM	205	6	1230
29	6/13/2013	U	77178 Winding Creek Cir	Fuse - Tree Limbs	5	1	6/13/13 9:46 PM	6/14/13 1:20 AM	214	8	1712
30	6/13/2013	U	16480 77th Ave	Fuse - Tree Limbs	5	1	6/13/13 10:10 PM	6/14/13 2:20 AM	250	42	10500
31	6/13/2013	U	17185 M-140	Fuse - Tree Limbs	5	1	6/13/13 10:25 PM	6/14/13 2:50 AM	265	9	2385
32	6/13/2013	U	76801 16th Ave	Underground riser fuse - tree limbs	5	1	6/13/13 10:38 PM	6/14/13 2:20 AM	222	11	2442
33	6/14/2013	U	17479 77th Ave	Primary line down - Tree limbs	5	1	6/14/13 5:10 AM	6/14/13 8:20 AM	190	19	3610
34	6/14/2013	U	15575 77th Ave	Primary line down - Tree limbs	5	1	6/14/13 8:50 AM	6/14/13 11:10 AM	140	86	12040
35	6/14/2013	U	00413 70th St	Primary line down - Tree limbs	5	1	6/14/13 9:10 AM	6/14/13 11:55 AM	165	44	7260
36	6/15/2013	U	321 Cartwright St	Service Down - Tree Limbs	5	1	6/15/13 4:05 PM	6/15/13 8:35 PM	270	1	270
37	6/16/2013	U	438 Park Ave	Service Down - Tree Limbs	5	1	6/16/13 5:05 AM	6/16/13 9:15 AM	250	1	250
38	6/16/2013	U	922 Hazel St	Service Down - Tree Limbs	5	1	6/16/13 8:40 AM	6/16/13 11:55 AM	195	1	195
39	6/16/2013	U	164 Bailey Ave	Primary Fuse Out	10	1	6/16/13 2:00 PM	6/16/13 3:25 PM	85	29	2465
40	6/17/2013	U	10 Water st	Bad Breaker	10	1	6/17/13 2:50 PM	6/17/13 4:05 PM	75	1	75
41	6/17/2013	U	531 Superior St	Limb on Primary Line	5	1	6/17/13 10:20 PM	6/18/13 1:25 AM	185	46	8510
42	6/18/2013	U	14th Ave	Primary Line Down - Tree Limb	5	1	6/18/13 10:50 AM	6/18/13 3:10 PM	260	84	21840

S/U - Scheduled or Unscheduled
Ints - # of Interruptions
Long - >1 min; Short - <1 min
Cause # - see table on page 3

43	6/18/2013	U	450 Broadway St	Line Fuse - Tree Limbs	5	1	6/18/13 4:45 PM	6/18/13 6:50 PM	125	27	3375
44	6/18/2013	U	152 Superior St	Line Fuse - Tree Limbs	5	1	6/18/13 10:10 PM	6/19/13 12:50 AM	160	16	2560
45	6/21/2013	U	1207 Monroe Blvd	Primary Line Down - Trees	5	1	6/21/13 10:35 AM	6/21/13 3:40 PM	305	62	18910
46	6/21/2013	U	61414 CR 388	Tree on Primary Line	5	1	6/21/13 4:10 PM	6/21/13 6:50 PM	160	9	1440
47	6/21/2013	U	73100 CR 388 #80	Bad Connection	10	1	6/21/13 5:40 PM	6/21/13 7:20 PM	100	1	100
48	6/21/2013	U	74th St & North Shore Dr	Tree limb on Primary Line	5	1	6/21/13 7:05 PM	6/21/13 9:50 PM	165	42	6930
49	6/23/2013	U	802 Center St	Car/Pole accident - Fuse Out	7	1	6/23/13 3:50 AM	6/23/13 6:20 AM	150	9	1350
50	6/23/2013	U	105 Blue Star Hwy	Tree on line - line fuse	5	1	6/23/13 3:55 PM	6/23/13 5:45 PM	110	42	4620
51	6/26/2013	U	06951 68th St	Fuse Squirrel	4	1	6/26/13 8:25 PM	6/26/13 10:05 PM	100	11	1100

S/U - Scheduled or Unscheduled
Ints - # of Interruptions
Long - >1 min; Short - <1 min
Cause # - see table on page 3

Total Customers this Month	**8,116**	**Days of Month**
Total Customer Minutes this Month	350,611,200	**30**

Outage Totals

		This Month	This Month Last Year
Unscheduled Outages			
Long	# Outages	51	37
	# Customers Out	8,162	901
	# Minutes Out	10,333	5600
	# Customer Minutes Out	9,265,523	138735
	# Within City System	50	37
	# Supply to City Minutes	9,081,180	0
Short	# Outages (Blinks)	0	0
	# Customers Affected	0	0
	# Within City System	0	0
	# Supply to City Minutes	0	0
Scheduled Outages			
Long	# Outages	0	0
	# Customers Out	0	0
	# Minutes Out	0	0
	# Customer Minutes Out	0	0
	# Within City System	0	0
	# Supply to City Minutes	0	0
Short	# Outages (Blinks)	0	0
	# Customers Affected	0	0
	# Within City System	0	0
	# Supply to City Minutes	0	0
Totals			
Total Long Outages		51	37
Total Short Outages (Blinks)		0	0
Total Customers Out (Long)		8,162	901
Total Customers Affected (Short- Blinks)		0	0
Total Customer Minutes Out		9,265,523	138735
Total Outages Within City System		50	37
Total Outages in Supply to City		1	0

Number of Outages (by Cause)

Cause #	Description	Total This Month	This Month Last Year	Rolling AT	% AT
0	Electric Supply Disruption to City	1	0	1	0%
1	Fallen Line / Rotted Pole	0	0	7	2%
2	Bad U/G Cable	1	3	9	3%
3	Lightning	0	0	1	0%
4	Animal Contact	2	11	39	12%
5	Tree Contact	35	10	132	42%
6	Contamination / Foreign Debris	0	0	0	0%
7	Human	2	1	8	3%
8	Other	0	0	2	1%
9	Undetermined	0	0	0	0%
10	Failed Device	10	12	119	37%
	Total	51	37	318	

AT - Annual 12 Month Total

12 Month Outage Statistics

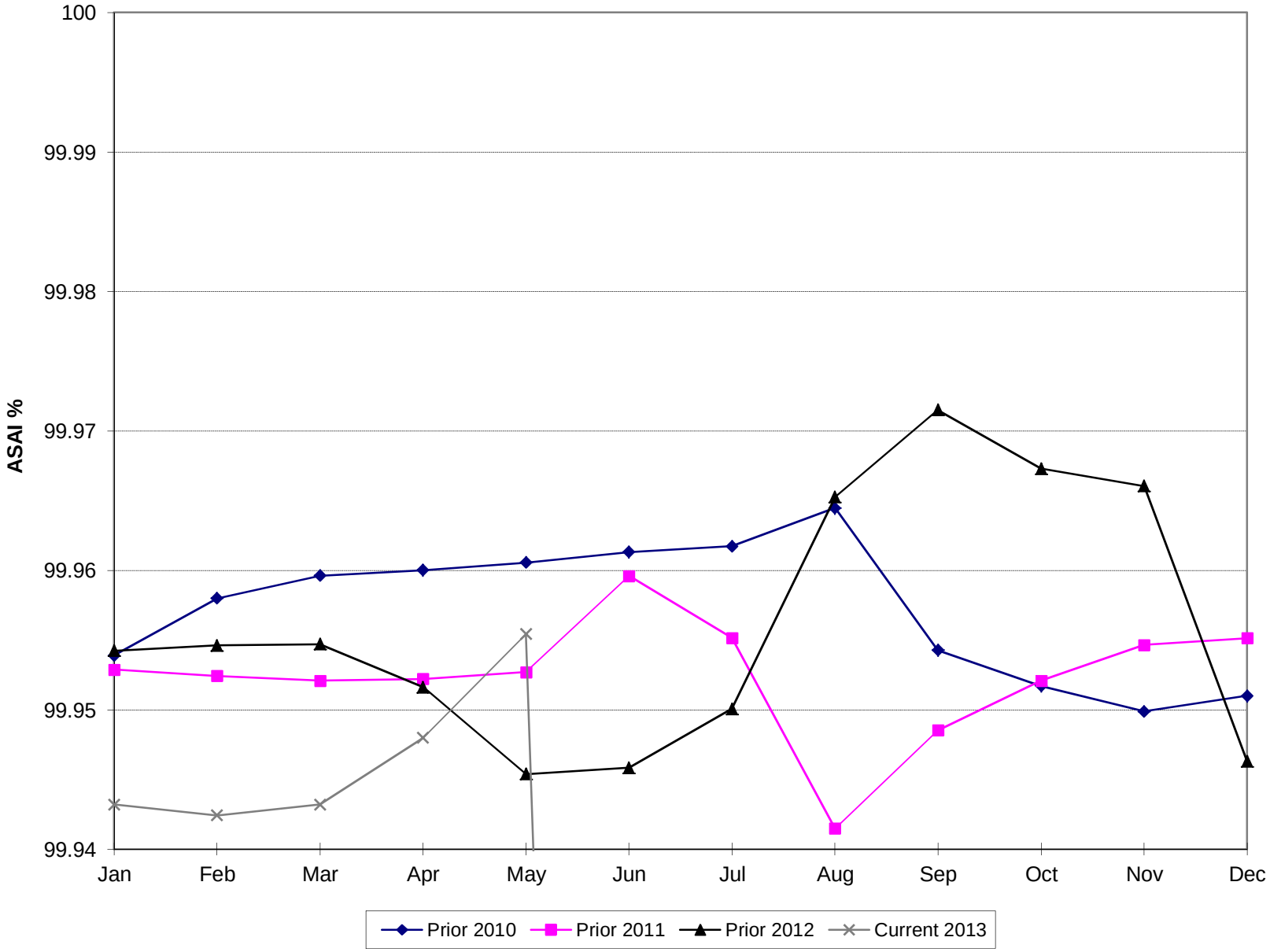
Index	As of This Month	As of This Month Last Year
ASAI (%)	99.7421	99.9458
CAIDI (Long) (min)	782.15	201.51
SAIDI (Long) (min)	112.97	23.78
SAIFI (Long) (ints/tot cust)	0.14	0.12
SAIFI (Short) (ints/tot cust)	0.00	0.00

ASAI - Average Service Availability Index
(customer minutes available/total customer minutes, as a %)
CAIDI - Customer Average Interruption Duration Index
(average minutes interrupted per interrupted customer)
SAIDI - System Average Interruption Duration Index
(average minutes interrupted per customer for all customers)
SAIFI (Long) - System Average Interruption Frequency Index
(# of long interruptions per customer for all customers)
SAIFI (Short) - System Average Interruption Frequency Index
(# of short interruptions per customer for all customers)

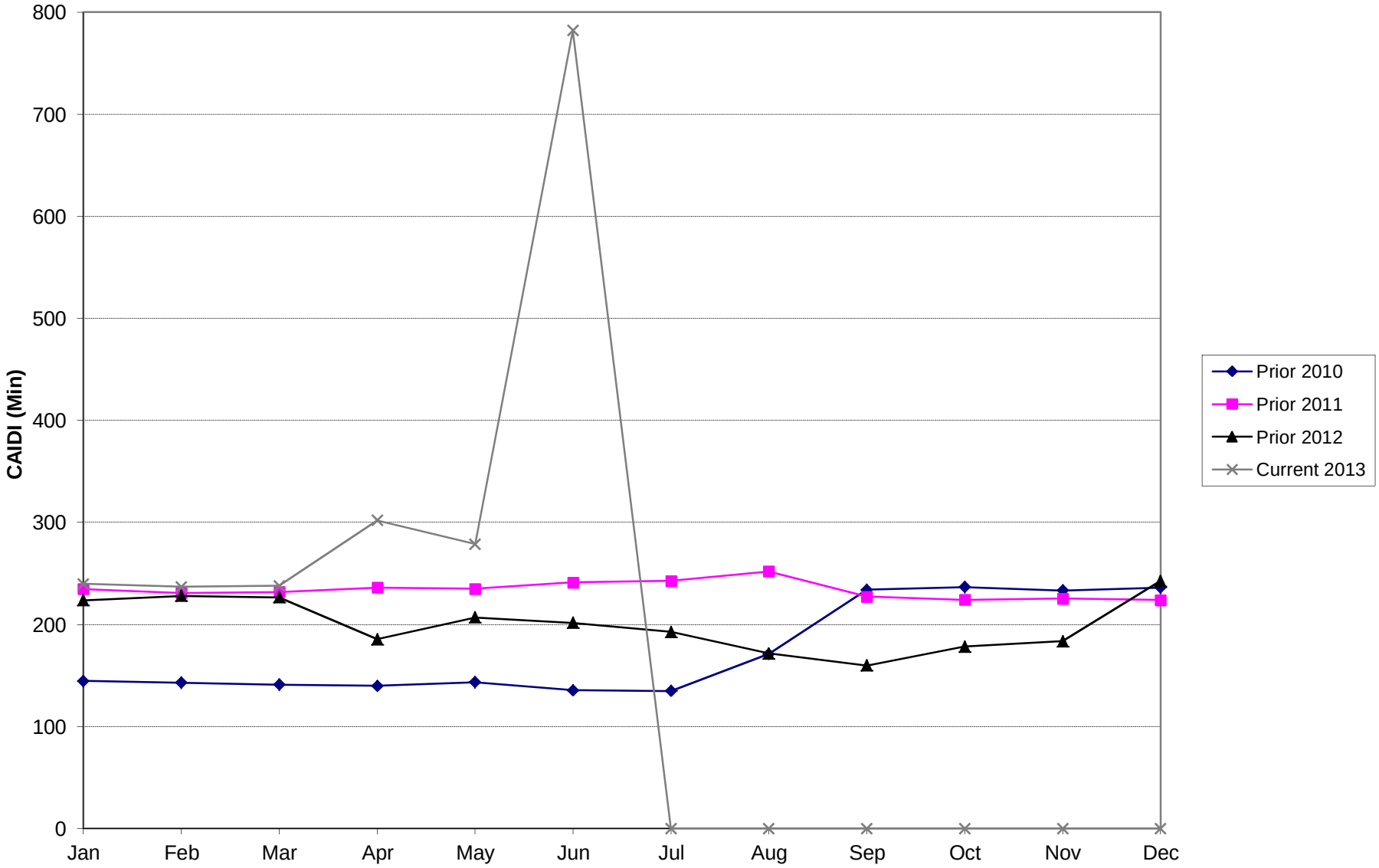
S/U - Scheduled or Unscheduled
Ints - # of Interruptions
Long - >1 min; Short - <1 min
Cause # - see table on page 3

South Haven Electric Distribution System **RELIABILITY REPORT** **JUN 2013**

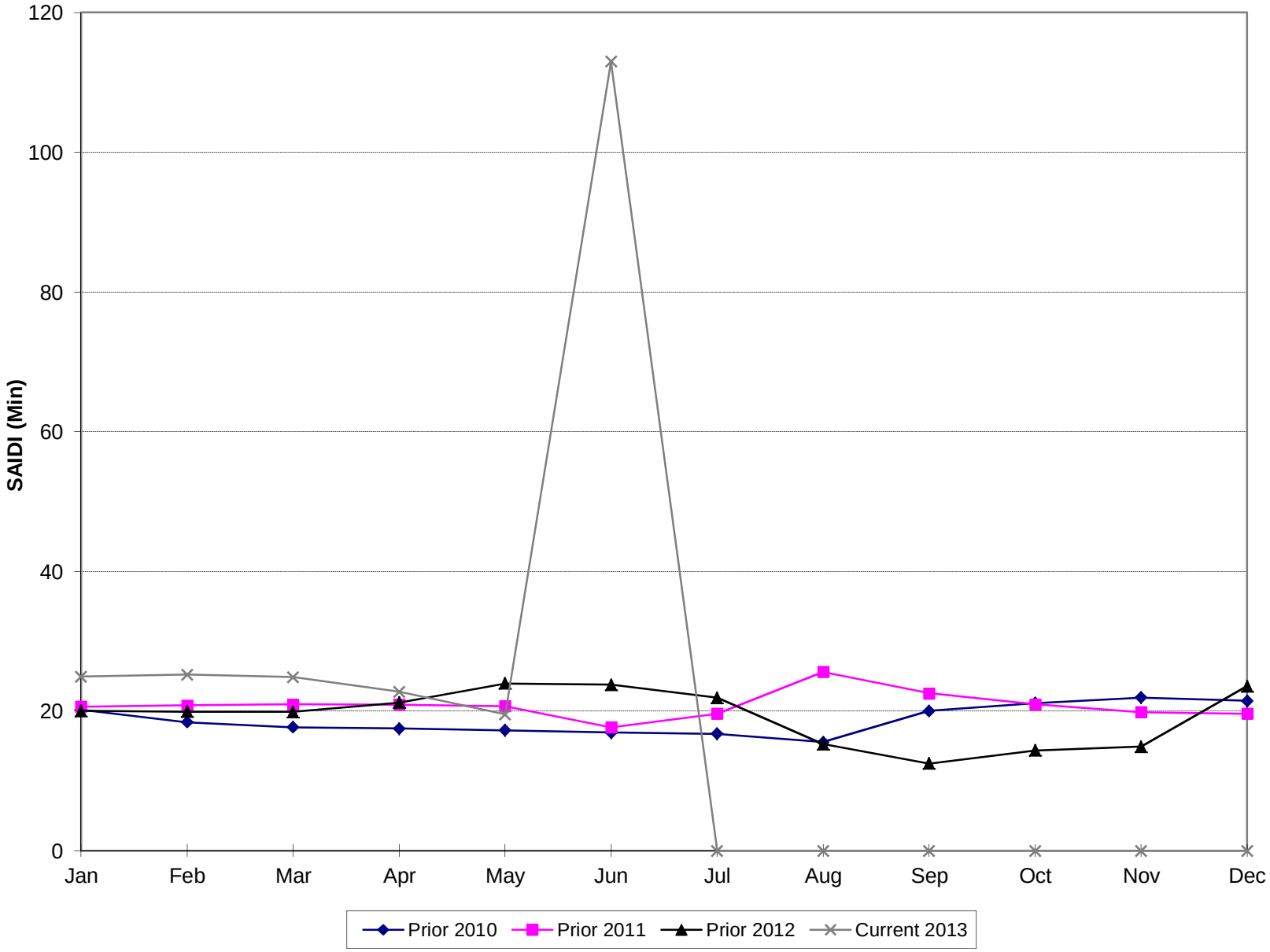
		Month	Jun 12	Jul 12	Aug 12	Sep 12	Oct 12	Nov 12	Dec 12	Jan 13	Feb 13	Mar 13	Apr 13	May 13	Jun 13
		Number of Customers	8,163	8,151	8,172	8,151	8,150	8,125	8,115	8,115	8,155	8,195	8,116	8,116	8,116
Unscheduled Outages															
	Long Outages	# Outages	37	41	39	23	38	22	37	17	12	8	8	18	51
		# Customers Out	901	925	266	318	867	363	1,763	961	330	50	12	91	8,162
		# Minutes Out	5,600	5,443	5,948	2,665	48,364	4,673	7,986	2,544	1,614	790	833	2,955	10,333
		# Customer Mins	138,735	131,704	49,248	70,715	285,401	87,547	870,455	194,095	50,568	4,645	1,233	23,475	9,265,523
		# City System	37	41	39	23	38	22	37	17	12	8	8	18	50
		# Supply to City Minutes	0	0	0	0	0	0	0	0	0	0	0	0	9,081,180
	Short Outages	# Outages (Blinks)	0	0	0	0	0	1	1	0	0	0	2	0	0
		# Customers Out	0	0	0	0	0	1	41	0	0	0	2	0	0
		# City System	0	0	0	0	0	1	1	0	0	0	2	0	0
		# Supply to City Minutes	0	0	0	0	0	0	0	0	0	0	0	0	0
Scheduled Outages															
	Long Outages	# Outages	0	0	0	0	0	0	0	0	0	0	0	0	0
		# Customers Out	0	0	0	0	0	0	0	0	0	0	0	0	0
		# Minutes Out	0	0	0	0	0	0	0	0	0	0	0	0	0
		# Customer Mins	0	0	0	0	0	0	0	0	0	0	0	0	0
		# City System	0	0	0	0	0	0	0	0	0	0	0	0	0
		# Supply to City Minutes	0	0	0	0	0	0	0	0	0	0	0	0	0
	Short Outages	# Outages (Blinks)	0	0	0	0	0	0	0	0	0	0	0	0	0
		# Customers Out	0	0	0	0	0	0	0	0	0	0	0	0	0
		# City System	0	0	0	0	0	0	0	0	0	0	0	0	0
		# Supply to City Minutes	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals															
		Total Long Outages	37	41	39	23	38	22	37	17	12	8	8	18	51
		Total Short Outages (Blinks)	0	0	0	0	0	1	1	0	0	0	2	0	0
		Total Custs Out (Long)	901	925	266	318	867	363	1,763	961	330	50	12	91	8,162
		Total Custs Out (Short Blinks)	0	0	0	0	0	1	41	0	0	0	2	0	0
		Total Cust Mins Out	138,735	131,704	49,248	70,715	285,401	87,547	870,455	194,095	50,568	4,645	1,233	23,475	9,265,523
		Total City System	37	41	39	23	38	22	37	17	12	8	8	18	50
		Total Supply to City	0	0	0	0	0	0	0	0	0	0	0	0	1
Indices															
		ASAI (%)	99.95	99.95	99.97	99.97	99.97	99.97	99.95	99.94	99.94	99.94	99.95	99.96	99.74
		CAIDI (Long) (min)	201.51	192.71	171.64	159.80	178.17	183.66	242.67	239.86	236.80	237.85	302.01	278.64	782.15
		SAIDI (Long) (min)	23.78	21.93	15.26	12.52	14.37	14.91	23.58	24.94	25.21	24.88	22.78	19.52	112.97
		SAIFI (long int/cust)	0.12	0.11	0.09	0.08	0.08	0.08	0.10	0.10	0.11	0.10	0.08	0.07	0.14
		SAIFI (short int/cust)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



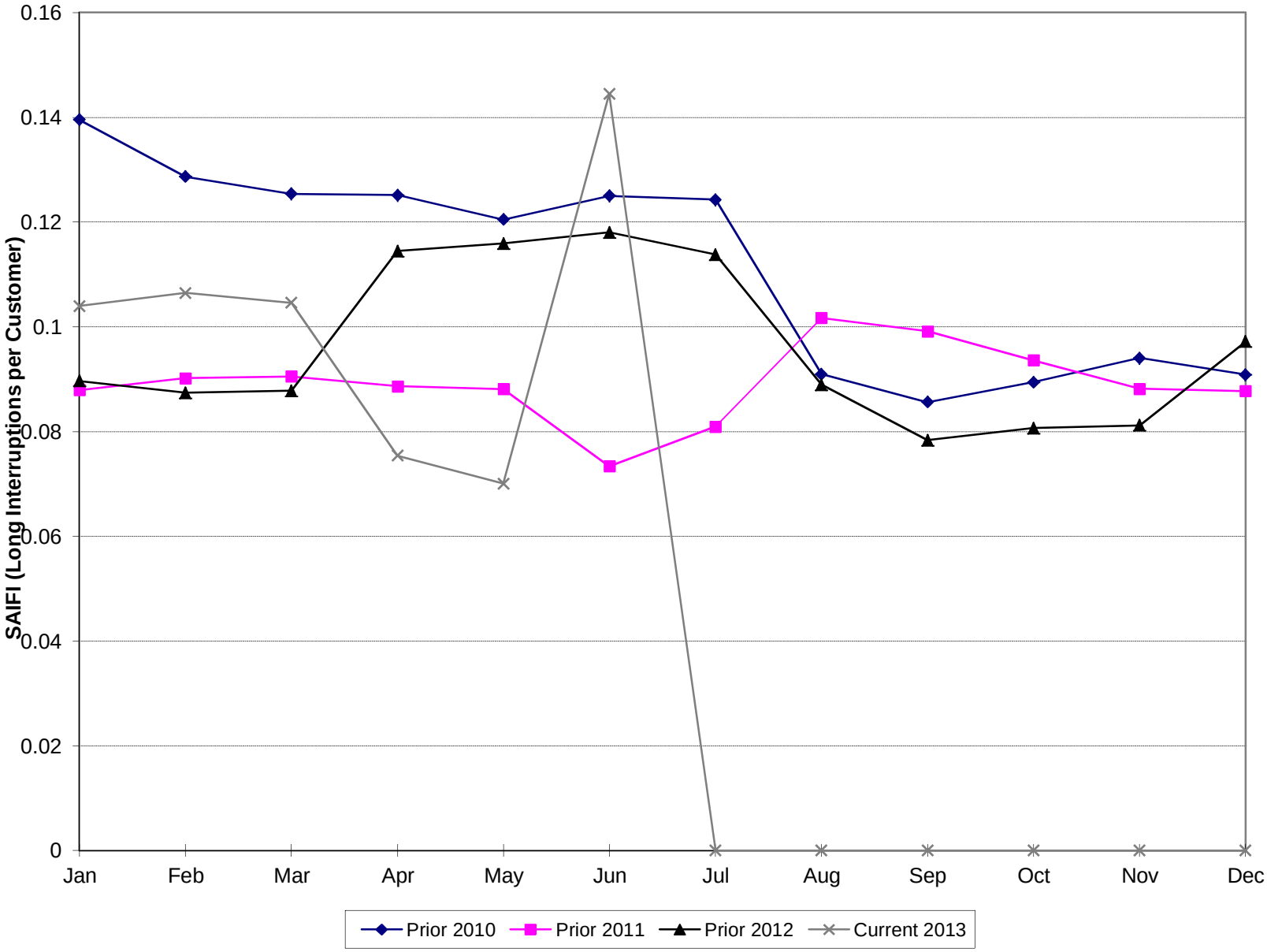
The ratio of the total customer minutes that service was available divided by the total customer minutes demanded (expected) in a time period. It is expressed as a percent.



This is the average duration of a customer outage, and is calculated by dividing the sum of the customer minutes off by the number of customers who experienced long interruptions.



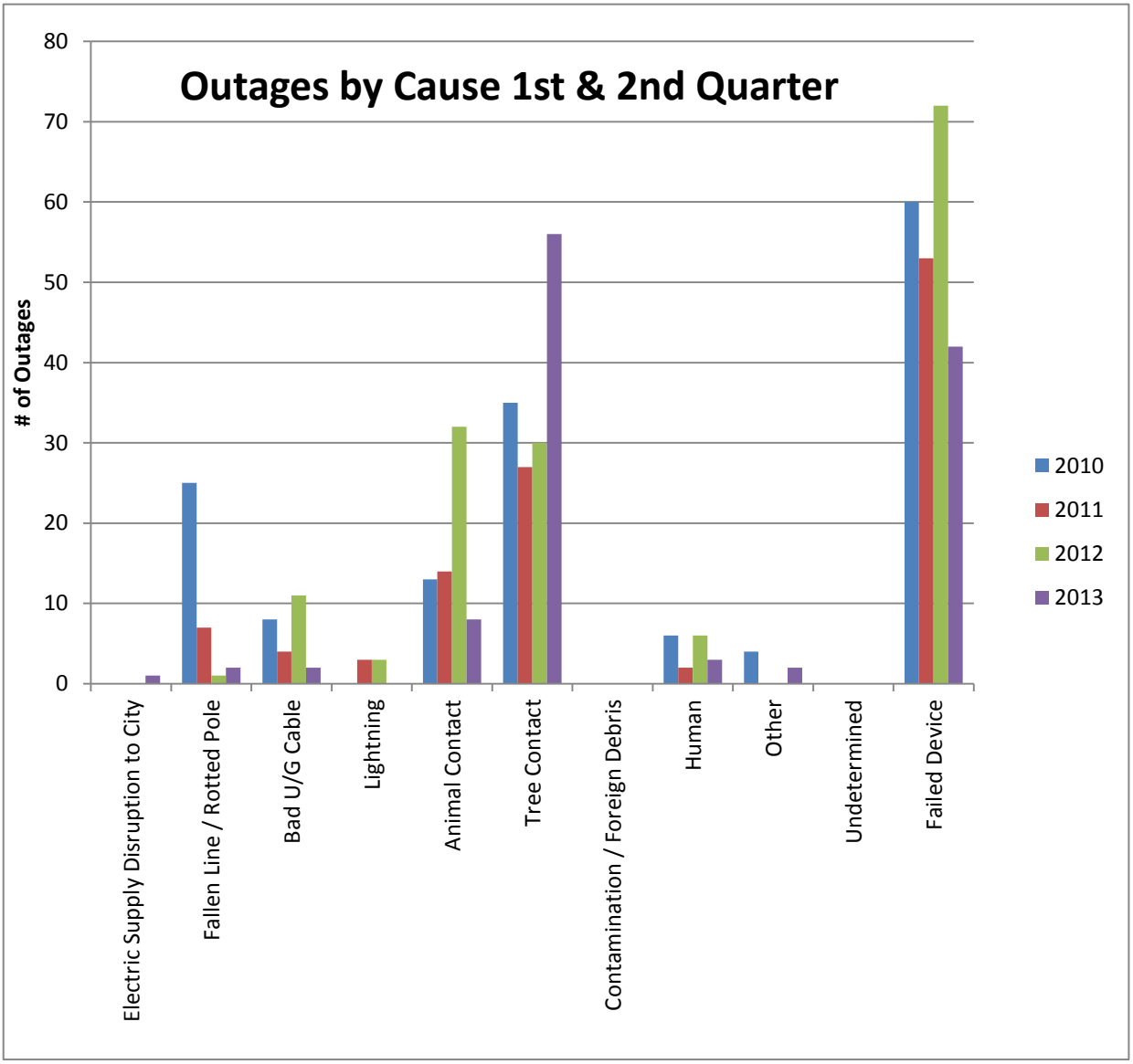
This is the avg interruption duration for all customers served, and is calculated by dividing the sum of the customer minutes off by the avg number of customers served.



The number of times a customer is interrupted (>1 minute), averaged over all customers. Divide total customer interruptions by an avg of total customers served.

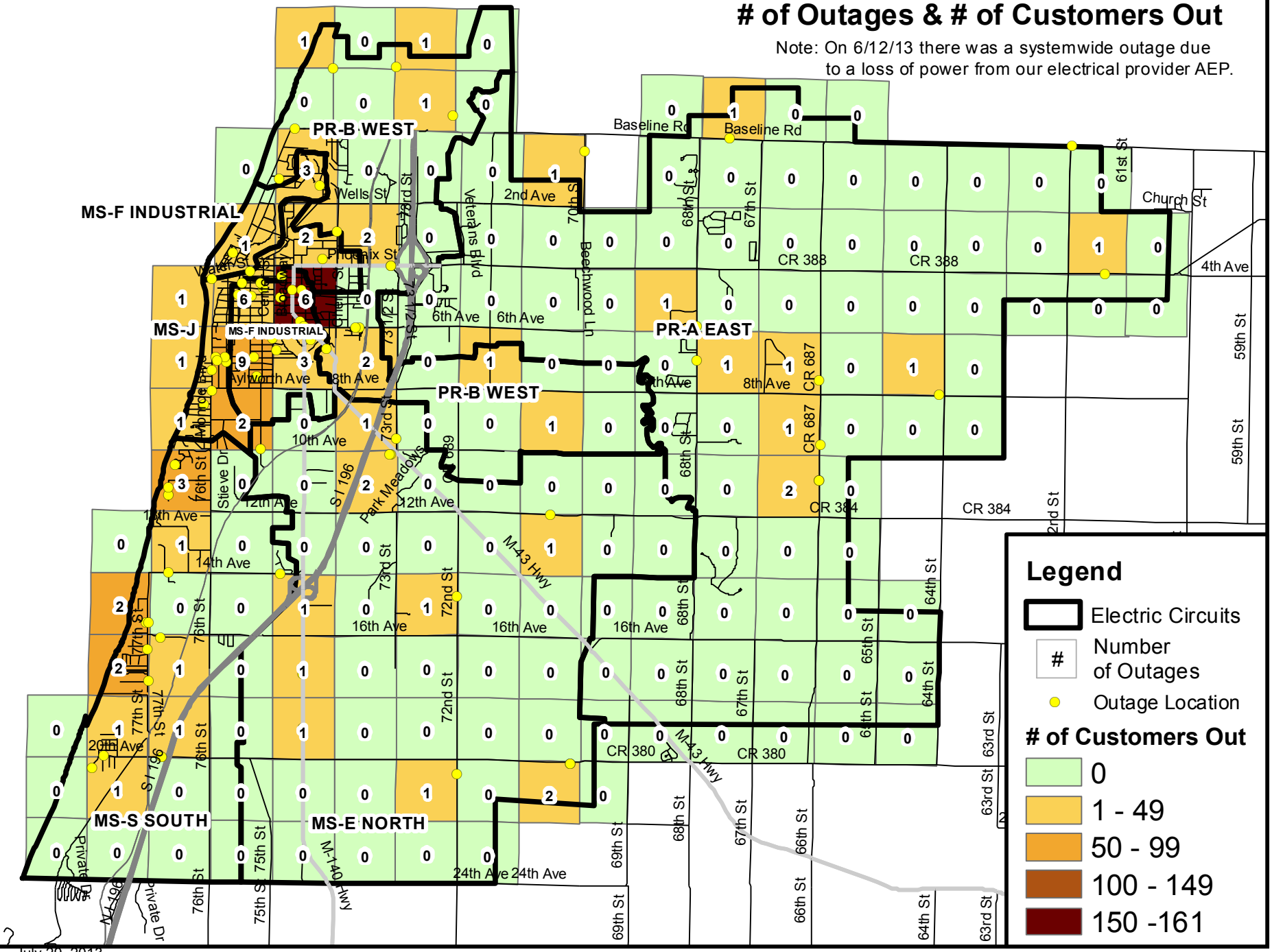
1st & 2nd Quarter Electrical Outages by Category

Outage Categories	2010	2011	2012	2013
Electric Supply Disruption to City	0	0	0	1
Fallen Line / Rotted Pole	25	7	1	2
Bad U/G Cable	8	4	11	2
Lightning	0	3	3	0
Animal Contact	13	14	32	8
Tree Contact	35	27	30	56
Contamination / Foreign Debris	0	0	0	0
Human	6	2	6	3
Other	4	0	0	2
Undetermined	0	0	0	0
Failed Device	60	53	72	42
Total	**151**	**110**	**155**	**116**



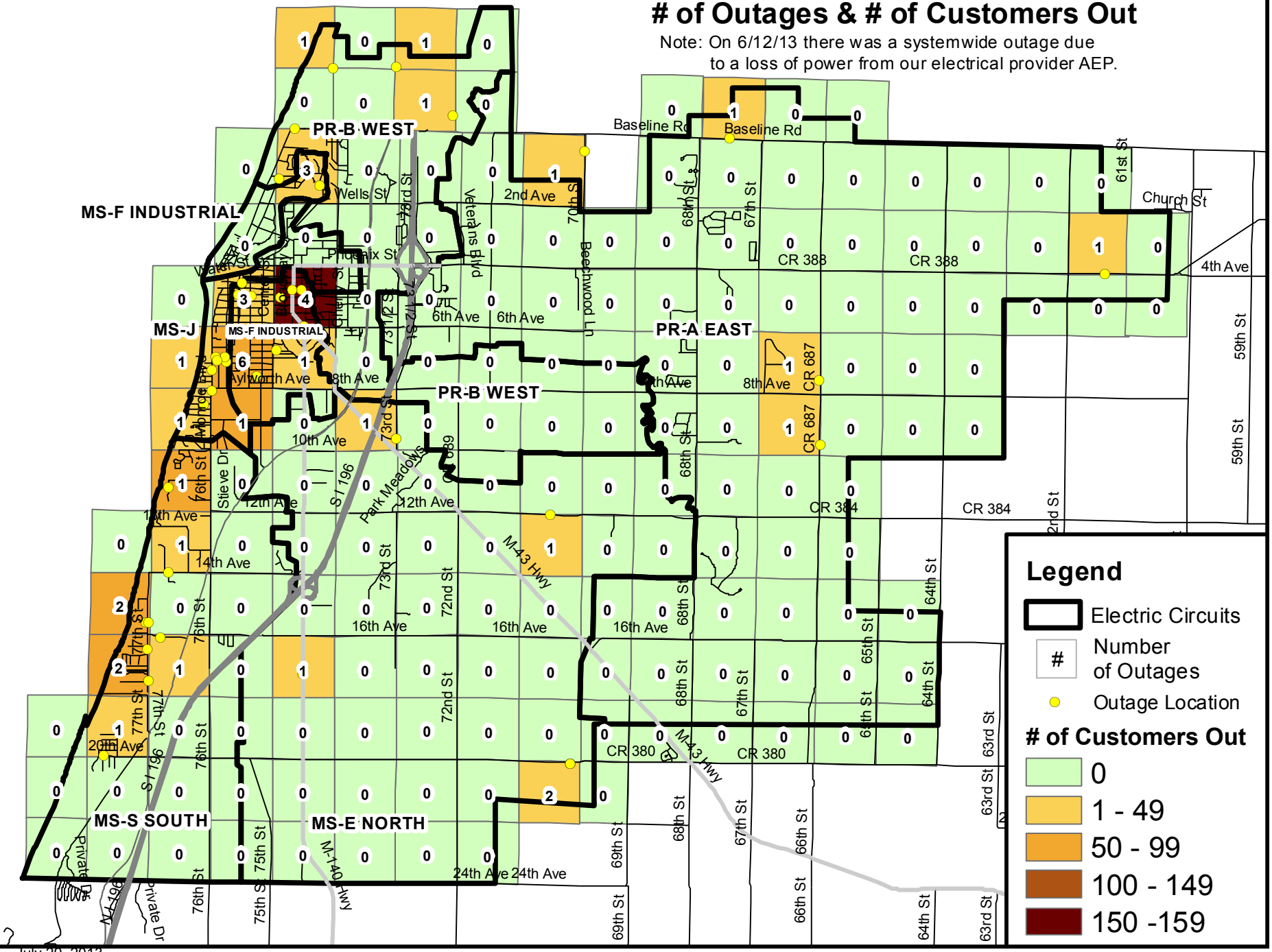
Electric Outages in 2nd Quarter of 2013
of Outages & # of Customers Out

Note: On 6/12/13 there was a systemwide outage due to a loss of power from our electrical provider AEP.



Electric Outages due to Trees in 2nd Quarter of 2013
of Outages & # of Customers Out

Note: On 6/12/13 there was a systemwide outage due to a loss of power from our electrical provider AEP.



Agenda Item # 11

Hydrant Water Sales Policy

City of South Haven

Background Information:

Bulk water sales are defined as hydrant water sales in Appendix #1 (copy attached) of the "City of South Haven Public Utilities Rules, Regulations and Policies" (BPU date of recommendation: December 18, 2006, adopted by City Council: January 15, 2007, updated: November 15, 2010). Per this policy, charges for use shall include:

> -Installation, removal, operation of fire hydrant - $50.00 labor (includes up to 4,000 cubic feet). The installation fee shall be paid in advance.
> -Water in excess of 4,000 cubic feet will be charged at the standard rates published.

This policy is based on water rates adopted in July of 2006. City staff recommends a formal change to the policy and rates to provide defined procedures, cover costs for installation and removal, and establish a fair rate for the water used by including a standby fee. The proposed Bulk Water Sales Policy is attached.

The Board considered the proposed policy at their June 24, 2013 regular meeting and requested that staff modify the language regarding availability of hydrant meters. The language in the attached policy has been changed to reflect the discussions at the last Board meeting.

The Board also requested additional information on charges assessed by other municipalities. The attached sheet shows a comparison of various municipal utilities in Michigan. Based upon this comparison, staff recommends that customers with remote hydrant meter installations be charged a daily standby charge, equivalent to the monthly standby charge divided by 30.42 and standard commodity charges as defined in the City's standard rate Ordinance. The rates will then be allowed to fluctuate if Council makes changes to the rate Ordinance in the future.

Summary of Charges based on adopted 2014 Water Rates:

Deposit for Hydrant Meter[1]	$500.00
Setup Fee for Hydrant Meter[1]	$200.00
Standby Fee for 3" Hydrant Meter[1]	$6.37 per day
Water Usage Rate	$53.25 minimum charge for 2,500 cubic feet or less 2,500 – 25,000 cubic feet: $1.93 per 100 cubic feet Over 25,000 cubic feet: $1.87 per 100 cubic feet

[1] Charged to customers taking delivery at location remote to DPW building.

Recommendation:

The Board is requested to pass a motion recommending that Council adopt the new Bulk Water Sales Policy by Resolution.

Attachments:

Bulk Water Sales Policy
Bulk Water Sales Cost Comparison

Respectfully submitted,

Larry Halberstadt, PE
City Engineer

City of South Haven

Department of Public Works

DPW Building • 1199 8th Ave. • South Haven, Michigan 49090
Telephone (269) 637-0737 • Fax (269) 637-4778

BULK WATER SALES POLICY

A. **Purpose.** This policy is intended to provide for bulk water sales. Bulk water sales are considered to be large volume, high flow delivery via a temporary connection to a fire hydrant. Bulk water sales are available for the following purposes: Filling of outdoor swimming pools, agricultural irrigation or livestock, construction projects, and commercial water sales. Other uses may be approved by the Public Works Director on a case by case basis.

B. **Application.** Customers seeking bulk water sales shall make application for service at the Department of Public Works on the form provided.

C. **Hydrant Meters.** All bulk water sales will occur via a hydrant meter and backflow preventer provided by the City.

D. **Location of Hydrant Meters.** Approved applicants may take delivery of water at the Department of Public Works Building, 1199 8th Avenue without incurring a hydrant meter deposit or setup fee. Applicants may request installation of a hydrant meter near their property. The City will review applicant's request to ensure that the hydrant meter can be installed in a safe location.

E. **Availability of Hydrant Meters.** The City will make every effort to provide service to customers as requested; however, the number of hydrant meter and backflow preventer assemblies is limited. During periods of high demand, the City may limit the number of days that a hydrant may be installed at a remote location.

   A customer purchasing water on an annual basis, may make application to have a hydrant meter and backflow assembly reserved in their name. The customer will be required to pay the full cost for purchase, assembly, maintenance, and storage of the assembly. The assembly will remain the property of the City and will the maintained and stored by the City. The customer deposit will be waived for a customer who pays for the full costs as described in this paragraph.

F. **Deposits for Hydrant Meters.** Applicants shall pay a deposit for the hydrant meter and backflow preventer assembly. The deposit will be refunded if the assembly is returned in an undamaged condition. In the event that the assembly is damaged, the City will repair the assembly and deduct the repair charges from the applicant's deposit.

G. **Setup Fees.** Applicants shall pay a fixed setup fee to cover the cost of installation of a hydrant meter near their property. The setup fee will include the average cost for staff time, administrative time, and vehicle mileage required for installing and removing the hydrant meter assembly.

H. **Payment.** Payment for usage will include standby charges based on the size of water meter provided and water usage rate based on the current rate schedule adopted by City Council and incorporated into the Code of Ordinances. The monthly standby charges will be prorated to a daily amount by dividing the monthly charge by the average number of days per month (30.42). The customer will be billed standby charges for the number of days that the hydrant meter remains installed and available for their usage. The customer will be billed water usage for a minimum of 2,500 cubic feet, regardless of the actual amount used. Customers taking delivery at the Department of Public Works Building will not be billed a daily standby charge.

I. **Connection to Hydrant Meters.** Customer may only connect to the hydrant meter assembly with flexible hose that can be rapidly removed in the event of a fire. No hard piping connections are permitted.

BULK WATER SALES COST COMPARISON

Utility	Deposit	Installation Cost	Daily Rate	Water Cost
City of Allegan	NA	NA	$2.95	Standard Commodity Charge
City of Grand Haven	$500	NA	$1.33	$2.00 per gallon
City of Grand Rapids	$300	NA	$5.00	Average Retail Commodity Charge
City of Holland	NA	NA	$14.57	$1.33 per gallon
City of Kentwood	$75	NA	$20.00	$0.0037 per gallon
City of Monroe	$500	$100	$15.00	Standard Commodity Charge
City of Muskegon	$200	NA	$1.67	Standard Commodity Charge
City of Niles	NA	NA	NA	$0.0052 per gallon
City of Saginaw	NA	NA	$4.93	Standard Commodity Charge, $150 minimum
City of Wyoming	$500	NA	Varies	Standard Commodity Charge
City of South Haven Proposed	**$500**	**$200**	**$6.37**	**Standard Commodity Charge, 2,500 cubic feet minimum**

CITY OF SOUTH HAVEN

ELECTRIC DISTRIBUTION SYSTEM STUDY & FIVE-YEAR PLAN

FINAL REPORT
JULY 3, 2013

City of South Haven
539 Phoenix Street
South Haven, MI 49090

GRP Engineering, Inc.
459 Bay Street
Petoskey, MI 49770

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CITY OF SOUTH HAVEN
ELECTRIC DISTRIBUTION SYSTEM STUDY & FIVE-YEAR PLAN
EXECUTIVE SUMMARY

The scope of this electric distribution system study was to review the City of South Haven's substations and distribution system for equipment and conductor capacity issues, voltage and VAR flow issues under several system scenarios for both current system loads and projected 5 and 10 year load growth. Additionally, a review of the system overcurrent protection philosophy and an assessment of the physical condition of the electrical system was completed. Implementation of the recommendations included in this report will maintain conductor and equipment within specified ratings, will balance circuit loads and system VAR flow.

The maximum continuous and emergency conductor ampacity ratings and equipment loading limits were established. Conductors will be limited to operate at 60% of their thermal rating for normal system conditions under peak loading conditions and 90% for first contingency operations. Substation transformers and high side (69kV) equipment will be allowed to operate at 40% of forced-air nameplate rating for normal and 80% for first contingency operations. The equipment and conductor ratings established in this study are goals for the City of South Haven to achieve and are the basis for the analysis and recommendations.

A review of the City of South Haven's substation transformer loading shows the Phoenix Road Substation transformer is loaded to 85% of its maximum rating under peak conditions. Additionally, the two Phoenix Road Substation distribution circuits are loaded to 74% and 94% not including the load growth with the new Meijer store. Main Substation has circuits loaded as high as 95% of capacity under peak load. Maintaining service to all customers with the loss of a circuit or substation transformer under peak load conditions is difficult to accomplish without damaging the system due to these high loads.

Completion of the sixteen recommended projects including adding a transformer and two new circuits at Phoenix Road Substation will significantly improve system reliability. These projects will provide usable circuit & substation backfeed capabilities, will rebuild lines with failing hardware, will fix problems with open-wire secondary and associated connections, will decrease system VAR flow, and will reduce outage rates with additional tree trimming and extra wildlife protection. The projects proposed in this five-year plan will alleviate many of the distribution circuit loading conditions. Annual reviews of the system should be continued to evaluate the effect of normal load growth plus concentrated growth along Blue Star Highway. These reviews will steer future improvement projects to maintain loading levels in the substations and throughout the distribution system which were established in this report.

Several tables, charts, graphs and drawings are included with this report to clearly state system deficiencies and recommended changes proposed herein.

CITY OF SOUTH HAVEN
ELECTRIC DISTRIBUTION SYSTEM STUDY & FIVE-YEAR PLAN
BACKGROUND & FINDINGS

The scope of this electric distribution system study was to review the City of South Haven's substation and distribution system for equipment and conductor capacity issues, voltage and VAR issues for both current system loads and projected 5 and 10 year load growth. The review was performed for normal system conditions plus first contingency substation and distribution circuit outages. The study also included a review of the system overcurrent protection philosophy and an assessment of the physical condition of the electrical system. Implementation of the recommendations included in this report will maintain conductor and equipment within specified ratings, will balance circuit loads and system VAR flow, will reduce customer outage times and will provide overall improvements to the electrical system.

Study process included:

- Collect 2012 historical system and distribution circuit load data.
- Add large industrial customers electric system computer model.
- Utilize peak circuit load and large customer billing data to allocate load in the model.
- Determine critical spot load measurements to utilize as a check of load allocation process.
- Establish substation equipment and conductor loading limits plus primary voltage limits.
- Determine projected system load growth.
- Analyze distribution system conductor and equipment loading levels, voltage drop, system VAR flow, capacitor placement, load balancing, and line regulator settings.
- Complete voltage drop and capacity analysis for several system scenarios including critical circuit ties at 2012 loading plus 5 & 10 year load growth.
- Perform system assessment in areas with high outage rates.
- Field review system construction through the secondary level.
- Review of the system over-current protection philosophy and make recommendation of system changes in protective device coordination.
- Perform review of system with additional transformer capacity and distribution circuits.
- Prepare construction cost estimates for recommended projects.

System Background Information

City of South Haven's electrical system is comprised of the following:

- Two distribution substations
- Six distribution circuits
- 103 Miles of overhead distribution line
- 24 Miles of underground distribution line
- 2012 Peak demand 35.3MW
- 2012 Energy 142,395MWh

The City of South Haven's electrical system is served by two 69kV transmission lines owned by AEP. One 69kV line serves Main Substation Transformer #1 and the second line serves Main Substation Transformer #2 plus Phoenix Road Substation. Although clearing has recently been completed on the 69kV line serving the two substations, the reliability of this line is low.

The City of South Haven's substations are designated with a two letter code which is utilized throughout this study. The codes are as follows for each substation.

- Main Substation – MS
- Phoenix Road Substation – PR

Main Substation (MS) was initially constructed in 1963 and is comprised of two (2) 15/20/25MVA transformers, one (1) 2.0MVA welder transformer, and four (4) distribution circuits each with 416kVA voltage regulators. A major substation improvement project was completed in 2009 including replacement of the two transformers and construction of the fourth distribution circuit. A voltage regulator replacement project was finished in 2010 upgrading the regulators to handle peak circuit load at maximum regulation. There is no room for further expansion on the Main Substation property.

Phoenix Road Substation (PR) was initially constructed in 1996 and is comprised of one (1) 12/16/20MVA transformer, one (1) 1.5MVA welder transformer, and two (2) distribution circuits each with 416kVA voltage regulators. The voltage regulators were replaced in 2010 with larger units which will handle peak circuit load at maximum regulation. Significant space exists within the substation fenced area for addition of a second transformer, associated bus work and distribution circuits.

Current configuration of the six distribution circuits are shown in the attached System Circuit Map drawing. The circuit area and general load served are noted below:

- MS-D serves a few industrial customers close to the substation, then residential loads along the lakeshore area south of the city, generally west of I-196, to the State Park. This circuit has old construction with copper conductor and failing hardware along 76th Street and 14th Avenue.
- MS-E serves several industrial customers near the substation, then a significant amount of rural residential load on M-43, M-140 and areas in between. Construction is new along Blue Star Highway and M-43, then relatively new in the remaining areas.
- MS-F serves core city industrial and residential load, plus some load north of the river along Lakeshore Drive. The backbone of this circuit is of new construction.
- MS-J serves a small portion of core city residential, the water treatment plant and a majority of the Central Business District (CBD) area. The sections of the circuit in the CBD area, north and east have recently been reconstructed.
- PR-A serves a portion of the commercial load on Veteran's Drive, and a very large geographic area of rural load to the east of the City. The main three-phase sections of this circuit have recently been reconstructed.
- PR-B serves the majority of large commercial load on the east side of I-196, the waste-water treatment plant, the hospital, and the most of the area north of the river. A few sections of the main three-phase line have been rebuilt recently.

System Model Update

The computer model of the City of South Haven's electrical system in Milsoft's WindMil Engineering Analysis software was updated including correcting missing conductor data, populating missing transformer impedances, adding major customer spot loads, field measured

spot loads, and dozens of minor connectivity and equipment issues. These corrections were critical to accurately analyzing the system. The WindMil computer model still strictly contains primary (15kV) conductors and equipment. Future updates will include secondaries, services and customers (meters) allowing for more accurate analysis results. Note that changes to the primary system completed by South Haven crews are not being updated in the WindMil model.

System Load Allocation

The City of South Haven provided historical system loads for 2001 – 2012 and substation transformer and circuit loads for years 2011 – 2012. Since this is a system capacity and planning study, worst case (peak) load data was utilized. July 6, 2012 circuit load data was utilized since this was the most recent system peak. The electrical system is currently loaded to 53% of total substation transformer capacity. A graph of historical system peak load is provided in the attachments section of this report.

Proper load allocation on the system within the computer model is key to accurate analysis results. Importing of individual customer billing data provides the most accurate results, but requires customers be included in the model. Significant effort was employed to accurately allocate the system load through circuit data, adding large customer billing data, and field verification with spot load checks.

Load Growth

Growth in peak demand for South Haven's electric system is projected to be 1.25% annually for the next ten years. One significant load addition anticipated is from the new Meijer store at 1.2MVA. Load growth in the system model was accomplished through a simple 1.25% annual growth rate on all circuit loads. Although localized load growth will likely occur in the commercial areas near the new Meijer store, along Blue Star Highway, and the east side of I-196. Peak demand load projection (MW and MVA) and energy (MWh) requirements are highlighted below.

Load Projections

Year	MW Demand	MVA Demand	MWh
2012	35.3	37.2	142,395
2013	35.7	37.6	144,722
2014	36.2	38.1	146,531
2015	36.6	38.6	148,362
2016	37.1	39.1	150,217
2017	37.6	39.5	152,095
2018	38.0	40.0	153,996
2019	38.5	40.5	155,921
2020	39.0	41.0	157,870
2021	39.5	41.6	159,843
2022	40.0	42.1	161,841

*Annual escalation factor of 1.25%

Conductor & Equipment Ratings

In order to evaluate substation transformer and distribution circuit capacity, not only must system load be determined, but maximum equipment and conductor ratings must be established. Ratings utilized in this study were established for three system conditions:

1. Normal – All substation transformers and distribution circuits in service, bus tie and circuit tie switches open.
2. First Contingency – One substation transformer, distribution circuit breaker or recloser out of service, bus tie switch/circuit tie switch closed. No loss of customers.
3. Second Contingency – Two substation transformers, distribution circuit breakers or reclosers out of service, bus tie switch/circuit tie switch closed. Loss of customers.

Substation equipment including high-side (69kV) transformers, breakers, circuit switchers, etc. will be allowed to operate at 40% of maximum nameplate rating for normal conditions, 80% for 1st contingency outages, and 100% for 2nd contingency outages. Low-side (12.5kV) substation equipment and distribution circuit conductor, regardless if overhead or underground, will be allowed to operate at 60% of maximum nameplate or thermal rating for normal system conditions, 90% for 1st contingency outages, and 100% for 2nd contingency outages. The equipment and conductor ratings established in this study are goals for the City of South Haven to achieve and are the basis for the analysis and recommendations. Refer to the Equipment & Conductor Loading table attached to this report.

Maximum ratings for substation equipment are provided by the manufacturers and are listed on equipment nameplates. Due to the expense and lead time associated with substation transformers and equipment, maximum continuous loading should not exceed nameplate ratings. Short term overloads in emergency situations can be handled by transformers with little or no damage based on percentage of overload and duration.

Overhead conductor ratings are more difficult to establish than equipment ratings since the calculations include thirteen variables including selecting maximum temperature often based on unknown design conditions. The ampacity (thermal) ratings of overhead conductors on South Haven's system were determined by the following variables:

- 104°F (40°C) Ambient Temperature
- 212°F (100°C) Conductor Temperature *(Normal, 1st Contingency & Emergency)*
- 2ft/sec wind speed (utility standard)
- Additional eleven variables using a conservative approach.

Standard ACSR conductors can be operated continuously up to 212°F, but system design (sag & clearances) must reflect this rating. Conductor sag at 212°F is often not factored into overhead distribution circuit design therefore a more conservative rating (167°F) is prudent to be used for normal system conditions. The main overhead circuits under review in this study have documented design with conductor sag at 212°F, therefore this thermal rating was used for normal system conditions. Under emergency conditions, conductors will be allowed to operate at 130% of their normal rating for up to four hours.

Underground conductor ratings were determined based on cable characteristics and installation method based on conductor size.

- 90°C Conductor Temperature *(Normal & 1st Contigency)*
- 105°C Conductor Temperature *(Emergency Rating)*
- 20°C Earth Ambient Temperature
- 75% Load Factor
- Conductors up to #4/0 AL 15kV 1/3rd Concentric Neutral – direct buried, one circuit.
- Large conductors, including tape-shield power cable – direct buried conduit, one circuit.
- 133%, EPR conductor insulation.

Conductor characteristics for all City of South Haven overhead and underground conductors were updated in the WindMil equipment database (EQDB) prior to running any analysis. This included ampacity ratings for normal system conditions, and all underground cable characteristics, including cable and insulation diameters, concentric neutral cable characteristics, resistances, and dielectric constants.

Overhead and underground conductor ampacities utilized in the study are provided on the table in the attachments section of this report. This ampacity table should be utilized by South Haven electrical system personnel for future system review and operation.

Voltage Limits

Primary system voltage limits were established based on published ANSI and MPSC voltage ranges. These ranges for voltage at the point of service were the basis for this study. The range of service utilization voltage under normal system conditions is ±5% of 120V (114V – 126V). Since the computer model does not contain secondary and service wire, voltage drop was calculated on the primary system only. Case studies of both rural and municipal systems show that >99% of customers have ≤4.0V drop due to secondaries and services. Therefore a lower limit of 118V was used to account for voltage drop beyond the transformer terminals. This allows for 4V drop on secondaries and services not included in the current system model.

Protective Device Coordination

The City of South Haven does not have a formal protective device coordination philosophy in place. The objectives of installing protective devices on the electrical distribution system are to:

- Safeguard human life, including operating personnel and general public.
- Protect equipment from damage caused by fault & overcurrent on the electrical system.
- Limit extent & duration of service interruption to City of South Haven customers.

Coordination philosophies are established to select protection equipment, determine relay and recloser settings, define fuse sizes and speeds, and chose a philosophy of whether fuses will be protected or allowed to blow upon initial fault conditions. The concept of a "fuse sacrificing" or "fuse saving" scheme carries the most weight in setting the coordination philosophy for a distribution system. Fuse sacrificing schemes have recloser and relay settings that allow fuses to blow prior to having an upling recloser or breaker operate. This type of scheme reduces circuit "blinks", but lengthens outage times for some customers. Fuse saving schemes have upline reclosers and breakers operate prior to downstream fuses operates. This reduces outage times for customers, but causes momentary outages for all customers served from the circuit.

Coordination philosophies may differ per circuit based on the customer make-up, circuit location, construction type and length.

The City of South Haven's electrical system covers both urban and rural areas, has industrial, commercial and residential customers, and is comprised of overhead and underground sections. The philosophy will be to place urban circuits that serve mainly commercial districts and have loads that can be sensitive to momentary outages on a fuse sacrificing scheme. Rural circuits where there are no major three phase customers and the circuit is mainly overhead on a fuse saving scheme. Overhead circuits that are exposed to tree and animal contact will have a fuse saving scheme. These type of faults have the ability to be cleared during breaker and recloser operations. Finally circuits comprised of over 80% underground will be placed on a fuse sacrificing scheme as faults on underground are often caused by device failure and should not be allowed to persist.

- Urban circuits – fuse sacrificing
- Rural circuits – fuse saving
- Overhead – fuse saving
- Underground – fuse sacrificing

Substation Transformer Loading

Considering under 1st contingency outage conditions that no loss of service to customers will be allowed, substation transformer capacity must be sufficient enough to support the loss of one transformer in the system under peak load conditions. Main Substation has two transformers with identical maximum 25MVA ratings. These transformers operate independently, but include a bus tie switch which allows for either transformer to connect to all distribution circuits served by the substation. Loading each transformer to a maximum of 40% of nameplate rating allows for one transformer to be out of service and the second transformer to carry all Main Substation distribution circuit load under peak system conditions. Under this 1st contingency outage condition the transformers will be allowed to operate at 80% of maximum rating. This provides capacity for short-term spikes in load, unplanned load growth, and additional load transfer in the event of a 2nd contingency condition. Refer to the Substation Equipment Loading Limit Diagram. The welder transformer only serves one industrial customer, is lightly loaded, and is not factored into this analysis.

Currently all three substation transformers on South Haven's system are operating above the 40% threshold for a normal system, peak load condition. Two substation transformers are operating above 65% of maximum rating including the Phoenix Road Substation transformer and one Main Substation transformer. Refer to the Substation Transformer Loading – System Normal Peak Conditions 2012 chart.

In the event one Main Substation transformer is out of service under peak load conditions and the second substation transformer needs to be utilized to carry all substation load, the backup transformer would be pushed above its maximum rating. If Main Substation transformer #1 is out of service, transformer #2 would be loaded to 26.4MVA which is 106% of nameplate rating. Circuit PR-B from Phoenix Road can handle an additional 1.7MVA of load from Main Substation which pushes the main line conductor to its 100% limitation. This reduces Main Substation transformer #2 load to 99%. Additional load shifts from circuit PR-B to PR-A would need to be completed to allow PR-B to handle Main Substation circuit loading and reduce the transformer loading below its top rating. Refer to the Substation Transformer Loading – Main Transformer #1 or #2 Out of Service 2012 charts.

Since Phoenix Road Substation only has one transformer, all PR-A and PR-B distribution circuit load would need to be carried by the Main Substation transformers in the event of a transformer outage. Sufficient transformer capacity is available at Main Substation, but circuit conductor loading limits the amount of load that can be transferred. Only 20% of the Phoenix Road Substation load under peak conditions can be transferred to Main Substation with no conductor or voltage drop issues. The welder transformer only serves one industrial customer with minimal load and is not factored into this analysis. Refer to the recently completed Welder Transformer study for analysis on the two welder transformers.

Substation Equipment

Substation breakers, switches, and circuit switchers are in good condition due to the recent upgrades at Main Substation and the relatively new construction at Phoenix Road Substation. None of the 69kV equipment owned by South Haven is operating above the 40% threshold for normal peak operating conditions. Furthermore, the 69kV breakers and circuit switchers are operating well below the 80% level under 1st contingency outage conditions.

Main Substation MS-C transformer #2 15kV circuit breaker is operating at 62% under peak load conditions. Additionally, under 1st contingency transformer outage conditions, the 15kV secondary bus tie breaker at Main Substation be operating at a maximum of 62% of its rating if transformer load is shifted to the sister transformer in the substation. Distribution circuit voltage regulators on feeders PR-A, PR-B, and MS-F are operating above the 60% level at peak load times.

Distribution Circuit Loading

Consistent with the substation transformer outage conditions, no loss of service to customers will be allowed under 1st contingency distribution circuit breaker or main circuit outage conditions. This will apply to mainline sections of distribution circuits. The City of South Haven's distribution circuits all have normally open tie points to other circuits, although most are limited to 200A due to conductor size. Limiting distribution circuit loading to 60% of conductor ampacity allows for one distribution circuit to be out of service and a backup circuit to carry the majority of load under peak system conditions. Note that a portion (20%) of the load would need to be shifted to a third distribution circuit. Under this 1st contingency outage condition the conductor will be allowed to operate at 90% of its thermal rating. Short-term spikes in load will be covered by utilizing the emergency conductor ratings. Refer to the Distribution Circuit Loading Limit Diagram.

Based on 2012 peak load conditions, three of South Haven's six distribution circuits are operating above their 60% rating. Both Phoenix Road Substation circuits are operating above 70% of their thermal rating under peak conditions. Refer to the City of South Haven Circuit Loading 2012 chart. Main line, three-phase circuit conductor loading was analyzed for 2012 peak load, plus five and ten year load growth at 1.25% per year. Conductor loadings are highlighted on the attached drawings based on four levels <60%, 60 – 80%, 80 – 100%, and >100% of the rated ampacity. Following the conductor rating discussion above, under normal system peak conditions, conductors operating at or above 60% of their rated ampacity should be increased in size or have load shifted to other circuits.

Primary conductor sections operating above 60% of their thermal rating at peak 2012 loading:

- MS-F from the substation exit to Elkenburg Street (1.9 miles)
- MS-F along North Shore Drive from Chicago Drive to Woodman Street (0.75 miles)
- MS-J from Lovejoy Street to Aylworth Avenue (0.9 miles)
- MS-J along St. Joseph St. from South Haven Street to Van Buren Street (0.7 miles)
- PR-A underground substation exits plus the overhead on 71½ St to Phoenix Road (2.75 miles)
- PR-A along 68th Street from Phoenix Road to Meadowbook (1.9 miles)

- PR-B underground sub exits and overhead on Second Ave and Blue Star Hwy to Wilson St. (2.9 miles)

A review of the distribution circuits following five and ten-year load growth shows capacity issues (>60%) developing on the following line sections:

- PR-B Baseline Road from Blue Star Highway to Lakeshore Drive.
- MS-F St. Joseph Ave from Alyworth Ave to Elkenburg St.
- MS-J Huron Street Hendrix from the riser pole to Kalamazoo St.

These loading conditions will need to be further reviewed in future studies as system changes are implemented and load increases are accurately measured.

System Loading – Critical Circuit Ties

Conductor and equipment loading levels were evaluated for all full-capacity circuit ties at peak load conditions. The Circuit Backup Review table attached to this report lists the eight main distribution circuit ties on South Haven's system. Highlighted values represent substation breakers and distribution conductors operating above 90% when carrying the load of an adjacent circuit. Exactly 75% of the main distribution circuit ties have the backup circuit exceeding 130% of the conductor rating under 2012 peak load conditions. Under the 1st contingency loss of one distribution circuits at peak load conditions, it is likely that customers will be out of service or damage to the system will occur.

Full-capacity circuit tie issues at peak load conditions:

- Loss of Phoenix Road Substation transformer #1, PR-A and PR-B cannot be tied to circuits fed from Main Sub due to voltage issues.
- MS-E cannot backup MS-F due to overloading of overhead sections above 100% rating.
- MS-F cannot backup MS-J due to overloading of overhead sections above 100% rating.
- PR-A backing up PR-B pushes the substation exit cable and overhead sections above 100% rating.

Additional circuit ties and backfeeding capabilities exist with the multitude of switches on the system. As unique switching arrangements are required, analysis should be completed on a case-by-case basis. Additionally, circuit ties completed at non-peak times should be individually reviewed.

Voltage Drop Analysis

Voltages were calculated on the system under peak loading conditions with the system in the following conditions:

- All circuit switches in normal state.
- Fixed and switched capacitor banks on/off.
- All substation transformer regulators allowed to operate to maximum step limit 16 raise.
- All distribution line voltage regulators allowed to operate to maximum step limit 16 raise.

Analysis completed in WindMil shows that no circuits had a calculated voltage on primary line sections <118V at peak loading conditions with capacitor banks on and voltage regulators operating.

The model shows several sections of circuits for low voltage conditions under 1st contingency state (one distribution circuit out of service.) The discussion above regarding loss of the Phoenix Road Substation highlights one of the primary voltage drop issues with circuits tied together. Another issued depicted in the model is low voltage on circuit MS-E upon the loss of the circuit breaker and all load moved to MS-F.

Load Balancing

A balanced distribution system has lower losses than the unbalanced case. Although completely balanced circuits are ideal, it is not always possible to achieve. All distribution circuits were analyzed for unbalanced loading conditions through several methods:

1. WindMil's Load Balance routine.
2. Review of total connected transformer kVA.
3. Evaluation of phase loading from historical substation loading data.

Circuit loading per phase under peak conditions showed the majority of Main Substation circuits to have significant load imbalance. This imbalance, as high as 236A between phases, causes difficulty in the analysis and operation of the system as all conductors and equipment must be sized to handle load on the highest phase. System loading spreadsheets attached to this report are based on loading of the highest phase. All circuit loading data was obtained from accurate microprocessor based SEL relays.

Circuit Loading

Circuit	AØ	BØ	CØ	% Imbalance
MS-D	83	144	184	222%
MS-E	301	225	253	134%
MS-F	335	269	505	188%
MS-J	185	235	220	127%
PR-A	334	334	347	104%
PR-B	392	437	405	111%

Recommendations for the re-phasing of several taps noted on the attached drawing are the combined results from the methods stated above. Additionally, the re-phasing of some taps may not be possible due to phase orientation on the poles. Should this be the case, similarly loaded taps should be located that can be re-phased. Some phase imbalance may also be on the customer side of the system and may not be able to be

System VAR Flow

The City of South Haven's electric distribution system serves a limited number of large industrial customers and meets required quantity of VAR's during both peak and non-peak load periods. A table below shows each circuit and their associated power factor and kVAR demand on the peak load day in July 2012.

Circuit	MVAR	Power Factor
MS-D	0.36	99%
MS-E	1.69	95%
MS-F	2.75	94%
MS-J	0.93	98%
PR-A	1.65	97%
PR-B	3.02	94%

Customer Outages

The City of South Haven maintains quarterly outage reports and all 2012 reports were closely reviewed for location and cause. The outage reports indicate a majority of the distribution circuit outages, roughly 40%, were caused by failed devices. The devices were not specifically listed, but would include items such as fused cutouts and connectors. Tree contact was responsible for approximately 30% of the outages and animal contact accounted for 15-20% of all outages.

Outages per circuit varied from month to month, but MS-D and MS-F accounted for 40% of the total outages. As noted in the system background section, circuit MS-D has poor construction (see pictures in the next section) and MS-F is routed through the core city with mature vegetation. Between 25-50% of outages each month documented were in the core residential area of the city. The outages in the core city were most often caused by failed equipment and tree contact. The City of South Haven is currently on a three year tree trimming cycle which is being changed to a more aggressive two-year cycle. This should reduce tree related outage and increase reliability in this portion of the service area.

The quarterly outage reports calculate the key performance indices (SAIDI, CAIDI, and ASAI) for the entire system. Calculation of these indices for each feeder would assist with benchmarking the circuits against each other and drive future circuit rehabilitation projects by geographical area. These idices are explained below:

- SAIDI – System Average Interruption Duration Index. Target value is 52 minutes
- CAIDI – Customer Average Interruption Duration Index. Target value is <120 minutes
- ASAI – Average System Interruption Duration Index. Target value is >99.99%

The key indices show that the South Haven's electrical system should be improved. The City of South Haven has an ASAI of between 99.94% - 99.97% and should set a goal and strive to achieve an ASAI of "Four Nines" or 99.99% reliability. A "Four Nines" reliability value translates into a SAIDI value of 52 minutes per year. South Haven's CAIDI value for the previous three years has been above 150 minutes for nearly every month. In 2011, the monthly CAIDI value was above 225 minutes.

System Construction

A broad review of distribution system construction was completed including all primary overhead and various sections of open-wire secondary. Many sections of the three-phase distribution circuits are in good condition due to recently completed rebuild projects. The visibly oldest and most deteriorated sections of primary overhead line including copper conductor were found as follows:

- 14th Avenue between Blue Star Highway and 77th Avenue (MS-D)
- 76th Street between 14th Avenue and 20th Street (MS-D)
- School Street & Huron Street in the CBD (MS-F)
- St Joseph Street between Elkenburg Street & Michigan Street (MS-J)

Various sections of open wire secondary construction were also reviewed. This "open wire" construction (three individual conductors running pole-to-pole from the 120/240-volt side of a transformer) is prevalent in the core city residential area. Several common issues were found that may be causing outages including mechanical connectors (split-bolts), small wire from a transformer serving large open-wire secondary, back-yard secondary runs through dense vegetation, and low clearances in drivable areas.

Pictures are provided below of old hardware and noted secondary issues.

Aging Hardware / Antiquated Glass Insulators
Three-phase Overhead Line on 76th Street

Disconnected Crossarm Braces (Note - Repairs Completed July 2013)
Three-phase Overhead Line on St Joseph Street

Open-Wire Secondary Construction
Multiple Services Connected to Small Wire

Open-Wire Secondary Construction
Low Clearance & Mechanical Connections

Protective Device Coordination

Distribution circuit breaker settings, OCR placement and main-line fuse locations were reviewed against the philosophy established herein. Breaker settings are identical for all circuits in the Main Substation and also at Phoenix Road Substation. These settings do not take into account the location of the circuit, customer make-up, or construction type overhead vs. underground. The breaker pickup levels at Main Substation are 840A phase trip and 600A ground trip. At Phoenix Road Substation they are 600A for both phase and ground. These pickup levels are quite high for circuits with maximum conductor ampacities less than 600A and 235A maximum phase imbalance.

Single-phase OCR's are present in the mainline sections of two circuits (MS-F and PR-B) with downstream three-phase customers. These OCR's limit the mainline ampacity to the maximum continuous current rating of the OCR. Single-phase OCR's on PR-A along Phoenix Road also limit the circuit ampacity, but this is a rural circuit, and the OCR's can be bypassed when utilized as a circuit backfeed. There are multiple sets of mainline fuses in this section of line downstream of the OCR's which likely do not all coordinate.

Protective device issues noted include:

- MS-F has a fuse in the mainline protecting the underground river crossing. This fuse should both protect the circuit and allow for contingency switching.
- MS-F has single-phase OCR's on the mainline located north of Elkenburg Street.
- MS-F has single-phase OCRs located on the east Aylworth Avenue tap which serves as a full-capacity backup and has several three-phase customers.
- MS-J has mainline fuses installed in north of Lovejoy Avenue.
- PR-A along Phoenix Road east of 71st Street has multiple fuses in series.
- PR-B has single-phase OCR's on the mainline along Blue Star Highway South of 2nd Avenue. This section of line will feed the Meijer store.

CITY OF SOUTH HAVEN
ELECTRIC DISTRIBUTION SYSTEM STUDY & FIVE-YEAR PLAN
RECOMENDATIONS

The following recommendations are based on the findings and analysis stated above including conductor and equipment loading at normal and first contingency operations (one circuit out of service), established acceptable service voltages, balanced circuit loads, system VAR flow, system construction, and protection device coordination. Implementation of these recommendations will bring the electrical distribution system within the required parameters established herein.

Substation Projects

Based on the findings that all of the City of South Haven's substation transformers are operating above the 40% threshold for peak load conditions in conjunction with the number of main distribution circuits having insufficient capacity to backup adjacent circuits, additional substation transformer capacity and distribution circuits are required. These are required to maintain service to customers under the first contingency outage conditions established in this study. Installation of a new 12/16/20MVA substation transformer at the Phoenix Road Substation would bring all substation transformers to just above the 40% threshold. Two new substation circuit exits (PR-C and PR-D) are required to shift load off of transformer #1 and circuits PR-A and PR-B.

The Substation Transformer Loading – System Normal Peak Conditions 2014 chart attached to this report depicts proposed substation transformer loading in 2014. This chart includes load growth, completion of proposed circuit projects, and is based on the addition of one new 12/16/20MVA transformer installed at Phoenix Road Substation.

Project #	Circuit	Description
#101	N/A	Installation of a second 12/16/20 MVA transformer and two underground substation exits (PR-C and PR-D) at Phoenix Road Substation. Estimated cost $1,350,000.

As stated in the recently completed Welder Transformer Loss Study, at the present loading levels and configurations both the Phoenix Road Substation and Main Substation "welder" transformers should be kept in service. Replacing the transformers would be cost-prohibitive and changing the system to a new primary underground service fed from the 12.5kV distribution system would cost an estimated $26,000 per location. A contingency plan should be established to replace the Phoenix Road Substation "welder" transformer due to tests showing possible insulation breakdown. The contingency plan may be to include a new feed to the welder transformer load as part of the transformer addition.

Distribution Line Projects

Considering the fact that half of South Haven's main distribution circuits are operating above the 60% rating under peak system conditions and 75% of the main distribution circuits are operating above their maximum rating when utilized as backup circuits, additional distribution circuits are

required. Constructing two new distribution circuits from Phoenix Road Substation plus completing several reconductoring projects will increase the number of full capacity circuit ties from eight to twenty with more than half of these operating below their thermal limit under a 1st contingency condition. The majority of these distribution line projects focus on upgrading circuit conductors that are overloaded based on the analysis completed herein.

The City of South Haven Circuit Loading 2014 & 2017 charts attached to this report depicts proposed circuit loading in years 2014 and 2017. This chart includes load growth, circuit balancing, and completion of proposed distribution circuit projects.

As noted and shown above, there are sections of overhead line that have broken hardware and deteriorating copper conductor. Additionally, the open-wire secondary construction in the core city area is experiencing outages caused by aging conductors, connections, and dense vegetation. Reconstruction of three sections of failing overhead distribution line is recommended to be completed over the next five years. A visual inspection of these sections of line and repairs of broken equipment should be completed immediately. The City of South Haven should also systematically work to upgrade sections of open-wire secondary in the core city residential area. These upgrades should include tree-trimming, replacement with triplex, installation of compression connections, and new transformer connections. These improvements to the secondary system will reduce outages and improve system reliability. Specific costs for upgrading secondary are not listed on a per-year basis.

Prioritization of system improvement projects should follow these general guidelines based on the analysis completed in this study. This prioritization was utilized to arrange the projects over the proposed five-year construction plan. Reconstruction of open-wire secondary within the core-city should be completed on an annual basis.

1. Installation of a second 12/16/20MVA transformer in the Phoenix Road Substation.

2. Construction of two new circuits from Phoenix Road Substation.

3. Balance load on circuits MS-D, MS-E, and MS-F.

4. Rebuild aging overhead lines on circuit MS-D.

5. Upgrade main circuit ties to full capacity.

6. Reconductor circuits that are overloaded when used as backfeeds.

2014

Projects #102 and #103 will address the loading and capacity issues with Phoenix Road Substation circuits, PR-A and PR-B. These two projects need to be done in conjunction with installation of the new transformer. Upon completion, PR-A and PR-B will be able to be backed up by PR-D and PR-C respectively. Additional circuit load shifts will be completed in conjunction with the construction of the new circuits.

Project #	Circuit	Description
#102	PR-C	Construct new circuit PR-C on 2nd Avenue/Wells Street from Phoenix Road Substation to Blue Star Highway (0.7 miles) with #336.4 ACSR double circuit on the existing pole line to relieve load from PR-B. Move all MS-F load on North Shore Drive to this new circuit PR-C. Estimated cost $136,000.
#103	PR-D	Construct new circuit PR-D on Veteran's Blvd from 2nd Avenue to Phoenix Road (0.6 miles) with #500kCM 15kV CU underground including padmount switchgear to relieve load and reduce geographic area from PR-A. Estimated cost $435,000

2015

Projects proposed for year two (2015) of this five-year plan focus on conductor upgrades to extend the new PR-C circuit and build additional full-capacity circuit ties. Move open point on Phillips Street close to the hospital.

#104	PR-C	Rebuild PR-C (old PR-B) overhead line from 2nd Avenue/Wells Street south along Blue Star Hwy to 6th Avenue (1.0 miles) with #336.4 ACSR. Shift MS-J load on Phoenix Street east of Pearl Street to PR-B. Completion of this project will increase the capacity of the circuit to 500A and allow for full capacity ties to PR-A and PR-D, plus a future tie to MS-F with project #108. Estimated cost $165,000
#105	MS-J	Rebuild MS-J overhead line from Lovejoy Street to Aylworth Avenue (0.3 miles) in the deep right-of-way with #336.4 Hendrix. This will increase the capacity of the circuit to 500A and complete a full capacity tie to MS-F. Estimated cost $75,000.
#106	MS-F	Add 1,800kVAR in switched capacitor banks. Estimated cost: $15,000
#107	PR-B	Add 2,400kVAR in switched capacitor banks. Estimated cost: $20,000

2016

Projects proposed for the third year of this five-year plan combine both reconstruction of aging facilities and the reconductoring of Main Substation circuits to add full-capacity circuit ties.

#108	MS-D	Complete reconstruction of MS-D along 14th Avenue between 76th Street and 77th Street (0.5 miles) including conductor upgrades to #1/0 ACSR. Completion of this project reduce potential outages from broken equipment. Estimated cost $48,000
#109	MS-J	Rebuild MS-J overhead line from Elkenburg Street to Michigan Avenue north along St. Joseph Street (0.6 miles) with #336.4 Hendrix. Completion of this project will increase the capacity of the circuit to

500A up to Michigan Avenue and allow for full capacity ties to PR-C following completion of project #113. Estimated cost $145,000

#110	MS-E	Rebuild MS-E along Kalamazoo Street for 0.25 miles north to Lovejoy Street with #336.4 ACSR. Completion of this project will create a full capacity tie to MS-F in this industrialize area close to the substation. Estimated cost is $45,000
#111	MS-E	Add 1,200kVAR in switched capacitor banks. Estimated cost: $10,000
#112	PR-A	Add 1,200kVAR in switched capacitor banks. Estimated cost: $10,000

2017

The two proposed projects in 2017 continue with reconstruction of Main Substation circuits due to aging facilities and the need to add more circuit ties.

#113	MS-F	Rebuild the overhead tie between MS-F and PR-C (old PR-B) through switch #15 along both LaGrange Street and Phillips Street (1.1 miles) with #336.4 ACSR. This project will increase the circuit tie to full capacity thus improving the reliability of the feed to the hospital. Estimated cost is $200,000
#114	MS-D	Complete reconstruction of MS-D along 76th Street between 14th Avenue 20th Street (1.5 miles) including conductor upgrades to #1/0 ACSR. Completion of this project reduce potential outages from broken equipment. Estimated cost $150,000

2018

The final year of this five-year construction work plan includes three projects to continue upgrading mainline circuit conductor and circuits ties which will improve system reliability.

#115	MS-D	Rebuild circuit MS-D along Jay R. Monroe Blvd from the deep ROW section south to 12th Avenue (0.5 miles) with #4/0 ACSR. This conductor is currently loaded above 60% of its rating. Estimated cost is $60,000
#116	PR-C	Rebuild PR-C (old PR-B) overhead line along Blue Star Highway from 2nd Avenue north to Baseline Rd (0.6 miles) with #336.4 ACSR conductor. Completion of this project will provide the initial backbone of a full capacity tie on the north edge of the service area. Estimated cost $95,000.
#117	MS-E	Rebuild MS-E along Blue Star Highway from M-140 south to Stieve Drive with #336.4 ACSR. Completion of this project will create a new full capacity tie to MS-D. Estimated cost $85,000

Phase Balancing

Main Substation circuits MS-D, MS-E, and MS-F need loading per phase balanced to improve efficiency, reduce line losses, and reduce total loading per circuit. Balancing the phases will improve South Haven's ability to tie circuits together, as the highest loaded phase is the limiting factor when making distribution ties. The City of South Haven should take specific spot load measurements on peak load days to verify which areas of the system are responsible for the unbalanced conditions.

The following circuits should be re-phased to improve load balance on the distribution circuits.

- MS-D move 50 amps from CØ to BØ
- MS-E move 30 amps from AØ to BØ
- MS-F move 30 amps from CØ to AØ
- MS-F move 100 amps from CØ to BØ
- MS-J move 25 amps from BØ to AØ

Protective Device Coordination

Distribution circuit breaker relay settings at both Main Substation and Phoenix Road Substation should have the ground pickup reduced to increase the sensitivity of the relay to ground faults. Additionally, the phase pickup at Main Substation should be reviewed to be reduced closer to the maximum conductor rating. Finally, the phase pickup on the distribution circuit breaker relays at Phoenix Road Substation should be increased to allow for full 200A fusing to be installed on the circuit and not limit those circuits to less than 200A.

The single-phase OCR's in the mainline sections of circuits MS-F and PR-B should be removed to increase the circuit rating to the maximum conductor ampacity and eliminate potential single-phasing of three-phase customers. Furthermore, the mainline fuses on MS-J should be removed for similar reasons. The single-phase OCR's on PR-A east of 71st Street should be moved to the three-phase line on 68th Street south of Phoenix Road following the completion of the new PR-D circuit. The multiple sets of in-line fuses on PR-A east of 71st Street should be removed.

MS-F has a fuse in the mainline protecting the underground river crossing. The size of this fuse should be reviewed and increased in size such that, it protects the circuit and still allows contingency switching.

In order to improve system reliability and reduce protective device operation, several changes should be implemented. Animal/wildlife guards should be installed on all overhead distribution transformers bushing and coated wire should be utilized on all transformer and arrester leads. Additionally, as a specific hardware group is determined to be failing, those items (e.g. porcelain fused cutouts) should be changed aggressively. Finally, an aggressive tree trimming plan should be implemented in areas with high outage rates, dense vegetation, and backyard or deep ROW areas.

Future System Projects

Future electrical construction projects will continue to focus on improving reliability in the system through insuring that conductor and equipment are operating within the limits established herein. Due to existing system loads and continued load growth, conductors will need to be replaced and potentially additional circuits constructed.

#115	PR-C	Complete reconstruction of the overhead three-phase PR-C circuit on Baseline Road from Blue Star Highway west to North Shore Drive with #336.4 Hendrix.
#113	MS-J	Replacement of the #350kCM 15kV CU underground cable on MS-J along Michigan Avenue and Maple Street with #500kCM 15kV CU to increase circuit capacity from 200A to 500A.

Even with the addition of a second transformer at Phoenix Road substation, all substation transformers will be loaded to above the established 40% level at peak load times. Additionally, the reliability of the 69kV transmission lines serving the existing substations is suspect. The City of South Haven should consider constructing a 69kV transmission tie between the two existing substations and review constructing another substation along Blue Star Highway in this area with potential load growth. The addition of a new substation centrally located between the two existing substations would also improve voltage issues when circuits are utilized as backups by decreasing the lengths of feeder conductor.

Conclusions

Completion of a review of the City of South Haven's substation transformer loading and distribution system conductor capacity under several system scenarios for both current system loads and projected 5 and 10 year load growth shows deficiencies exist. The most significant issue is the loading on the Phoenix Road Substation transformer and the two distribution circuits PR-A and PR-B. Installation of a second 12/16/20MVA transformer and two new circuits will relieve the loading issue on the existing transformer and circuits PR-A and PR-B. This will also provide capacity needed for a single contingency loss of a transformer in Phoenix Road Substation.

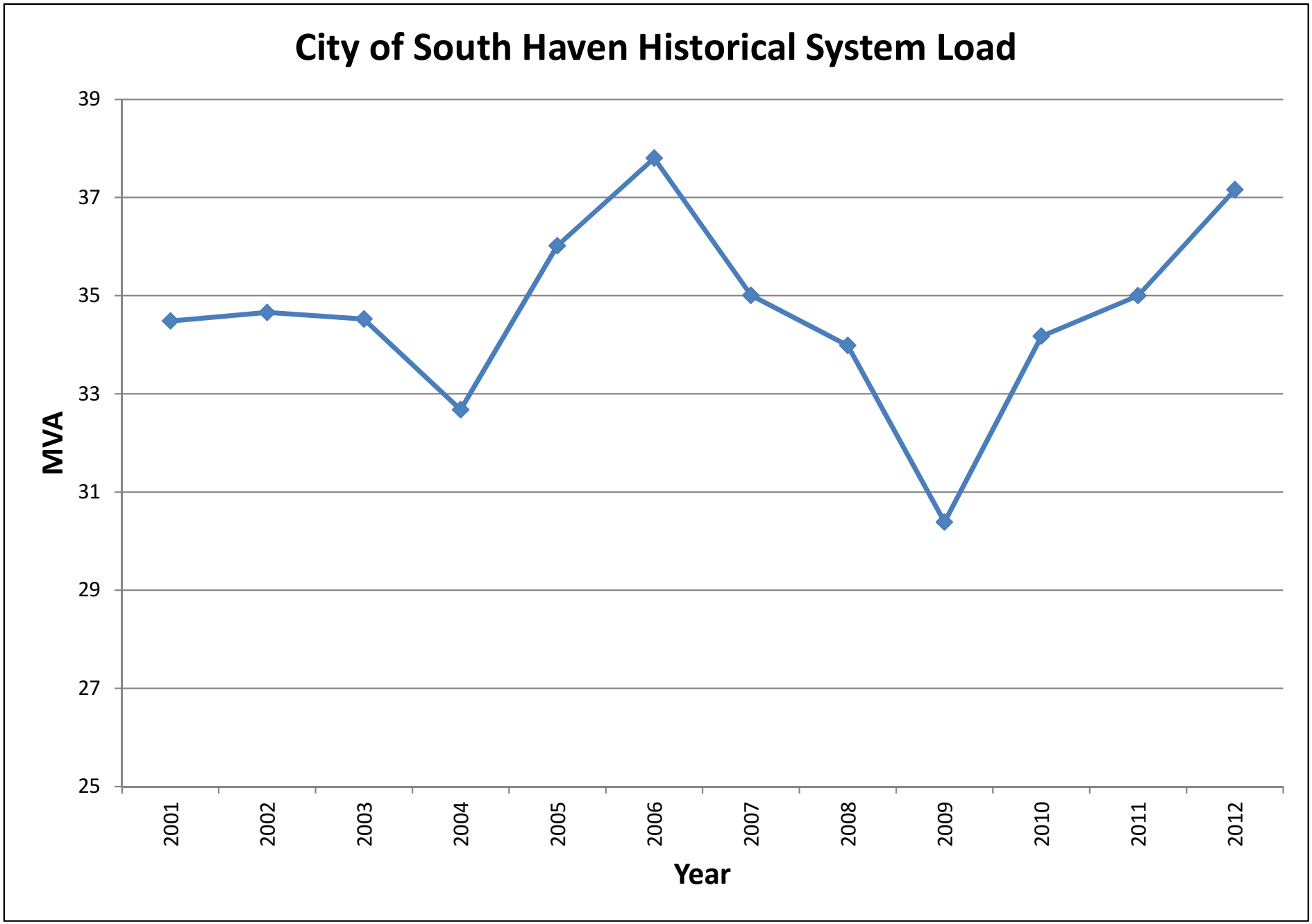
Completion of the recommended projects will significantly improve system reliability by providing usable circuit & substation backfeed capabilities, rebuilding lines with failing hardware, fixing problems with open-wire secondary and associated connections, decreasing system VAR flow, and reducing outage rates with additional tree trimming and extra wildlife protection. The projects proposed in this five-year plan will alleviate many of the distribution circuit loading conditions. Annual reviews of the system should be continued to evaluate the effect of normal load growth plus concentrated growth along Blue Star Highway. These reviews will steer future improvement projects to maintain loading levels in the substations and throughout the distribution system which were established in this report.

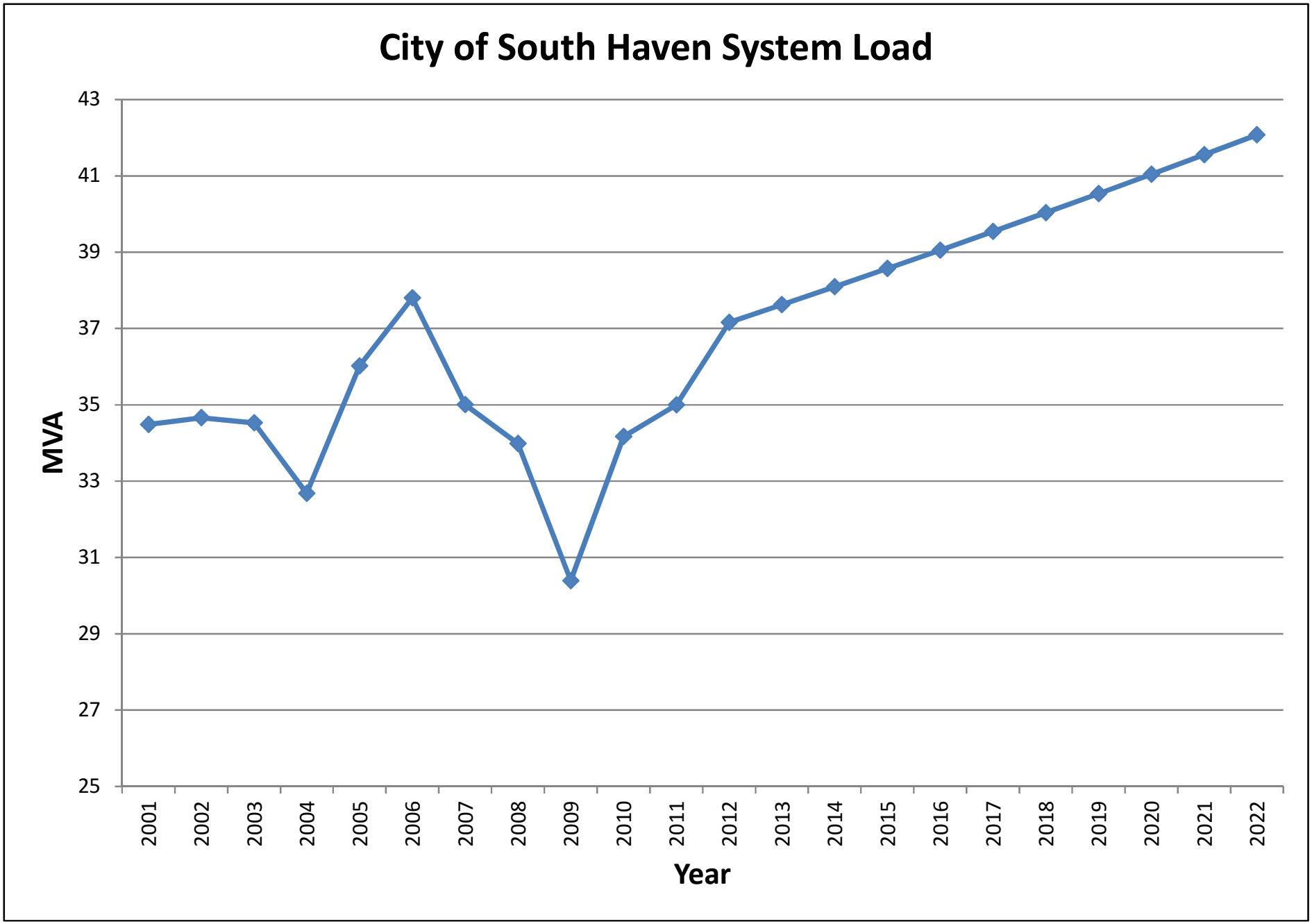
SYSTEM LOAD GRAPH

CONDUCTOR LOADING LIMITS

CONDUCTOR AMPACITIES

EQUIPMENT & CIRCUIT LOADING DIAGRAMS


City of South Haven Historical System Load
39
37
35
33
31
29
27
25
MVA
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Year



*System load includes projected 1.25% growth from 2013 - 2022

City of South Haven
System Study & Five Year Plan
Substation Loading Peak Conditions

Main Substation			2011		2012		2013		2017		2022		2027	
Item	Device	Rating[1]	Amps	Capacity	Amps	Capacity	Amps	Capacity	Amps	Capacity	Amps	Capacity	Amps	Capacity
84T1	69kV Circuit Switcher	1,200	0	0%	54	5%	55	5%	49	4%	53	4%	56	5%
84T2	69kV Circuit Switcher	1,200	0	0%	91	8%	92	8%	59	5%	62	5%	66	6%
MSX1	15/20/25 MVA Xfmr	1,159	0	0%	301	26%	305	26%	274	24%	291	25%	310	27%
MSX2	15/20/25 MVA Xfmr	1,159	0	0%	505	44%	511	44%	324	28%	345	30%	367	32%
MSX4WLD	2.0 MVA Xfmr	93	0	0%	15	16%	15	16%	16	17%	17	18%	18	19%
MS-B	1200A Breaker	1,200	0	0%	301	25%	305	25%	274	23%	291	24%	310	26%
MS-C	1200A Breaker	1,200	0	0%	505	42%	511	43%	324	27%	345	29%	367	31%
MS-D	1200A Breaker	1,200	0	0%	184	15%	186	16%	263	22%	280	23%	298	25%
MS-E	1200A Breaker	1,200	0	0%	301	25%	305	25%	274	23%	291	24%	310	26%
MS-F	1200A Breaker	1,200	0	0%	505	42%	511	43%	324	27%	345	29%	367	31%
MS-J	1200A Breaker	1,200	0	0%	235	20%	238	20%	188	16%	200	17%	213	18%
MS-Weld	175E SM-4 Fuses	175	0	0%	15	9%	15	9%	16	9%	17	10%	18	10%
VReg_MSD	416kVA V_Reg	548	0	0%	184	34%	186	34%	263	48%	280	51%	298	54%
VReg_MSE	416kVA V_Reg	548	0	0%	301	55%	305	56%	274	50%	291	53%	310	57%
VReg_MSF	416kVA V_Reg	548	0	0%	505	92%	511	93%	324	59%	345	63%	367	67%
VReg_MSJ	416kVA V_Reg	548	0	0%	235	43%	238	43%	188	34%	200	37%	213	39%
MS-H[2]	1200A Breaker	1,200	0	0%	505	42%	511	43%	324	27%	345	29%	367	31%

Phoenix Road Substation			2011		2012		2013		2017		2022		2027	
Item	Device	Rating[1]	Amps	Capacity	Amps	Capacity	Amps	Capacity	Amps	Capacity	Amps	Capacity	Amps	Capacity
CSAA	69kV Circuit Switcher	1,200	0	0%	142	12%	143	12%	94	8%	100	8%	106	9%
CSBB	69kV Circuit Switcher	1,200	-----	-----	-----	-----	-----	-----	73	6%	78	6%	83	7%
PRX1	12/16/20 MVA Xfmr	927	0	0%	784	85%	794	86%	518	56%	552	59%	587	63%
PRX2	12/16/20 MVA Xfmr	927	-----	-----	-----	-----	-----	-----	405	44%	431	46%	458	49%
PRXWLD	1.5 MVA Xfmr	70	0	0%	1	1%	1	1%	1	1%	1	1%	1	1%
PR-A	1200A Breaker	1,200	0	0%	347	29%	351	29%	193	16%	205	17%	218	18%
PR-B	1200A Breaker	1,200	0	0%	437	36%	442	37%	326	27%	346	29%	369	31%
PR-C	1200A Breaker	1,200	-----	-----	-----	-----	-----	-----	270	22%	287	24%	306	25%
PR-D	1200A Breaker	1,200	-----	-----	-----	-----	-----	-----	135	11%	144	12%	153	13%
PR-Weld	100E SM-4 Fuses	100	0	0%	1	1%	1	1%	1	1%	1	1%	1	1%
VReg_PRA	416kVA V_Reg	548	0	0%	347	63%	351	64%	193	35%	205	37%	218	40%
VReg_PRB	416kVA V_Reg	548	0	0%	437	80%	442	81%	326	59%	346	63%	369	67%
VReg_PRC	416kVA V_Reg	548	-----	-----	-----	-----	-----	-----	270	49%	287	52%	306	56%
VReg_PRD	416kVA V_Reg	548	-----	-----	-----	-----	-----	-----	135	25%	144	26%	153	28%
PR-H[2]	1200A Breaker	1,200	-----	-----	-----	-----	-----	-----	923	77%	982	82%	1,045	87%

[1] Transformer ratings are given for FFA rating on the secondary side of the transformers. Secondary voltage is 12.5kV for all transformers.
[2] Bus tie breaker/switch amps are calculated from the sum of adjacent bus breakers/switches.
[3] Cells highlighted in red represent high-side (69kV) equipment and transformers which are operating at or above 40% of nameplate rating OR low-side (12.5kV) equipment which is operating at or above 60% of nameplate rating under normal peak load conditions.

City of South Haven
System Study & Five-Year Plan
Equipment & Conductor Loading

High Side Equipment (69kV)

Breakers, Circuit Switchers, Disconnect Switches

Example 1200A Breaker

		Amps	MVA (69kV)	MVA (138kV)
Normal	40%	480	57	115
1st Contigency	80%	960	115	229
2nd Contigency	100%	1,200	143	286

Transformers (Maximum Nameplate Rating - 2nd Stage Cooling)

Substation Power Transformers

Example 12/16/20MVA Transformer

		OA (MVA)	FA (MVA)	FFA (MVA)
Normal	40%	4.8	6.4	**8.0**
1st Contigency	80%	9.6	12.8	**16.0**
2nd Contigency	100%	12.0	16.0	**20.0**

Low Side Equipment (12.5kV)

Reclosers, Breakers, Disconnect Switches

Example 1200A ABB Type R Circuit Breaker

		Type R Amps	500kCM 15kV CU	336.4 ACSR
Normal	60%	720	274	337
1st Contigency	90%	1,080	410	506
2nd Contigency	100%	1,200	456	562

Conductor ratings provided for reference.

*All allowed loading levels are at peak summer load conditions.

City of South Haven
Conductor Ampacity

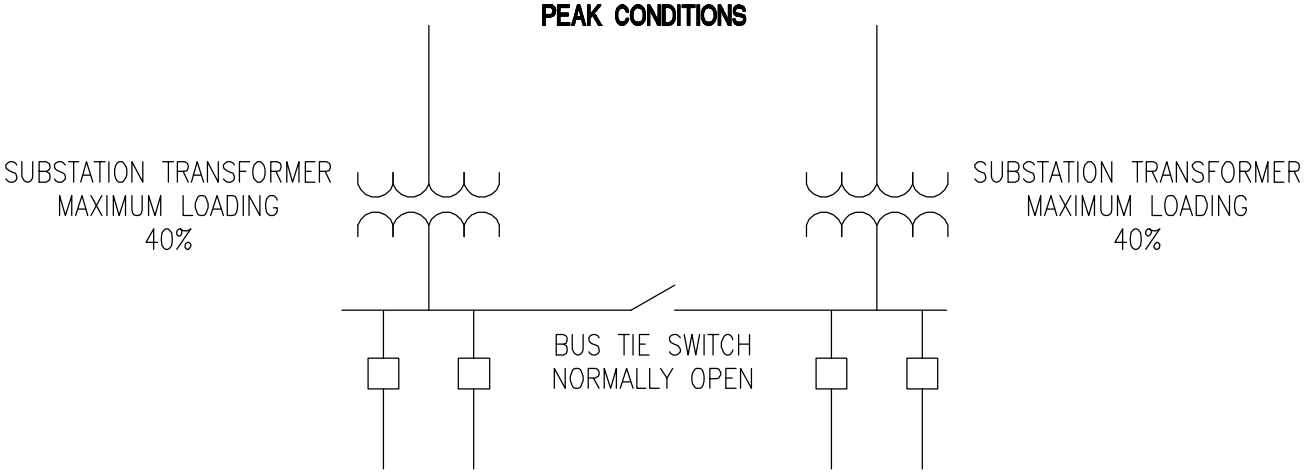
	Rated Ampacity			60% Rated Ampacity		
ACSR Conductor	120°F	167°F	212°F	120°F	167°F	212°F
#4 ACSR 7/1 "Swannate"	46	115	149	28	69	89
#2 ACSR 7/1 "Sparate"	59	153	197	35	92	118
#1/0 ACSR 6/1 "Raven"	73	198	256	44	119	154
#4/0 ACSR 6/1 "Penguin"	96	295	381	58	177	229
#336.4 ACSR 18/1 "Merlin"	119	421	562	71	253	337
#477 ACSR 26/7 "Hawk"	126	533	715	76	320	429
#1/0 Hendrix Black		201	235		121	141
#4/0 Hendrix Black		306	357		184	214
#336 Hendrix Black		447	521		268	313
#336 Hendrix Grey		478	548		287	329
#477 Hendrix Black		556	647		334	388
#477 Hendrix Grey		596	683		358	410

*Ampacities based on 104°F (40°C) Ambient Temperature, 2 ft/sec Wind Speed, Full Sun.

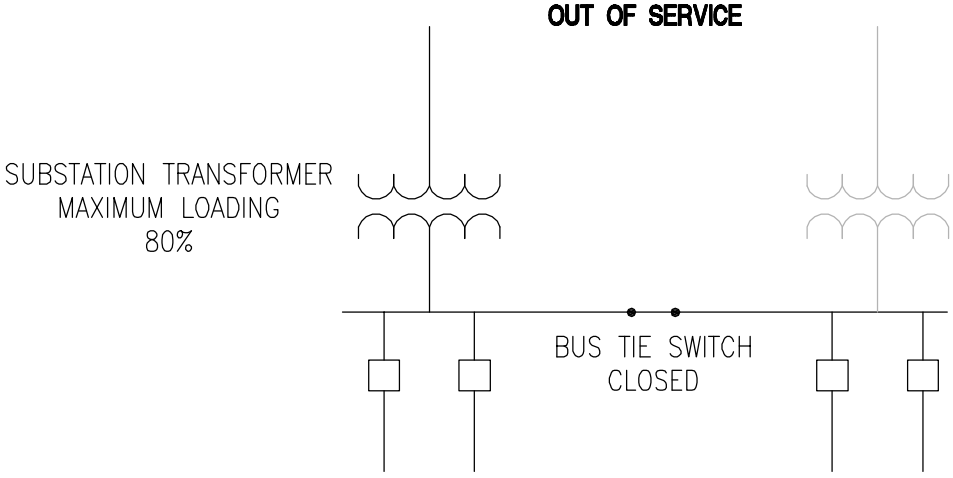
	AL Rated Ampacity		CU Rated Ampacity	
Underground Cable	Direct Buried	Buried Ductbank (2-way)	Direct Buried	Buried Ductbank (2-way)
#2 15kV Full Neutral	165		215	
#1/0 15kV Full Neutral	215		275	
#4/0 15kV 1/3rd Neutral	318		404	
#500 15kV 1/3rd Neutral		356		430
#750 15kV 1/3rd Neutral		427		490

*Ampacities based on 90°C (194°F) conductor temperature, 75% load factor, 20°C (68°F) ambient earth temperature & 90rho soil.

SYSTEM NORMAL
PEAK CONDITIONS

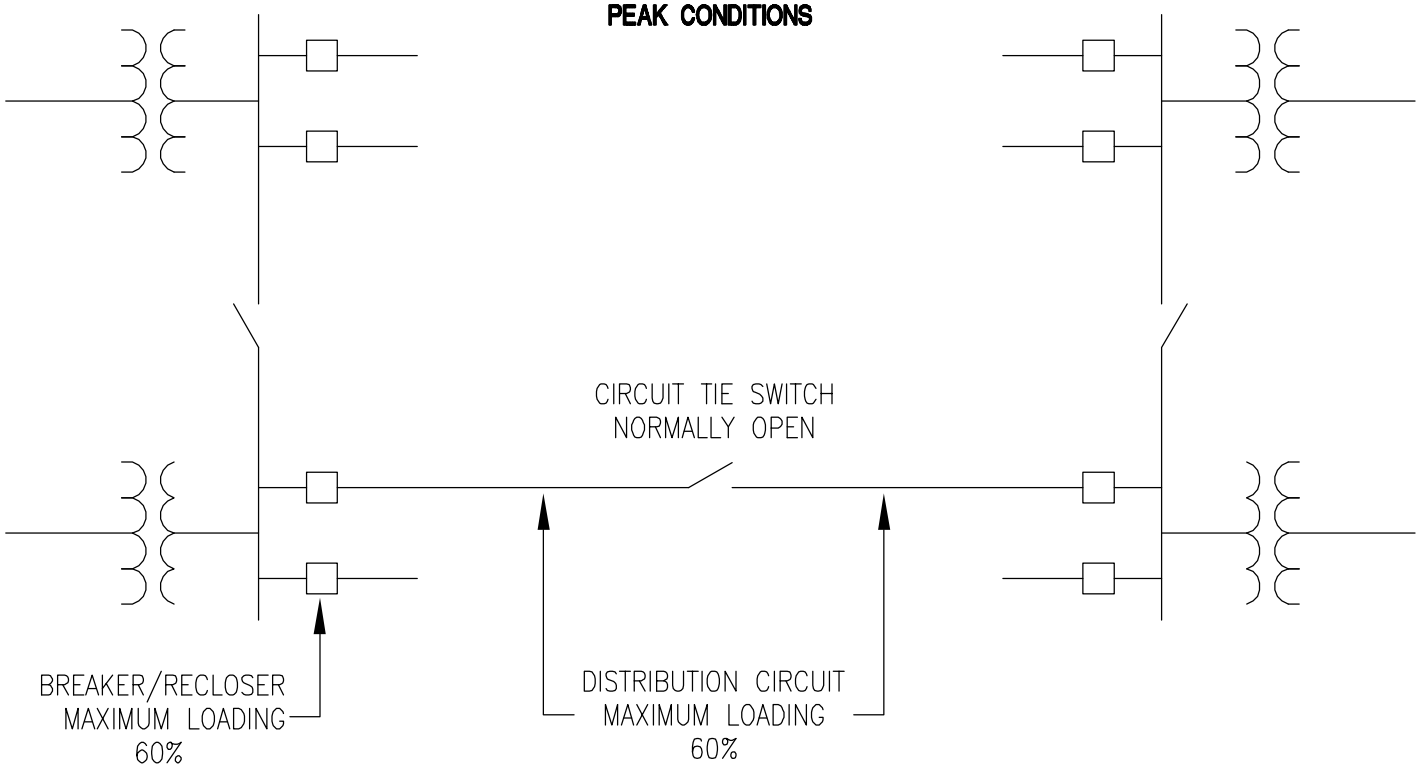


SUBSTATION TRANSFORMER
OUT OF SERVICE

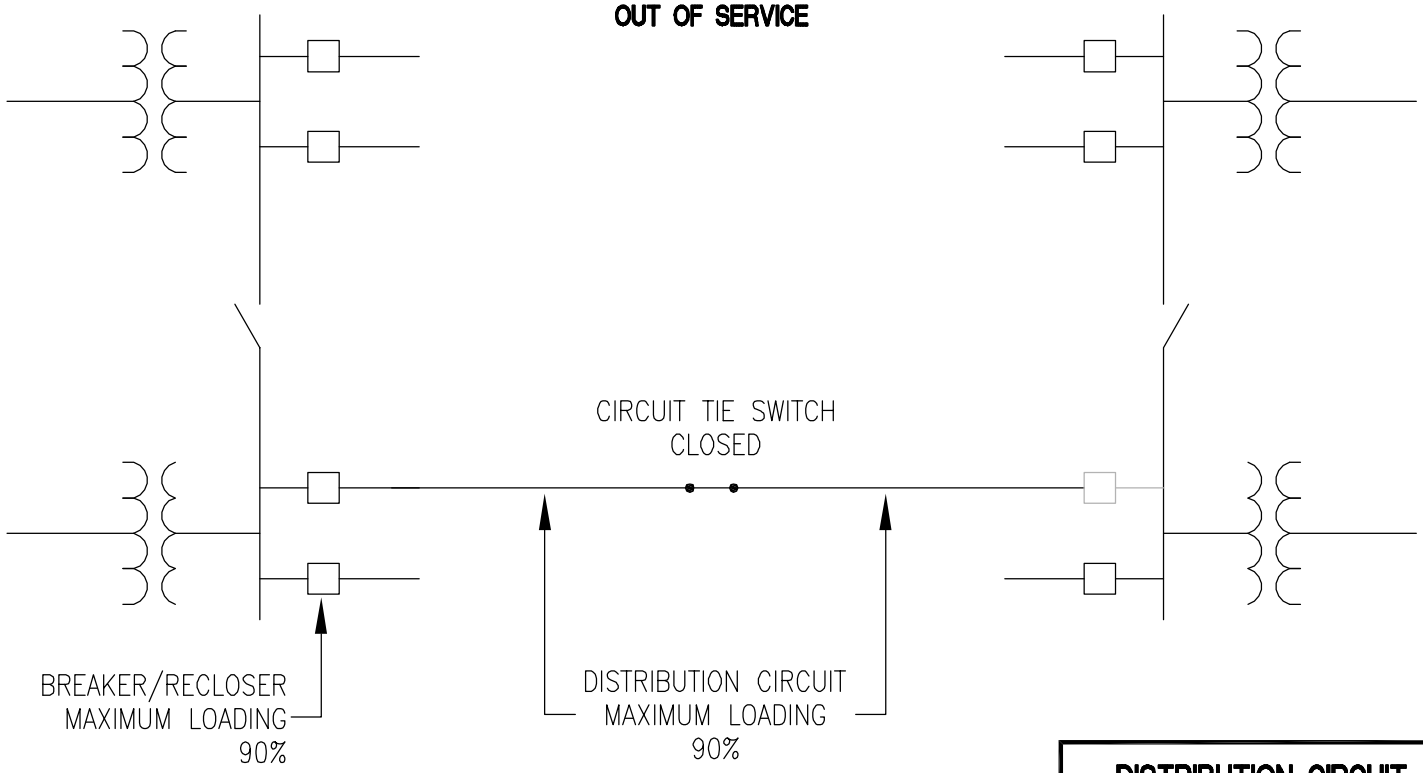


SUBSTATION EQUIPMENT LOADING LIMIT DIAGRAM

SYSTEM NORMAL
PEAK CONDITIONS



DISTRIBUTION CIRCUIT
OUT OF SERVICE

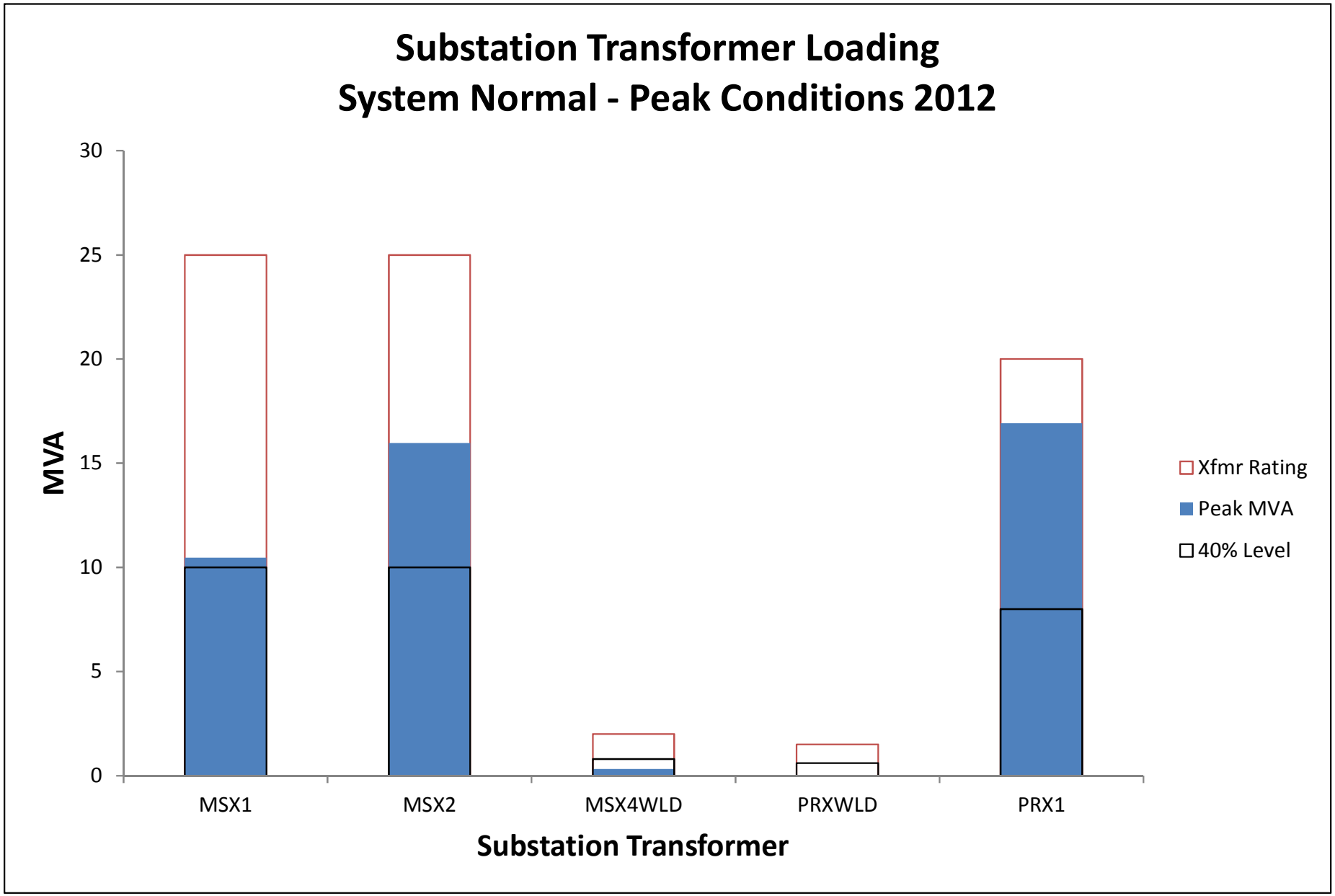


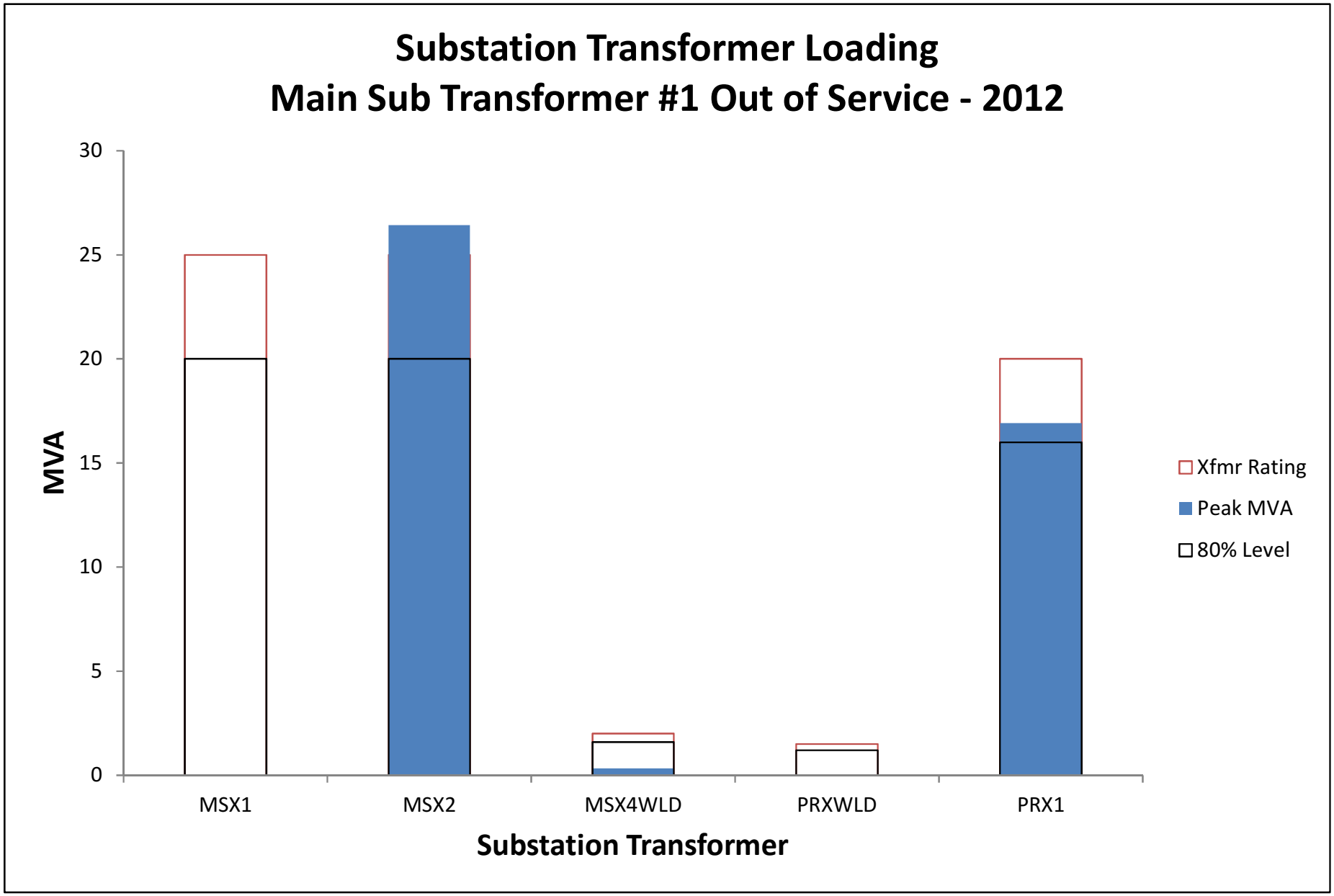
DISTRIBUTION CIRCUIT LOADING LIMIT DIAGRAM

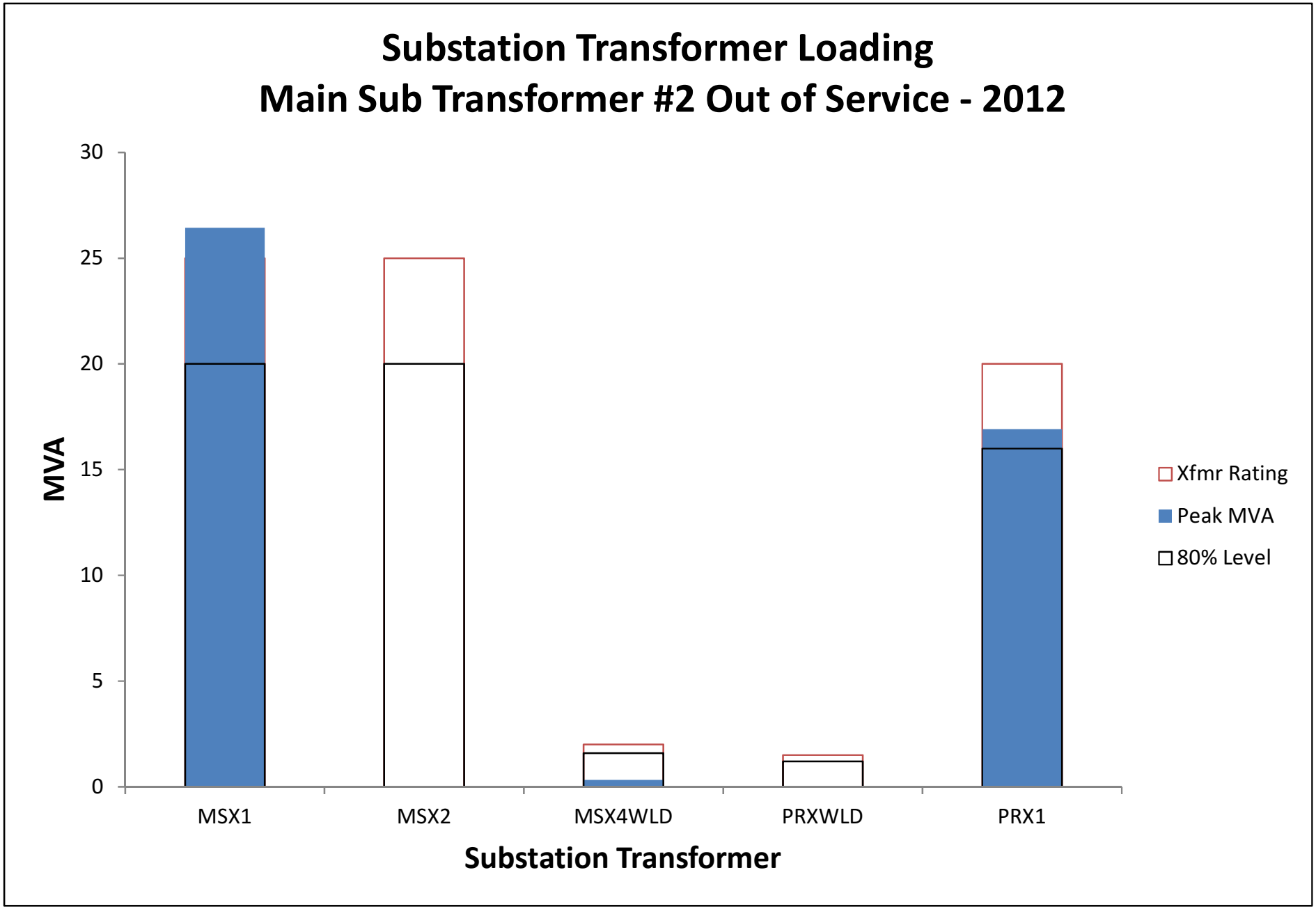
2012

SUBSTATION TRANSFORMER

LOAD CHARTS


Substation Transformer Loading
System Normal - Peak Conditions 2012
MVA
30
25
20
15
10
5
0
MSX1
MSX2
MSX4WLD
PRXWLD
PRX1
Substation Transformer
Xfmr Rating
Peak MVA
40% Level


Substation Transformer Loading
Main Sub Transformer #1 Out of Service - 2012
MVA
30
25
20
15
10
5
0
MSX1
MSX2
MSX4WLD
PRXWLD
PRX1
Substation Transformer
Xfmr Rating
Peak MVA
80% Level

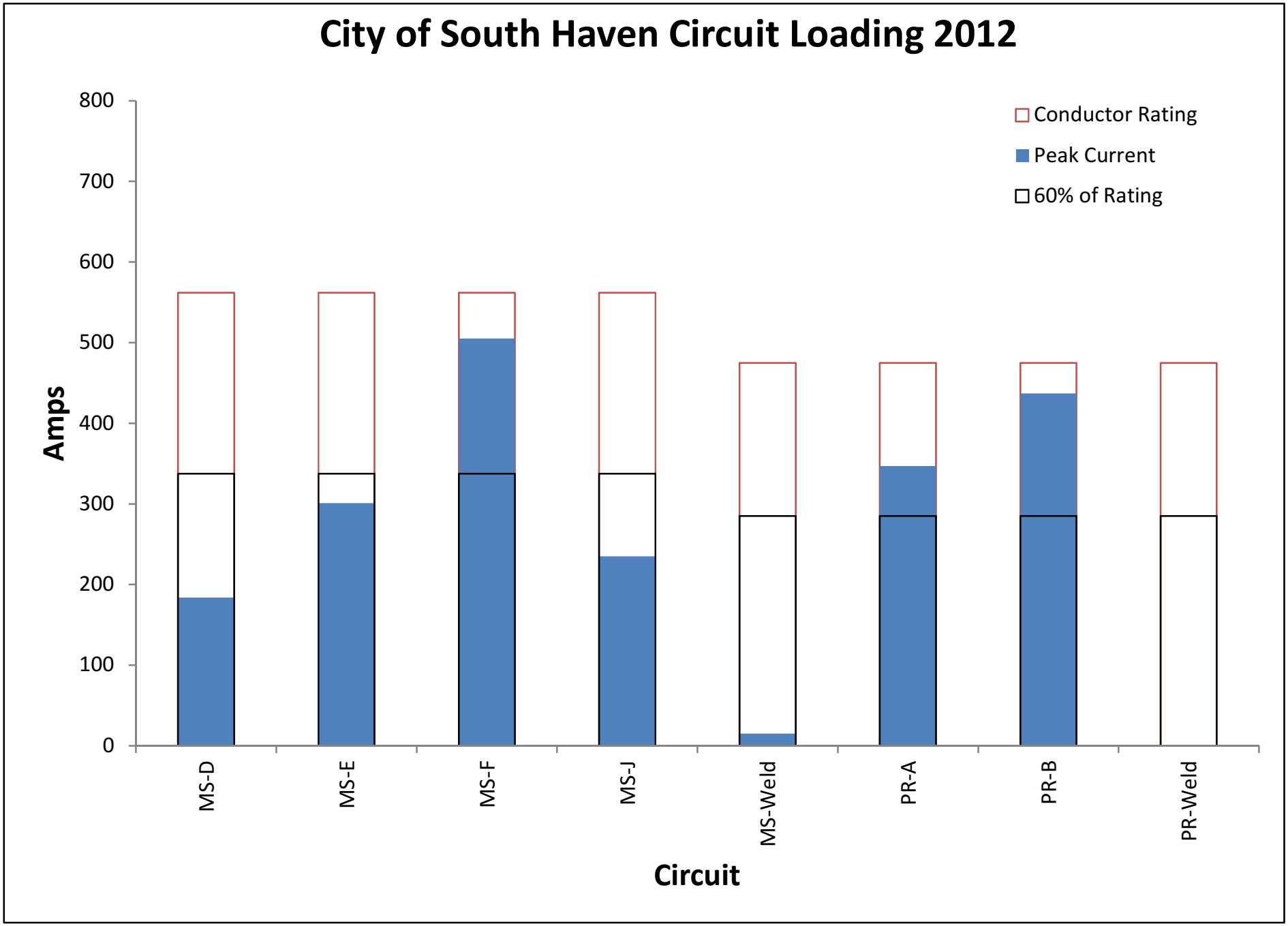

Substation Transformer Loading
Main Sub Transformer #2 Out of Service - 2012
MVA
30
25
20
15
10
5
0
MSX1
MSX2
MSX4WLD
PRXWLD
PRX1
Substation Transformer
Xfmr Rating
Peak MVA
80% Level

2012

DISTRIBUTION CIRCUIT

LOAD CHART & TABLE

CIRCUIT BACKUP REVIEW


City of South Haven Circuit Loading 2012
800
700
600
500
400
300
200
100
0
Amps
Conductor Rating
Peak Current
60% of Rating
MS-D
MS-E
MS-F
MS-J
MS-Weld
PR-A
PR-B
PR-Weld
Circuit

City of South Haven
System Study & Five Year Plan
Circuit Backup Review

Circuit Out-of-Service	Backup Circuit	Load Year 2012 Total Load	Recloser/ Breaker Capacity	Backup Circuit Conductor Capacity	Backup Circuit Sub Xfmr Capacity	Notes
MS-D	MS-E	485				14th Ave & M-140 (200A)[3]
MS-D	MS-J	419	35%	75%	44%	St Joe South of Lovejoy
MS-E	MS-D	485				14th Ave & M-140 (200A)[3]
MS-E	PR-A	648				16th Ave & M-43 (200A)[3]
MS-E	MS-F	806	67%	143%	44%	M-140 & Aylworth
MS-E	MS-F	806				Kalamazoo & Lovejoy (200A)[3]
MS-E	PR-B	738				Blue Star & M-43 200A limit on PR-B
MS-F	MS-J	740	62%	132%	44%	Kal-Haven Trail By Main Sub
MS-F	MS-E	806				Kalamazoo & Lovejoy (200A)[3]
MS-F	MS-E	806	67%	143%	26%	M-140 & Aylworth
MS-F	MS-J	740				Maple Street / Huron Street (200A)[3]
MS-F	PR-B	942				Oak St (200A)3
MS-F	PR-B	942				Phillips St (200A)[3]
MS-F	MS-J	740				Kalamazoo St & Huron St (200A)[3]
MS-J	MS-D	419	35%	75%	26%	St Joe South of Lovejoy
MS-J	MS-F	740	62%	132%	44%	Kal-Haven Trail By Main Sub
MS-J	MS-F	740				Maple Street / Huron Street (200A)[3]
MS-J	MS-F	740				Kalamazoo St & Huron St (200A)[3]
MS-J	PR-B	672				Phoenix & Blue Star (200A)[3]
MS-J	PR-B	672				ATS Dunkley St (200A)[3]
PR-A	MS-E	648				16th Ave & M-43 (200A)[3]
PR-A	PR-B	784				6th Ave & Blue Star (200A)[3]
PR-A	PR-B	784	65%	165%	85%	Phoenix Sub
PR-A	PR-B	784				Pheonix and 73rd (200A)[3]
PR-B	MS-E	738				Blue Star & M-43 (200A)[3]
PR-B	MS-F	942				Phillips St (200A)3
PR-B	MS-F	942				Oak St (200A)3
PR-B	MS-J	672				ATS Dunkley St (200A)[3]
PR-B	MS-J	672				Phoenix & Blue Star (200A)[3]
PR-B	PR-A	784	65%	165%	85%	Phoenix Sub
PR-B	PR-A	784				6th Ave & Blue Star (200A)[3]
PR-B	PR-A	784				Pheonix and 73rd (200A)[3]

[1] Ratings for ransformers are given as FFA rating on the secondary side of the transformers. Breaker & recloser ratings are nameplate. Conductor ratings are based on maximum thermal conductor operating temperature.

[2]Cells highlighted in red represent high-side (69kV) equipment and transformers which would be operating at or above 80% of nameplate rating OR low-side (12.5kV) equipment and conductors which would be operating at or above 90% of nameplate rating for these 1st contigency conditions.

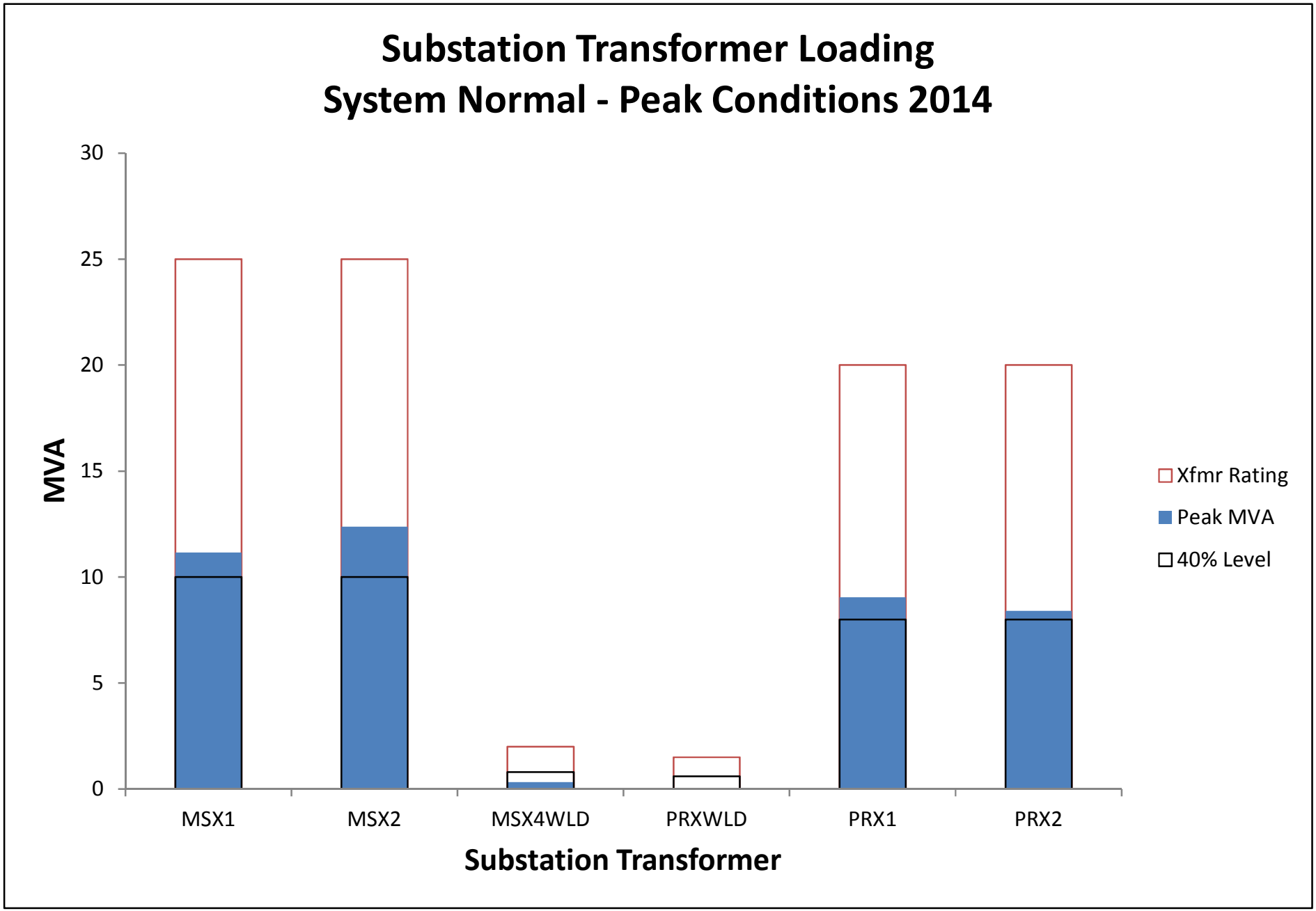
[3]These circuits were not considered in the backup review due to conductors limiting the loading to 200 Amps.

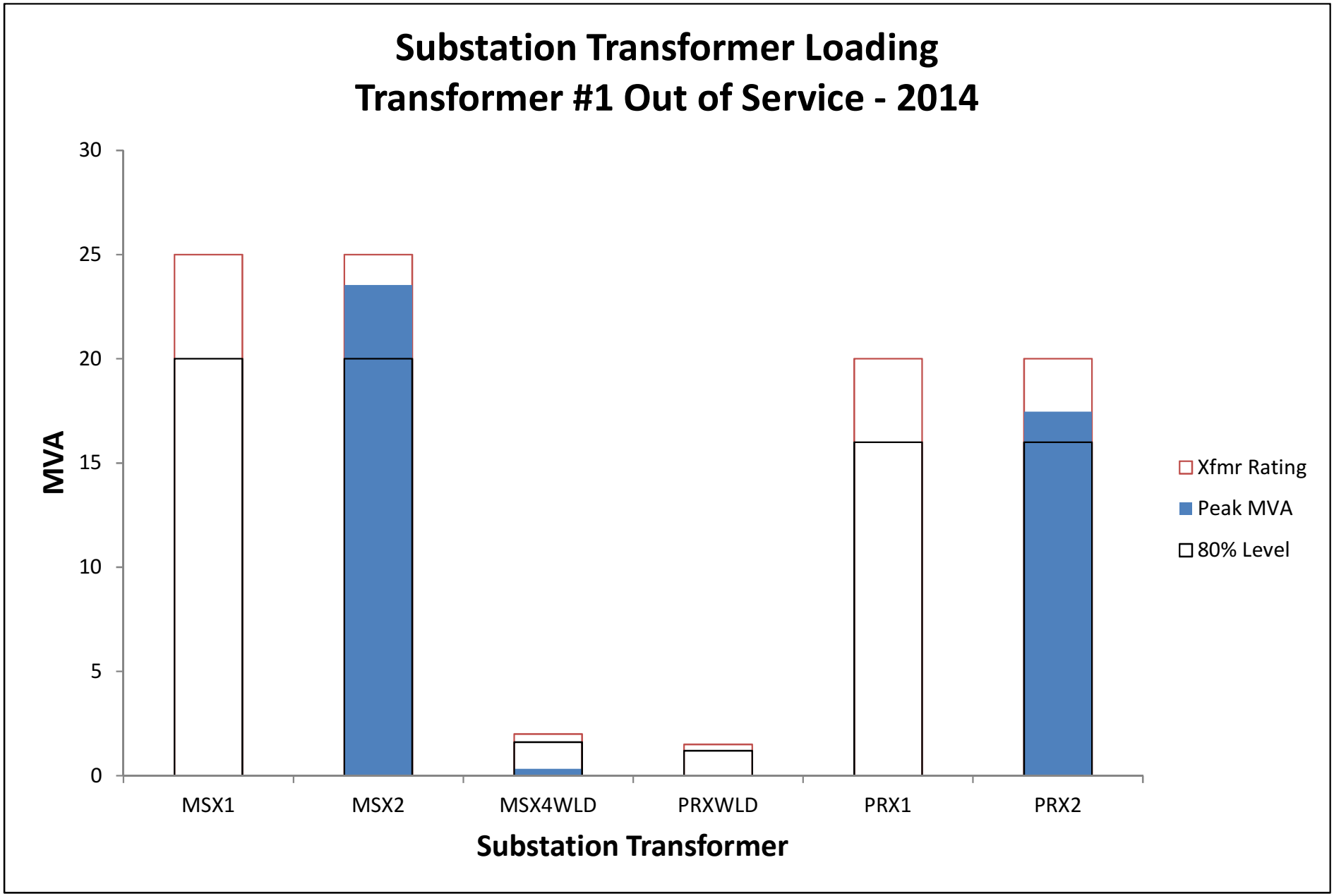
2014

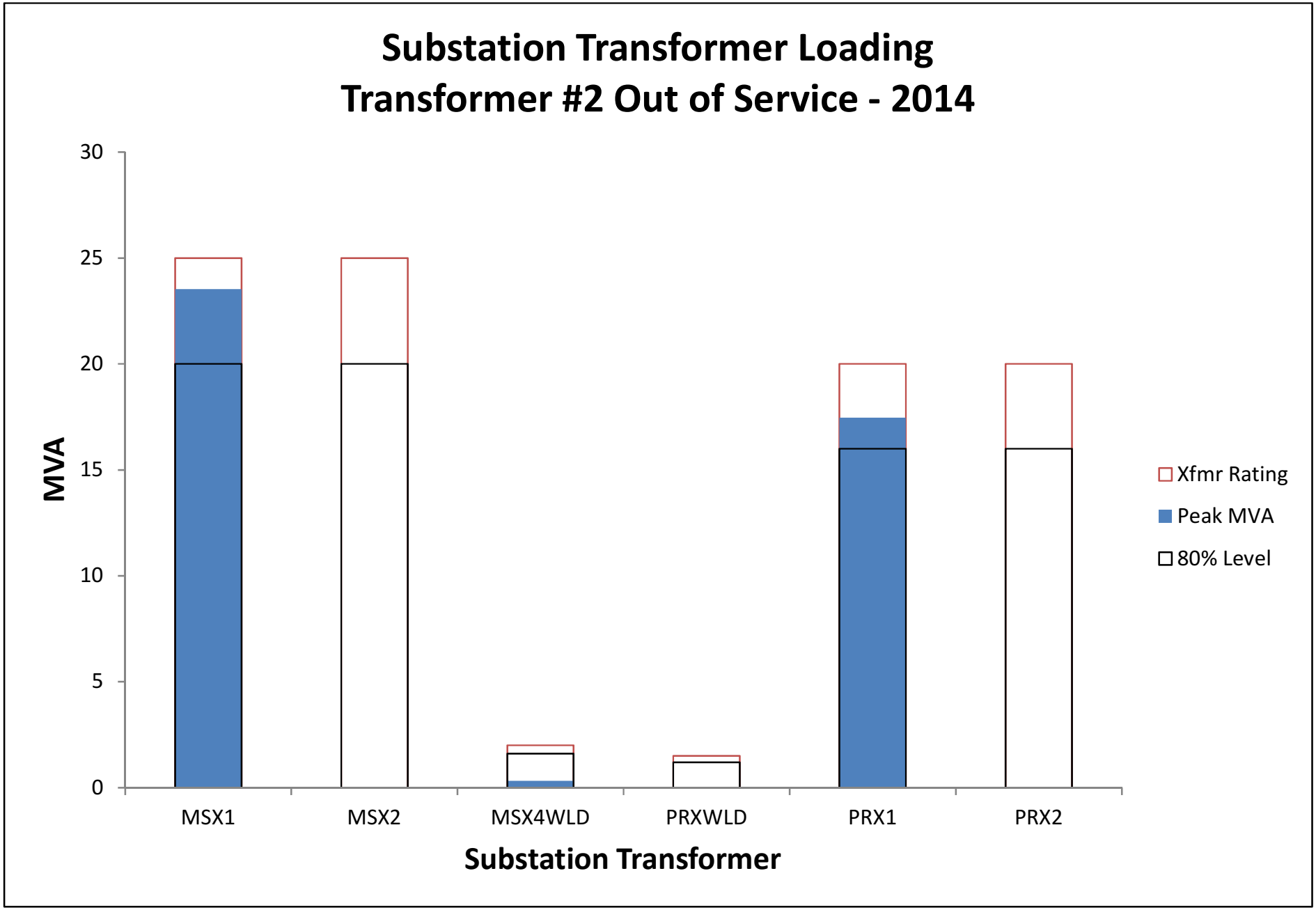
SUBSTATION TRANSFORMER

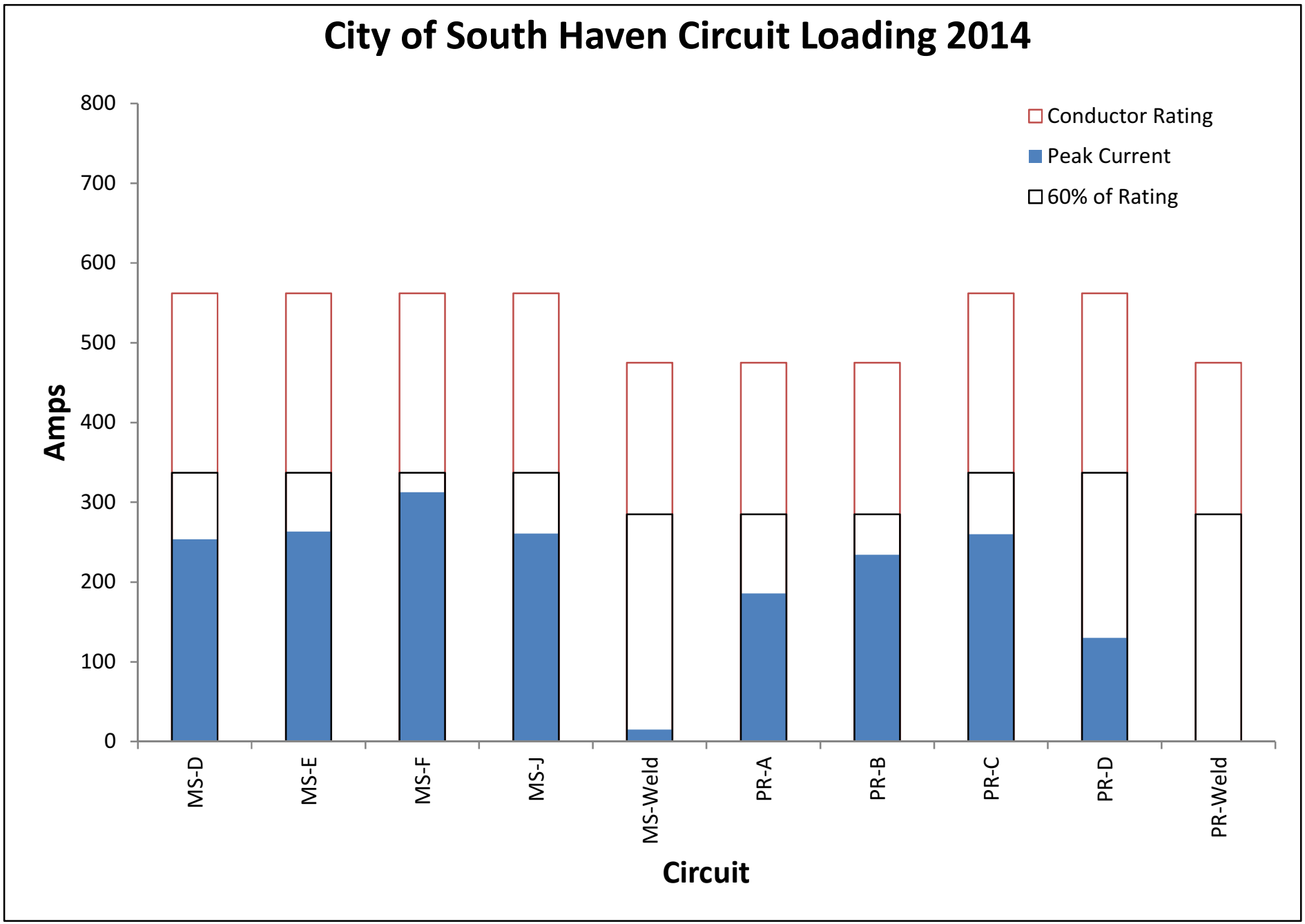
LOAD CHARTS

CIRCUIT BACKUP REVIEW


Substation Transformer Loading
System Normal - Peak Conditions 2014
MVA
30
25
20
15
10
5
0
MSX1
MSX2
MSX4WLD
PRXWLD
PRX1
PRX2
Substation Transformer
Xfmr Rating
Peak MVA
40% Level


Substation Transformer Loading
Transformer #1 Out of Service - 2014
MVA
30
25
20
15
10
5
0
MSX1
MSX2
MSX4WLD
PRXWLD
PRX1
PRX2
Substation Transformer
Xfmr Rating
Peak MVA
80% Level


Substation Transformer Loading
Transformer #2 Out of Service - 2014
MVA
30
25
20
15
10
5
0
MSX1
MSX2
MSX4WLD
PRXWLD
PRX1
PRX2
Substation Transformer
Xfmr Rating
Peak MVA
80% Level


City of South Haven Circuit Loading 2014
800
700
600
500
400
300
200
100
0
Amps
Conductor Rating
Peak Current
60% of Rating
MS-D
MS-E
MS-F
MS-J
MS-Weld
PR-A
PR-B
PR-C
PR-D
PR-Weld
Circuit

City of South Haven
System Study & Five Year Plan
Circuit Backup Review

Circuit Out-of-Service	Backup Circuit	Load Year 2014 Total Load	Recloser/ Breaker Capacity	Backup Circuit Conductor Capacity	Backup Circuit Sub Xfmr Capacity	Notes
MS-D	MS-E	517				14th Ave & M-140 (200A)[3]
MS-D	MS-J	475	40%	84%	45%	St Joe South of Lovejoy
MS-D	MS-E	517	43%	92%	45%	Stieve Dr and Blue Star
MS-E	MS-D	517				14th Ave & M-140 (200A)[3]
MS-E	MS-D	517	43%	92%	45%	Stieve Dr and Blue Star
MS-E	PR-A	449				16th Ave & M-43 (200A)[3]
MS-E	MS-F	561	47%	100%	45%	M-140 & Aylworth
MS-E	MS-F	561				Kalamazoo & Lovejoy (200A)[3]
MS-E	PR-B	553	46%	116%	51%	Blue Star & M-43 (200A)[3]
MS-F	MS-J	519	43%	92%	45%	Kal-Haven Trail By Main Sub
MS-F	MS-E	561				Kalamazoo & Lovejoy (200A)[3]
MS-F	MS-E	561	47%	100%	45%	M-140 & Aylworth
MS-F	MS-J	519				Maple Street / Huron Street (200A)[3]
MS-F	PR-B	587				Oak St (200A)[3]
MS-F	PR-B	587	49%	124%	51%	Phillips St (200A)[3]
MS-F	MS-J	519				Kalamazoo St & Huron St (200A)[3]
MS-F	PR-C	558	46%	99%	42%	North of River New Open Point
MS-J	MS-D	475	40%	84%	45%	St Joe South of Lovejoy
MS-J	MS-F	519	43%	92%	45%	Kal-Haven Trail By Main Sub
MS-J	MS-F	519				Maple Street / Huron Street (200A)[3]
MS-J	MS-F	519				Kalamazoo St & Huron St (200A)[3]
MS-J	PR-B	510				Phoenix & Blue Star (200A)[3]
MS-J	PR-B	510				ATS Dunkley St (200A)[3]
PR-A	MS-E	449				16th Ave & M-43 (200A)[3]
PR-A	PR-B	475				6th Ave & Blue Star (200A)[3]
PR-A	PR-B	475	40%	100%	51%	Phoenix Sub
PR-A	PR-B	475				Pheonix and 73rd (200A)[3]
PR-A	PR-D	316	26%	56%	42%	71 1/2 and Phoenix New Tie Switch
PR-B	MS-E	553	46%	98%	45%	Blue Star & M-43 (200A)[3]
PR-B	MS-F	587	49%	104%	45%	Phillips St (200A)[3]
PR-B	MS-F	587				Oak St (200A)[3]
PR-B	MS-J	510				ATS Dunkley St (200A)[3]
PR-B	MS-J	510				Phoenix & Blue Star (200A)[3]
PR-B	PR-A	475	40%	100%	51%	Phoenix Sub
PR-B	PR-A	475				6th Ave & Blue Star (200A)[3]
PR-B	PR-A	475				Pheonix and 73rd (200A)[3]
PR-B	PR-C	549	46%	98%	42%	New Tie 2nd Ave and Blue Star
PR-C	PR-B	549	46%	116%	51%	New Tie 2nd Ave and Blue Star

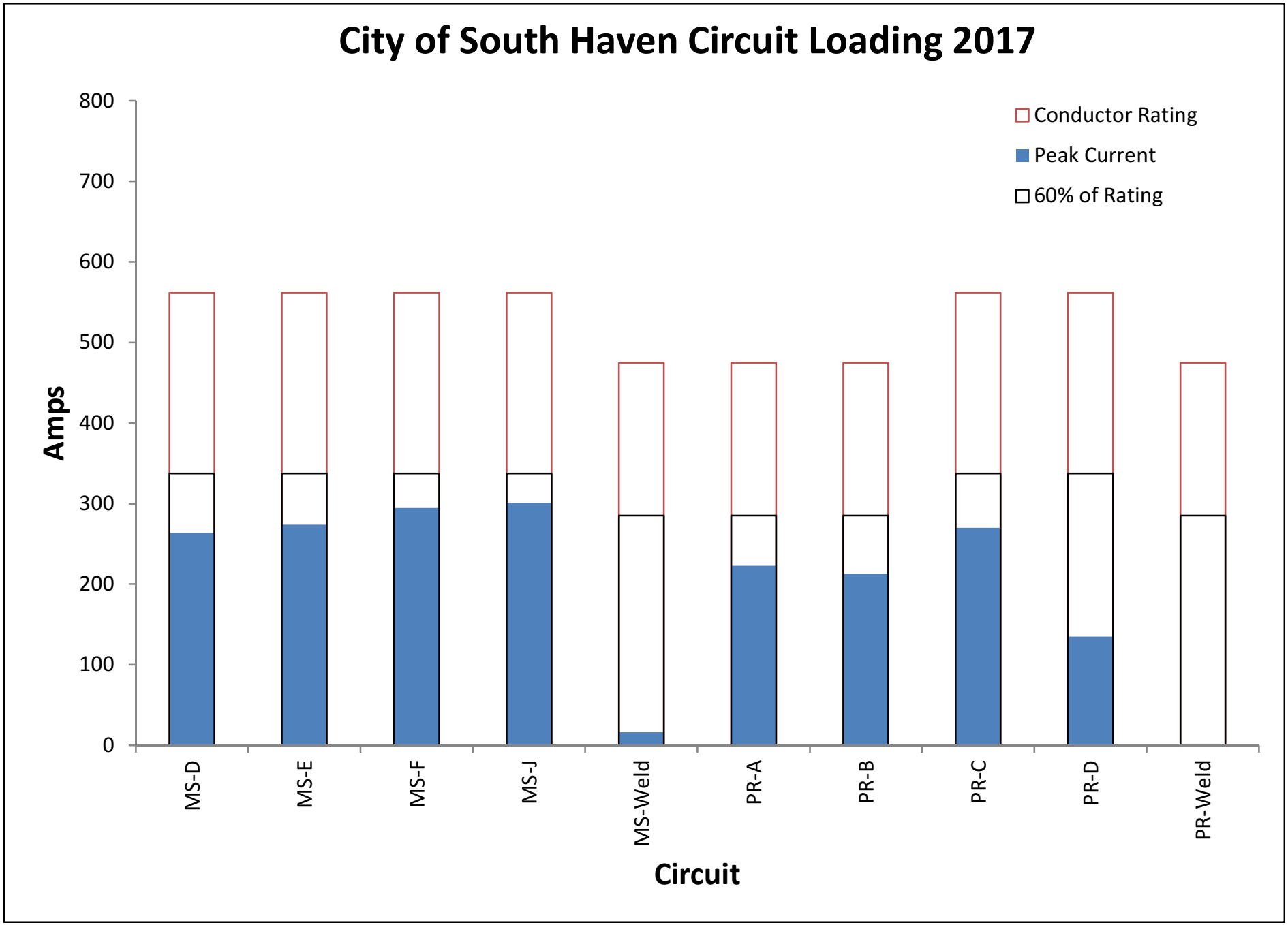
City of South Haven
System Study & Five Year Plan
Circuit Backup Review

Circuit Out-of-Service	Backup Circuit	Load Year 2014 Total Load	Recloser/ Breaker Capacity	Backup Circuit Conductor Capacity	Backup Circuit Sub Xfmr Capacity	Notes
PR-C	MS-F	558	46%	99%	45%	North of River New Open Point
PR-D	PR-A	316	26%	66%	51%	71 1/2 and Phoenix New Tie Switch

[1] Ratings for ransformers are given as FFA rating on the secondary side of the transformers. Breaker & recloser ratings are nameplate. Conductor ratings are based on maximum thermal conductor operating temperature.

[2]Cells highlighted in red represent high-side (69kV) equipment and transformers which would be operating at or above 80% of nameplate rating OR low-side (12.5kV) equipment and conductors which would be operating at or above 90% of nameplate rating for these 1st contigency conditions.

[3]These circuits were not considered in the backup review due to conductors limiting the loading to 200 Amps.


City of South Haven Circuit Loading 2017
800
700
600
500
400
300
200
100
0
Amps
Conductor Rating
Peak Current
60% of Rating
MS-D
MS-E
MS-F
MS-J
MS-Weld
PR-A
PR-B
PR-C
PR-D
PR-Weld
Circuit

City of South Haven
System Study & Five Year Plan
Circuit Backup Review

Circuit Out-of-Service	Backup Circuit	Load Year 2017 Total Load	Recloser/ Breaker Capacity	Backup Circuit Conductor Capacity	Backup Circuit Sub Xfmr Capacity	Notes
MS-D	MS-E	537				14th Ave & M-140 (200A)[3]
MS-D	MS-J	452	38%	80%	28%	St Joe South of Lovejoy
MS-D	MS-E	537	45%	96%	24%	Stieve Dr and Blue Star
MS-E	MS-D	537				14th Ave & M-140 (200A)[3]
MS-E	MS-D	537	45%	96%	24%	Stieve Dr and Blue Star
MS-E	PR-A	466				16th Ave & M-43 (200A)[3]
MS-E	MS-F	598	50%	106%	28%	M-140 & Aylworth
MS-E	MS-F	598				Kalamazoo & Lovejoy (200A)[3]
MS-E	PR-B	599	50%	126%	56%	Blue Star & M-43 (200A)[3]
MS-F	MS-J	513	43%	91%	28%	Kal-Haven Trail By Main Sub
MS-F	MS-E	598				Kalamazoo & Lovejoy (200A)[3]
MS-F	MS-E	598	50%	106%	24%	M-140 & Aylworth
MS-F	MS-J	513				Maple Street / Huron Street (200A)[3]
MS-F	PR-B	650				Oak St (200A)[3]
MS-F	PR-B	650	54%	137%	56%	Phillips St (200A)[3]
MS-F	MS-J	513				Kalamazoo St & Huron St (200A)[3]
MS-F	PR-C	594	50%	106%	44%	North of River New Open Point
MS-J	MS-D	452	38%	80%	24%	St Joe South of Lovejoy
MS-J	MS-F	513	43%	91%	28%	Kal-Haven Trail By Main Sub
MS-J	MS-F	513				Maple Street / Huron Street (200A)[3]
MS-J	MS-F	513				Kalamazoo St & Huron St (200A)[3]
MS-J	PR-B	514				Phoenix & Blue Star (200A)[3]
MS-J	PR-B	514				ATS Dunkley St (200A)[3]
PR-A	MS-E	466				16th Ave & M-43 (200A)[3]
PR-A	PR-B	518				6th Ave & Blue Star (200A)[3]
PR-A	PR-B	518	43%	109%	56%	Phoenix Sub
PR-A	PR-B	518				Pheonix and 73rd (200A)[3]
PR-A	PR-D	328	27%	58%	44%	71 1/2 and Phoenix New Tie Switch
PR-B	MS-E	599	50%	107%	24%	Blue Star & M-43 (200A)[3]
PR-B	MS-F	650	54%	116%	28%	Phillips St (200A)[3]
PR-B	MS-F	650				Oak St (200A)[3]
PR-B	MS-J	514				ATS Dunkley St (200A)[3]
PR-B	MS-J	514				Phoenix & Blue Star (200A)[3]
PR-B	PR-A	518	43%	109%	56%	Phoenix Sub
PR-B	PR-A	518				6th Ave & Blue Star (200A)[3]
PR-B	PR-A	518				Pheonix and 73rd (200A)[3]
PR-B	PR-C	595	50%	106%	44%	New Tie 2nd Ave and Blue Star
PR-C	PR-B	595	50%	125%	56%	New Tie 2nd Ave and Blue Star

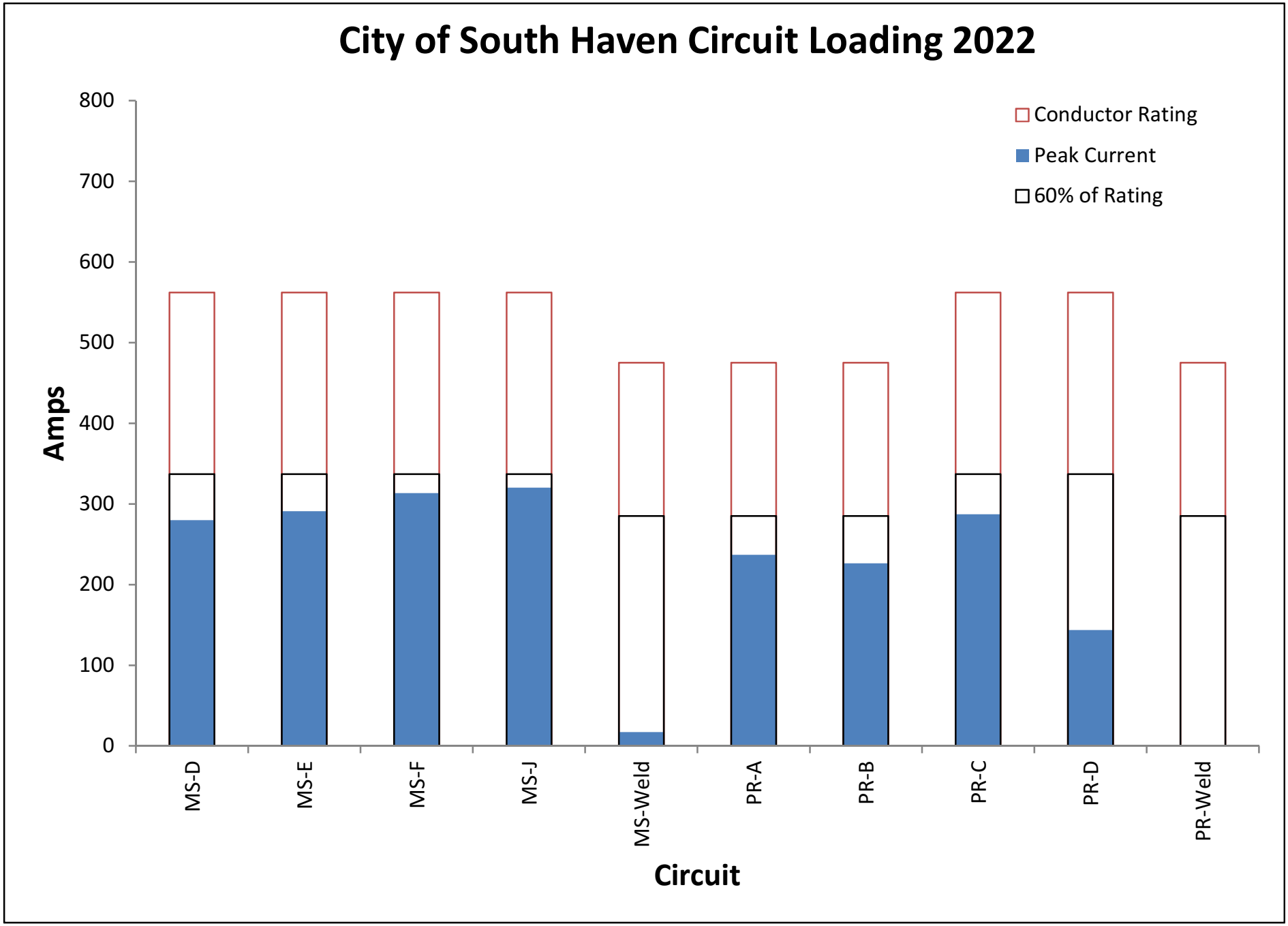
City of South Haven
System Study & Five Year Plan
Circuit Backup Review

Circuit Out-of-Service	Backup Circuit	Load Year 2017 Total Load	Recloser/ Breaker Capacity	Backup Circuit Conductor Capacity	Backup Circuit Sub Xfmr Capacity	Notes
PR-C	MS-F	594	50%	106%	28%	North of River New Open Point
PR-D	PR-A	328	27%	69%	56%	71 1/2 and Phoenix New Tie Switch

[1] Ratings for ransformers are given as FFA rating on the secondary side of the transformers. Breaker & recloser ratings are nameplate. Conductor ratings are based on maximum thermal conductor operating temperature.

[2]Cells highlighted in red represent high-side (69kV) equipment and transformers which would be operating at or above 80% of nameplate rating OR low-side (12.5kV) equipment and conductors which would be operating at or above 90% of nameplate rating for these 1st contigency conditions.

[3]These circuits were not considered in the backup review due to conductors limiting the loading to 200 Amps.


City of South Haven Circuit Loading 2022
800
700
600
500
400
300
200
100
0
Amps
Conductor Rating
Peak Current
60% of Rating
MS-D
MS-E
MS-F
MS-J
MS-Weld
PR-A
PR-B
PR-C
PR-D
PR-Weld
Circuit

City of South Haven
System Study & Five Year Plan
Circuit Backup Review

Circuit Out-of-Service	Backup Circuit	Load Year 2022 Total Load	Recloser/ Breaker Capacity	Backup Circuit Conductor Capacity	Backup Circuit Sub Xfmr Capacity	Notes
MS-D	MS-E	571				14th Ave & M-140 (200A)[3]
MS-D	MS-J	480	40%	85%	30%	St Joe South of Lovejoy
MS-D	MS-E	571	48%	102%	25%	Stieve Dr and Blue Star
MS-E	MS-D	571				14th Ave & M-140 (200A)[3]
MS-E	MS-D	571	48%	102%	25%	Stieve Dr and Blue Star
MS-E	PR-A	496				16th Ave & M-43 (200A)[3]
MS-E	MS-F	636	53%	113%	30%	M-140 & Aylworth
MS-E	MS-F	636				Kalamazoo & Lovejoy (200A)[3]
MS-E	PR-B	638	53%	134%	59%	Blue Star & M-43 (200A)[3]
MS-F	MS-J	546	45%	97%	30%	Kal-Haven Trail By Main Sub
MS-F	MS-E	636				Kalamazoo & Lovejoy (200A)[3]
MS-F	MS-E	636	53%	113%	25%	M-140 & Aylworth
MS-F	MS-J	546				Maple Street / Huron Street (200A)[3]
MS-F	PR-B	692				Oak St (200A)[3]
MS-F	PR-B	692	58%	146%	59%	Phillips St (200A)3
MS-F	MS-J	546				Kalamazoo St & Huron St (200A)[3]
MS-F	PR-C	632	53%	113%	46%	North of River New Open Point
MS-J	MS-D	480	40%	85%	25%	St Joe South of Lovejoy
MS-J	MS-F	546	45%	97%	30%	Kal-Haven Trail By Main Sub
MS-J	MS-F	546				Maple Street / Huron Street (200A)[3]
MS-J	MS-F	546				Kalamazoo St & Huron St (200A)[3]
MS-J	PR-B	547				Phoenix & Blue Star (200A)[3]
MS-J	PR-B	547				ATS Dunkley St (200A)[3]
PR-A	MS-E	496				16th Ave & M-43 (200A)[3]
PR-A	PR-B	552				6th Ave & Blue Star (200A)[3]
PR-A	PR-B	552	46%	116%	59%	Phoenix Sub
PR-A	PR-B	552				Pheonix and 73rd (200A)[3]
PR-A	PR-D	349	29%	62%	46%	71 1/2 and Phoenix New Tie Switch
PR-B	MS-E	638	53%	113%	25%	Blue Star & M-43 (200A)[3]
PR-B	MS-F	692	58%	123%	30%	Phillips St (200A)[3]
PR-B	MS-F	692				Oak St (200A)[3]
PR-B	MS-J	547				ATS Dunkley St (200A)[3]
PR-B	MS-J	547				Phoenix & Blue Star (200A)[3]
PR-B	PR-A	552	46%	116%	59%	Phoenix Sub
PR-B	PR-A	552				6th Ave & Blue Star (200A)[3]
PR-B	PR-A	552				Pheonix and 73rd (200A)[3]
PR-B	PR-C	634	53%	113%	46%	New Tie 2nd Ave and Blue Star
PR-C	PR-B	634	53%	133%	59%	New Tie 2nd Ave and Blue Star

City of South Haven
System Study & Five Year Plan
Circuit Backup Review

Circuit Out-of-Service	Backup Circuit	Load Year 2022 Total Load	Recloser/ Breaker Capacity	Backup Circuit Conductor Capacity	Backup Circuit Sub Xfmr Capacity	Notes
PR-C	MS-F	632	53%	113%	30%	North of River New Open Point
PR-D	PR-A	349	29%	73%	59%	71 1/2 and Phoenix New Tie Switch

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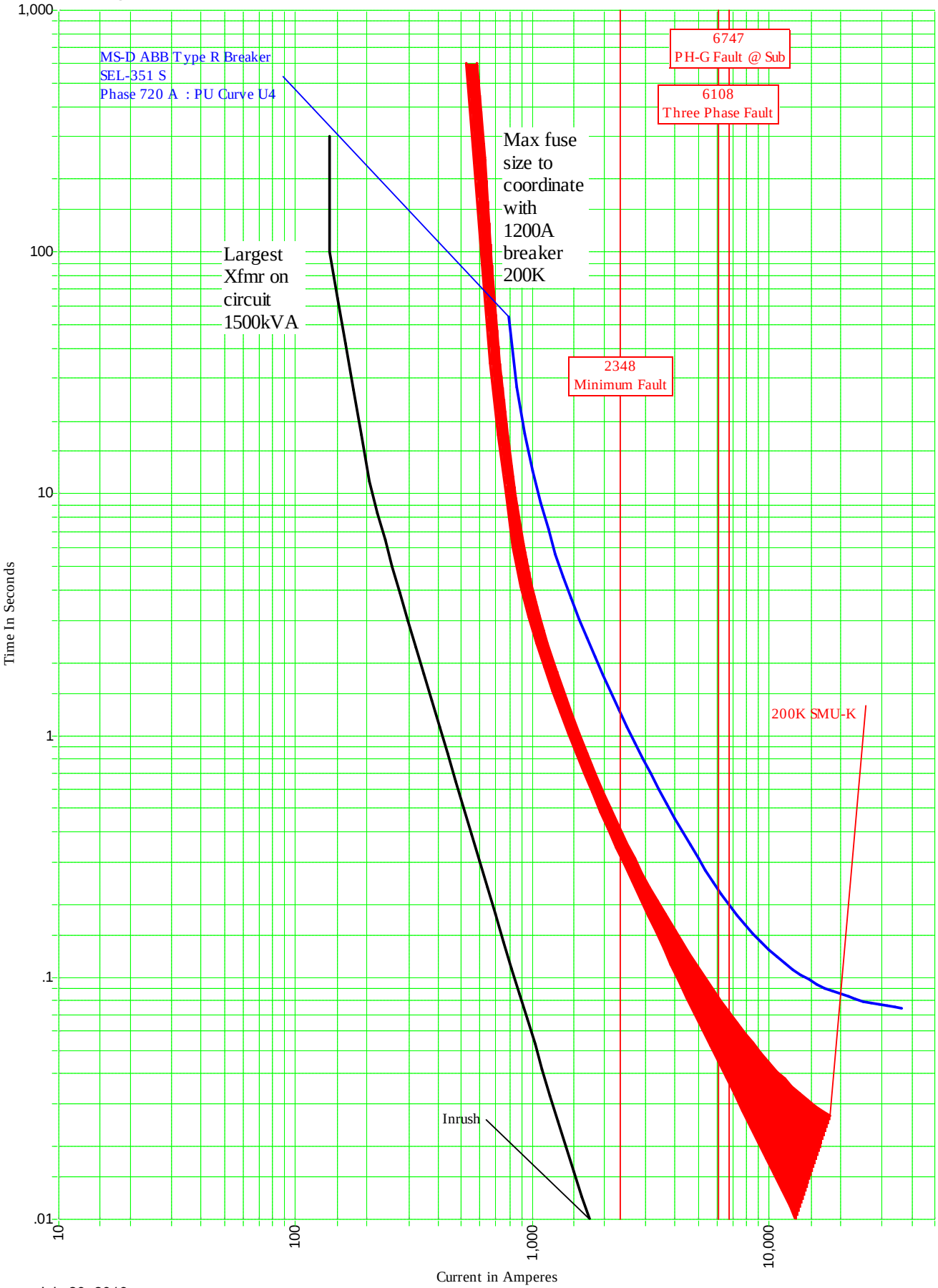
[2]Cells highlighted in red represent high-side (69kV) equipment and transformers which would be operating at or above 80% of nameplate rating OR low-side (12.5kV) equipment and conductors which would be operating at or above 90% of nameplate rating for these 1st contigency conditions.

[3]These circuits were not considered in the backup review due to conductors limiting the loading to 200 Amps.

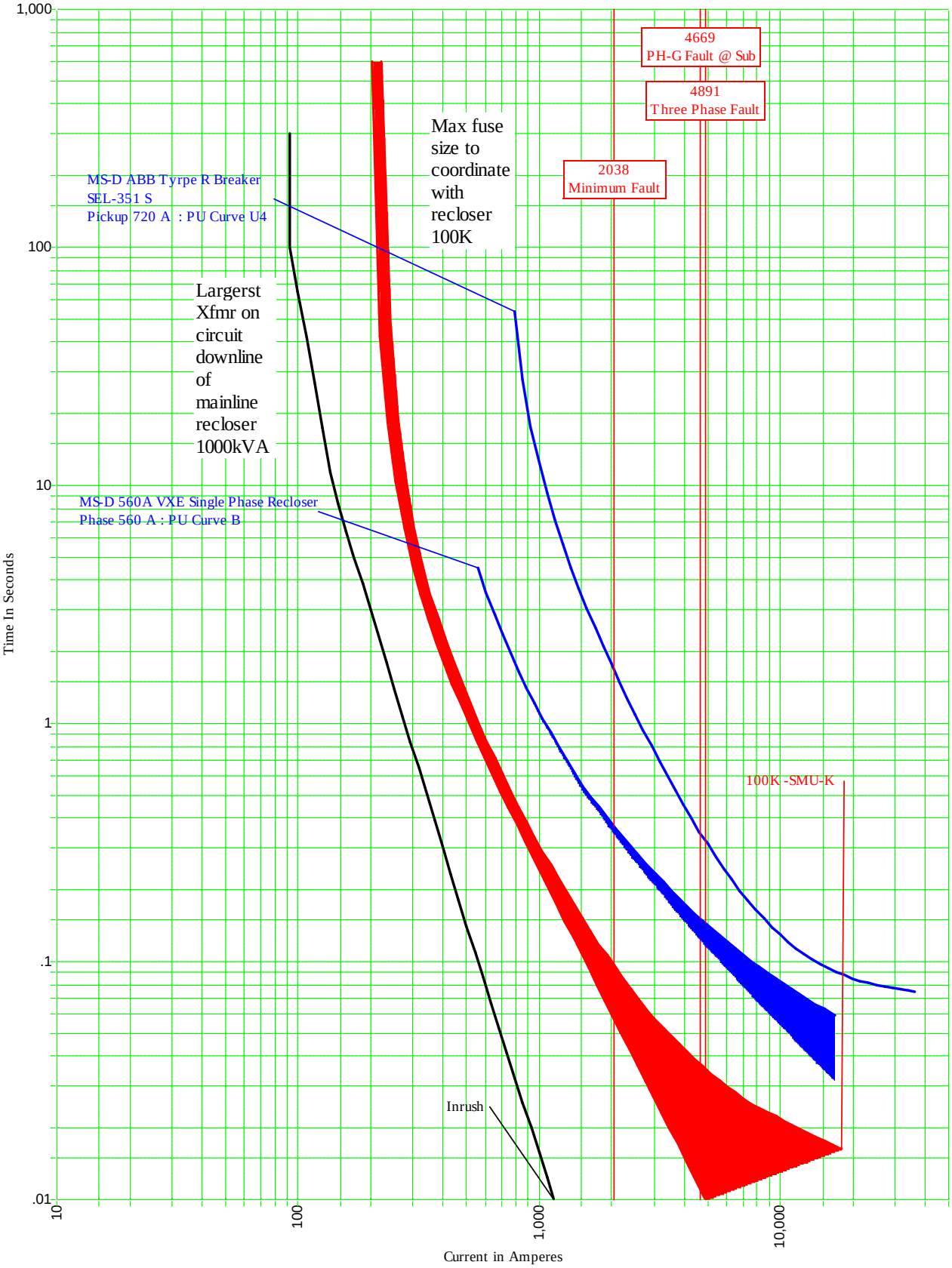
TCC’s CURVE

City of South Haven Main Substation MS-D Substation Breaker



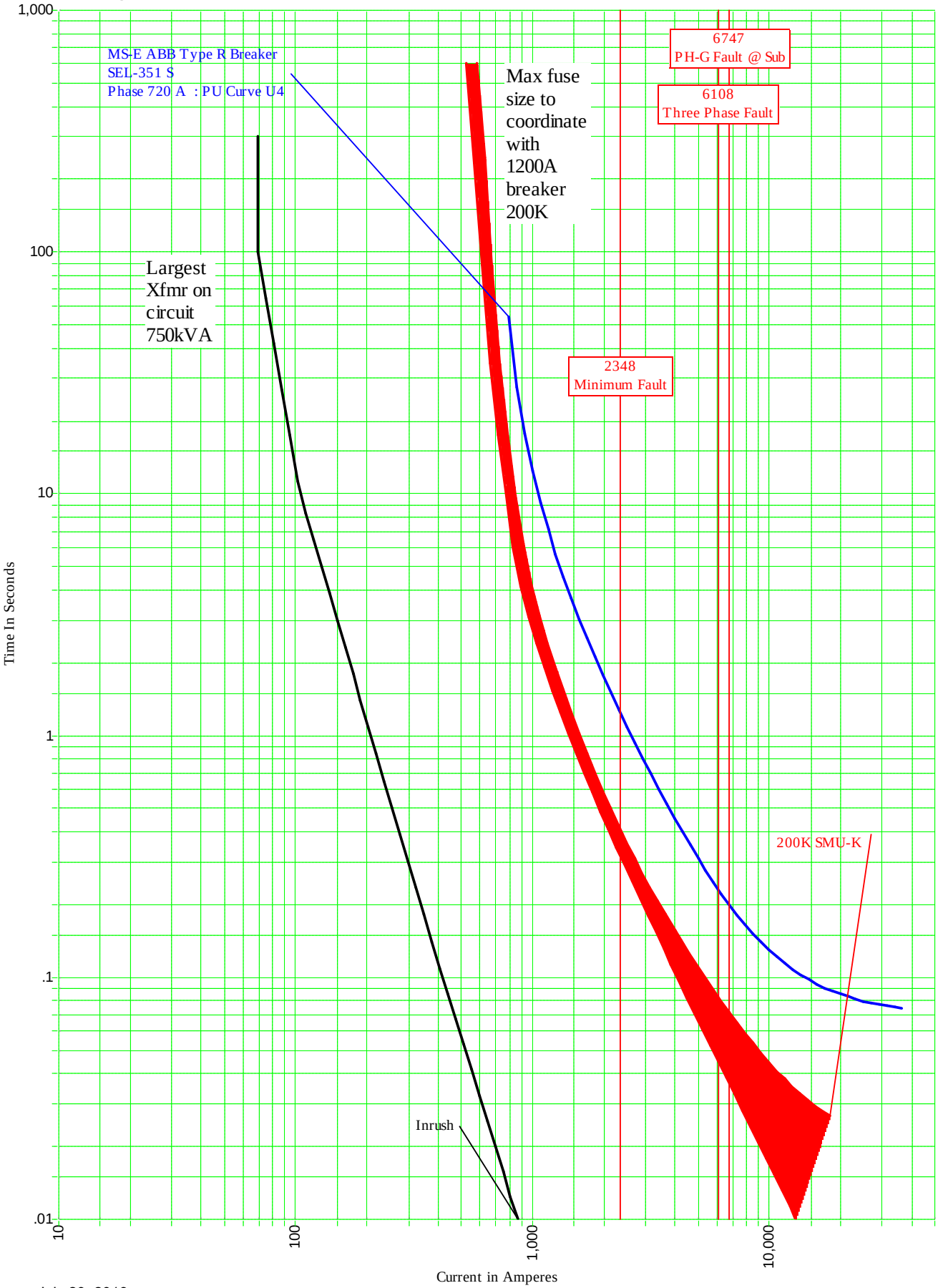
Base Voltage: 7.200 kV

City of South Haven Main Substation MS-D Mainline Recloser



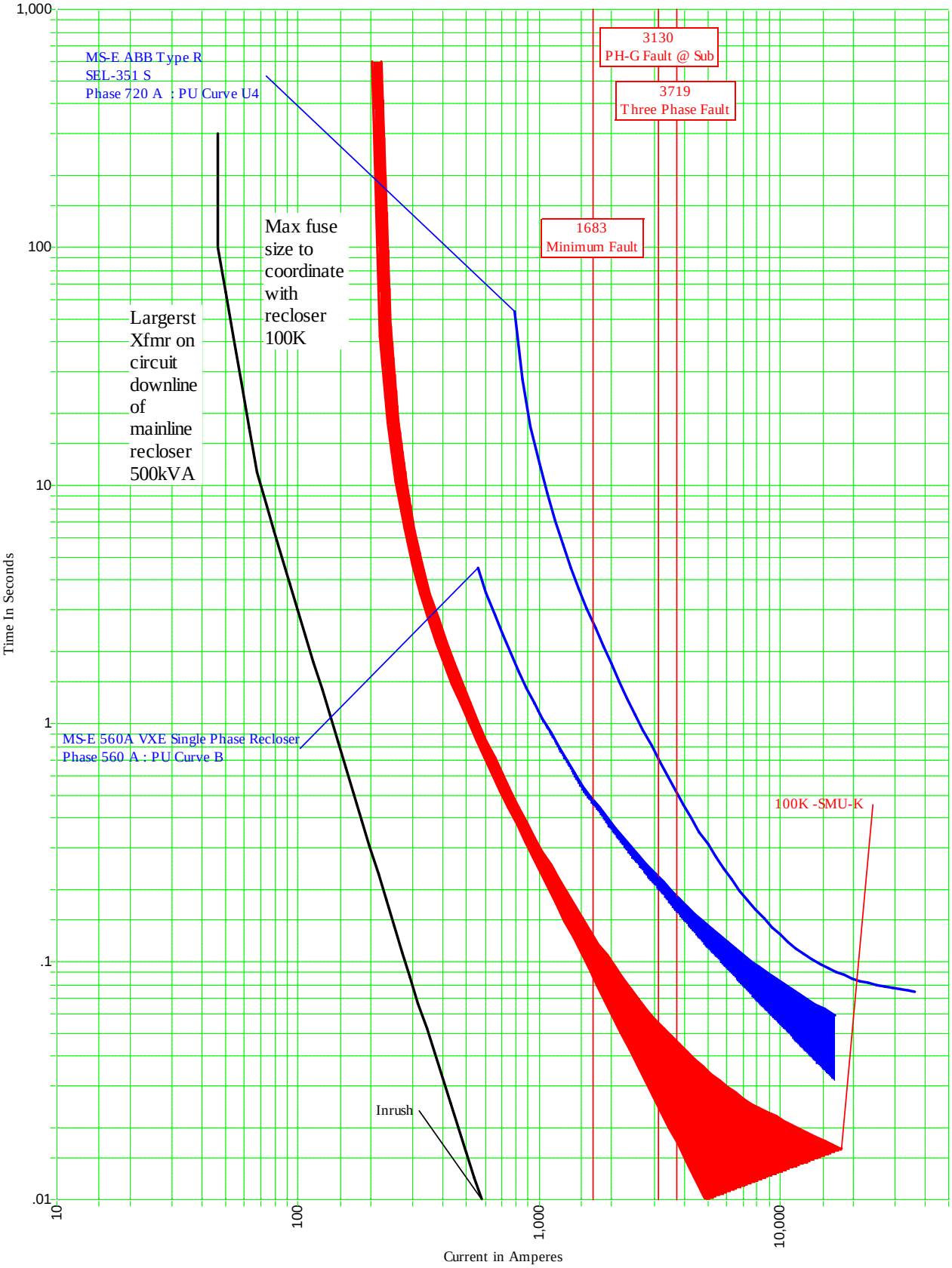
Base Voltage: 7.200 kV

City of South Haven Main Substation MS-E Substation Breaker



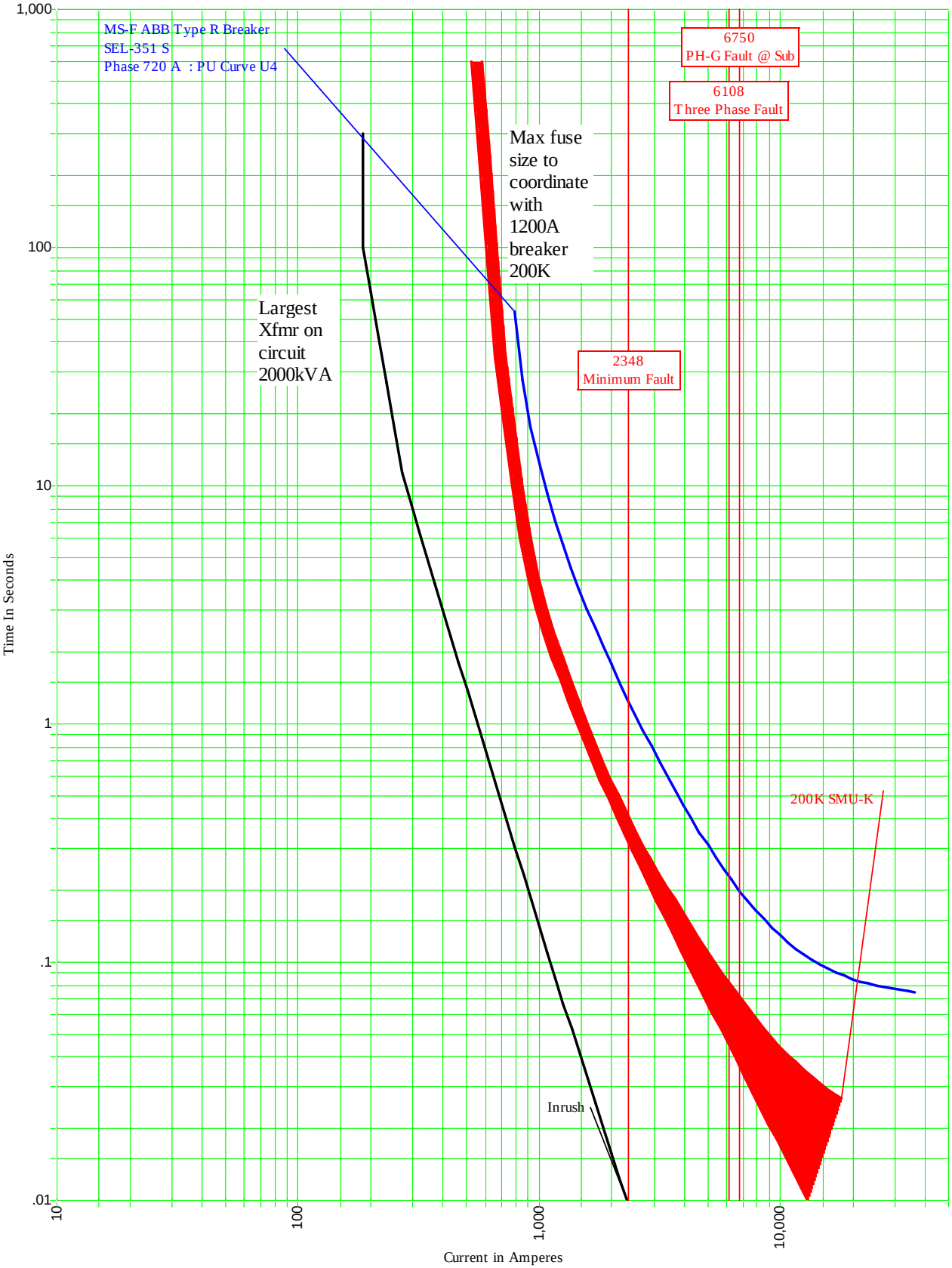
Base Voltage: 7.200 kV

City of South Haven Main Substation MS-E Mainline Recloser



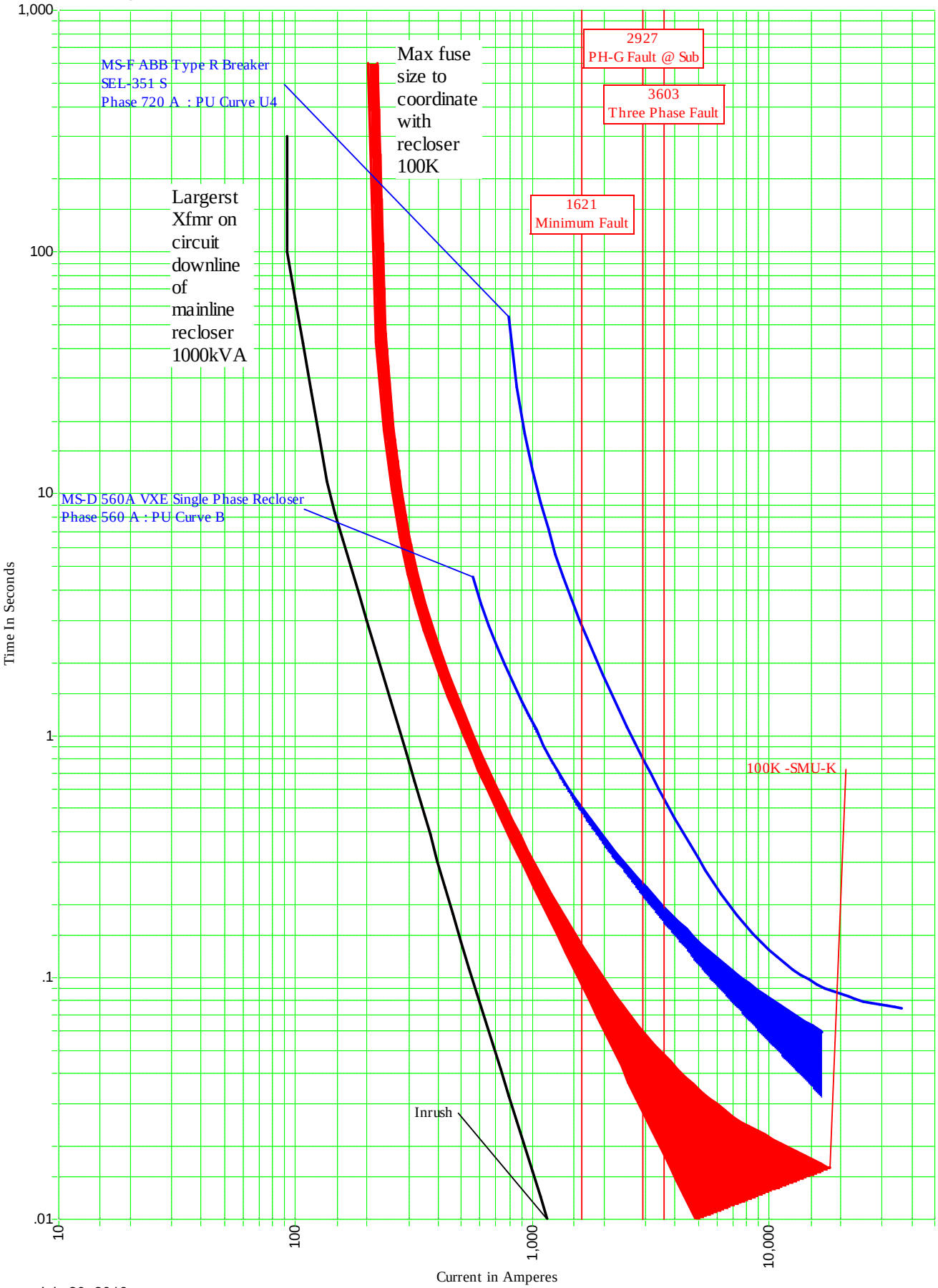
Base Voltage: 7.200 kV

City of South Haven Main Substation MS-F Substation Breaker



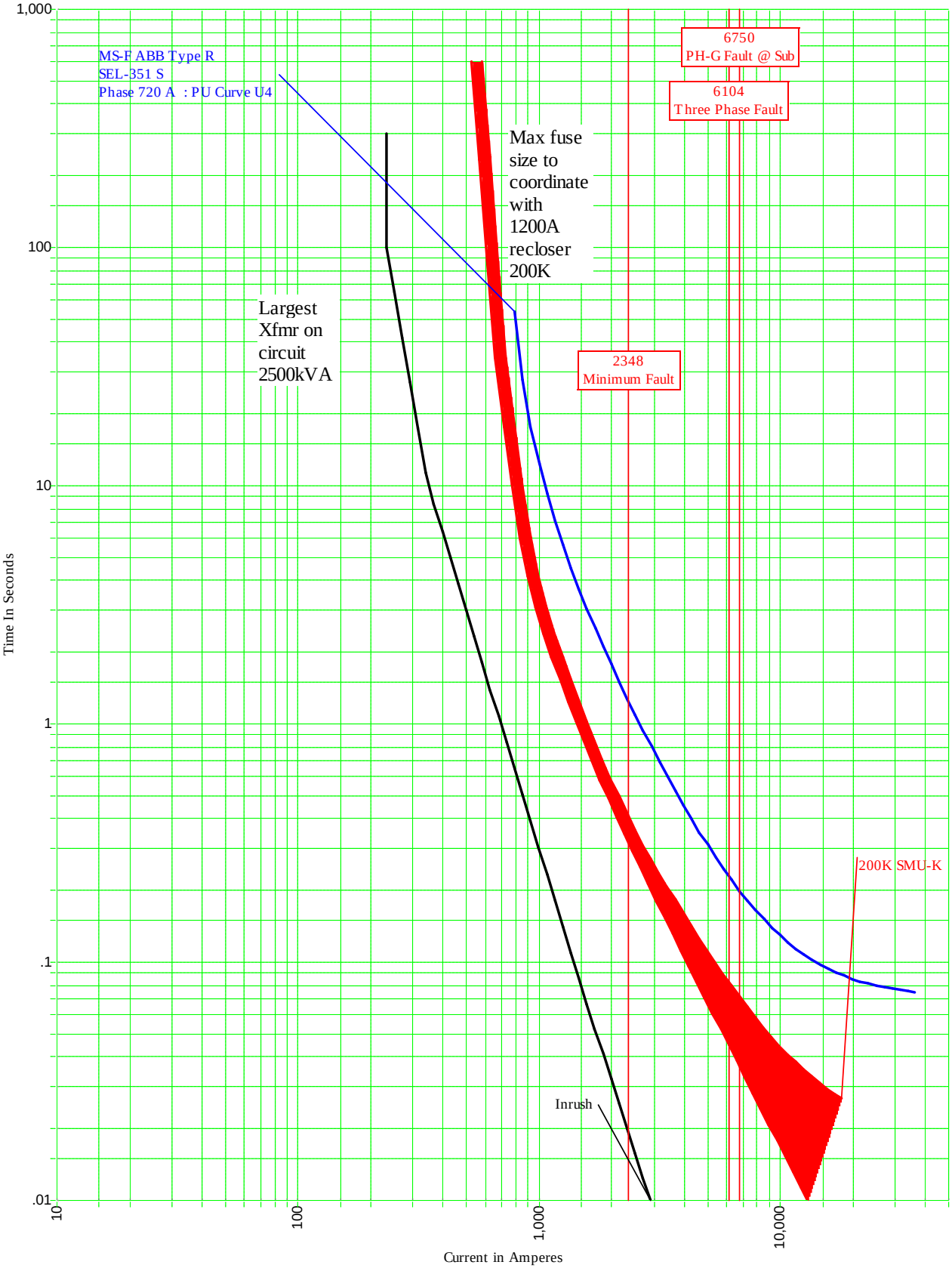
Base Voltage: 7.200 kV

City of South Haven Main Substation MS-F Mainline Recloser



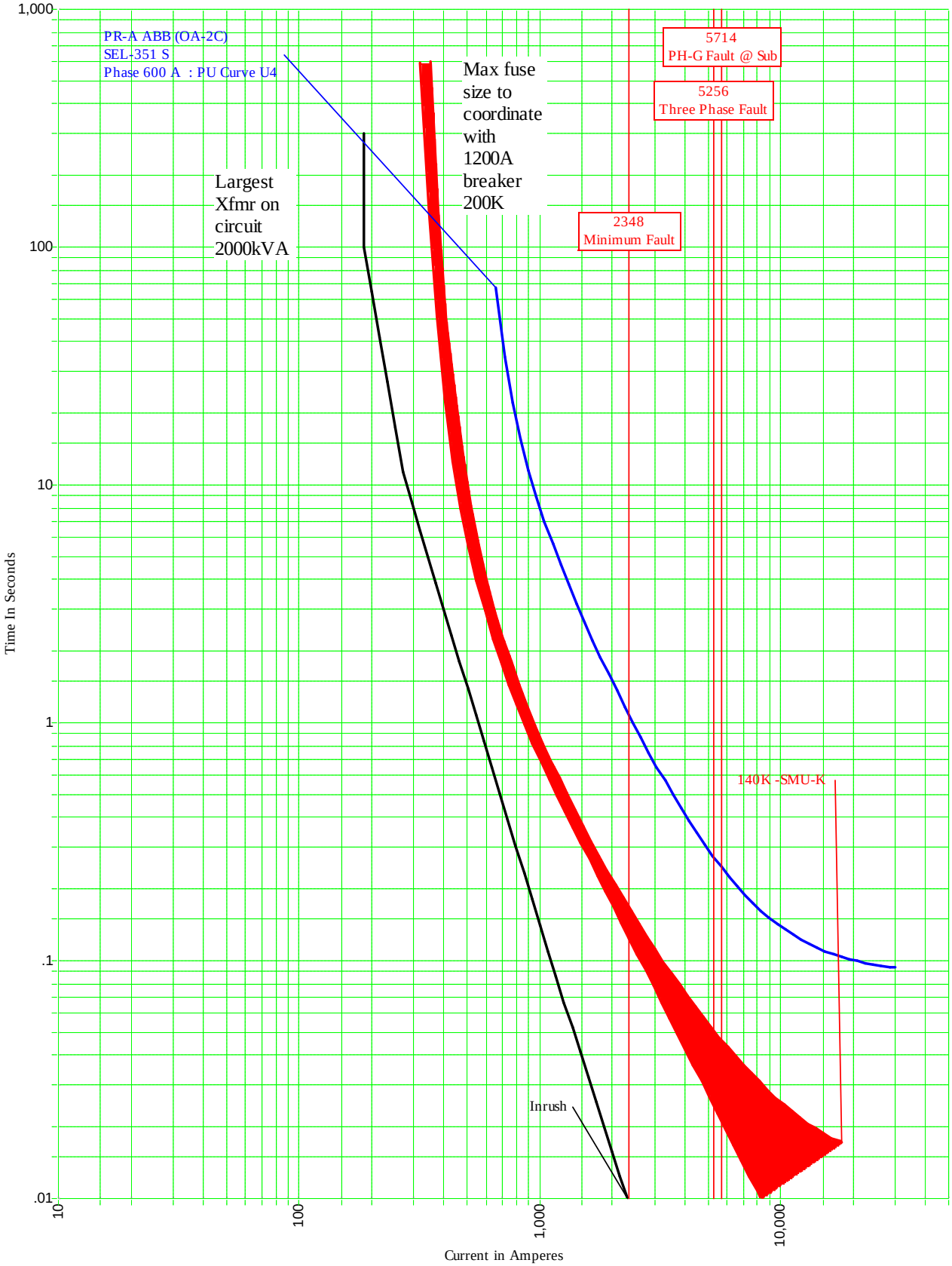
Base Voltage: 7.200 kV

City of South Haven Main Substation MS-J Substation Breaker



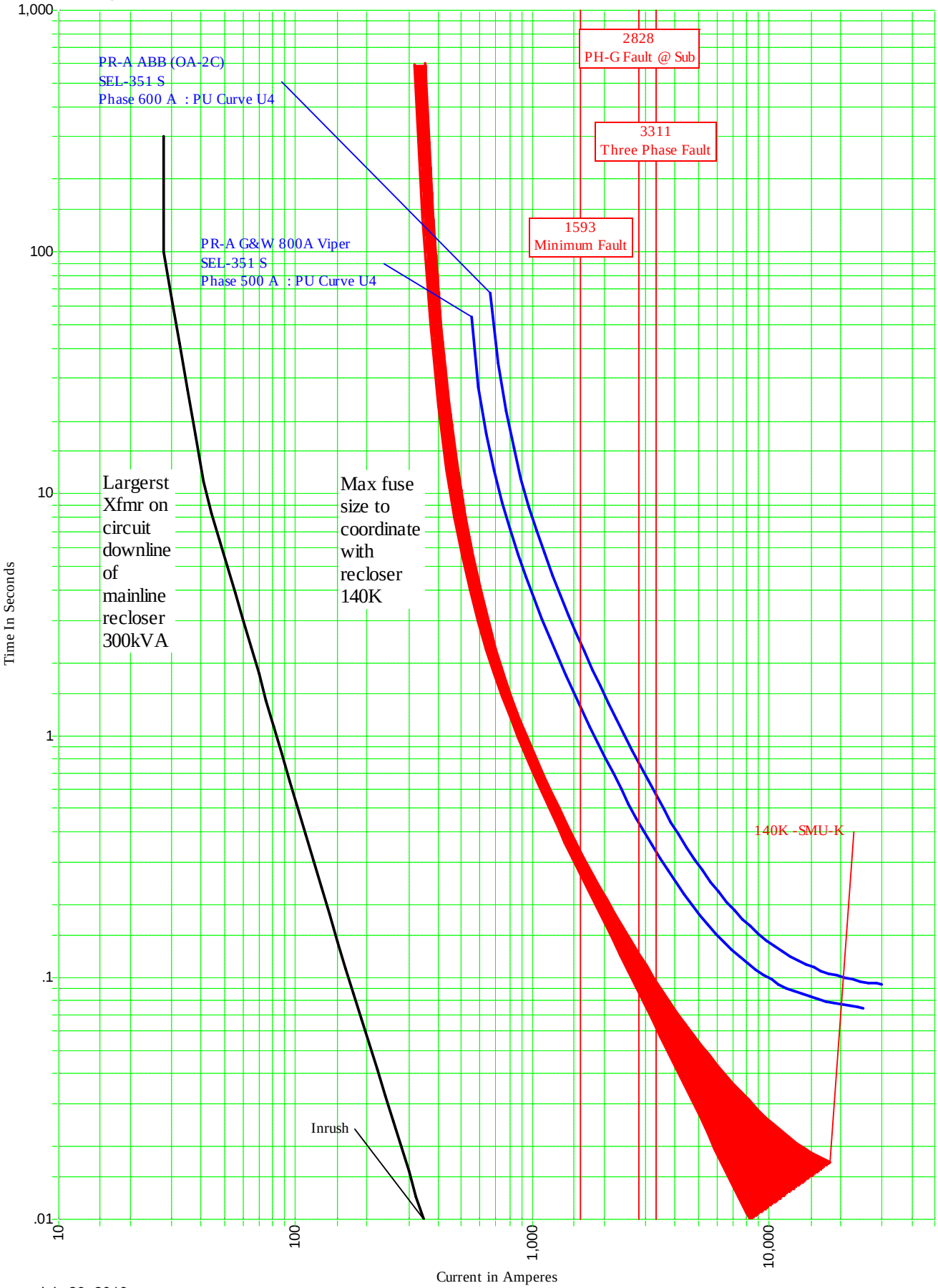
Base Voltage: 7.200 kV

City of South Haven Phoenix Substation PR-A Substation Breaker



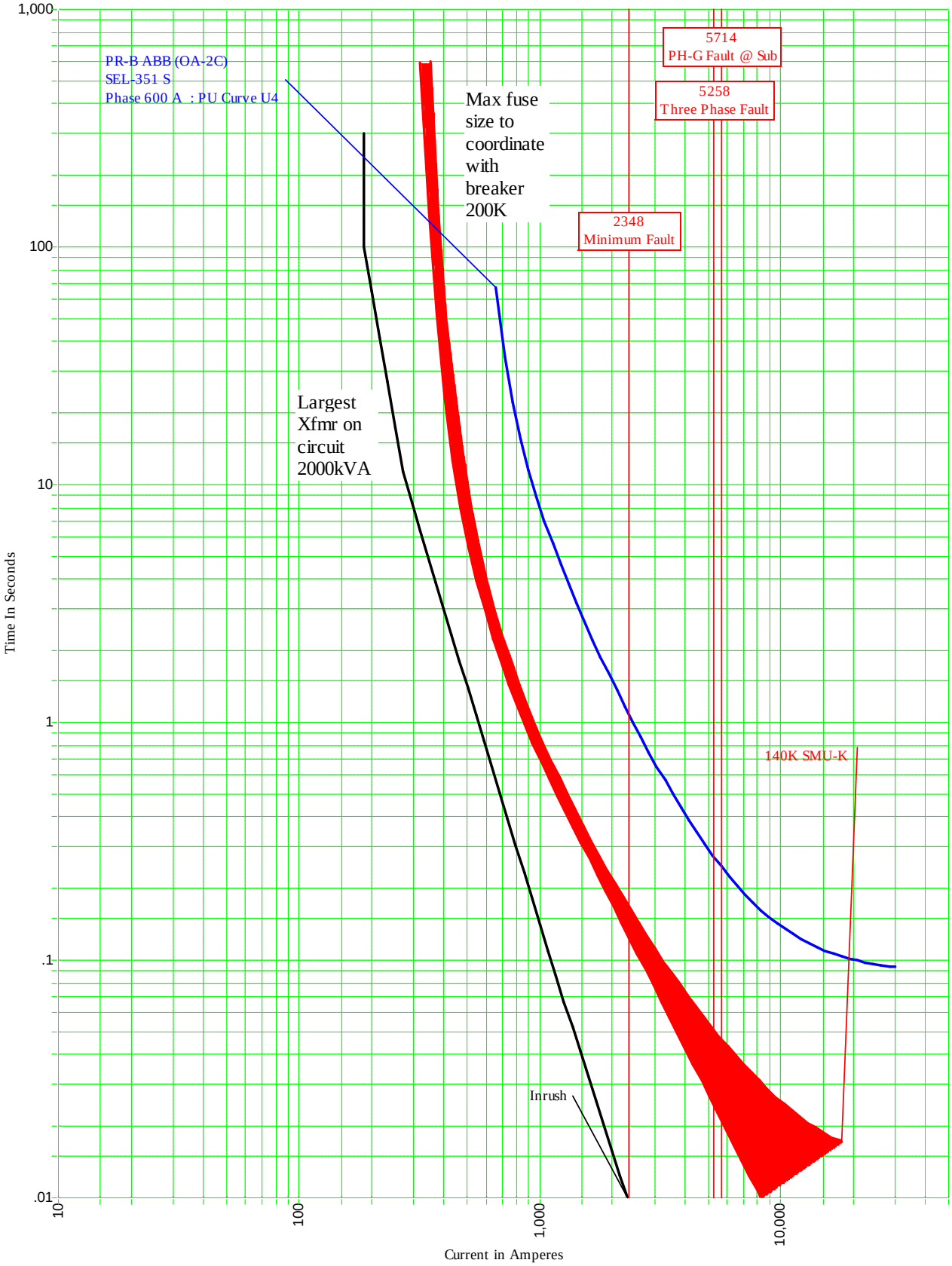
Base Voltage: 7.200 kV

City of South Haven Phoenix Substation PR-A Mainline Recloser



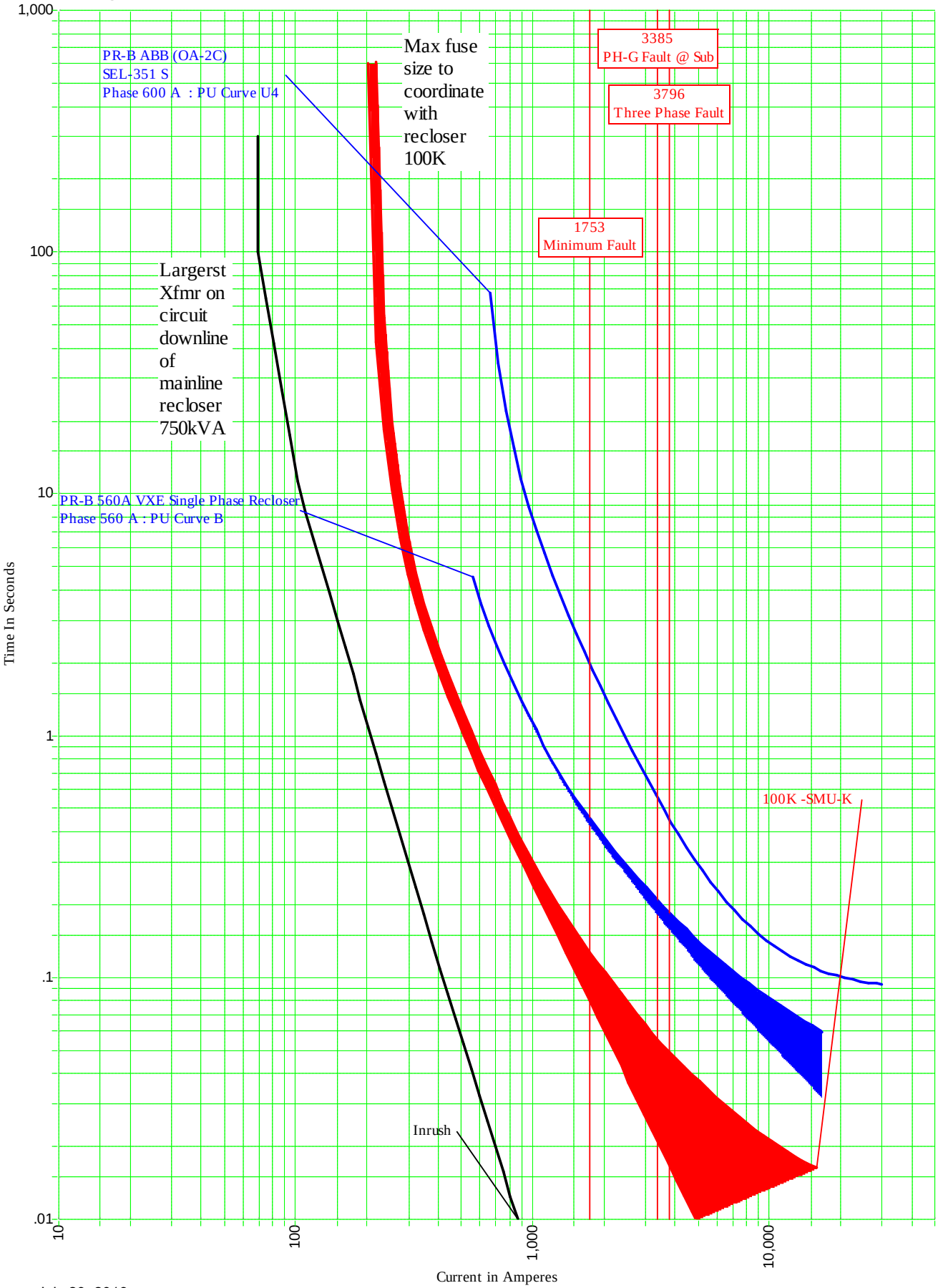
Base Voltage: 7.200 kV

City of South Haven Phoenix Substation PR-B Substation Breaker



Base Voltage: 7.200 kV

City of South Haven Phoenix Substation PR-B Mainline Recloser



Base Voltage: 7.200 kV

2014 - 2018

ELECTRICAL SYSTEM PROJECTS

City of South Haven
2014 - 2018 Electric System Projects

Year	Project #	Priority	Project Description	Estimated Cost
2014	101	1	Installation of a second 12/16/20 MVA transformer and two underground substation exits (PR-C and PR-D) at Phoenix Road Substation.	$1,350,000
2014	102	2	Construct new circuit PR-C on 2nd Avenue/Wells Street from Phoenix Road Substation to Blue Star Highway (0.7 miles) with #336.4 ACSR double circuit on the existing pole line to relieve load from PR-B. Move all MS-F load on North Shore Drive to this new circuit PR-C.	$136,000
2014	103	3	Construct new circuit PR-D on Veteran's Blvd from 2nd Avenue to Phoenix Road (0.6 miles) with #500kCM 15kV CU underground including padmount switchgear to relieve load and reduce geographic area from PR-A.	$435,000
			2014 Total	$1,921,000
2015	104	1	Rebuild PR-C (old PR-B) overhead line from 2nd Avenue/Wells Street south along Blue Star Hwy to 6th Avenue (1.0 miles) with #336.4 ACSR. Completion of this project will increase the capacity of the circuit to 500A and allow for full capacity ties to PR-A and PR-D, plus a future tie to MS-F with project #108. Shift MS-J load on Phoenix Street east of Pearl Street to PR-B.	$165,000
2015	105	2	Rebuild MS-J overhead line from Lovejoy Street to Aylworth Avenue (0.3 miles) in the deep right-of-way with #336.4 Hendrix. This will increase the capacity of the circuit to 500A and complete a full capacity tie to MS-F.	$75,000
2015	106	3	Add 1,800kVAR in switched capacitor banks to circuit MS-F.	$15,000
2015	107	4	Add 2,400kVAR in switched capacitor banks to circuit PR-B.	$20,000
			2015 Total	$275,000
2016	108	1	Complete reconstruction of MS-D along 14th Avenue between 76th Street and 77th Street (0.5 miles) including conductor upgrades to #1/0 ACSR. Completion of this project reduce potential outages from broken equipment.	$48,000
2016	109	2	Rebuild MS-J overhead line from Elkenburg Street to Michigan Avenue north along St. Joseph Street (0.6 miles) with #336.4 Hendrix. Completion of this project will increase the capacity of the circuit to 500A up to Michigan Avenue and allow for full capacity ties to PR-C following completion of project #113.	$145,000
2016	110	3	Rebuild MS-E along Kalamazoo Street for 0.25 miles north to Lovejoy Street with #336.4 ACSR. Completion of this project will create a full capacity tie to MS-F in this industrialized area close to the substation.	$45,000
2016	111	4	Add 1,200kVAR in switched capacitor banks to circuit MS-E.	$10,000
2016	112	5	Add 1,200kVAR in switched capacitor banks to circuit PR-A.	$10,000
			2016 Total	$258,000

City of South Haven
2014 - 2018 Electric System Projects

Year	Project #	Priority	Project Description	Estimated Cost
2017	113	1	Rebuild the overhead tie between MS-F and PR-C (old PR-B) through switch #15 along both LaGrange Street and Phillips Street (1.1 miles) with #336.4 ACSR. This project will increase the circuit tie to full capacity thus improving the reliability of the feed to the hospital.	$200,000
2017	114	2	Complete reconstruction of MS-D along 76th Street between 14th Avenue 20th Street (1.5 miles) including conductor upgrades to #1/0 ACSR. Completion of this project reduce potential outages from broken equipment.	$150,000
			2017 Total	$350,000
2018	115	1	Rebuild circuit MS-D along Jay R. Monroe Blvd from the deep ROW section south to 12th Avenue (0.5 miles) with #4/0 ACSR. This conductor is currently loaded above 60% of its rating.	$60,000
2018	116	2	Rebuild PR-C (old PR-B) overhead line along Blue Star Highway from 2nd Avenue north to Baseline Rd (0.6 miles) with #336.4 ACSR conductor. Completion of this project will provide the initial backbone of a full capacity tie on the north edge of the service area.	$95,000
2018	117	3	Rebuild MS-E along Blue Star Highway from M-140 south to Stieve Drive with #336.4 ACSR. Completion of this project will create a new full capacity tie to MS-D.	$85,000
			2018 Total	$240,000

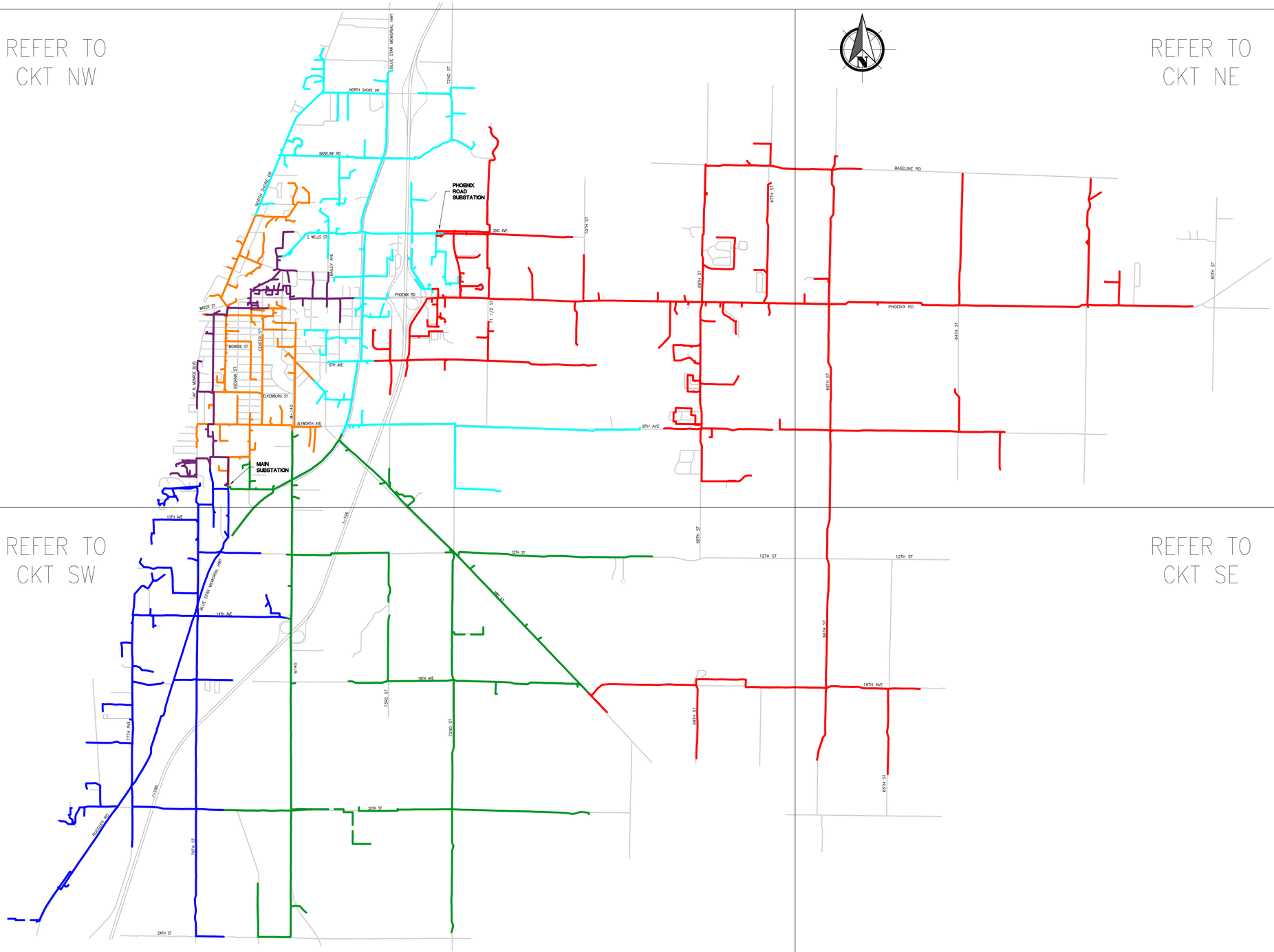
SYSTEM CIRCUIT MAPS

REFER TO
CKT NW

REFER TO
CKT NE

REFER TO
CKT SW

REFER TO
CKT SE



LEGEND

- MS-D (SOUTH)
- MS-E (NORTH)
- MS-F (INDUSTRIAL)
- MS-J
- PR-A (EAST)
- PR-B (WEST)

MS-MAIN SUBSTATION
PR-PHOENIX ROAD SUBSTATION

ENG.	NMA
DR	KMW
CK	MPM
APP	MPM

DATE	ISSUED FOR
07-02-2013	FINAL REPORT
06-24-2013	DRAFT REPORT

GRP Engineering, Inc.
PETOSKEY, MICHIGAN, 231-439-9683
GRAND RAPIDS, MICHIGAN, 616-942-7183

CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

SYSTEM CIRCUIT MAP

PROJECT NUMBER: 12-0550.01

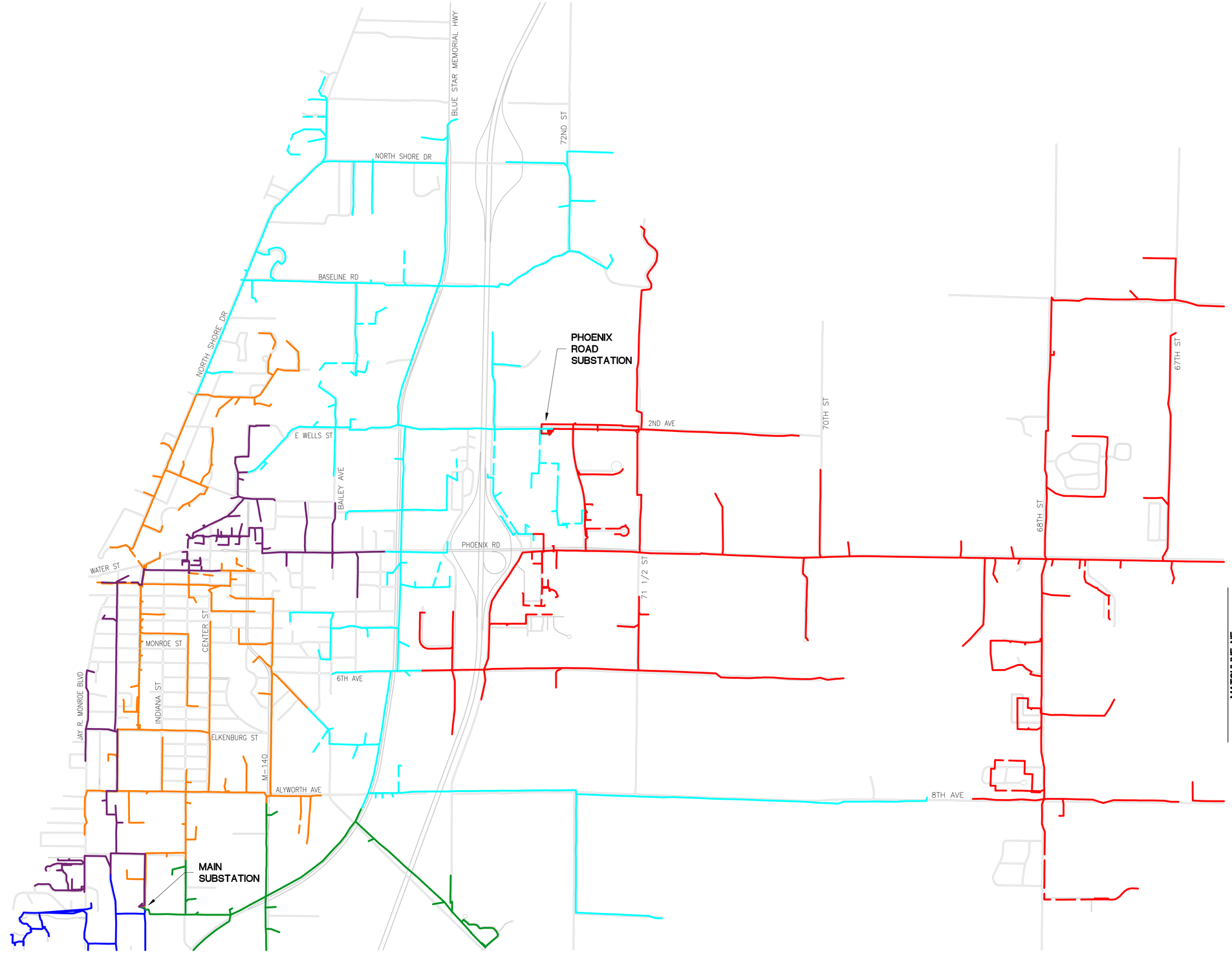
DRAWING NUMBER: CKT ALL

0 500' 1000' 2000'

LEGEND

- MS–D (SOUTH)
- MS–E (NORTH)
- MS–F (INDUSTRIAL)
- MS–J
- PR–A (EAST)
- PR–B (WEST)

MS–MAIN SUBSTATION
PR–PHOENIX ROAD SUBSTATION



ENG.	NMA		
DR	KMW		
CK	MPM		
APP	MPM		
		07-02-2013	FINAL REPORT
		06-24-2013	DRAFT REPORT
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GRAND RAPIDS, MICHIGAN, 616–942–7183

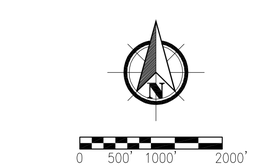
CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

SYSTEM CIRCUIT MAP - NORTHWEST

PROJECT NUMBER: 12-0550.01

DRAWING NUMBER: CKT NW



LEGEND

- MS-D (SOUTH)
- MS-E (NORTH)
- MS-F (INDUSTRIAL)
- MS-J
- PR-A (EAST)
- PR-B (WEST)

MS-MAIN SUBSTATION
PR-PHOENIX ROAD SUBSTATION

MATCHLINE NW

MATCHLINE SE

11TH AVE
BLUE STAR MEMORIAL HWY
14TH AVE
M140
16TH AVE
77TH AVE
73RD ST
72ND ST
I-196
12TH ST
68TH ST
HWY 43
20TH ST
RUGGLES RD
76TH ST
24TH ST

ENG.	NMA		
DR	KMW		
CK	MPM		
APP	MPM		
		07-02-2013	FINAL REPORT
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CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

SYSTEM CIRCUIT MAP - SOUTHWEST

PROJECT NUMBER: 12-0550.01

DRAWING NUMBER: CKT SW

0 500' 1000' 2000'

LEGEND

- MS-D (SOUTH)
- MS-E (NORTH)
- MS-F (INDUSTRIAL)
- MS-J
- PR-A (EAST)
- PR-B (WEST)

MS-MAIN SUBSTATION
PR-PHOENIX ROAD SUBSTATION

ENG.	NMA		
DR	KMW		
CK	MPM		
APP	MPM		
		07-02-2013	FINAL REPORT
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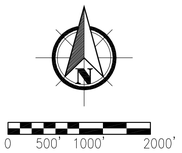
CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

SYSTEM CIRCUIT MAP - NORTHEAST

PROJECT NUMBER: 12-0550.01

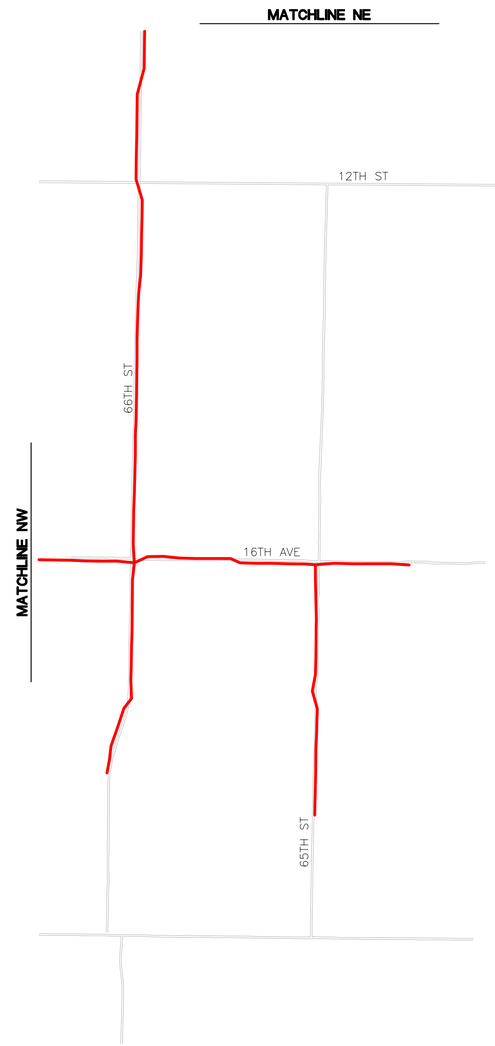
DRAWING NUMBER: CKT NE



LEGEND

- MS–D (SOUTH)
- MS–E (NORTH)
- MS–F (INDUSTRIAL)
- MS–J
- PR–A (EAST)
- PR–B (WEST)

MS–MAIN SUBSTATION
PR–PHOENIX ROAD SUBSTATION



ENG.	NMA
DR	KMW
CK	MPM
APP	MPM

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CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

SYSTEM CIRCUIT MAP - SOUTHEAST

PROJECT NUMBER: 12-0550.01

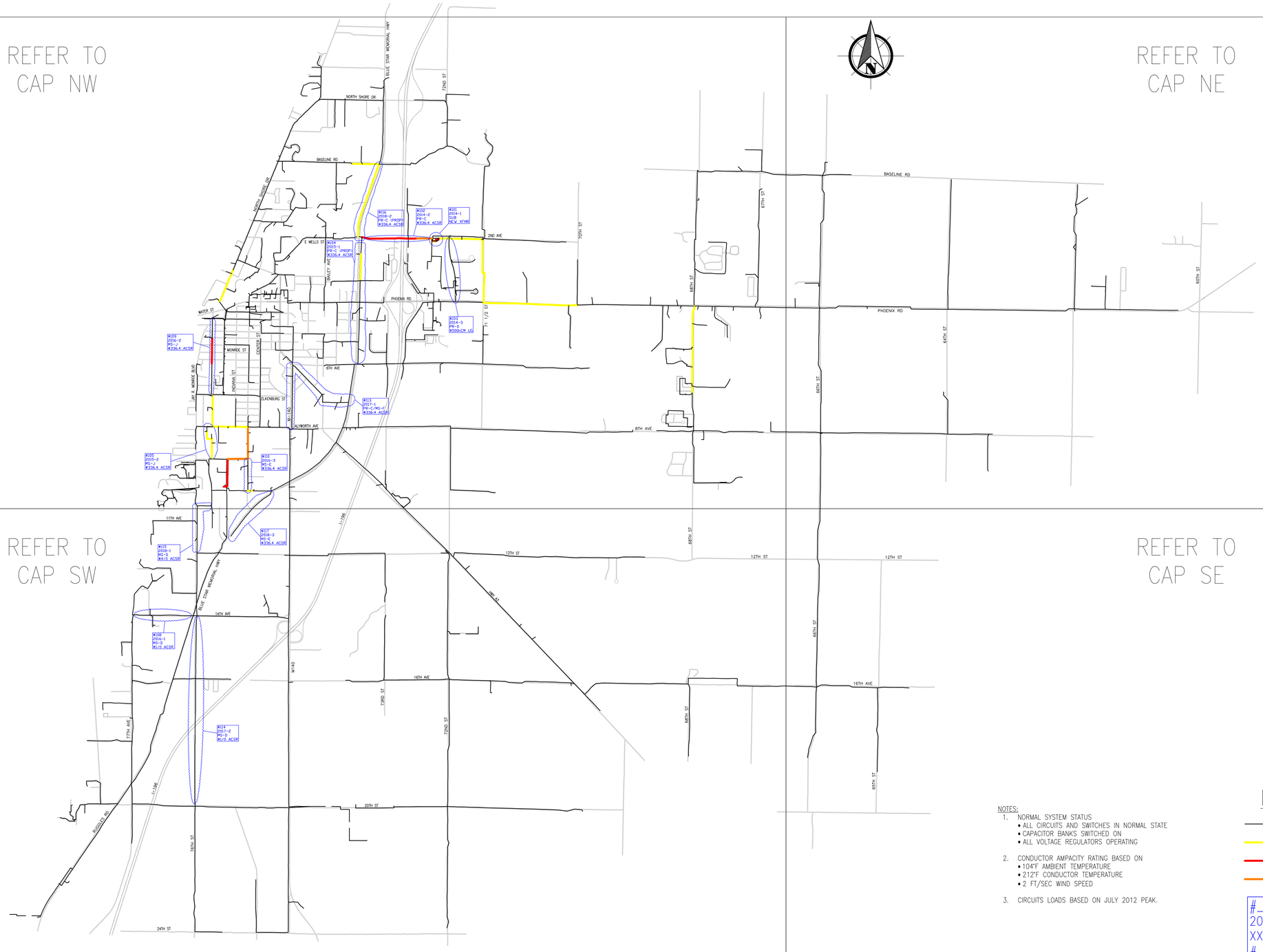
DRAWING NUMBER: CKT SE

CIRCUIT CONDUCTOR

LOADING DRAWINGS

REFER TO
CAP NW

REFER TO
CAP NE



REFER TO
CAP SW

REFER TO
CAP SE

NOTES:
1. NORMAL SYSTEM STATUS
   - ALL CIRCUITS AND SWITCHES IN NORMAL STATE
   - CAPACITOR BANKS SWITCHED ON
   - ALL VOLTAGE REGULATORS OPERATING
2. CONDUCTOR AMPACITY RATING BASED ON
   - 104°F AMBIENT TEMPERATURE
   - 212°F CONDUCTOR TEMPERATURE
   - 2 FT/SEC WIND SPEED
3. CIRCUITS LOADS BASED ON JULY 2012 PEAK.

LEGEND

- <60% RATED CONDUCTOR AMPACITY
- 60%–80% RATED CONDUCTOR AMPACITY
- 80%–100% RATED CONDUCTOR AMPACITY
- >100% RATED CONDUCTOR AMPACITY

#___
2013-__
XXX-X
#____

- PROJECT NUMBER
- PRIORITY
- CIRCUIT
- PROPOSED CHANGE/CONDUCTOR

City of South Haven

ENG.	NMA
DR	KMW
CK	MPM
APP	MPM

DATE	ISSUED FOR
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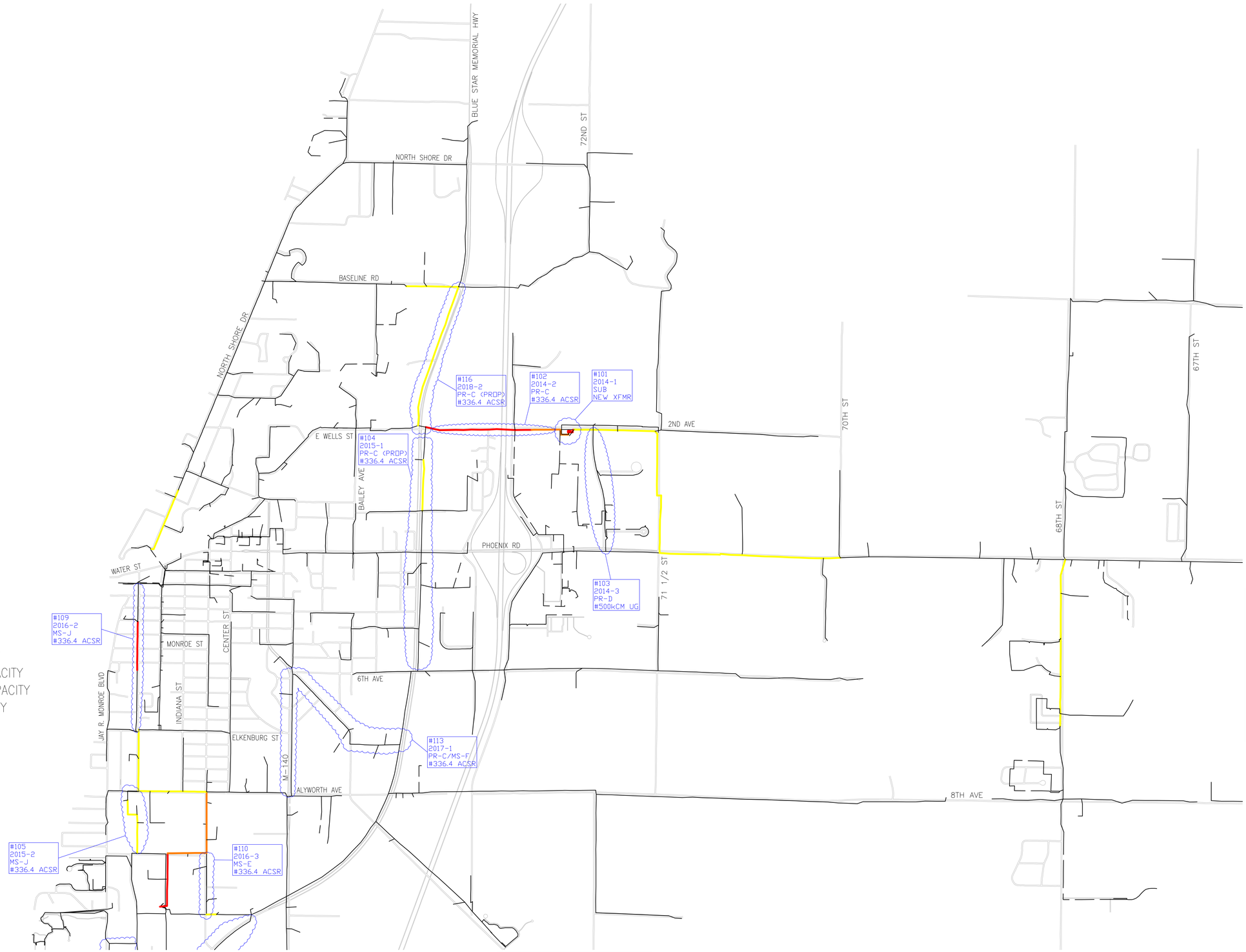
CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

CONDUCTOR CAPACITY & PROPOSED PROJECTS

PROJECT NUMBER: 12-0550.01

DRAWING NUMBER: CAP ALL



LEGEND

- <60% RATED CONDUCTOR AMPACITY
- 60%–80% RATED CONDUCTOR AMPACITY
- 80%–100% RATED CONDUCTOR AMPACITY
- >100% RATED CONDUCTOR AMPACITY

#___ PROJECT NUMBER
2013-__ PRIORITY
XXX-X CIRCUIT
#____ PROPOSED CHANGE/CONDUCTOR

NOTES:

1. NORMAL SYSTEM STATUS
   - ALL CIRCUITS AND SWITCHES IN NORMAL STATE
   - CAPACITOR BANKS SWITCHED ON
   - ALL VOLTAGE REGULATORS OPERATING
2. CONDUCTOR AMPACITY RATING BASED ON
   - 104°F AMBIENT TEMPERATURE
   - 212°F CONDUCTOR TEMPERATURE
   - 2 FT/SEC WIND SPEED
3. CIRCUITS LOADS BASED ON JULY 2012 PEAK.

City of South Haven

ENG.	NMA
DR	KMW
CK	MPM
APP	MPM

DATE	ISSUED FOR
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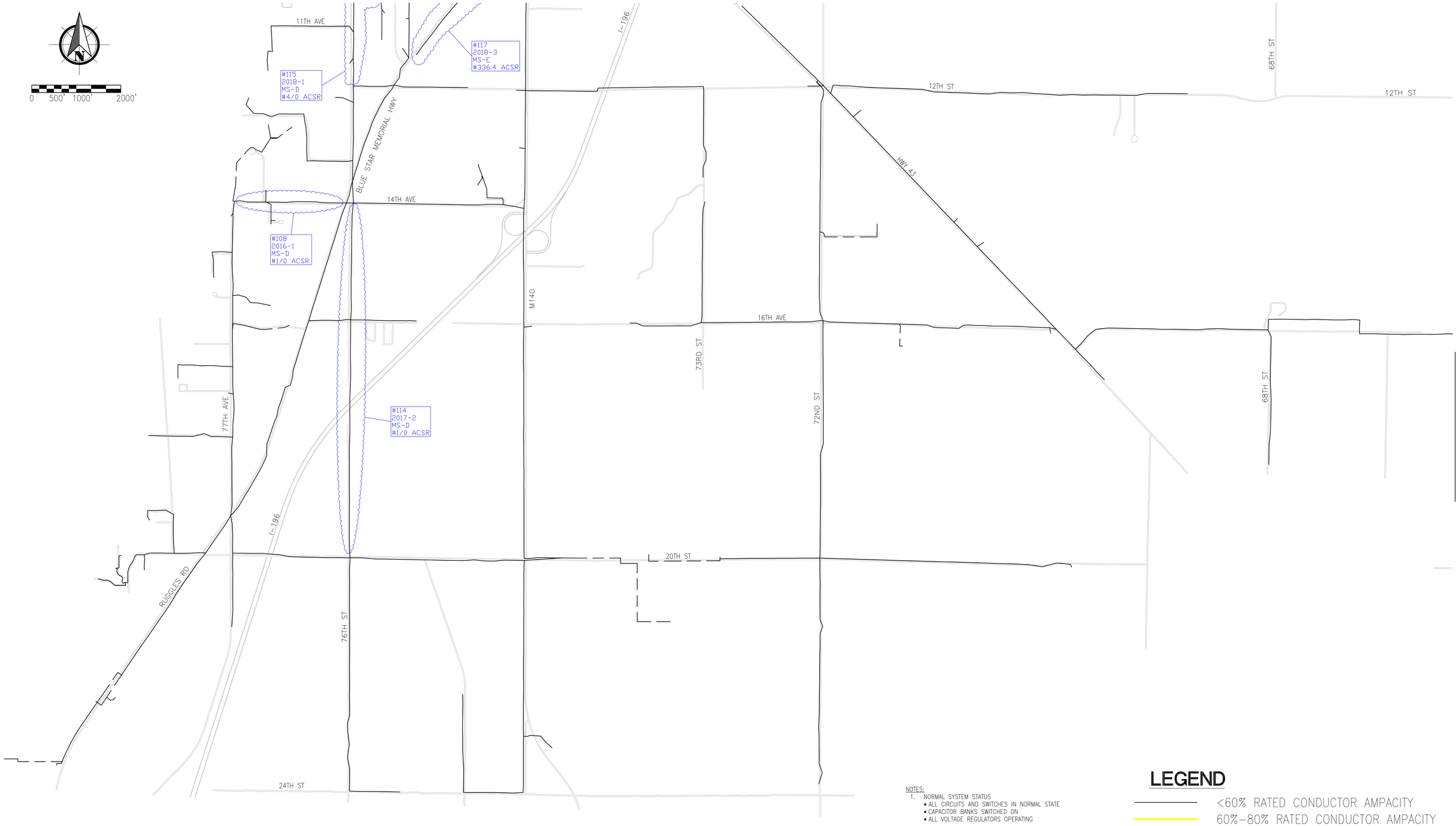
CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

CONDUCTOR CAPACITY & PROPOSED PROJECTS

PROJECT NUMBER: 12-0550.01

DRAWING NUMBER: CAP NW



NOTES:

1. NORMAL SYSTEM STATUS
   - ALL CIRCUITS AND SWITCHES IN NORMAL STATE
   - CAPACITOR BANKS SWITCHED ON
   - ALL VOLTAGE REGULATORS OPERATING
2. CONDUCTOR AMPACITY RATING BASED ON
   - 104°F AMBIENT TEMPERATURE
   - 212°F CONDUCTOR TEMPERATURE
   - 2 FT/SEC WIND SPEED
3. CIRCUITS LOADS BASED ON JULY 2012 PEAK.

LEGEND

- <60% RATED CONDUCTOR AMPACITY
- 60%–80% RATED CONDUCTOR AMPACITY
- 80%–100% RATED CONDUCTOR AMPACITY
- >100% RATED CONDUCTOR AMPACITY

#___ PROJECT NUMBER
2013-__ PRIORITY
XXX-X CIRCUIT
#____ PROPOSED CHANGE/CONDUCTOR

City of South Haven

ENG.	NMA
DR	KMW
CK	MPM
APP	MPM

DATE	ISSUED FOR
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CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

CONDUCTOR CAPACITY & PROPOSED PROJECTS

PROJECT NUMBER: 12-0550.01

DRAWING NUMBER: CAP SW

NOTES:
1. NORMAL SYSTEM STATUS
   - ALL CIRCUITS AND SWITCHES IN NORMAL STATE
   - CAPACITOR BANKS SWITCHED ON
   - ALL VOLTAGE REGULATORS OPERATING
2. CONDUCTOR AMPACITY RATING BASED ON
   - 104°F AMBIENT TEMPERATURE
   - 212°F CONDUCTOR TEMPERATURE
   - 2 FT/SEC WIND SPEED
3. CIRCUITS LOADS BASED ON JULY 2012 PEAK.

LEGEND

- <60% RATED CONDUCTOR AMPACITY
- 60%-80% RATED CONDUCTOR AMPACITY
- 80%-100% RATED CONDUCTOR AMPACITY
- >100% RATED CONDUCTOR AMPACITY

#___ PROJECT NUMBER
2013-__ PRIORITY
XXX-X CIRCUIT
#____ PROPOSED CHANGE/CONDUCTOR

City of South Haven

ENG.	NMA
DR	KMW
CK	MPM
APP	MPM

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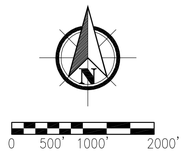
CITY OF SOUTH HAVEN

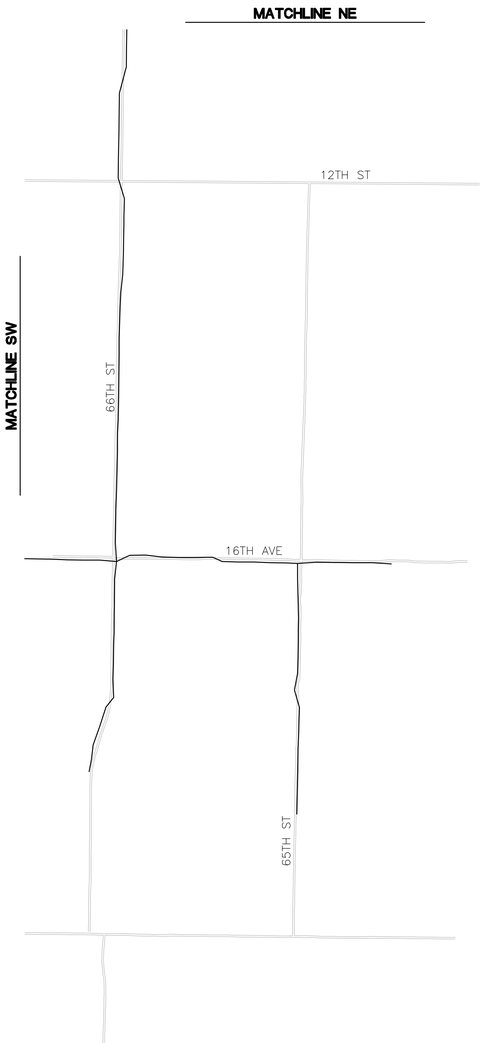
SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

CONDUCTOR CAPACITY & PROPOSED PROJECTS

PROJECT NUMBER: 12-0550.01

DRAWING NUMBER: CAP NE





LEGEND

- <60% RATED CONDUCTOR AMPACITY
- 60%–80% RATED CONDUCTOR AMPACITY
- 80%–100% RATED CONDUCTOR AMPACITY
- >100% RATED CONDUCTOR AMPACITY

#___
2013-__
XXX-X
#____

- PROJECT NUMBER
- PRIORITY
- CIRCUIT
- PROPOSED CHANGE/CONDUCTOR

NOTES:
1. NORMAL SYSTEM STATUS
   - ALL CIRCUITS AND SWITCHES IN NORMAL STATE
   - CAPACITOR BANKS SWITCHED ON
   - ALL VOLTAGE REGULATORS OPERATING
2. CONDUCTOR AMPACITY RATING BASED ON
   - 212°F AMBIENT TEMPERATURE
   - 212°F CONDUCTOR TEMPERATURE
   - 2 FT/SEC WIND SPEED
3. CIRCUITS LOADS BASED ON JULY 2012 PEAK.

City of South Haven

ENG.	NMA
DR	KMW
CK	MPM
APP	MPM

DATE	ISSUED FOR
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06-24-2013	DRAFT REPORT

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CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

CONDUCTOR CAPACITY & PROPOSED PROJECTS

PROJECT NUMBER: 12-0550.01

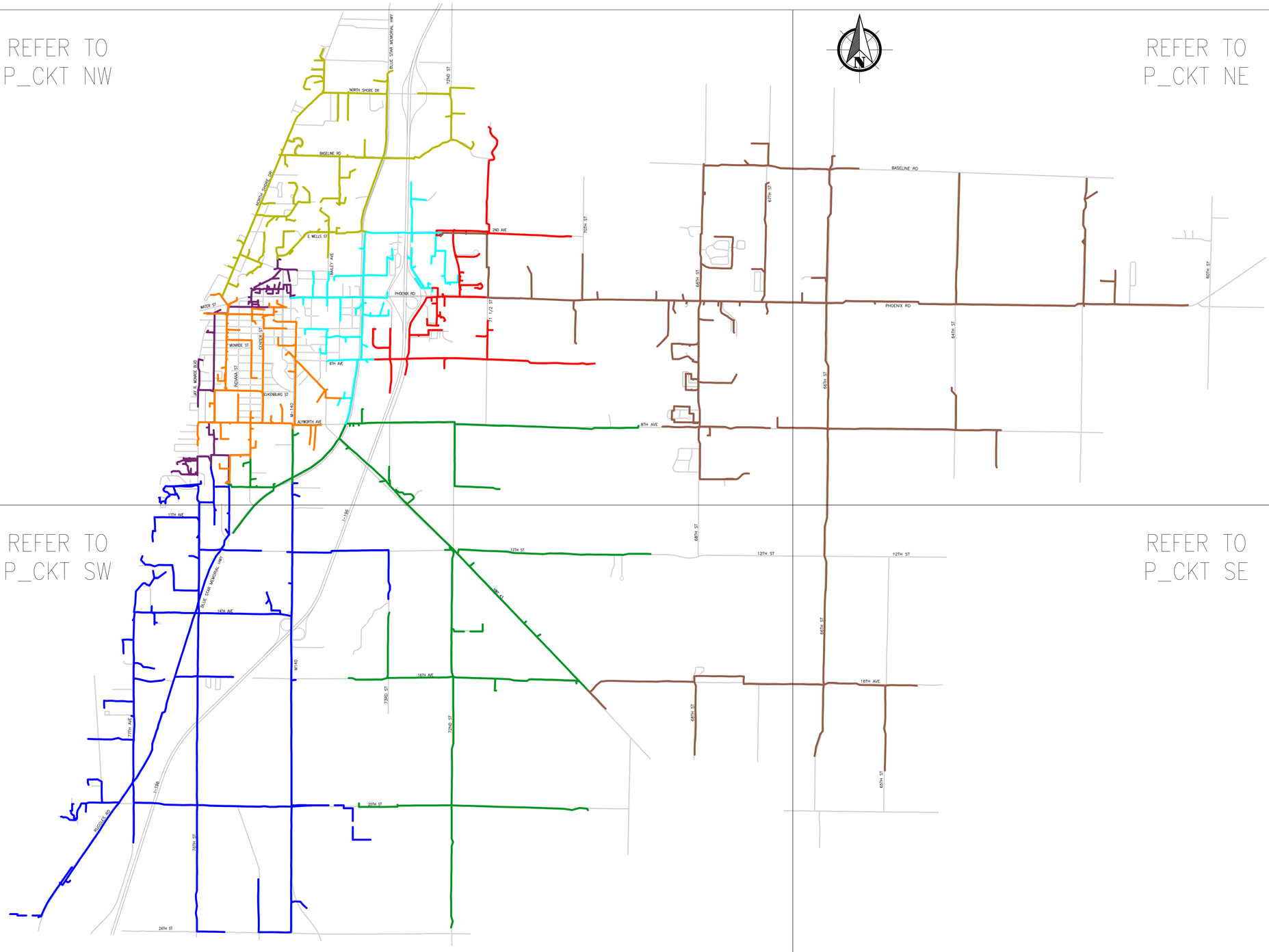
DRAWING NUMBER: CAP SE

REFER TO
P_CKT NW

REFER TO
P_CKT NE

REFER TO
P_CKT SW

REFER TO
P_CKT SE



LEGEND

- MS-D (SOUTH)
- MS-E (NORTH)
- MS-F (INDUSTRIAL)
- MS-J
- PR-A
- PR-B
- PR-C
- PR-D

MS-MAIN SUBSTATION
PR-PHOENIX ROAD SUBSTATION

ENG.	NMA		
DR	KMW		
CK	MPM		
APP	MPM		
		07-02-2013	FINAL REPORT
		06-24-2013	DRAFT REPORT
		DATE	ISSUED FOR

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GRAND RAPIDS, MICHIGAN, 616-942-7183

CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

PROPOSED SYSTEM CIRCUIT MAP

PROJECT NUMBER: 12-0550.01

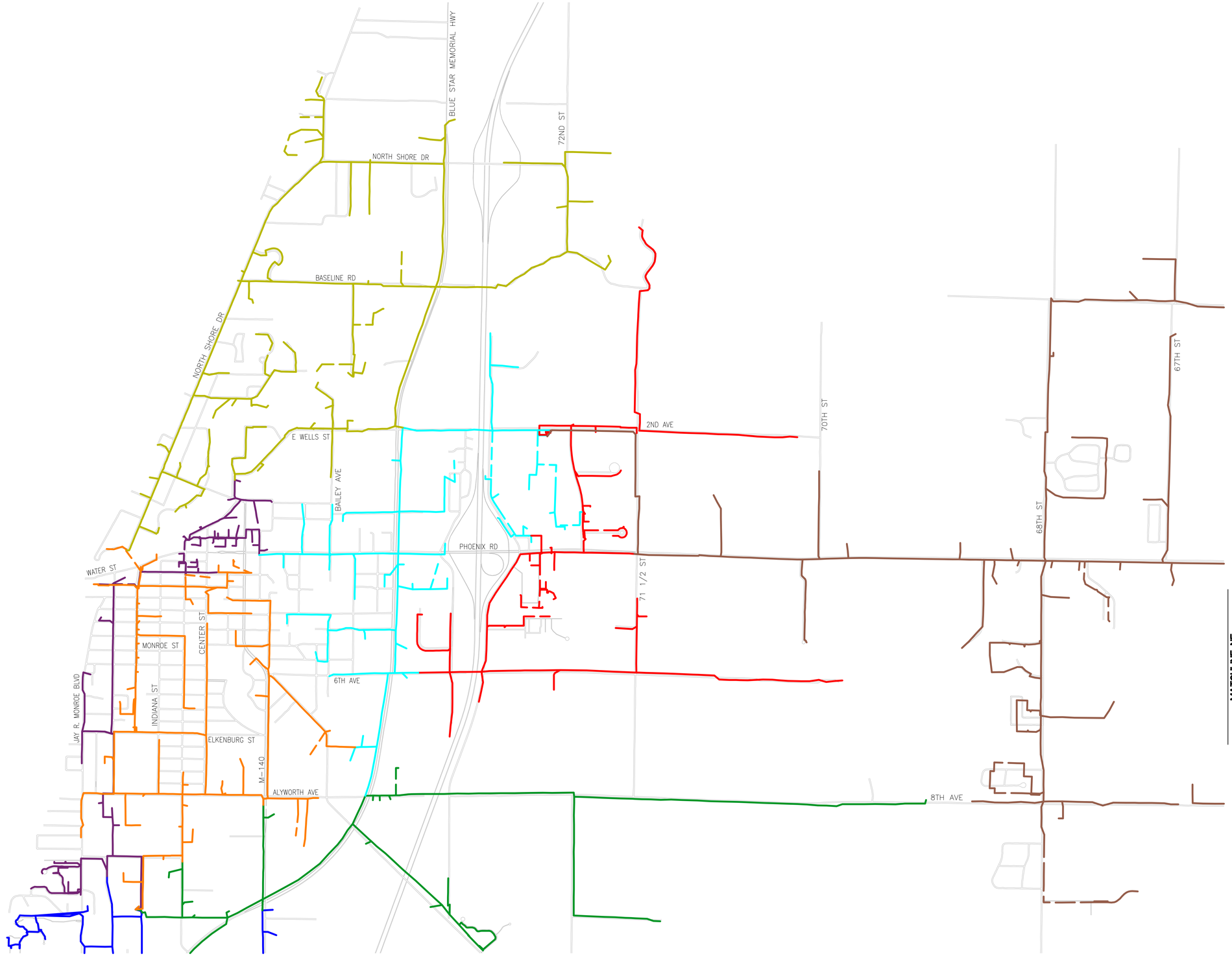
DRAWING NUMBER: P_CKT ALL

0 500' 1000' 2000'

LEGEND

- MS-D (SOUTH)
- MS-E (NORTH)
- MS-F (INDUSTRIAL)
- MS-J
- PR-A
- PR-B
- PR-C
- PR-D

MS-MAIN SUBSTATION
PR-PHOENIX ROAD SUBSTATION



ENG.	NMA		
DR	KMW		
CK	MPM		
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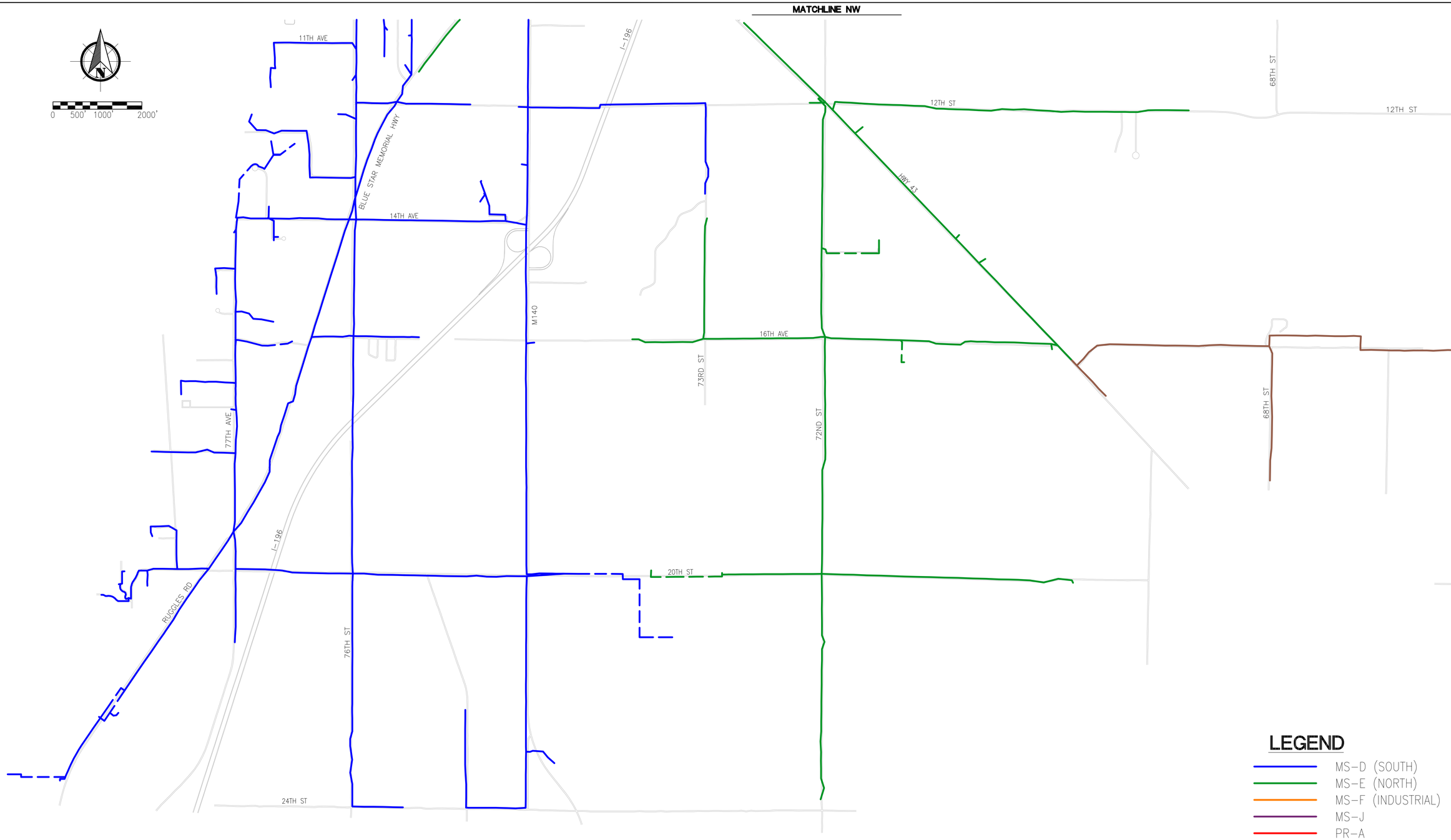
CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

PROPOSED SYSTEM CIRCUIT MAP - NORTHWEST

PROJECT NUMBER: 12-0550.01

DRAWING NUMBER: P_CKT NW



ENG.	NMA		
DR	KMW		
CK	MPM		
APP	MPM		
		07-02-2013	FINAL REPORT
		06-24-2013	DRAFT REPORT
		DATE	ISSUED FOR

GRP Engineering, Inc.
PETOSKEY, MICHIGAN, 231-439-9683
GRAND RAPIDS, MICHIGAN, 616-942-7183

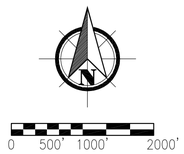
CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

PROPOSED SYSTEM CIRCUIT MAP - SOUTHWEST

PROJECT NUMBER: 12-0550.01

DRAWING NUMBER: P_CKT SW



LEGEND

- MS-D (SOUTH)
- MS-E (NORTH)
- MS-F (INDUSTRIAL)
- MS-J
- PR-A
- PR-B
- PR-C
- PR-D

MS-MAIN SUBSTATION
PR-PHOENIX ROAD SUBSTATION

ENG.	NMA			
DR	KMW			
CK	MPM			
APP	MPM	07-02-2013	FINAL REPORT	
		06-24-2013	DRAFT REPORT	
		DATE	ISSUED FOR	

GRP Engineering, Inc.
PETOSKEY, MICHIGAN, 231-439-9683
GRAND RAPIDS, MICHIGAN, 616-942-7183

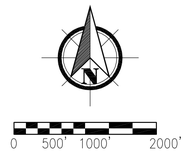
CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

PROPOSED SYSTEM CIRCUIT MAP - NORTHEAST

PROJECT NUMBER: 12-0550.01

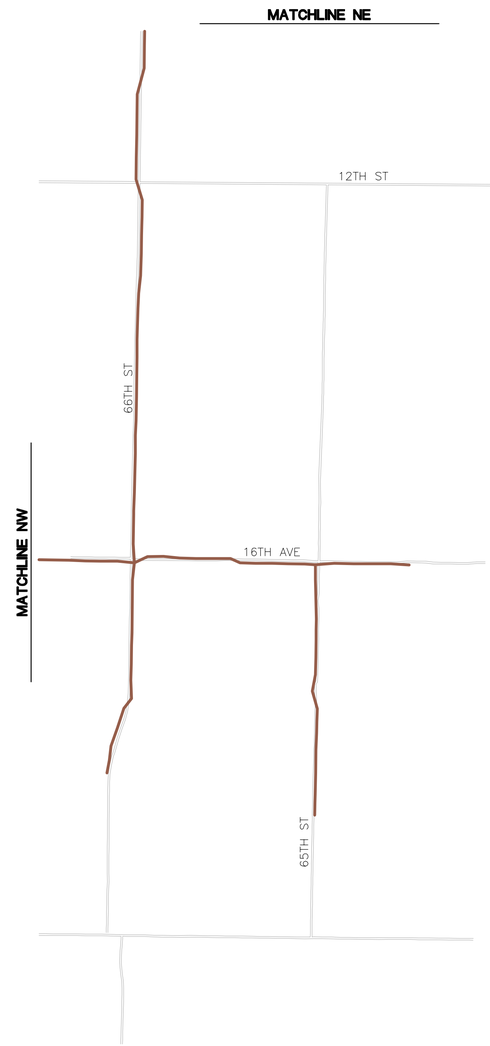
DRAWING NUMBER: P_CKT NE



LEGEND

- MS–D (SOUTH)
- MS–E (NORTH)
- MS–F (INDUSTRIAL)
- MS–J
- PR–A
- PR–B
- PR–C
- PR–D

MS–MAIN SUBSTATION
PR–PHOENIX ROAD SUBSTATION



ENG.	NMA			
DR	KMW			
CK	MPM			
APP	MPM			
		07-02-2013	FINAL REPORT	
		06-24-2013	DRAFT REPORT	
		DATE	ISSUED FOR	

GRP Engineering, Inc.
PETOSKEY, MICHIGAN, 231-439-9683
GRAND RAPIDS, MICHIGAN, 616-942-7183

CITY OF SOUTH HAVEN

SYSTEM STUDY & 5 YEAR PLAN — SOUTH HAVEN, MICHIGAN

PROPOSED SYSTEM CIRCUIT MAP - SOUTHEAST

PROJECT NUMBER: 12-0550.01

DRAWING NUMBER: P_CKT SE

City of South Haven

Agenda Item # 13

Water System Reliability Study

Background Information:

The City of South Haven owns and operates a Type I Community Public Water Supply (WSSN 06100). In addition, South Haven operates two additional Type I Community Public Water Supplies under Franchise Agreements. These include the South Haven/Casco Township Sewer and Water Authority (WSSN 06103) and Covert Township (WSSN 01661). These three systems are interconnected and operated as a single distribution system with three separate pressure districts.

Part 12 Rules of the Michigan Safe Drinking Water Act (Act 399, P.A. of 1976, as amended) require that the City conduct a water system reliability study and update the study every five years. Part 16 Rules set forth requirements for preparation of General Plans and include requirements for hydraulic analysis of the distribution system.

The City's last Water System Reliability Study was performed in 2007. In order to stay in compliance with the rules, a new study is required. The Water System Reliability Study serves as the five year capital improvement plan for the Water Utility.

Staff has solicited proposals from three engineering firms that are qualified to perform the necessary work. Proposals were received from Fishbeck, Thompson, Carr & Huber (FTC&H), Fleis & Vandenbrink, and Prein & Newhof. The proposals range in price from $10,800 to $16,400.

Although all firms invited to submit a proposal are qualified to complete the study, FTC&H has a successful record of delivering projects for South Haven, including the new Water Filtration Plant. Staff recommends that FTC&H be selected to complete the 2013 Water System Reliability Study. FTC&H performed the City's last Water System Reliability Study in 2007. Their work at that time included development of a hydraulic model of the distribution system. Preparation of the 2013 study will require the hydraulic model be updated to show changes made to the system since the completion of the last study. Because of their familiarity with the system, staff time will be minimized during preparation of the report. The other two firms may require additional time from City staff to familiarize them with the City's facilities.

Recommendation:

The Board is requested to pass a motion recommending that Council enter into a contract with Fishbeck, Thompson, Carr & Huber for Professional Services for the 2013 Water System Reliability Study in the amount of $16,400.

Attachments:

Request for Proposals 2013-02
Proposal: FTC&H
Proposal: Flies & Vandenbrink
Proposal: Prein & Newhof

Respectfully submitted,

Larry Halberstadt, PE
City Engineer

City of South Haven

Dept. of Public Works

DPW Building • 1199 8th Ave. • South Haven, Michigan 49090
Telephone (269) 637-0737 • Fax (269) 637-4778

REQUEST FOR PROPOSALS 2013-02

To: Prospective Consultants

From: Larry Halberstadt, PE, City Engineer

Date: February 18, 2013

RE: 2013 Water System Reliability Study

The City of South Haven owns and operates a Type I Community Public Water Supply (WSSN 06100). In addition, South Haven operates two additional Type I Community Public Water Supplies under Franchise Agreements. These include the South Haven/Casco Township Sewer and Water Authority (WSSN 06103) and Covert Township (WSSN 01661). These three systems are interconnected and operated as a single distribution system with three separate pressure districts.

Part 12 Rules of the Michigan Safe Drinking Water Act (Act 399, P.A. of 1976, as amended) require that the City conduct a water system reliability study and update the study every five years. Part 16 Rules set forth requirements for preparation of General Plans and include requirements for hydraulic analysis of the distribution system.

The City is seeking proposals from qualified consultants to assist us with meeting the requirements of Part 12 and Part 16 Rules. It is anticipated that the following minimum Scope of Services would be provided:

1. Obtain and review information from the City required for the study. Such materials would include the following:
   a. Construction record drawings of water distribution system improvement projects completed since the last study (2006), including valve and hydrant locations.
   b. Construction record drawings of water distribution system improvements that were not included with the last study, including valve and hydrant locations.
   c. Water production and consumption information for the City and franchise communities. This would include billing record information from Casco Township, South Haven Township, Covert Township, and the primary system water users.
   d. A list of the 10 largest water users in the City and the 5 largest water users in each of the franchise communities, including locations.
   e. A copy of the current storage tank and pumping operational configurations.
   f. A copy of the most recent Michigan Department of Environmental Quality (MDEQ) Water System Review ("Sanitary Survey") of the water system.
   g. Any available current population data and population projection data for the City.
   h. Any available planning studies or growth projection data for the service area of franchise communities.
   i. Fire flow requirements and Insurance Services Office reports.

   j. Records or reports of current problem areas (frequent repairs, pressure or quality complaints, etc.), if any.
   k. A copy of the 2007 Water System Reliability Study.
   l. Recent inspection reports for storage and pumping facilities.
2. Evaluate the following known deficiencies in the system:
   a. During peak demand periods, it is difficult to maintain acceptable water levels in the Standpipe. The study needs to investigate the piping layout at the Standpipe site to determine if a hydraulic restriction exists at the site or if the restriction is within the distribution system. The study also needs to review operation of the system with the Standpipe out of service.
   b. During peak demand periods, low pressures have been reported along North Shore Drive at the northern end of the low service pressure district. The study should evaluation potential solutions to alleviate these low pressures.
3. Analyze the historical water use data and population figures and review water usage records. Use this data to project future water use demands for average day, maximum day, and maximum hour demands for 5- and 20-year planning periods in line with the requirements of the updated Part 399 rules.
4. Complete hydraulic analysis of the distribution system using the WaterCAD® hydraulic model.
   a. Update the hydraulic model for system improvements or modifications made since the model was developed during the 2007 reliability study.
   b. Collect field data using hydrant flow tests and calibrate the model. Primary focus will be on recently improved areas of the distribution system. City of South Haven staff will be available to operate valves and hydrants during field investigations.
   c. Complete model runs for the following scenarios:
      (i) Current system under existing demands.
      (ii) Current system under future demands (5 & 20 year).
      (iii) 5 year improvements under 5 year demands
      (iv) 20 year improvements under 20 year demands.
   d. Prepare drawings for graphical representation of model results.
   e. Evaluate model runs and identify deficiencies relative to pressure and fire flows.
   f. Evaluate system improvements needed to reduce or eliminate deficiencies.
   g. Perform extended period simulation as necessary to evaluate the known deficiency noted under item 2.a.
5. Evaluate the need for routine flushing in Casco, Covert, and South Haven Townships.
6. Develop a prioritized list of recommended improvements in a 5- and 20-year capital improvement plan with cost estimates.
7. Update the water system General Plan drawings with improvements completed since the previous study. Make other corrections where noted by City Staff. Provide one hard copy and electronic copy of the General Plan drawings.
8. Develop a pipe inventory to satisfy the requirements of the General Plan in conjunction with input from the City on pipe materials and age.
9. Summarize the study in a report format. Submit the draft report for City review and comment. After integrating City comments, submit the study to the MDEQ for review. Assist the City in obtaining approval from the MDEQ by incorporating applicable MDEQ comments into the final report.

10. Provide three hard copies and electronic copy of the final report to the City and one hard copy to the MDEQ.
11. Attend meetings with the City as part of the project including:
    a. Project Kickoff Meeting: Meet with City staff to review the work plan, clarify the City's goals, and obtain required information on the system. If desired, a representative from the MDEQ may be included in the kickoff meeting to ensure that their expectations will be met.
    b. Progress Meeting: Meet with City staff to review the draft report.
    c. Board Meeting: Present draft report to the City's Board of Public Utilities.

Prospective consultants should submit information regarding their experience, qualifications, schedule, and fees for completing the Water System Reliability Study. The City will review the proposals and select a consultant based on the proposal that best meets the needs of the City.

Questions regarding the proposal should be directed to Larry Halberstadt, City Engineer at 269-637-0770 or lhalberstadt@south-haven.com. Proposals should be submitted no later than Friday, March 15, 2013.

FLEIS & VANDENBRINK
ENGINEERING, INC.
Offices in Michigan and Indiana

March 15, 2013

Mr. Larry Halberstadt, PE, City Engineer
City of South Haven - DPW
1199 8th Avenue
South Haven, MI 49090

RE: 2013 Water System Reliability Study
Request for Proposals 2013-02

Dear Mr. Halberstadt:

As requested, we have prepared a budget to perform a Water System Reliability Study. The MDEQ requires a Water System Reliability Study every five years to satisfy the requirements of Act 399. A reliability study evaluates your system's supply, storage and distribution to ensure a continuous and ample supply of water.

A water reliability study will also identify and document deficiencies in the City's current water system, update the computer model to simulate the hydraulics of the existing system and develop recommendations to plan, budget and prioritize future capital improvements required for the water system.

We propose to complete the water reliability study and hydraulic analysis on a lump sum basis, following the Scope of Services listed in your Request for Proposals dated February 18, 2013. A fee breakdown of the major tasks is as follows:

Task	Budget
Review and Compile Existing Data and Operations	$1,500
Update Water Map	$1,200
Hydrant Testing	$900
Computer Model Calibration and Simulations	$3,400
Draft Report, Review with City & MDEQ, Final Report	$3,800
Total	**$10,800**

We look forward to working with you on this project. If there are any questions please feel free to call.

Sincerely,

FLEIS & VANDENBRINK ENGINEERING, INC.

Jeffrey S. Wingard, P.E.
Project Manager

Authorized Representative – City of South Haven _____ Date _____

4748 Campus Drive, Kalamazoo, MI 49008 • Office: 269.385.0011 • Fax 269.382.6972 • www.fveng.com

Review and Compile Existing Data and Operations

A. Meet with City staff and review scope of work and schedule.
   1. Collect data on historical water use and pump records.
   2. Review problem areas in the water distribution system.
   3. Review Service area.
   4. Review fire flow objectives for the community based on service areas.
B. Review and inventory the existing water system components:
   1. Review the intake, shore well, pump data, and treatment system.
   2. Review the elevated tank(s).
   3. Review the water distribution system and its overall condition.
   4. Review chemical analysis of the water.
C. Review current water use and pumping records. Calculate the 5 & 20 year projections.
D. Review the most recent Insurance Services Organization (ISO) evaluation of the system.

Update Water Map and Computer Model

A. Update Water Map by adding the watermains since last reliability study.
B. Update the computer model of the system and setup hydraulic analysis.
C. Complete computer runs, identifying static pressures and flows at key locations.

Hydrant Testing

A. Perform hydrant testing at key locations in the City.

Model Calibration & Simulations

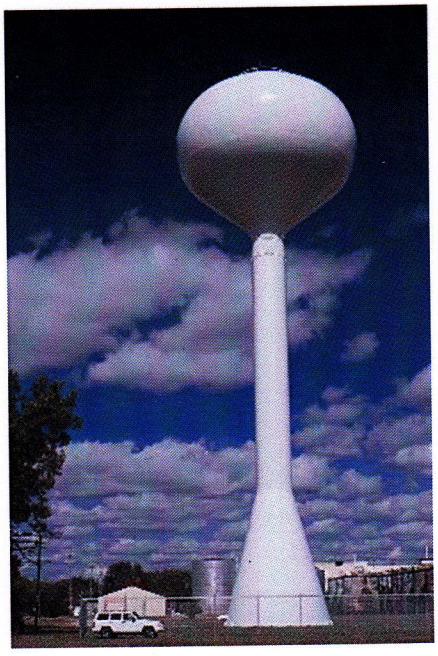
A. Calibrate the computer model to reflect conditions recorded during the hydrant testing.
B. Perform fire flow and maximum day simulations of water system.
C. Simulate proposed improvements to the water system.
D. Simulate projected water demands. Identify deficiencies where the system cannot produce the desired flows. Evaluate improvements to the water system.
E. Identify short and long-range improvements that are needed to meet the 5 & 20 year needs.

Draft Report, Review with City & MDEQ, Final Report

A. Prepare draft report summarizing the findings and outlining the recommendations.
B. Submit draft report to the City and meet with the staff to review.
C. Update the report after receiving review comments.
D. Submit revised report to the Michigan Department of Environmental Quality (MDEQ).
E. Receive comments from the MDEQ and finalize the water reliability study.

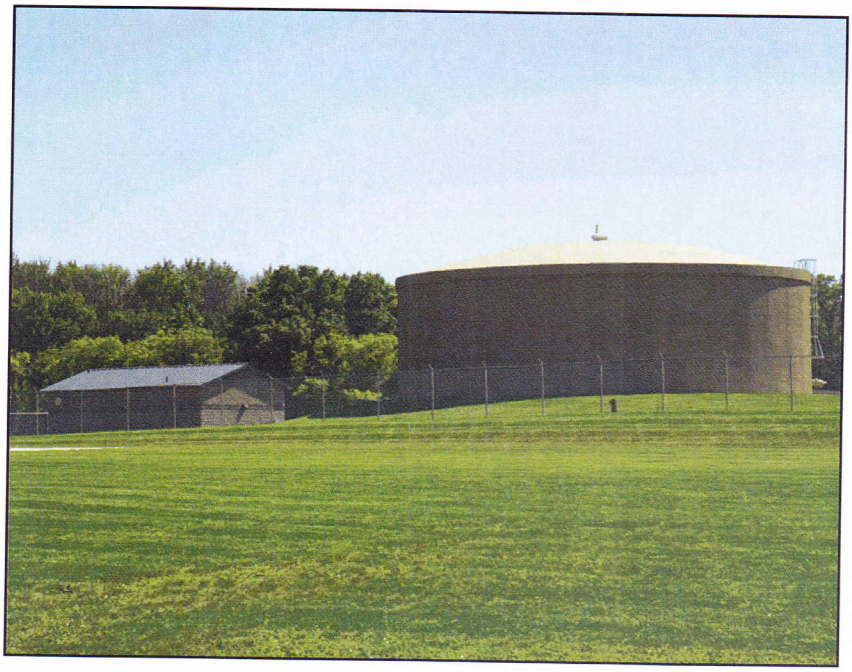
FLEIS & VANDENBRINK ENGINEERING, INC.

Water System Master Plans & Reliability Study Experience



F&V has assisted numerous communities plan and perform water reliability studies. These communities include:

Community	Pressure Zones
Allendale Charter Township	Multiple
Camp Grayling Training	Multiple
City of Bangor	Single
City of Belding	Single
City of East Grand Rapids	Single
City of Grand Blanc	Single
City of Harbor Springs	Single
City of Hudsonville	Multiple
City of Manton	Single
City of Muskegon Heights	Multiple
City of Newaygo	Multiple
City of Plainwell	Single
City of Portland	Single
City of Potterville	Single
City of Scottville	Single
City of Wayland	Single
Town of Ossian	Single
Town of Lagro	Multiple
Town of Markle	Single
Town of Windfall	Single
Village of Augusta	Single
Village of Bear Lake	Single
Village of Benzonia	Single
Village of Berrien Springs	Single
Village of Beulah	Single
Village of Bloomingdale	Single
Village of Breckenridge	Single
Village of Centreville	Single
Village of Colon	Single
Village of Constantine	Single
Village of Eau Claire	Single
Village of Edmore	Single
Village of Howard City	Single
Village of Lakeview	Single
Village of Lawrence	Single
Village of Mattawan	Single
Village of Middleville	Multiple
Village of Nashville	Multiple
Village of New Lothrop	Single
Village of Northport	Single
Village of Pentwater	Single
Village of Roscommon	Single
Village of Saranac	Single
Village of Stockbridge	Single
Village of Suttons Bay	Multiple
Yankee Springs Township	Single



Proposal for
City of South Haven

Professional Engineering Services
2013 Water System
Reliability Study

fish beck, thompson, carr & huber

engineers
scientists
architects
constructors

Table of Contents

March 15, 2013

Mr. Larry Halberstadt, P.E.
City Engineer
City of South Haven
1199 8th Avenue
South Haven, MI 49090

Re: Proposal for Engineering Services
City of South Haven 2013 Water System Reliability Study

Dear Larry:

Fishbeck, Thompson, Carr & Huber, Inc. (FTC&H) is pleased to provide the City of South Haven our proposal to complete an update to the City's water system reliability study and general plan. The proposal describes our understanding of the work, the services we will provide, and the related fees.

Statement of Understanding

The Part 12 Rules of the Michigan Safe Drinking Water Act (Act 399, P.A. of 1976, as amended) require that Type I water supplies conduct a water system reliability study and update the study every five years. At a minimum, the study must evaluate the present and future water demands and the ability of the existing system to reliably deliver the quantities of water needed, including periods when the normal power service is interrupted. Reliability studies submitted after December 4, 2011, are expected to adhere to the new requirements.

The Part 16 Rules regarding general plans have been recently updated by the state of Michigan. General plans now require a hydraulic model of the distribution system and a capital improvements plan that identifies needs for 5- and 20-year planning periods. Compliance with the updated regulation is required by January 1, 2016.

The City has requested a proposal to fulfill the requirements to complete a reliability study and general plan update for the water system. The reliability study will examine the City's system under both current and projected future demand conditions. Current demands will be compiled and the City's future demand projections for 5- and 20-year periods will be developed based primarily on historical water usage trends and available population projections. The study completed will also fulfill the new requirements for a general plan so the City's studies comply with current regulations.

The City's last reliability study was completed by FTC&H and issued in 2007. The previous study included the development and calibration of a hydraulic model of the distribution system. FTC&H previously submitted a proposal in December 2011 to complete the requested reliability study update. Our current proposal is based on our previous proposal with modifications made according to the City's request for proposals, dated February 18, 2013.

The City of South Haven owns and operates a Type I Community Public Water Supply (WSSN 06100). In addition, South Haven operates two additional Type I Community Public Water Supplies under Franchise Agreements. These include the South Haven/Casco Township Sewer and Water Authority (WSSN 06103) and Covert Township (WSSN 01661). These three systems are interconnected and operated as a single distribution system with three separate pressure districts.

ftc&h
engineers
scientists
architects
constructors

1515 Arboretum Dr., SE
Grand Rapids, MI
49546
ph: 616.575.3824
fax: 616.575.8155
www.ftch.com

Scope of Services

We will complete the following as part of the study:

- Obtain and review information from the City required for the study. Such materials will include:
  - Construction record drawings of water distribution system improvement projects completed since the last study or not included in the last study, including valve and fire hydrant locations. Electronic format, i.e., AutoCAD or geographic information system is preferred.
  - Water production and consumption information for the City and customer communities. This will include billing record information from Casco Township, South Haven Township, Covert Township, and the system's primary water users.
  - A list of the 10 largest water users in the City and the five largest water users in each of the customer communities, including locations.
  - A description of current storage tank, high-service pumping, and booster station operational configurations.
  - Copy of most recent Michigan Department of Environmental Quality (MDEQ) Water System Review (also known as a Sanitary Survey) of the water system.
  - Any available current population data and population projection data for the City.
  - Any available planning studies or growth projection data for the service area of franchise communities.
  - Fire flow requirements and Insurance Services Office reports. In lieu of updated information, values from the previous study will be assumed.
  - Records or reports of current problem areas (frequent repairs, pressure or quality complaints, etc.), if any.
  - Recent inspection reports for storage and pumping facilities.
- Evaluate known deficiencies in the system.
  - The City has recently made known that water system operators have had difficulty maintaining acceptable water levels in the standpipe during peak demand periods. As part of the study, we will investigate the piping layout of the standpipe and evaluate potential solutions to alleviate what is generally thought to be a hydraulic restriction. We will also evaluate the model without the standpipe in the system.
  - At times, low pressures have occurred along North Shore Drive at the northern end of the service area. As part of the study, we will evaluate potential solutions to alleviate these low pressures.
- Analyze the historical water use data and population figures, and review water usage records. Use this data to project future water use demands for average day, maximum day, and maximum hour demands for 5- and 20-year planning periods in line with the requirements of the updated Part 399 rules.

FTC&H

- Complete hydraulic analysis of the distribution system using the WaterCAD hydraulic model.
  - Update the hydraulic model for system improvements or modifications made since the model was developed during the 2007 reliability study.
  - Collect field data using hydrant flow tests and calibrate the model. Our primary focus will be on recently improved areas of the distribution system. We assume FTC&H will be assisted by water system personnel to operate valves and hydrants during field investigations.
  - Complete model runs for the following scenarios:
    - Current system under existing demands.
    - Current system under future demands (5- and 20-year).
    - 5-year improvements under 5-year demands.
    - 20-year improvements under 20-year demands.
    - Extended period simulation to evaluate the water levels in the standpipe.
  - Prepare drawings to graphically represent model results.
    - Pressure contours at peak hour demands
    - Available fire flow at maximum day demands
  - Evaluate model runs and identify deficiencies relative to pressure and fire flows.
  - Evaluate system improvements needed to reduce or eliminate deficiencies.
  - Evaluate the need for routine flushing in Casco, Covert, and South Haven Townships.
  - Develop a prioritized list of recommended improvements in a 5- and 20-year capital improvements plant with cost estimates.
  - Update the water system general plan drawings with improvements completed since the previous study. Provide one hard copy and one electronic copy of the General Plan drawings.
  - Develop a pipe inventory to satisfy the requirements of the General Plan in conjunction with input from the City on pipe materials and age.
  - Summarize the study in a report format. Submit the draft report for City review and comment. After integrating City comments, submit the study to the MDEQ for review. Help the City obtain approval from the MDEQ by incorporating applicable MDEQ comments into the final report.
  - Provide three hard copies and one electronic copy of the final report to the City and one hard copy to the MDEQ.
  - Attend meetings with the City as part of this project. The following meetings are assumed:
    - Project Kickoff Meeting: Meet to review the work plan, clarify the City's goals, and obtain required information on the system. If desired, a representative from the

MDEQ may be included in the kickoff meeting to ensure their expectations will be met.

- Progress Meeting: Review the draft report with City staff.
- BPU Meeting: Present the draft report to the Board of Public Utilities.

Professional Services Fees

Our fee to complete the work as outlined in the scope of services is a lump sum amount of Sixteen Thousand Four Hundred Dollars ($16,400).

We will complete the scope of services as outlined within six months after authorization to proceed. If the City has a need to complete the study within a specific timeframe, we will be glad to discuss specific dates for project completion.

The engineering team that completed the previous study is currently designated to complete the update. Having completed the previous model and study, we will be able to dedicate our time focusing on analysis rather than getting familiar and up to speed with the model. We are offering to decrease our fee from our 2011 proposal as a show of our desire to build on the great relationship we have with the City.

We hope the City will find this proposal favorable and that we will be able to continue to work with the City on another important water system project.

Sincerely,

FISHBECK, THOMPSON, CARR & HUBER, INC.

John A. Willemin, P.E.

crf
Enclosures

Timothy D. McNamara, P.E.

Principal and Senior Vice President
Process Engineering Department Head

Role in Project

Principal-in-Charge

Registration/Certification

Professional Engineer - Michigan, Wisconsin, Indiana, Kentucky, Connecticut, Florida, Ohio

Education

M.S. Degree in Sanitary Engineering, Michigan State University

B.S. Degree in Civil Engineering, Michigan State University

Awards

2007 Raymond J. Faust Award for Outstanding Personal Service in the Water Supply Field, American Water Works Association/ Michigan Section

2006 William F. Shepard Award for 20 Years of Membership and Service, Michigan Water Environment Association

Years of Experience

28 with FTC&H
3 with other firms
31 years total

Mr. McNamara is responsible for the technical leadership of process engineers assigned to projects. He has significant experience in report preparation, design, specifications and contract documents, and construction coordination. His career has focused on the areas of treatment processes, pumping systems, instrumentation, and project management. He has been involved in numerous treatment plant renovation and expansion projects, new treatment plants and several groundwater remediation projects. Although he currently specializes in project management and oversight roles, Mr. McNamara also provides his technical expertise for complex project issues.

Mr. McNamara has significant expertise in potable water systems, particularly with membrane filtration, lime softening, media filtration, pumping, and storage systems. He also has a variety of experience with wastewater systems. He has been responsible for studies, preliminary and final design, and construction phase services for numerous projects. Several of his projects have been constructed using a consultant led construction management process.

Water Pumping and Distribution

- Michigan State University, East Lansing, Michigan — Water system reliability study and distribution system modeling.
- City of Niles, Michigan — Water system reliability study and distribution system modeling, and booster pumping station.
- City of Lowell, Michigan — Water reliability study and northeast and northwest booster pumping stations.
- City of Kalamazoo, Michigan — Water system strategic plan.
- Plainfield Township, Michigan — Water reliability study and distribution modeling.
- City of St. Joseph, Michigan — Distribution modeling.
- City of Sturgis, Michigan — Water reliability study and distribution modeling.
- City of Cedar Springs, Michigan — Water reliability study and distribution modeling.
- City of Portage, Michigan — Distribution system modeling.
- City of Alma, Michigan — Water reliability study and distribution modeling.
- City of Port Huron, Michigan — Low-service pumping VFDs.
- East Lansing-Meridian Water and Sewer Authority, East Lansing and Spring Lake, Michigan — High-service pump addition.
- City of Marquette, Michigan — Booster station.
- City of Ionia, Michigan — Booster station.

Water Treatment

- City of South Haven, Michigan — Surface WTP.

- Board of Water & Light, City of Lansing, Michigan
  - Wise Road Softening Plant — Mechanical, electrical, and instrumentation and control systems replacements.
  - Dye Softening Plant — Raw water piping and valve vault expansion.
- Michigan State University, East Lansing, Michigan — Water treatment alternatives study.
- City of Niles, Michigan — Iron removal facility.
- City of Owosso, Michigan — Upgrades to the City's 6-MGD water softening plant including new treatment tanks, chemical feed systems, and restoration of the existing building.
- City of Marquette, Michigan — New microfiltration treatment plant.
- City of Muskegon Heights, Michigan — Surface WTP expansion.
- City of Mackinac Island, Michigan — Conversion of an existing plant to a microfiltration treatment plant.
- Bad Axe-Port Austin, Michigan — Study and preliminary design of a microfiltration treatment plant.
- City of Portage, Michigan — Iron filtration plant study.
- Saginaw Chippewa Indian Tribe, Mt. Pleasant, Michigan — Lime softening plant.
- City of Grand Ledge, Michigan — Iron removal plant.
- City of St. Joseph, Michigan — Zebra mussel control system and filter renovations.
- City of Mt. Pleasant, Michigan — Lime softening plant.
- City of Benton Harbor, Michigan — Water filtration plant improvements.
- East Lansing-Meridian Water and Sewer Authority, East Lansing, Meridian Township, Michigan — Water softening plant improvements.
- City of Grand Rapids, Michigan — Filter renovations and structural improvements.

Water Supply

- City of Muskegon Heights, Michigan — Lake intake system.
- City of Saint Joseph, Michigan — Lake intake system.
- City of South Haven, Michigan — Lake intake system.
- Ira Township, Michigan — Lake intake system.

Affiliations

American Water Works Association
Water Environment Federation

John A. Willemin, P.E.

Vice President/Senior Process Engineer

Role in Project

Project Manager

Registration/Certification

Professional Engineer – Michigan, Wisconsin

Education

M.S. Degree in Civil/Environmental Engineering, Michigan Technological University

B.S. Degree in Civil Engineering, Michigan Technological University

Years of Experience

15 with FTC&H
4 with other firms
19 years total

Mr. Willemin is a project manager and senior design engineer with experience focusing on water and wastewater treatment and transport.

Water Distribution

- City of Kalamazoo, Michigan — Well Station 11 pumping improvements.
- City of St. Joseph, Michigan — 1.5-Mg elevated storage tank.
- City of Alma, Michigan — 1.3-MGD well pump and well house.
- City of Grand Ledge, Michigan — 10.8-MGD pump station and 0.75-Mg, prestressed concrete, ground level storage tank.
- City of Holland, Michigan — Design and construction of improvements to the City's two booster pumping stations to increase pumping capacity. Design and construction services for a 1-Mg elevated storage tank.
- City of Ionia, Michigan — Rehabilitation of the City's 1-Mg ground level storage tank.
- City of Wyoming, Michigan — 5-Mg prestressed concrete ground level storage tanks.
- City of Midland, Michigan WTP — Design of a 9.5-MGD water booster pumping station to serve a new pressure district.
- City of Niles, Michigan — 1-MGD booster pumping station and 0.3-Mg elevated storage tank.

General Water Supply

- City of South Haven, Michigan — Water distribution system reliability study.
- City of St. Louis, Michigan — Water system master plan study.
- Lake Charter Township, Michigan — Water system master plan study.
- City of St. Joseph, Michigan — Water distribution system model update and water system reliability study.
- City of Ionia, Michigan — Reliability study and master plan.
- Saginaw Chippewa Indian Tribe, Mt. Pleasant, Michigan — Water system master plan update.
- Huron Shore Regional Utility Authority, East Tawas, Michigan — Reliability study and master meter study.
- City of Portage, Michigan — Reliability study and evaluation of additional storage and pumping capacity to increase fire flows.
- City of Kalamazoo, Michigan — Water system strategic plan.
- East Lansing-Meridian Water and Sewer Authority, East Lansing, Meridian Township, Michigan — Long-term planning study.
- Oakland County Water Resources Commissioner, Oakland County, Michigan — Energy audit for water system facilities.

Water Treatment

- City of South Haven, Michigan

- 7-MGD conventional treatment plant with high-rate settling and raw water pumping station.
- Water plant reliability and capacity expansion study.

➤ City of St. Joseph, Michigan

- 20-MGD intake and shorewell pumping station.
- Filter underdrain and media replacement project.
- Facilities, operation, and processes assessment for City's existing 16-MGD treatment plant, including capacity analysis to expand treatment to 20 MGD.

➤ City of Marinette, Wisconsin — 5-MGD membrane filtration plant with high-rate settling pretreatment system and powdered activated carbon feed system. Performed study for surface water treatment for Green Bay/Lake Michigan supply.

➤ Lake Charter Township, Michigan.

- 3-MGD membrane filtration plant.
- WTP and intake study.
- 1-Mg ground level finished water storage tank.

➤ City of Ludington, Michigan — Water treatment feasibility study.

➤ City of Muskegon, Michigan — Water system reliability study update.

➤ Michigan Ad Hoc Water Group, Northern Berrien County, Michigan — Feasibility study for new 7-MGD membrane treatment plant.

➤ City of Portage, Michigan — Feasibility study for arsenic and iron removal treatment.

➤ Marion, Howell, Oceola, Genoa (MHOG) Water Authority, Howell, Michigan — Study to evaluate blending softened water with hard water in the WTP distribution system.

➤ City of Niles, Michigan — Design of a new 2.6-MGD iron removal treatment facility for the City's groundwater supply.

➤ City of New Baltimore , Michigan — Plate settler pretreatment system and membrane filtration system process design for plant expansion from 2 MGD to 6 MGD.

➤ City of Owosso, Michigan — Design of upgrades to the City's 6-MGD water softening plant, including new treatment tanks, chemical feed systems, and restoration of the existing building.

➤ City of Holland, Michigan — Site evaluation for new shore well and 20-MGD membrane filtration plant.

➤ East Lansing-Meridian Water and Sewer Authority, East Lansing, Meridian Township, Michigan — Chloramination system for a 16-MGD WTP.

Affiliations

American Water Works Association, Michigan Section, Trustee and Water Treatment Practices Committee Co-chair
Water Environment Federation
West Michigan Water Works Association

David J. Baar, P.E.

Associate
Senior Process Engineer

Role in Project

Senior Process Engineer

Registration/Certification

Professional Engineer - Michigan

Education

B.S. Degree in Engineering, Civil Concentration, Calvin College

Years of Experience

13 with FTC&H
2 with other firms
15 years total

Mr. Baar has worked in the engineering and construction industry as a design engineer. His experience includes working with governmental, commercial, and industrial clients. He has provided civil and environmental engineering, construction assistance, construction inspection, and startups for various projects. His projects include water and wastewater treatment systems, pumping systems, and water distribution systems. His major focuses are municipal water treatment, pumping and storage, industrial wastewater treatment, and water distribution system modeling.

Water Distribution

- City of Grand Rapids, Michigan, Comprehensive Master Plan — Completed hydraulic modeling for distribution system master plan for this major metropolitan area. The hydraulic model development involved importing GIS data, and reducing the model from over 80,000 pipes to 7,000. The distribution system includes 11 customer communities, 11 pressure districts, two 30-mile transmission mains, 21 storage tanks and reservoirs totaling 88 million gallons, and numerous pump stations and valve vaults. The model was calibrated and recommendations for system improvements were provided in a report.
- City of Portage, Michigan — Water System Reliability Study — A model of all pipes in the City water system was developed using GIS data. The model was calibrated and used to evaluate needed system improvements. The reliability study also identified well capacity deficiencies which led to a feasibility study for iron and arsenic removal.
- City of Coldwater, Michigan — Completed water system reliability study
- City of Cadillac, Michigan – Project management for water system reliability study.
- City of Kalamazoo, Michigan — Completed water system master plan and developed water distribution system computer model for the City and its customer communities.
- City of Greenville, Michigan — Completed water system reliability study and developed calibrated hydraulic model. Several subsequent projects used the model to evaluate developments and improvements to the distribution system.
- City of Roosevelt Park, Michigan — Completed water system reliability study and rate study. The reliability study included the development of a calibrated hydraulic model and recommendation of system improvements.
- City of Niles, Michigan — Completed modeling for a water system master plan.
- Huron Shore Regional Utility Authority, Oscoda, Michigan — Water system reliability study including development of calibrated hydraulic model.
- City of Fremont, Michigan — Water system reliability study.
- City of St. Joseph, Michigan — Reliability study, distribution system modeling, and new river crossing.
- City of Midland, Michigan — Distribution system modeling for new high pressure district and 7.5-MGD pumping station with design and construction of valve vaults.

- Plainfield Township, Michigan — Updated and calibrated an existing model for the Township and customer communities. Completed reliability study.
- Village of Westphalia, Michigan — Completed pipe network analysis of distribution system for reliability study update.
- City of Grand Ledge, Michigan — Completed PNA of distribution system for reliability study update.

Water Treatment

- City of Marinette, Wisconsin — Completed preliminary process design for a new 5 mgd membrane treatment plant. Final design is underway in 2009.
- Lake Charter Township, Michigan
  - Process design for new 2 mgd membrane treatment system to increase existing treatment plant capacity.
  - Process design for cast-in-place, concrete-finished water storage reservoir and process piping system.
- Michigan State University, East Lansing, Michigan — Designed new well house for University's drinking water supply.
- City of Muskegon, Michigan – Completed water filtration plant reliability study.
- City of Portage, Michigan
  - Garden Lane Well Field — Completed feasibility study for arsenic, iron, and manganese from three existing wells and one proposed future well.
  - Shuman Well Field — Implemented sampling plan and treatability study for municipal water supply. Performed feasibility study for a 5.8-MGD iron and manganese removal facility.
- City of Cedar Springs, Michigan — Water system modeling, wellhouse design, construction phase engineering, and startup assistance for a 1.5-MGD water supply well and SCADA system upgrade.
- City of Wyoming, Michigan — Designed renovations to backwash reclaim system as part of the WTP expansion
- East Lansing-Meridian Water and Sewer Authority, East Lansing, Meridian Township, Michigan — Completed final design for an ammonia system for a 16.0-MGD WTP. System included flow paced feed on anhydrous ammonia gas system and building modifications for a chemical feed and storage area.
- City of Mackinac Island, Michigan — Provided design engineering service for upgrades to an aeration system at the WTP.

Affiliations

American Society of Civil Engineers,
American Water Works Association, Young Professionals Committee
Water Environment Federation

Brian D. Phillips, P.E., LEED AP

Process Engineer

Role in Project

Process Engineer and Hydraulic Modeling

Registration/Certification

Professional Engineer – Michigan

LEED Accredited Professional

Education

M.S. Degree in Civil Engineering, South Dakota School of Mines and Technology

B.S. Degree in Civil Engineering, Ohio Northern University

Years of Experience

6 with FTC&H
3 with other firms
9 years total

Mr. Phillips has worked in the construction industry as a project engineer on a variety of projects including WTPs, pump stations, and bridges. He also has experience in the engineering industry as a process engineer working on WTPs, water distribution systems, and pumping systems.

Water Distribution

- Lake Charter Township, Michigan
  - Distribution system modeling and water system reliability study.
  - Construction phase engineering for a 1-MG finished water tank.
- City of Ionia, Michigan — Distribution system modeling.
- City of Cedar Springs, Michigan — Distribution system modeling and water system reliability study.
- Grand Valley State University, Allendale, Michigan — Developed a calibrated hydraulic model for the University's water system and completed a long-term improvements study.
- City of South Haven, Michigan — Distribution system modeling and water system reliability study.
- City of Alma, Michigan — Water system model updates and field calibration.

Municipal Water Treatment

- Lansing Board of Water & Light, Lansing, Michigan
  - Dye Water Plant — Design and construction phase services for the replacement of raw water piping, valves, and actuators.
  - Wise Road Water Plant — Conducted an evaluation of various WTP components following a plant-wide chemical release.
  - Wise Road Water Plant — Design and construction phase services for replacement of process equipment, chemical feed systems, electrical and instrumentation equipment, and SCADA system.
- City of Grand Rapids, Michigan
  - Design and construction phase services for flocculation/sedimentation tank rehabilitation projects, including new interior waterproof lining and the installation of traffic bearing coating on the tanks' exterior.
  - Construction phase services on exterior façade restoration projects.
  - Design and construction phase services for filter rehabilitation projects, including new interior waterproof lining and new filter underdrain system.
  - Design and construction phase services for filter valve rehabilitation projects involving replacement of automated pneumatic valve actuators with motorized units.

FTC&H

- City of St. Joseph, Michigan
  - Completed multi-seasonal investigation optimizing the location of a new surface water intake.
  - Designed 36-MGD Lake Michigan surface water intake.
  - Designed and inspected a filter rehabilitation project that included underdrain, surface wash, and media replacement.
  - Designed a zebra mussel control system for a Lake Michigan water intake.
- City of South Haven, Michigan
  - Completed WTP reliability study and plant expansion analysis.
  - Designed a 7-MGD replacement surface WTP. Project included a new Lake Michigan intake and raw water pumping station.
- City of Marinette, Wisconsin — Completed the design of a 5-MGD replacement surface WTP, which included pretreatment and microfiltration.
- Ottawa County Road Commission, Grand Haven, Michigan
  - Northwest-Ottawa Direct Filtration Plant — Served as full-time, onsite engineer for the 2-year expansion project of a 23.25 MGD WTP.
  - Completed design of a replacement fluoride treatment system.
  - Construction phase services for improvements to the raw water pumping system.
- City of Midland, Michigan — Chemical feed system replacement.
- City of Grand Ledge, Michigan — Completed design of a fluoride treatment system.
- Michigan State University, Michigan Kellogg Biological Station, East Lansing, Michigan — Arsenic treatment system for facility water supply.
- Hamilton Parsons School, Romeo, Michigan — Arsenic treatment system for facility water supply.
- City of Port Huron, Michigan — Completed design of a backwash storage tank.

Construction

- Baldwin WTP, Cleveland, Ohio
  - Chemical Feed System Rehabilitation — Coordinated between owner, subcontractors, and vendors. Reviewed shop drawings and prepared submittals.
  - Filter Rehabilitation and Upgrade — Involved with the forming and placing of jobsite concrete and demolition, and installation of ductile iron pipe and stainless steel pipe and valve assemblies. Other responsibilities included project schedule maintenance, submittal preparation, and survey layout.

Affiliations

American Water Works Association, Distribution System Practices Committee Chair

Geneva M. Vanlerberg, P.E.

Process Engineer

Role in Project

Process Engineer and Hydraulic Modeling

Registrations/Certifications

Professional Engineer - Michigan

HAZWOPER Site Worker

Education

M.S. Degree in Environmental Engineering, Michigan State University

B.S. Degree in Civil Engineering, Michigan State University

Years of Experience

3 with FTC&H
2 with other firms
5 years total

Training

Innovyze Advanced Water Modeling and Master Planning, 2012

Ms. Vanlerberg has worked in the engineering and construction industry as a design engineer. Her experience includes working with governmental, commercial, and industrial clients. She has provided civil and environmental engineering, construction assistance, construction inspection, and startups for various projects, which include water and wastewater treatment systems, pumping systems, and water distribution systems.

Ms. Vanlerberg's major focuses are municipal water treatment, pumping and storage, industrial wastewater treatment, and water distribution system modeling. She also has experience in remedial system design, environmental sampling, surveying, quality control testing, and construction oversight.

Water Distribution

- City of Grand Ledge, Michigan — Completed water distribution system reliability study including hydraulic modeling with model calibration.
- Michigan State University, East Lansing, Michigan — Completed water distribution system reliability study including hydraulic modeling.
- City of Grand Rapids, Michigan
  - Performed hydraulic modeling to evaluate improvements to capacity of transmission main supplying water from the Lake Michigan Filtration Plant to the City distribution system.
  - Performed hydraulic modeling to assist in design of Dean Lake Service Center pumping capacity improvements.
  - Performed hydraulic modeling to assist in design of East Paris Service Center pumping capacity improvements.
- City of Coldwater, Michigan — Updated water distribution system hydraulic model to provide the City with an interactive GIS map showing data for available fire flow throughout the system.
- City of Kalamazoo, Michigan — Updated water distribution system hydraulic model and evaluated the impact of various improvements throughout the system. Completed water reliability study including capital improvements plan.
- City of Niles, Michigan — Completed hydraulic modeling of water distribution system to fulfill MDEQ requirements of a general plan.
- City of Midland, Michigan — Took a non-working hydraulic model from the owner, determined the deficiencies in the model, and fixed the model to provide the owner with a working hydraulic model of their distribution system.

Water Treatment

- City of Muskegon, Michigan, WTP — Successfully obtained grant for and designed fluoride feed system upgrades.
- City of South Haven, Michigan, WTP — Performed design of Lake Michigan water intake.

- City of Alma, Michigan, WTP — Performed evaluation of existing plant and made recommendations for upgrades necessary to increase plant capacity by 50 percent.
- Oakland County, Michigan — Performed energy audits on various water treatment plants and well houses within the county and made recommendations for energy saving improvements.
- City of Coldwater, Michigan — Evaluated options for upgrading the plant chlorination system. The technologies evaluated were bulk sodium hypochlorite use and onsite sodium hypochlorite generation.
- Lansing Board of Water & Light, Lansing, Michigan — Assisted in evaluation and design of WTP rehabilitation after a chemical release incident damaged much of the plant. A plant-wide evaluation included pumps, piping, valves, chemical feeding systems, electrical, and instrumentation and controls systems. Design included site decontamination, new chemical feeding systems, and new electrical and instrumentation and controls systems.

Stormwater

- Michigan State University, East Lansing, Michigan — Designed rainwater harvesting and re-use system for large campus building.
- MDOT, Various Michigan Locations — Assisted in design of various highway stormwater pumping stations.

Groundwater Supply

- City of Charlotte, Michigan — Designed new water supply well with submersible pump to replace an existing clogged well.

Wastewater Treatment

- St. Clair County, Michigan
  - Assisted in design of a landfill leachate pretreatment system including carbon dioxide stripping, ammonia stripping, pH adjustment, clarification, and aerated lagoons.
  - Performed onsite bench scale testing of landfill leachate to determine chemical dosing requirements for the pretreatment system.
  - Performed part-time construction inspection and startup of the treatment system.
- City of Holland, Michigan, WWTP — Designed flow metering and valving for yard piping during plant upgrade.
- Kellogg Company, Grand Rapids, Michigan — Designed flow monitoring manhole at food processing facility to ensure accurate metering of wastewater discharge to the sanitary sewer.

Affiliations

American Water Works Association

fic&h

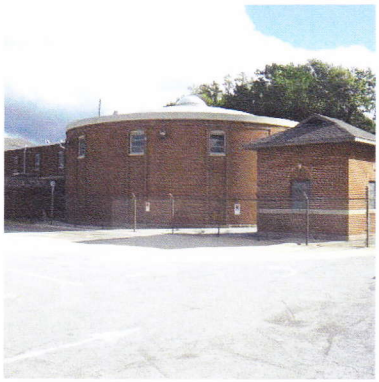
Water Reliability Study and Water System Master Plan Clients

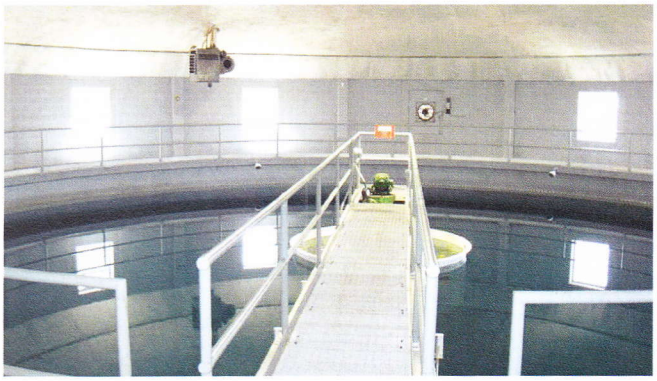
Michigan

- City of Alma
- City of Cedar Springs
- City of Coldwater
- East Lansing-Meridian Water and Sewer Authority
- Village of Freeport
- City of Fremont
- City of Grand Haven
- City of Grand Ledge
- City of Grand Rapids
- City of Greenville
- Huron Shore Regional Utility Authority
- City of Ionia
- City of Kalamazoo
- Kalamazoo Lake Sewer and Water Authority
- Lake Charter Township
- City of Lowell
- City of Ludington
- Michigan State University
- City of New Baltimore
- Plainfield Charter Township
- City of Plainwell
- City of Portage
- City of Roosevelt Park
- City of South Haven
- City of St. Joseph
- City of St. Louis
- City of Sturgis

Water Treatment and Distribution System Reliability Study

City of South Haven, Michigan





Summer demand conditions had pushed the WTP to over 95 percent of rated capacity. The City retained FTC&H to update the reliability study for the WTP and distribution system, and conduct an extensive master plan for the plant to evaluate short-term and long-term solutions to the capacity short fall.

The WTP study included detailed evaluations of rapid mixing, flocculation, coagulation, filtration, and chemical feed processes, as well as a facilities assessment for the existing buildings, tanks, and mechanical and electrical systems. Intake capacity was verified with pump drawdown testing, followed by a hydraulic analysis of plant piping, and a filter rate study to develop alternatives to meet short-term capacity needs. Future water demand projections were completed with input from the City and their customer communities to set a timeline for long-term improvements. Alternatives for long-term capacity needs included evaluation of membrane filtration, high rate sedimentation with sand filtration, and conventional treatment using clarifiers and sand filters. All of the alternatives included a component for increasing intake capacity and a detailed investigation of three identified WTP sites.

The distribution system study included a pressure network analysis and development and calibration of a computerized distribution system model. The model was used in site evaluations to determine relative transmission and distribution system improvements necessary to accommodate identified WTP capacity. The study also included evaluations of system pressure, fire flow, and storage.

References

Mr. Roger Huff, Public Works Director
(269) 637-0719

Mr. Robert Miller, Water Plant Superintendent
(269) 637-0715

ftc&h

Water Treatment Plant

City of South Haven, Michigan

Integrated Services

FTC&H's integrated services approach afforded single-source delivery for all project aspects. FTC&H was responsible for:

- Comprehensive Master Planning
- Hydraulic Modeling
- Process Design
- Facilities Design
- Construction Management At-Risk
- Estimating
- Cost Management
- Scheduling
- Subcontractor Management
- Regulatory Compliance
- System Startup
- O&M Training

Awards

2013 Engineering Excellence Honorable Award - American Council of Engineering Companies/MI

2012 Project of the Year Award - American Public Works Association/ Michigan Chapter

2012 Project of the Year Award - American Public Works Association/ Southwest Michigan Chapter

FTC&H updated the reliability study for the plant and developed an extensive master plan to evaluate short- and long-term solutions addressing a capacity shortfall. As a result, the City elected to construct new facilities adjacent to the existing plant consisting of high-rate (plate settler) sedimentation followed by conventional filtration. The City retained FTC&H to design and construct the necessary facilities.

The new 7-MGD conventional surface water treatment plant includes flocculation, sedimentation with inclined plate settlers, and dual-media filters.

The plant also includes a new raw water pumping station, an all new SCADA system, and a new switchgear and generator building.

FTC&H developed a Building Information Model (BIM) of the facility, which was used during the construction phase. The 3-D computerized facility model was often used by our construction team to quickly gain an understanding of some of the more complex aspects of the construction.

The final project phase was the demolition of the previous plant. FTC&H provided full-service design and construction management services.

Project Data

Completion Date: May 2011
Construction Cost: $18.7 million

Reference

Mr. Roger Huff, Public Works Director (269) 637-0719

Mr. Robert Miller, Water Plant Superintendent (269) 637-0715

ftc&h

Water System Improvements

City of St. Joseph, Michigan

The City of St. Joseph owns and operates a 16-MGD surface WTP serving customers in the City and in the Lake Michigan Shoreline Water and Sewage Treatment Authority. Growth in the service area has steadily increased, pushing water demands ever closer to WTP capacity. FTC&H has worked with the City for several years on a number of projects related to water supply, treatment, and distribution.

References

Mr. Tim Zebell
City Engineer
(269) 983-5541

Mr. Greg Alimenti
Water Plant Superintendent
(269) 983-1240

The City of St. Joseph WTP was constructed in 1931 and expanded in 1957 and 1973. In response to increased demands and some treatment performance issues, the City retained FTC&H to complete a comprehensive study of the existing plant and intake system covering all facets of the facilities, operations, and processes. The WTP study was completed in conjunction with the water system reliability study, also by FTC&H, for the development of demand projections and included a capacity expansion analysis. Alternatives for expansion included membrane filtration, high rate settling with sand filtration, dissolved air flotation with sand filtration, and solids contact clarification with sand filtration. The use of high rate settling was recommended, along with a new intake. FTC&H also assisted the City with the preparation and submittal of a project plan to obtain low interest loan funding through the Drinking Water Revolving Fund.

FTC&H completed several improvements projects at the WTP including design and construction phase services for a zebra-mussel control system, two filter rehabilitation projects, and the addition of a variable frequency drive pump to one of the City's high service pumps.

FTC&H has worked extensively with the City on distribution system evaluations and completed a hydraulic computer model and pressure network analysis for the City's system. In addition to the evaluation of system pressures and available fire flows, the model was used to evaluate locations for a new elevated storage tank and to simulate emergency supply with interconnection to the adjacent Benton Harbor water system.

ftc&h

Water System Improvements

City of Niles, Michigan

Integrated Services

FTC&H's integrated services approach afforded the City single-source delivery for all project aspects. FTC&H was responsible for:

- Comprehensive Master Planning
- Hydraulic Modeling
- Process Design
- Facilities Design
- Construction Management At-Risk
- Estimating
- Cost Management
- Scheduling
- Subcontractor Management
- Regulatory Compliance
- System Startup
- O&M Training

The City of Niles completed a major water system improvements project including installation of a new WTP, booster pumping station, 0.3-MG elevated storage tank, and 8,800 feet of raw and finished water transmission main.

The 2.6-mgd treatment plant was designed for iron and manganese removal and included aeration, detention tanks, pressure sand filters, chemical feed systems, and high-service pumping. The booster station and elevated storage tank were constructed to create a new, intermediate pressure district to improve pressures in the distribution system.

The improvements were the culmination of a comprehensive master planning effort that included an assessment of the City's water quality and a pressure network analysis of the City's distribution system.

FTC&H worked with the City through all project phases, from conceptual planning through design, construction, and operations training, including serving as the construction manager at-risk. FTC&H's integrated services provided the City single-source accountability for project quality, cost, delivery, and performance.

Project Data

Completion Date: October 2005
Construction Cost: $4,770,000

References

Mr. Johnnie Hall, Water Superintendent
(269) 683-4700

ftc&h

East End Utilities

Coldwater Board of Public Utilities
Coldwater, Michigan

FTC&H provided planning, design, construction phase engineering, and construction management services for a new pressure district in the BPU's water distribution system. Prior to the project, the City experienced low pressures and available fire flows on the east side of the water distribution system. FTC&H used a hydraulic model of the water distribution system to quantify these issues and analyze improvement alternatives. We determined new pressure district at an increased hydraulic grade was the best solution. FTC&H designed improvements for the new pressure district, including a 400,000-gallon elevated storage tank, water booster station, valve vault, and miscellaneous water main improvements.

The booster station pumps water from the City's main pressure district to the new east side pressure district. Within the booster station, there are pressure control valves (pressure sustaining valve, check valve, and controlled bleed valve) that allow flow between the two pressure districts. The controlled bleed valve allows water system operations to bleed flow from the high to low pressure district to maintain water quality. The booster station includes a generator for reliability.

A remote valve vault in the distribution system between the two pressure districts, includes valves that open to allow flow under emergency conditions. A pressure sustaining valve allows flow from the high to low pressure district in the event of a high demand event (fire flow) on the low-pressure side. A check valve allows flow from the low to high-pressure side in the event of complete loss of the booster station.

Project Data

Completion Date: September 2009
Construction Cost: $2,682,952

Reference

Mr. Charles Bauschard, BPU Engineering Manager
(517) 279-6907

ftc&h

Grand Rapids Metropolitan Area Water System
Comprehensive Master Plan and Pipe Network Analysis

City of Grand Rapids, Michigan

As part of its Citywide Comprehensive Master Plan and Pipe Network Analysis, the City of Grand Rapids retained FTC&H to complete a 20-year master plan for its water distribution system and evaluate major transmission main and pump station improvements.

The water system serves over 300,000 customers in ten area communities. The master plan included development of a hydraulic model of the entire service area for use in evaluating the existing system, as well as projected expansions and improvements.

The City pumps treated drinking water from the Lake Michigan Filtration Plant to the Grand Rapids Metropolitan Area through two large-diameter transmission mains. Water service is extended to a total of ten customer communities. The distribution system includes seven major pressure districts, 13 water storage tanks, and 60 pumps in 12 different pumping stations.

The work completed for the master plan included the following tasks:

- Population and water use projections including revision of system demands to reflect actual consumption records.
- Model development and calibration including verification and necessary changes to pipe diameters, closed valves, PRV settings, and piping connections.
- Water distribution system evaluation and hydraulic modeling.
- High-service pump and transmission main capacity evaluation.
- Evaluation of proposed improvements to meet future demand conditions including cost estimates.

The model included all of the pumps, tanks, and control valves in the system, and all service and transmission mains 10 inches in diameter and larger. The model was skeletonized from over 100,000 pipes to 7,000 pipes. In total, the model contained over 7,000 pipes and over 6,500 nodes or junctions. Pump stations, storage tanks, and regulator valves were added to complete the model.

FTC&H collected operating information on several high demand days in the summer and compared the actual readings to model predictions. Most areas were accurately predicted, but one area that has historically experienced low pressures was predicted to have significantly higher pressures. FTC&H worked with the City to design a hydrant flow test. A comparison of the model results with the hydrant flow test allowed calibration of the model.

FTC&H updated the model using InfoWater. By working in the GIS platform, the database can be easily compared and worked with simultaneously without needing to convert any data.

Project Data

Completion Date: 2004

Reference

Mr. Wayne Jernberg, Assistant Water System Manager
(616) 456-4055

FTC&H

Area Water System Strategic Plan

City of Kalamazoo, Michigan

The City of Kalamazoo retained FTC&H to complete a strategic plan for the Kalamazoo area water system which serves over 100,000 customers in ten area communities. The plan included extensive hydraulic modeling and evaluation of existing systems. The plan will be used as a guide for future water system improvements and operations.

The Kalamazoo area water system includes 16 groundwater supply pumping stations, 13 booster/bleeder stations, and seven water storage tanks in seven separate pressure districts.

The work completed for the strategic plan included the following tasks:

- Population and water use projections.
- Water system supply and distribution evaluation and hydraulic modeling.
- Treatment strategy development for iron removal.
- Arsenic compliance evaluation.
- Physical plant facilities evaluation for pumping and treatment sites.

Population and water demand projections were developed and used in the calibrated hydraulic model to evaluate system performance at current and future maximum day and fire flow conditions. Recommendations were presented including additional well supplies, pumping capacity, and storage, in addition to several distribution system piping improvements.

Treatment strategies were developed to reduce the iron concentration throughout the system. A separate evaluation was conducted for arsenic resulting primarily in operational recommendations to manage low levels of arsenic detected in a few of the supply wells.

Physical conditions of the water system pumping stations and treatment facilities were visited and evaluated by a team of FTC&H engineers. Recommendations were made to ensure reliability of the equipment and structures.

Cost estimates were completed for the resulting recommendations, and a timeline was created showing the prioritized list of improvements, estimated costs, and estimated time of completion.

Project Data

Completion Date: 2003
Updated: 2012

Reference

Mr. Frank Renaldi, P.E., Facilities Engineer
(269) 337-8129

ftc&h

Water Distribution System Improvements

City of Grand Ledge, Michigan

FTC&H has been working with the City for over three decades to improve their water system. A hydraulic model of the water system has been completed and calibrated. Numerous facility improvements have been completed, which are crucial to the system's ability to provide expanded services and for the reliability of the system at large.

The following projects were completed as part of the water system improvements:

- Wellhead protection plan
- Water reliability study (2003)
- Well No. 8 including a new well, well house, and water main
- Drilling and testing for two new wells
- A new elevated storage tank
- Iron removal plant
- Ground level storage tank and booster station in the industrial park (2007)
- Creation and maintenance of base maps for the water system

Improvements to the City's water transmission lines included:

- Willis Industrial Park
- Jenne Street water main (7,600 lf)
- Booth Street and Church Street (4,000 lf)

Projects for the replacement of undersized mains in conjunction with road construction included:

- Washington Street (996 lf)
- West Main Street (2,902 lf)
- Park and McMillan Streets (1,635 lf)
- Pleasant and Front Street (5,087 lf)
- Lincoln Street (1,991 lf)
- South Kent Green (2,239 lf)

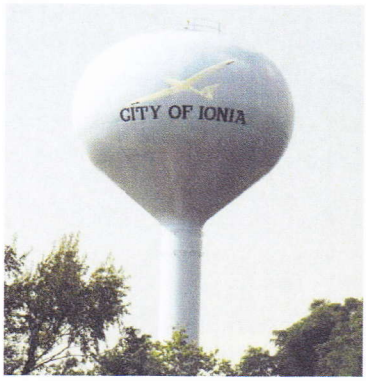
Reference

Mr. Larry LaHaie
Public Services Director
(517) 627-2149

ftc&h

Water System Improvements

City of Ionia, Michigan



A water reliability study indicated the City needed approximately $8 million of improvements to their public water supply system to provide water to a new prison, to an existing prison facility, and to extend water south of the river into a nearby township.

FTC&H completed the design and construction of two new production supply wells, two 500,000-gallon elevated storage tanks, a booster pumping station, 47,000 lf of transmission main, upgrades to an emergency power supply, and a new telemetry controls system for nine wells, four tanks, and two booster stations.

The project was subdivided into seven separate contracts, which included three transmission main contracts of $1.5 million to $2 million.

The project was funded in part by the U.S. Department of Commerce, Economic Development Administration, the State of Michigan, and by City funds.

Project Data

Completion Date: 1999
Construction Cost: $6.2 million

Reference

Mr. Chris Kenyon, Director of Public Utilities
(616) 527-0370

ftc&h

Water System Reliability Study

City of Alma, Michigan

The City of Alma retained FTC&H to complete a reliability study for their water system.

The study met the state requirements relative to capacity of various parts of the water system and water demands. The assessment included a status review of the various water plant processes. The adequacy of the distribution system was evaluated against present and future water demands and fire flows with a PNA.

The regulations for total trihalomethane were a source of concern for the City. The supply source was an inland stream and the treatment provided was lime softening. Using chlorine dioxide for disinfection allowed the City to maintain the trihalomenthane below the current standard, but there was concern for future standards which were expected to be lower.

A preliminary review of available groundwater sources was completed to determine whether or not a groundwater source could be developed. The preliminary review was positive, and the report included a work plan and cost estimate for a detailed hydrogeological study to work toward the development of a permanent groundwater source to serve the City and replace the use of the Pine River.

Project Data

Completion Date: July 2000

FTC&H

2013 Water System Reliability Study

Proposal for Engineering Services

City of South Haven
Department of Public Works

March 15, 2013

Prein&Newhof

Prein&Newhof

Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

March 13, 2013

Mr. Larry Halberstadt, P.E.
City of South Haven
1199 8th Avenue
South Haven, Michigan 49090

RE: Proposal for Water System Reliability Study for WSSN 06100, 06103 and 01661

Dear Larry:

Thank you for inviting Prein&Newhof to share our qualifications and proposal for engineering services related to your Water System Reliability Study Update. We have provided this service to many Michigan communities (more than 20 within the last 5 years) and believe that the reliability study as described in our proposal will not only meet the requirements of the law, but also provide valuable information for City personnel.

Value

We have worked with communities of various sizes, many similar to the City of South Haven, including multi-community water system evaluations with multiple pressure districts. We have evaluated many water filtration plants and lake water supplies. Through our past experience with similar clients, we have developed an approach that is both cost-effective and complete. In addition, we have been able to accurately estimate the fee to complete a reliability study, and are confident of our fee presented herein.

Experience

Your Project Manager, Project Engineer and Hydraulic Specialist have completed more than 80 Reliability Studies including 25 within the past 5 years. The proposed key team members have been working together in similar roles for 10+ years, and we encourage you to contact references listed in this proposal in regard to their experiences and our abilities.

Responsiveness

We pride ourselves on providing a high quality service to our clients. We have planned three meetings in our fees, but can meet on short notice as we are a relatively short drive away. We understand the importance of meeting our client's needs in a timely manner.

Cost

Our not-to-exceed fee for this project is $14,900. Please do not hesitate to call with questions regarding the breakdown of tasks or any other part of this proposal.

Enclosed please find three (3) copies of our proposal. Our team looks forward to working with you on this important project. Should you have any questions regarding our proposal, please feel free to call.

Sincerely,

Prein&Newhof

Thomas A. Smith, P.E.

James R. Hegarty, P.E.

MAS/TS/tas
Enclosures

3355 Evergreen Drive NE Grand Rapids, MI 49525 t. 616-364-8491 f. 616-364-6955 www.preinnewhof.com

Contents

Professional Profile

At P&N, our goal is to serve our clients wisely – meeting their infrastructure needs with a combination of experience, integrity, creativity, and common sense.

For over 40 years, Prein&Newhof has been meeting infrastructure needs for township, municipal, and private clients across West Michigan. We offer a wide range of engineering, environmental consulting, surveying, GIS, and laboratory services.

Because every situation is different, we put a high value on personal attention. And because needs change over time, we are dedicated to crafting flexible, long-term solutions rather than quick fixes.

Professional Services

At Prein&Newhof, we are constantly developing our services to serve our clients better. We aim to be your all-purpose civil and environmental engineer.

Our primary services include the following:

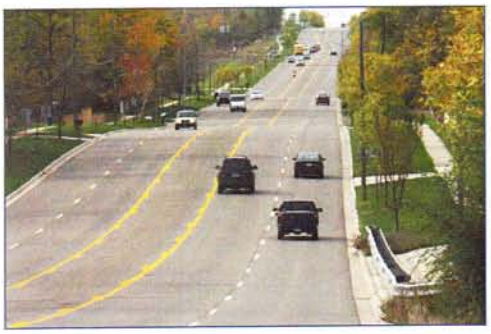
- Municipal Engineering
- Water & Wastewater Systems
- Stormwater Management
- Roads & Trails
- Airports
- Private Development
- Environmental Consulting
- Laboratory Testing
- Structural Engineering
- Geotechnical Engineering
- Surveying
- GIS & Mapping

History

Begun by Tom Newhof and Ed Prein in 1969, P&N was founded on the belief that each engineer should take personal responsibility for meeting his or her clients' needs – building long-term relationships and managing each project from start to finish, from preliminary design to final construction. Today, we are the engineer of choice for over 50 communities across West Michigan.

Employees

Prein&Newhof is 100% employee-owned, with 82 full-time personnel, including engineers, surveyors, drafters, geologists, chemists, communication specialists, and support staff.



Our Values

At Prein&Newhof, our strength lies in our dedication to thinking ahead, building lasting relationships, and crafting long-term solutions. We See Farther.

Invest Wisely

- We will find long-term, sustainable solutions – refusing to cut corners or compromise quality.
- We will make informed financial decisions that improve our service, build our business, and enable us to fairly compensate our employees.
- We will use our time and resources efficiently.

Develop Relationships

- We will develop long-term relationships with communities, businesses, and our own employees.
- We will work collaboratively with municipal governments and regulatory agencies to reach our clients' goals.
- We will communicate openly and thoughtfully, and we will remember that our actions always speak louder than our words.

Take Responsibility

- We will be responsible to our clients, our colleagues, and our communities to be completely honest and ethical in all that we do.
- We will each contribute to the success and profitability of Prein&Newhof.
- We will demand accountability, and we will reward success.

Build Expertise

- We will be experts in our fields, well-qualified to meet our clients' changing needs.
- We will adapt our services to better serve our clients, and we will actively solicit their feedback.
- We will not be content with the status quo, but will constantly seek new ways to improve.

Build Our Community

- We will be a positive force in our communities – making every community we live in and every community we serve a better place to live and work.

Our Locations

Prein&Newhof has five locations throughout west and south Michigan to serve our clients.

Grand Rapids Office (Corporate Office)
3355 Evergreen Drive NE • Grand Rapids, MI 49525
t. 616-364-8491 • f. 616-364-6955

Cadillac Office
1202 N Mitchell St • Cadillac, MI 49601

Holland Office
258 James Street • Holland, MI 49424
t. 616-394-0200

Kalamazoo Office
7123 Stadium Drive • Kalamazoo, MI 49009
t. 269-372-1158 • f. 269-372-3411

Muskegon Office
4910 Stariha Avenue • Muskegon, MI 49441
t. 231-798-0101 • f. 231-798-0337

Traverse City Office
1220 Airport Access Road • Traverse City, MI 49686
t. (231) 946-2394 • f. (231) 946-0580

Environmental Laboratory
3260 Evergreen Drive NE • Grand Rapids, MI 49525
t. 616-364-7600 • f. 616-364-4222

On the Internet
www.preinnewhof.com
info@preinnewhof.com

Team Introduction

The Prein&Newhof team has unparalleled experience in completing Water System Reliability Studies in Michigan, including work in communities of varying sizes, customer types, and supply types.

Thomas Smith, P.E.

Tom Smith, a senior project manager and hydraulics specialist, has prepared reliability studies for more than 70 clients during his 20+ years working in Michigan. He has worked with communities of all sizes, with various water sources, and customer communities as well as wholesale suppliers. Many of the reliability studies he has completed required the development of a model, while many others required updating only. During the past 5 years, Tom has completed more than 20 Reliability Studies for various communities primarily in west Michigan.

During the past 5 years, Tom has completed more than 20 Reliability Studies for various communities.

James Hegarty, P.E.

Jim will serve as your quality assurance specialist on this Water System Reliability Study. He is a senior project manager, representing township and municipal clients in all areas of municipal engineering. Jim has provided quality assurance on many projects in the past, frequently working with other members of your project team, and is a valuable resource for information on project funding and grants, design and application of challenging pipelines, and conceptual design.

Michael Schwartz, P.E.

Mike will perform as Project Engineer on this Water System Reliability Study. He has been working on Reliability Studies for more than 10 years including many with Tom Smith. Within the past 5 years, Mike has analyzed 8 systems as part of their Reliability Studies. He has also recently completed a Project Plan for the City of Galesburg.

Kevin has performed in a similar role as Project Engineer on more than 15 Water System Reliability Studies.

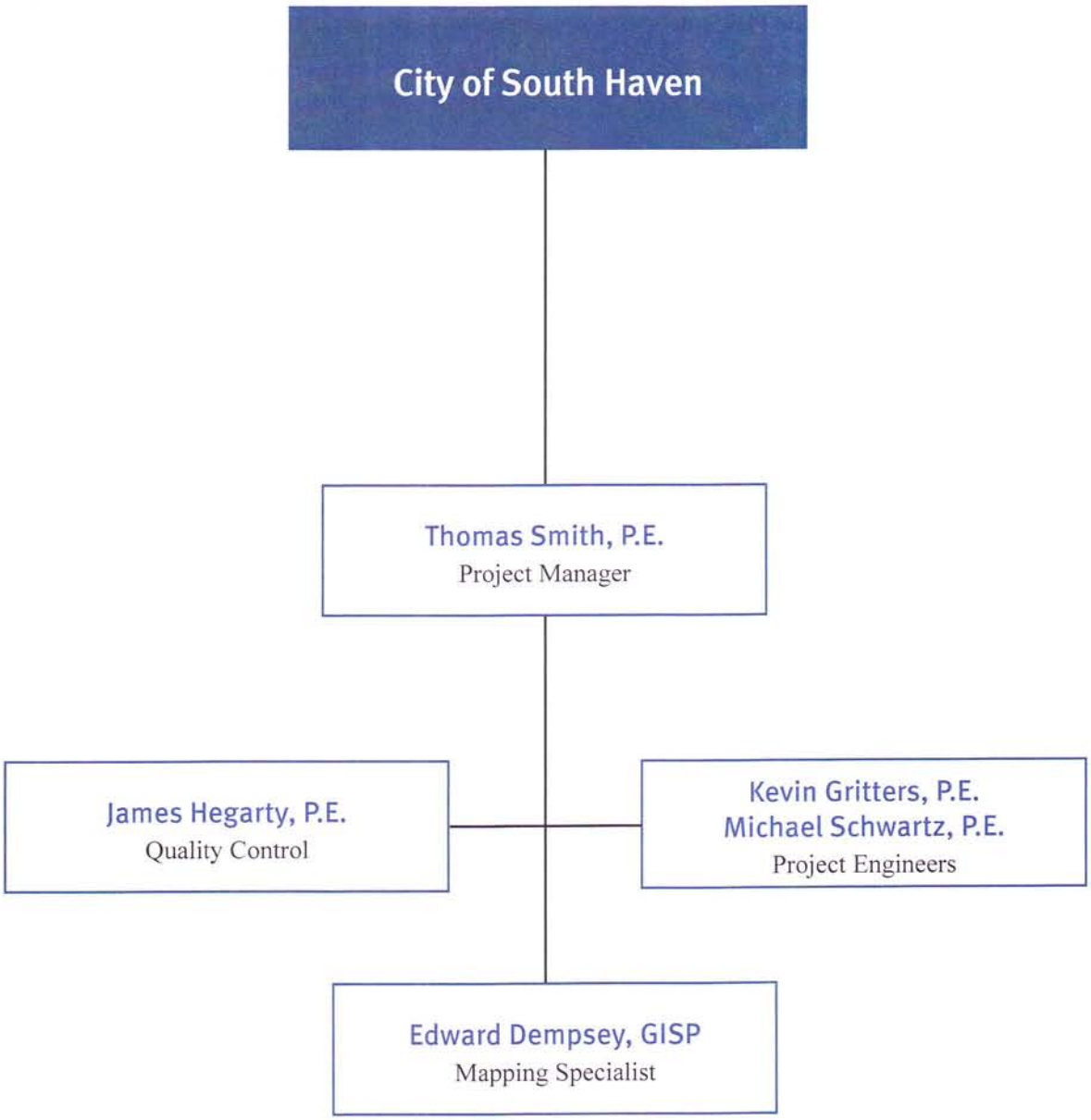
Kevin Gritters, P.E.

Kevin will perform as the Project Engineer for distribution on this Water System Reliability Study. He has extensive experience with evaluation and design of water systems, and has been working on Reliability Studies for 5 years, most with Tom Smith. Kevin has performed in a similar role as Project Engineer on 15 Water System Reliability Studies.

Edward Dempsey, GISP

Ed provides GIS and mapping services to Prein&Newhof clients. He has worked with your project team on numerous studies to prepare GIS products as well as General Plan Maps and other high quality maps for WSRSs.

Team Chart


City of South Haven
Thomas Smith, P.E.
Project Manager
James Hegarty, P.E.
Quality Control
Kevin Gritters, P.E.
Michael Schwartz, P.E.
Project Engineers
Edward Dempsey, GISP
Mapping Specialist

Thomas A. Smith, P.E., CFM

Project Manager, Hydraulics Specialist

Tom has spent 20 years developing his expertise in hydrologic and hydraulic engineering and modeling. He manages projects for township and municipal clients and also leads hydrologic and hydraulic modeling efforts at Prein&Newhof.

Tom's studies include Floodplain Analyses and Mitigation Planning, Water Reliability Studies, Master Plans, stormwater analyses, treatment plant studies, transient analyses, inflow and infiltration studies, and Emergency Response Plans.

Representative Experience

During the past 5 years, Tom has completed 23 Reliability Studies:

- City of Allegan (2012)
- City of Leslie (2012)
- City of Big Rapids (2009)
- City of Carson City (2010)
- City of Cheboygan (2009)
- City of Fennville (2012)
- Fruitport Township (2008)
- Georgetown Township (2013)
- City of Hart (2008)
- City of Hastings (2011)
- Holland/Park/Zeeland Townships (2008)
- City of Kentwood (2011)
- Village of Lakeview (2009)
- City of Montague (2008)
- Village of Muir (2008)
- City of Norton Shores (2009)
- Northwest Ottawa Water System (2012)
- City of Rockford (2008)
- Village of Shelby (2011)
- City of Stanton (2012)
- Village of Tekonsha (2008)
- City of Whitehall (2008)
- City of Wyoming (2010)

Tom also has worked on master plans and/or reliability studies for these communities: Allegan, Brighton, Chelsea, Crockery Township, Davison, Ferrysburg, Grand Haven Charter Township, Grosse Pointe, Jackson, Kalamazoo Lake SWA, Laketown Township / Allegan County, Madison Township, Milan, Park Township, Plainfield Charter Township, Richmond, Saginaw, St. Clair, Saline, Spring Lake Township, Village of Spring Lake, Traverse City, Webberville, and Williamston.

Education

M.S. Civil Engineering
University of Michigan, 1992

M.S. Civil Engineering
Pennsylvania State University, 1991

B.S. Civil Engineering
Pennsylvania State University, 1989

License

P.E. Michigan, 1995

Certified Floodplain Manager (CFM)

Certified Industrial Stormwater Operator

Certified Stormwater Operator

Professional Activities

American Membrane Technology Assn.

American Society of Civil Engineers

American Water Works Association
- Michigan Section Chair-Elect, 2007-2010
- Michigan Section Trustee, 2007-2010

Association of State Floodplain Managers

Water Environment Federation
- Watershed Management Committee

Michigan Stormwater Floodplain Assn.
Board of Directors, 2010-Present

Professional History

Prein&Newhof, 2000-present

McNamee, Porter and Seeley, 1992-2000

Sweetland Engineering, 1989-1990

James R. Hegarty, P.E.

Senior Project Manager

35 years engineering experience

Jim represents townships and municipal clients in all areas of municipal engineering, and is a valuable resource for information on project funding and grants.

He has specialized experience in the design and application of challenging pipelines, other buried structures and short–span bridges. He has also played a major role in the development of three of West Michigan's most spectacular trails: the Cannon Township Trail, the Flat River Trail in Greenville, and the Riverwalk in Big Rapids.

Jim can explain complicated engineering concepts so that they are understandable to non–engineers. He has had many successful experiences in public meetings because of this ability, and he is often invited to speak to civic, client and technical organizations.

Personal Awards

Regional Award of Merit 2007
Association of State Dam Safety Officials

Franklin Meyers Distinguished Service Award 2003
American Society of Civil Engineers, Michigan Section

Fellowships

Water Fellow 2009
Michigan State University Center for Water Sciences

Representative Experience

Muskegon County
- Industrial Park Utility Feasibility Study

City of Big Rapids
- Muskegon River Watermain Crossing
- Wellhead Protection Plan
- Conversion from Surface to Ground Water Supply Source

GVSU Water Resources Institute
- Groundwater Presentation

Fitzgerald Henne Inc
- City of Leslie Water Treatment Plant

Double JJ Resort
- Back Forty RV Campground Utilities

Education

B.S. Civil Engineering
The Ohio State University, 1977

License

P.E. Michigan, 1981

Professional Activities

American Society of Civil Engineers
- President, Michigan Section, 2000–2001
- Founder, Mackinac Scholarship
- Admitted as Fellow, 1996

Association of State Dam Safety Officials

Conservation Resource Alliance

Land Conservancy of West Michigan

Michigan River Partnership

Michigan Water Environment Association
- On–Site Wastewater Committee

Timberland Resource Conservation & Development Area Council

MSU Water Fellow

Muskegon River Watershed Assembly

Professional History

Prein&Newhof, 1993–present

Lamar/Premarc, 1985–1993

Phoenix Contractors, 1982–1985

Armco Inc., 1977–1982

Michael A. Schwartz, P.E.

Senior Engineer

Since joining Prein&Newhof in 1998, Mike has become a valuable asset to the clients he serves. He is involved in municipal projects including water and wastewater systems, roadway design, and storm water systems. Mike has worked on many water system reliability studies and water system designs.

Water System Reliability Studies

- Emmett Charter Township (2006)
- City of Bronson (2012)
- City of Galesburg (2001, 2008)
- City of Montague (2002, 2008)
- City of Parchment (2006, 2011)
- Gun Plain Township (2005)
- Otsego Township (2000, 2006, 2011)
- Village of Schoolcraft (1999, 2006)
- Village of Tekonsha (2002, 2008)
- Village of Vicksburg (2008)

Mike has also performed master plans and/or reliability studies for:

- Emmett Township (DLZ/Firekeepers Casino)
- Barry Township
- Charleston Township
- Pavilion Township
- South County Sewer & Water Authority
- Village of PawPaw (Walmart)

Water System Design (Partial List)

- City of Galesburg: 2006-2007 Water Improvements
- Village of Vicksburg: Zachary Street Extension, 22nd Street Watermain
- Kalamazoo Township: Orchard & Douglas Avenue
- Oshtemo Township: H Avenue and 6th Street
- Charleston Township: Elevated Storage Tank Project

Awards Won

Quality of Life Award, 2012
American Public Works Association, SW Michigan Branch
Project: Texas Township Farmer's Market Trailhead and Trail

Young Engineer of the Year, 2007
Michigan Society of Professional Engineers

Education

B.S. Environmental Engineering
University of Central Florida, 1996

License

P.E. Michigan, 2002

Certification & Training

Claim Trends and Risk Management Considerations in Today's Economy, 2011

Construction Phase Services Risk Management, 2011

Advanced Contract Negotiations, 2011

Certified Storm Water Operator

Barry-Eaton TOST Registered Evaluator, 2009

Existing Systems Evaluator Training, 2008

Project Managers Boot Camp, 2006

Arc GIS via ESRI, 2004

Professional Liability for Design Professionals, 2000.

Onsite Wastewater Systems, Michigan State University, 2000.

Professional Activities

National Society of Professional Engineers

Michigan Society of Professional Engineers

Michigan Environmental Health Assn.

Professional History

Prein&Newhof, 1998-present

CEC, The Ozone Company, 1996-1998

Kevin L. Gritters, P.E.

Water Distribution Specialist

Kevin served three years as an intern for Prein&Newhof before joining the firm full-time in the spring of 2005. He has spent the past three years developing expertise in hydrologic and hydraulic modeling and engineering for municipal clients. Over the past two years, he has worked on Water System Reliability Studies for more than 15 communities and has provided hydraulic, stormwater, and floodplain modeling services for multiple clients. He is a Project Engineer on water distribution and wastewater collection projects.

Early in his career, Kevin was involved in construction observation for a variety of municipal improvement projects, such as non-motorized trail, water distribution, wastewater collection, and stormwater management. He also gained experience in writing cost estimates and project specifications for municipal improvement projects.

Representative Projects

Water Supply Improvements

- Muskegon County DPW – Whitehall Road Water Main
- Plainfield Township – Generator addition at seven elevated & ground storage tank sites
- Mason County DPW – North Main Street Water Main Extension
- Fruitport Township/City of Norton Shores – Water Supply Study & Hydraulic Modeling

Water System Reliability Studies

- City of Allegan (2011)
- City of Big Rapids (2010)
- Village of Carson City (2010)
- City of Cheboygan (2009)
- Fruitport Charter Township (2008)
- City of Hastings (2011)
- Holland Charter Township (2009)
- City of Kentwood (2010)
- Village of Lakeview (2009)
- NW Ottawa Water System (2011)
- City of Norton Shores (2009)
- Village of Shelby (2011)
- City of Stanton (2011)
- Park Township (2009)
- City of Rockford (2009)
- City of Whitehall (2009)
- City of Wyoming (2010)

Education

B.S. Engineering
Calvin College, 2005

License

P.E., Michigan, 2009

Certification & Training

Certified Storm Water Operator, 2006

Confined Space Training, 2006

Professional Associations

American Society of Civil Engineers

American Water Works Association

Michigan Water Environment Association

Professional History

Prein&Newhof, 2002-present

Publications

Smith, T. and K. Gritters. "Ottogan Intercounty Drain Flood Damage and Reconstruction." MACDC Pipeline Magazine. 2nd Quarter 2010.

Edward Dempsey, GISP

GIS Specialist

Ed has over a decade of experience in the GIS industry. He specializes in custom GIS application development for the ESRI product suite including ArcGIS Desktop and ArcGIS Server. Ed has successfully delivered a wide variety of GIS applications for Federal, state, county and local governments.

Ed also has expertise in GIS database development and optimization, and is well versed in Web mapping technologies such as Google Maps and Microsoft's Bing Maps.

Technical Skills

- **GIS Applications**: ArcGIS Desktop 10, ArcGIS Server, Google Earth, Google Maps, Microsoft Bing Maps, and ERDAS Imagine
- **Database**: ArcSDE, SQL Server, Microsoft Access
- **Programming**: ArcObjects, Visual Basic.NET, ASP.NET, Python, JSP, MapObjects, AML, Avenue, HTML, and ColdFusion
- **Operating Systems**: Windows XP, Windows 7, Macintosh OS, and UNIX

Representative Projects

Ed has done mapping for Water System Reliability Studies in several communities:

- City of Allegan (2011)
- City of Carson City (2010)
- Fruitport Township (2008)
- City of Hastings (2011)
- Village of Lakeview (2009)
- City of Norton Shores (2009)
- City of Rockford (2008)
- Village of Shelby (2011)
- City of Stanton (2011)
- City of Wyoming (2010)

Education

Master of City and Regional Planning
Clemson University

B.S. Geography (GIS and Urban Planning)
State University of New York at Geneseo

Certification & Training

Federal Aviation Administration – AGIS Level 3 Training, 2010

Certified GIS Professional (GISP), 2004

Advanced ArcObjects Component Development with VB, ESRI

ArcView Spatial Analyst, Introduction to ArcIMS, ESRI

ArcSDE Admin. for SQL Server, ESRI

Developing Applications with ArcGIS Server (.NET), ESRI

Professional Activities

URISA (Urban & Regional Information Systems Association)

IMAGIN (Improving Michigan Access to Geographic Information Networks)

MiCAMP (Michigan Communities Association of Mapping Professionals)

GIS Certification Institute, Application Review Committee

Professional History

Prein&Newhof, 2008–present

I.M. Systems Group, Inc., 2002–2008

South Carolina Dept. of Commerce, 2000–2002

Greater Atlanta Data Center, Kennesaw State University, 1999–2000

Concept Statement

INTRODUCTION/SUMMARY

The City of South Haven provides water to City customers and to two additional Type I Community Public Water Supplies under Franchise Agreements, South Haven/ Casco Township Sewer and Water Authority, and Covert Township. The City pumps treated Lake Michigan water through miles of transmission and distribution piping to customers in the three pressure districts.

You would like to update the 2007 Water System Reliability Study (WSRS) and General Plan (GP) for each of the three community water supplies. This project will help you:

- Satisfy the State of Michigan requirement of updating the WSRS and General Plan Map every 5 years
- Maintain a high level of service to your customers
- Identify deficiencies within your system (e.g. areas with insufficient fire flow or pressure during peak usage periods)
- Determine recommended improvements to address system deficiencies and prioritize each (This includes two deficiencies identified in the request for proposals.)
- Improve effectiveness of maintenance authorities
- Further develop and refine water system in GIS/Asset Management program
- Develop a Capital Improvements Plan

Your WSRS and GP will consider the reliability of the combined water systems, evaluating South Haven's water treatment facilities, including the capacity of various elements and condition of equipment. They will also evaluate the hydraulics if your distribution system, the capacity of your storage facilities, and the condition of system equipment in each community.

Because of changes made to the Safe Drinking Water Act a few years ago, your updated WSRS and GP will include additional reliability and planning elements. Your 2013 WSRS also will consider any existing capital improvement plans.

We will then use your WSRS and GP to develop a Capital Improvement Plan (CIP). This document will prioritize recommended system improvements and separate them into two groups: 0-5 years and 5-20 years. While creating the CIP, we will consider system capacity, condition of facilities, redundancy, maintenance programs, and system hydraulics.

At the end of this process, you will receive:

- A WSRS report with a description of the study and a set of recommended system improvements.
- A GP map showing all distribution system elements, deficiencies, and recommended system projects.
- A CIP that prioritizes specific facility and distribution issues identified by the WSRS and shown on the GP Map.
- An updated, accurate computer model, which can be a great asset to your future projects

Finally, we understand that communication is critical to the success of a project. Your Project Manager will focus on this throughout the project; we will meet periodically with City personnel and provide updates on various elements of the study for City

review and comment. Our emphasis on communication includes bi-weekly summary of progress and three progress meetings. This approach will help ensure that your project is completed in a timely fashion.

PROCESS

Prein&Newhof developed this scope of services to meet your needs as outlines in the request for proposals, including the requirements of Part 16, General Plans and Part 12, Reliability of the Michigan's Safe Drinking Water Act, 1976, P.A. 399, as amended, MCL 325.001 to 325.1023, and the Administrative Rules, Supplying Water to the Public, R325.10101 to R325.12820.

The following is a summary of process to meet your project goals:

1. Obtain and Review Information

At the outset of this study, the City will provide information for the study as outlined in the request for proposals. We will review this information and provide a list of questions or additional needs to complete the study.

2. Identify Rated Capacity of System Elements

We will review the current capacity of various elements in your water system. The rated capacity measures your system's reliability to supply projected demands. This includes supply capacity, capacity of elements at the treatment plant, storage capacity, and the capacity of any other related equipment.

3. Prepare 20-Year Demand Projections

We will project water use demands through year 2033 in five-year increments. We use any information provided by the City to justify the projections. This could include historic water use data, population projections, land use maps, historic building permits, known development, or any other information provided regarding potential growth. Based on this information, we will project your average day, maximum day, maximum hour flow and fire flow demands.

4. Obtain Hydrant Flow Test Results

We must use hydrant flow tests to calibrate your hydraulic model. A hydrant test provides real field data on the system operation. We understand the City will assist in the testing, and we will work with City employees to complete 15-20 tests in an approximately 8-hour period.

We will develop a hydrant testing plan that includes all locations at which hydrants will be tested. This plan ensures representation of differing areas of your combined systems as well as various distribution main sizes and ages. We propose approximately one day of testing with our field engineer and we will provide the testing equipment.

5. Update Hydraulic Model

The objective of this task is to update the water distribution system computer model from your last Water System Reliability Study. The update will include new water mains and other key system components since 2007, as well as demands.

We propose to update the existing WaterCAD® computer program. This software package has both the capability of performing complex distribution system hydraulic analyses and a convenient user interface for hassle-free data entry. In addition, the software package has the ability to perform extended-period analyses and to prepare superior graphic output. We will also provide the resulting digital model to you.

After we update your model, we will analyze system pressures and flows for existing 5-year and 20-year demand projections. The model will help identify hydraulically-deficient areas within your distribution system. We then can provide future updates and simulations with ease.

6. Verify/Calibrate Computer Model

Calibration is a critical step in developing an accurate model, since results of a poorly-calibrated model typically don't provide meaningful information. We will verify/calibrate your model using 15 to 20 hydrant test results, primarily by adjusting roughness factors and demands. MDEQ requires calibrations based on recent hydrant test results, as mentioned previously.

7. Analyze System & Provide a Prioritized List of Recommendations

The calibrated model can accurately simulate system operation. We will perform model simulations for existing and projected average day demands, maximum day demands, peak hour demands, and maximum day demands plus fire.

We will identify any deficiencies for both existing and future demand conditions. These include areas of low pressure under emergency (20 psi) or non-emergency (35 psi) conditions, or other reliability concerns. We will then tabulate and report any deficiencies and solutions. We will prepare cost estimates for alternative solutions for your evaluation.

The request for proposals specifically identifies two known deficiencies:

1. We will review water levels in the Standpipe and investigate the piping layout at the Standpipe site to determine if a hydraulic restriction exists at the site or if the restriction is within the distribution system. The study will also include a review of the system operation with the Standpipe out of service. We will perform extended period simulations to assist in evaluating standpipe levels.
2. We understand that during peak demand periods, low pressures have been reported along North Shore Drive at the northern end of the low service pressure district. We will evaluate this issue and develop alternatives for increased pressure, if necessary.

We will meet with you to discuss all the deficiencies, alternative recommendations, and cost implications. After receiving your input, we will list prioritized, recommended improvements to your transmission and distribution mains and other facilities. We will base any recommendations on the cost-effectiveness of the various improvement options and prioritize them.

8. Evaluate Overall System Reliability

We will evaluate your overall system reliability and provide recommendations to improve it. This considers such reliability issues as Operation and Maintenance programs, equipment condition, available capacity, redundancy, and standby power.

9. Prepare a List of Prioritized Capital Improvements in a Plan

We will develop a mitigation plan for areas that we find are deficient. We will provide justification, an opinion of cost, and prioritize each recommendation. Recommendations may also consider other utility projects to determine the priority with input from City personnel. These improvements will be used to develop a Capital Improvement Plan for the next 20 years, including years 0-5 (short-term) and 5-20 (long-term).

If requested, we will provide a list of current funding sources available for water system capital improvements. We will develop this list with knowledge of the recommended projects in the capital improvement plan.

10. Prepare Maps

Your 2013 WSRS will also include a series of maps. These include an existing water system map, a General Plan Map, a service area map, and graphical representation of model results.

We will provide an updated base map of your water distribution system. We will identify water mains, hydrants, valves and storage tanks on the base map. This map will also be used for your new General Plan Map, which also includes identification of deficiencies and recommended improvements. We will provide one hard copy and an electronic copy of the General Plan drawings.

Graphical representation of results in the form of contour maps are also required under the Safe Drinking Water Act for General Plans. We will meet this MDEQ requirement, which would include pressure contours under peak demands. Finally, we will provide a service area boundary map with existing and future boundaries, as required by the MDEQ.

12. Develop Pipe Inventory

We will develop a complete pipe inventory database to satisfy the requirements of the General Plan. The data will be prepared utilizing input from the City on pipe materials and age as required by the MDEQ. This information can be used to further refine the asset management program for the water system.

13. Evaluate Routine Flushing Needs

Flushing is an effective first step in clearing water mains when water quality appears degraded. Along with removing stagnant water and improving chlorine residuals, hydrant flushing also allows the operator to check the operation of hydrants and exercises valves.

While there are rules-of-thumb for flushing of hydrants, the actual need for flushing varies from system to system and location to location within a system. We will evaluate the need for routine flushing in Casco, Covert, and South Haven Townships by performing extended period simulations on the system. The simulations will help identify the critical areas for hydrant flushing, and will provide information for the development of a hydrant flushing prioritization plan.

14. Complete and Submit Report for City Review

We will submit copies of the draft report to you for review. The report will include the results of the evaluations as discussed in this section, as well as data required by the

MDEQ. The City will review the draft report and provide comments. Following your review, we will meet with you to discuss the report.

15. Incorporate Comments and Submit Report to MDEQ for Review

Following the receipt of feedback from you, we will edit the report to incorporate necessary changes. We will submit a final draft report to MDEQ for their review.

16. Incorporate MDEQ Comments and Submit Final Report

The MDEQ may provide comments on the report, and the timeline for their review is unknown. If MDEQ provides any comments, we will discuss them with you before we finalize your report for MDEQ's final approval. We will provide 3 copies of the final report as well as an electronic copy to the City.

17. Project Management (Throughout)

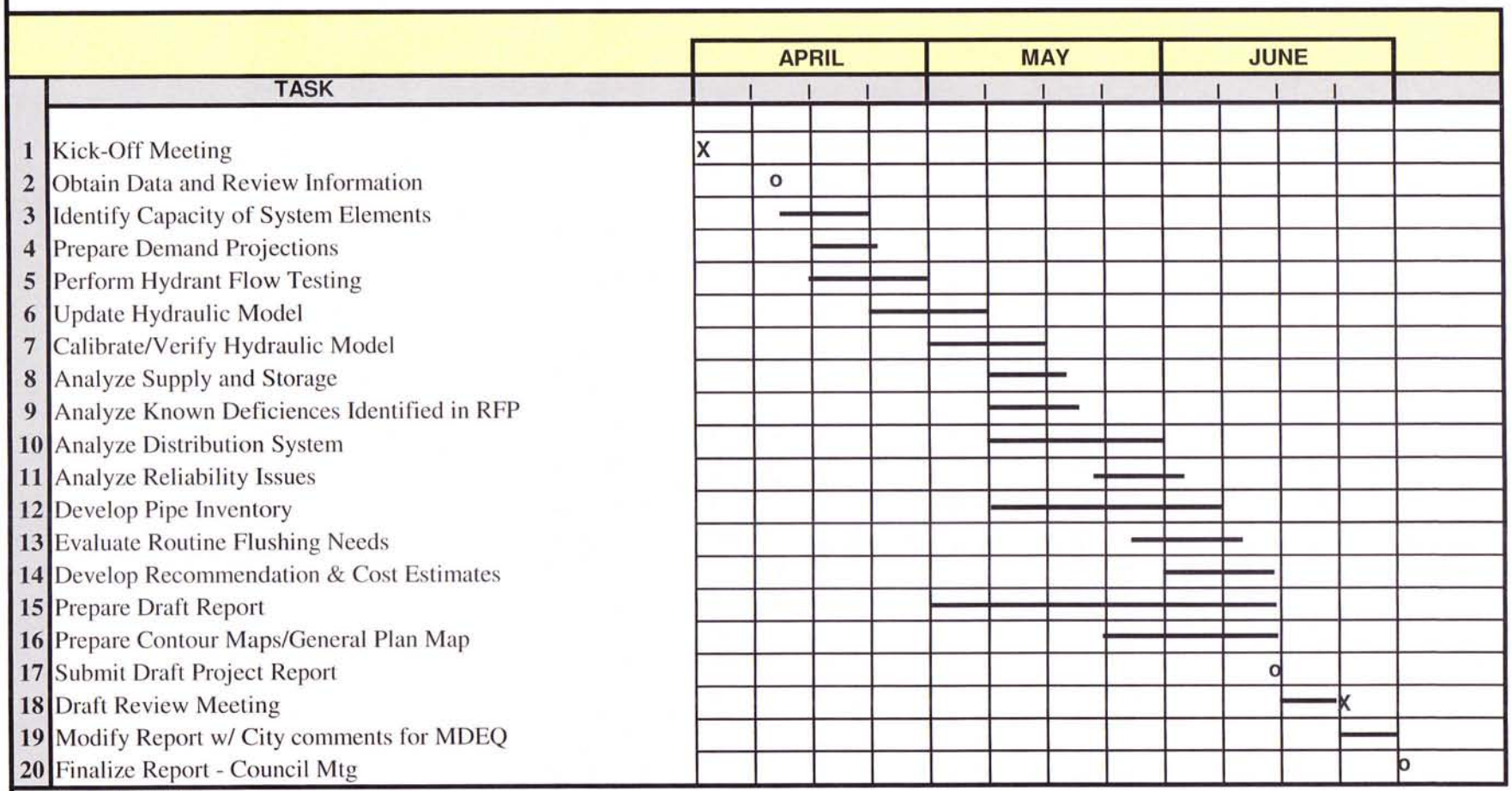
Your project team understands the importance of good communication. We will emphasize communication, including meeting up to four (4) times during the course of the project. These include:

- Project kickoff meeting to review the work plan, clarify the City's goals, and obtain required information on the system. If desired, a representative from the MDEQ may be included in the kickoff meeting to ensure that their expectations will be met.
- Progress Meeting to review the draft report.
- Board Meeting to present the draft report to the City's Board of Public Utilities.

We will provide semi-weekly project reports showing progress relative to the proposed schedule and identifying any concerns or issues. We also will communicate with the MDEQ as necessary to ensure that all requirements are met.

With this emphasis on communication, we will complete the project in approximately 3 months (schedule can be adjusted based on your needs). While the MDEQ review period is unknown, it is likely the project will be completed and approved within 6 months. Please note that our schedule is flexible, and can be adjusted based on your availability for meetings, for assistance with hydrant testing, and for review of the draft report.

April 1, 2013 — 3 Months — June 30, 2013



X = MEETING

-Schedule is contigent upon receiving necessary data within a week of the kickoff meeting

-Broad Task Descriptions are given in the scope of services section of the proposal

-Schedule is flexible. The 3 month time frame allows 3 months of MDEQ review time for overall approval within 6 months.

Prein&Newhof

Recent Reliability Study Projects (2004-present)

Client	Study Year	2010 Population	Client Contact(s)	Prein&Newhof Staff
Village of Lyons	2013	789	Susan Craft, DPW Director, (989) 855-2529	Thomas Smith, Kevin Gritters, Jason Washler
City of Leslie	2012	1,851	Brian Reed, City Manager, (517) 589-8236	Thomas Smith, Kevin Gritters, Barbara Marczak
City of Fennville	2012	1,398	Gary Tuhacek, DPW Director, (269) 561-2444	Thomas Smith, Ken Bosma
Georgetown Township	2012	46,985	Dennis Bishop, DPW Supervisor, (616) 457-2340	Thomas Smith, Catherine Prein, Ken Bosma, Kevin Gritters, Ed Dempsey
Northwest Ottawa Water System (NOWS) - Northside	2012	21,152	Ron Brondyke, Spring Lake Twp. DPW Director, (616) 842-1340 Leon Stille, Crockery Twp. Supervisor, (616) 873-6868 Craig Bessinger, Ferrysburg City Manager, (616) 842-5803	Thomas Smith, Kevin Keift, Mike Fuller
City of Kentwood	2011	48,707	Ronald Woods, DPW Director, (616) 554-0824	Thomas Smith, Jason Washler, James Cook
City of Big Rapids	2011	10,601	Mark Gifford, DPW Director, (231) 592-4018	Thomas Smith, James Hegarty
City of Allegan	2011	4,990	Ray Berken, Water Plant Superintendent, (269) 686-1116	Thomas Smith, James Cook, Kevin Gritters, Edward Dempsey
City of Hastings	2011	7,803	Tim Girrback, Director of Public Services, (269) 945-2468	Thomas Smith, Kevin Gritters, Edward Dempsey
City of Stanton	2011	1,415	James Freed, Village Manager, (989) 352-6322	Thomas Smith, Kevin Gritters, Edward Dempsey
City of Wyoming	2011	72,833	Scott Zastrow, Assistant Director of Public Works, (616) 399-6511	Thomas Smith, Kevin Gritters, Edward Dempsey
Village of Shelby	2011	2,065	Randy Phillips, Superintendent, (231) 861-2500	Thomas Smith, Kevin Gritters, Ed Dempsey
City of Whitehall	2010	2,706	Scott Huebler, City Manager, (231) 894-4048	James Cook, Barbara Marczak, Thomas Smith, Jason Washler, Kathy Crisan
City of Carson City	2010	1,093	Mark Borden, City Administrator (989) 584-3515	Jason Washler, Thomas Smith, Kevin Gritters, Ed Dempsey
City of Cheboygan	2010	4,867	Steven Gall, Director of Public Works (231) 627-2582	Thomas Smith, Ed Dempsey
Holland, Park, & Zeeland Townships	2009	63,409	Terry Nienhuis, Holland Charter Twp. Supervisor, (616) 396-2345 George Jacob, Park Twp. Supervisor, (616) 399-4520 Glenn Nykamp, Zeeland Charter Twp. Supervisor, (616) 772-6701	Ken Bosma, Thomas Smith, Phil Glupker, Kevin Gritters, Derek Schmuldt
City of Norton Shores	2009	23,994	Derek Gajdos, Water and Sewer Director, (231) 799-6804	Jason Washler, Thomas Smith, Kevin Gritters, and Ed Dempsey
City of Rockford	2009	5,719	Michael Young, City Manager (616) 866-1537	Barbara Marczak, Thomas Smith, Mark Prein, Kevin Gritters, Ed Dempsey
Village of Lakeview	2009	1,007	James Freed, Village Manager, (989) 352-6322	Jason Washler, Thomas Smith, Kevin Gritters, and Ed Dempsey
City of Hart	2008	2,126	David Dillingham, DPW Director, (231) 873-3100	Mark Lee, Thomas Smith, Kathy Crisan
City of Montague	2008	2,361	Steve Hammond, Superintendent, (231) 893-1155	Barbara Marczak, Thomas Smith, Mike Schwartz, Kathy Crisan
Village of Tekonsha	2008	717	Gary White, (517) 767-4288	Dan Frizzo, Thomas Smith, Mike Schwartz
City of Galesburg	2008	2,009	Robert Wilson, DPW Director, (269) 665-4541	Dan Frizzo, Dan Lewis, Mike Schwartz
Fruitport Charter Twp.	2008	12,505	Dale Lee, Township DPW Supervisor, (231) 865-3151	Thomas Smith, Kevin Gritters, Kathy Crisan
Village of Vicksburg	2008	2,906	Matt Crawford, City Manager, (269) 49-1919	Dan Frizzo, Mike Schwartz
Plainfield Charter Township	2007	44,288	Robert Homan, Township Manager, (616) 364-6488	Robert VanderMale , Thomas Smith, Catherine Prein, Kathy Crisan
Village of Muir	2007	604	Al Crooke, Village President, (989) 855-2144	Thomas Smith, Trevor Wagenmaker, Kathy Crisan
City of Ludington	2006	8,069	Kurt Malzahn	Mark Lee, Thomas Smith, Kelly Place
Otsego Township	2006	5,594	Gale Dugan, Supervisor, (269) 694-9434	Dan Frizzo, Mike Schwartz, Larry Stehouwer
Village of Schoolcraft	2006	1,525	Gordon Shaw, DPW Director, (269) 679-4304	Dan Frizzo, Dan Lewis, Mike Schwartz
City of Parchment	2006	1,804	Rick Smit, Water Operator, (269) 344-6400	Dan Frizzo, Dan Lewis, Mike Schwartz
Emmett Township	2006	11,770	Dennis Dunnigan, Planning/Zoning Administrator, (269) 968-241	Dan Frizzo, Mike Schwartz, Thomas Smith
Kalamazoo Lake Sewer & Water Authority	2006	10,606	Daryl Van Dyke, Manager, (269) 857-2709	Ken Bosma, Thomas Smith, Derek Schmuldt
Gun Plain Township	2005	5,895	Thomas Rook, Water Operator, (616) 877-4097	Dan Frizzo, Mike Schwartz, Larry Stehouwer
Grand Haven Twp.	2004	15,178	Mark VerBerkMoes, Public Services Director, (616) 842-5988	Mike Fuller, Thomas Smith, Rick Solle, Kathy Crisan

Water Reliability Studies

Prein&Newhof has focused on water supply system consultation and design since we opened our doors in 1969. This includes preparation of various studies including Master Plans and Water System Reliability Studies.

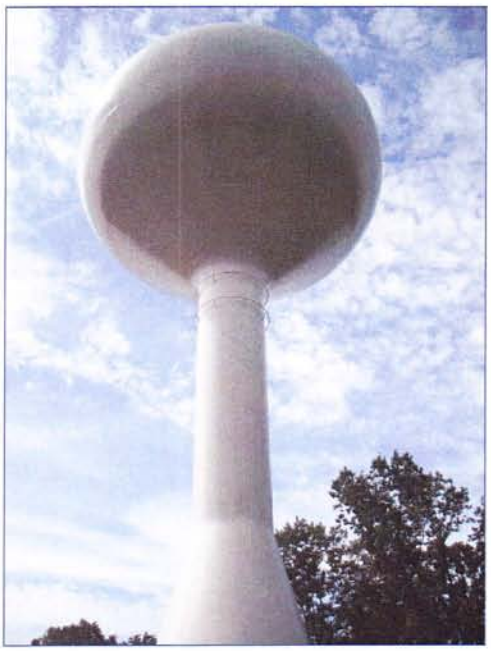
Prein&Newhof professionals interact with MDEQ representatives on a regular basis, including for Reliability Studies, and understand what each representative is looking for. Some communities desire to meet the minimum requirements while others prefer to add specific items of concern. In either case, Prein&Newhof strives to not only meet the requirements, but to provide a useful report that will be referenced on a regular basis.

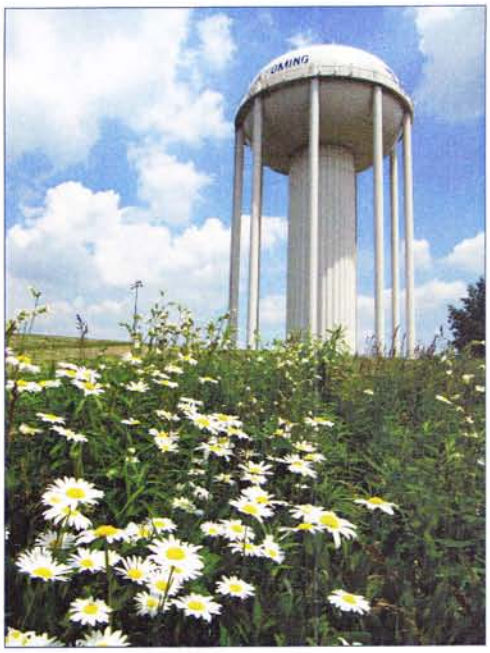
A Reliability Study focuses on system demand projection and system capacity, to ensure that the water system can supply customer needs into the future. Projections are compared with capacity determinations for supply, treatment elements, system storage, and the distribution system (pressure and fire flow).

Prein&Newhof has experience with a variety of software packages for hydraulic modeling of the distribution system. In addition, we place an emphasis on evaluating reliability issues including water main redundancy, pipe condition, pump operation, emergency interconnects, and maintenance programs.

During the past 5 years, Prein&Newhof has prepared Water System Reliability Studies for more than 30 communities, including:

- Groundwater and Surface Water Sources
- Wholesale and Customer Communities
- Small, Medium and Large sized Communities





City of Wyoming

Water System Reliability Study

The City of Wyoming hired Prein&Newhof to prepare their Water System Reliability Study update as required every 5 years by Michigan's Safe Drinking Water Act. The City provides an average of 34.2 mgd to 11 customer communities and the City itself. The evaluation focused on various reliability issues for the system from the intake, through water treatment and transmission to all communities, and to the distribution system to City of Wyoming customers.

The root of the original law — to ensure adequate capacity — was a primary focus. The study included an analysis of the capacity of all elements of supply, including a review of the intake and each treatment element. The transmission system, which includes two large transmission mains from the lakeshore Water Treatment Plant to the City of Wyoming and a future booster station, was analyzed.Finally, the distribution system was analyzed for capacity and fire protection including the pumps, water mains and storage facilities.

Water use projections were prepared for the City of Wyoming and combined with projections previously developed for each of the customers communities served by the City. The projected water use was compared with capacities throughout the system to ensure a reliable supply of water beyond 10 years.

The City had recently completed a major water treatment plant expansion. As a result, the treatment capacity meets supply needs for future demand projections. The dual transmission mains originally were sized to carry 92 mgd; however, a booster station was also analyzed to determine the feasibility of and expected increase in transmission capacity.

One of the more significant tasks for this analysis was the evaluation of the hydraulics of the City system. An existing hydraulic model was updated to include all pipes in the system and all recent water main improvement projects. Field tests were completed following a hydrant testing plan and the model was calibrated using the field data. With a calibrated model, the system pressures and available fire flows were evaluated. Recommendations were prepared to improve fire protection where needed and to provide for future development in some areas, including prioritization of each.

Prein&Newhof also assessed the reliability of the system's redundancy, backup power, maintenance programs, and efficiency of pump operation. Recommendations were prepared for every aspect of the system reliability to provide a planning document for a more effective and efficient water supply system in West Michigan.

Completion Year:

2011

Total Project Cost:

$43,000

Project Team:

Kevin Gritters, P.E.

Catherine Prein, P.E.

Thomas Smith III, P.E., Project Manager

Client Reference:

William Dooley, P.E., Dir. of Public Works
(616) 530-7254

References

Prein&Newhof performed a Water System Reliability Study for each of the following municipalities within the past five years. We encourage you to call them to discuss their experience with Prein&Newhof. Estimated population figures are from 2010.

Primary References

City of Allegan

Study Year: 2011 (and 2002)
Project Cost: $7,500
Est. Population: 4,998
Contact: Ray Berkin, WTP Superintendent, (269) 376-5511

City of Fennville

Study Year: 2012 (and 2003)
Project Cost: $6,900
Est. Population: 1,398
Contact: Gary Tuhacek, DPW Director, (269) 561-2444

City of Hart

Study Year: 2008 (and 2002)
Project Cost: $7,500
Est. Population: 2,126
Contact: David Dillingham, DPW Director, (231) 873-3100

Holland, Park, & Zeeland Townships

Study Year: 2010 (and 2003)
Project Cost: $17,000
Est. Population: 63,409
Contact: Donald Komejan, Holland Charter Township Manager, (616) 396-2345
Contact: Jerry Felix, Park Township Supervisor, (616) 399-4520
Contact: Glenn Nykamp, Zeeland Charter Township Supervisor, (616) 772-6701

City of Kentwood

Study Year: 2011 (and 2005)
Project Cost: $9,000
Est. Population: 48,707
Contact: Ronald Woods, DPW Director, (616) 554-0824

City of Montague
Study Year: 2008 (and 2002)
Project Cost: $6,500
Est. Population: 2,361
Contact: Thomas Kroll, DPW Director, (231) 893-1155

Northwest Ottawa Water System (NOWS) - Northside
Study Year: 2011 (and 2006)
Project Cost: $3,000 ($15,000)
Est. Population: 19,962 - 2,323 + 2,892
Contact: Ron Brondyke, Spring Lake Township Public Works Director, (616) 842-1340
Contact: Leon Stille, Crockery Township Supervisor, (616) 873-6868
Contact: Craig Bessinger, Ferrysburg City Manager, (616) 842-5803

Otsego Township
Study Year: 2011 (and 2006)
Project Cost: $6,300
Est. Population: 5,594
Contact: Cindy Hunt, Clerk, (269) 694-9434

Plainfield Charter Township
Study Year: 2007
Project Cost: $25,000
Est. Population: 30,952
Contact: Robert Homan, Township Manager, (616) 364-6488

Village of Schoolcraft
Study Year: 2006
Project Cost: $5,200
Est. Population: 1,525
Contact: Rob Coffman, DPW Director, (269) 679-4304

City of Whitehall
Study Year: 2010 (and 2003)
Project Cost: $6,000
Est. Population: 2,706
Contact: Scott Huebler, Manager, (231) 894-4048

Fee

The Prein&Newhof team developed our fee based on the scope provided in request for proposals. The base cost to meet the needs outlined in the request for proposals is $14,900.