

BAY CITY ELECTRIC LIGHT & POWER

SYSTEM IMPROVEMENTS

ASSOCIATED WITH THE

CITY OF BAY CITY

UPTOWN AT RIVERS EDGE

DEVELOPMENT PROJECT



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I. EXECUTIVE SUMMARY

The former industrial sites south of 9th Street along the Saginaw River have been basically cleared and Bay City is pursuing alternatives to develop the site. The Uptown at Rivers Edge development proposes to have private developers create marina space, a festival market place and restaurants and a residential condominium development. Consumers Energy has a main switching station at Water Street fed by an overhead crossing of the Saginaw River. These facilities hamper the site development. Additionally, Bay City Electric Light & Power have a main distribution station at 10th and Saginaw Street, the Saginaw Street Substation, which has been reviewed as to its impact to the development.

Novak Engineering, Inc (NEI) has reviewed the East Side electric distribution facilities as it pertains to serving future loads and relocations necessary for implementation of the Rivers Edge Development. The alternatives reviewed include rehabilitation of existing sites and relocation to sites outside the development area. The transmission line crossing over the Saginaw River was analyzed utilizing a direct route crossing at 9th Street. An overhead and underground option was reviewed.

The distribution facilities presently provide proper voltage to the customers and the circuits are not overloaded. Routes were reviewed to utilize the present and new feeders from Trumbull Street and 26th Street Substations to serve the Saginaw Street Substation loads. This would allow Saginaw Street to be removed. The heavy loads and the distance from the substations make this option impractical. New circuits across the river from Henry Street Sub can carry the downtown loads, however the cost to run these circuits combined with the expansion of the Henry Street Sub and the greater exposure for outages does not make this a preferred alternative. NEI recommends retaining Saginaw Street Substation to serve the downtown and Rivers Edge areas.

The Saginaw Street Substation has been reviewed in the past concerning the aesthetics of the station and if it was in the best location to serve the area customers. Additionally, NEI has analyzed the construction of the existing facility. The distribution analysis, as described above, indicates that the station is in a good location to serve downtown and with the Rivers Edge developing will be in position to properly serve these new customers. The construction of the sub includes an older facility for Circuits 1 through 4 and a separate transformer and feeder for Circuit 5. Transformer 2 has a wood pole 46kV structure. These structures are typically temporary meant to be in place for 20 years or less. The control house/ switchgear building houses the breakers and relays for Circuits 1-4. The building and switchgear appear to be in good condition. The breakers should be inspected and tested. The clearance to the energized terminations of the voltage regulators does not meet present NESC requirements. NEI strongly recommends that these clearances be addressed. Overall, NEI recommends that a new station be constructed as part of the Water Street Station relocation. The new sub could be built adjacent to the new Consumers station and reduce the aesthetic impact of the electric facilities, and occupy less total space than presently utilized. The cost estimate for a new substation is \$1,750,000 with metal enclosed switchgear.

The Consumers Energy Water Street Station is a switching and system protection station for the East Side 46kV transmission system for both Consumers and BCEL&P. The alternatives reviewed for this station were rebuilding at 9th Street and Water Street; refurbishing the existing site; rebuilding next to Henry Street; and removal of the station. The recommended alternative is rebuilding on 9th Street west of Water Street. If possible, a joint facility with BCEL&P new Saginaw Street Substation would save space, eliminate some overhead transmission lines and provide a reliable source for the downtown and Rivers Edge customers. The cost estimate for a new switching / breaker station is \$1,650,000.

The river crossing is a dominant item in the skyline along the Saginaw River. Also, the steel towers on the east side that lead to Water Street Station are intrusive and will make development of the Rivers Edge area difficult. NEI reviewed two crossing methods; each would be at the foot of 9th Street. Any crossing over or under the river will require submission of a permit to the Army Corp. of Engineers and the State DNR. Clearance for sailboats and freighters must be maintained. The overhead option would use two steel poles as opposed to the present towers. The crossing length would be reduced to 785 feet, compared to the present to 1025 feet allowing for slightly shorter structures. The cost estimate for the overhead alternative is \$686,000. The underground option was estimated with a single 20" conduit bored under the river bottom and space for three 46kV circuits. Pull boxes would be located near the river bank and the underground extended back away from the river to improve the aesthetics and not have the large termination riser poles next to the river. The cost estimate for the underground alternative is \$1,000,000. NEI recommends the overhead alternative; it is significantly less expensive, has greater flexibility for future expansion and with modern steel pole structures could be considered aesthetic and a landmark for the City skyline.

The Rivers Edge Development will be a significant load based on the buildings, condominiums and boat slips proposed. The electric demand for the proposal is 2000kVA. This will require the underground extension of a circuit to the site and should be looped through the site for reliable service. The cost to provide service to the various customers is \$425,000.

When Consumers Energy sold their distribution facilities to Bay City, the Water Street Distribution Sub had environmental issues. Consumers has completed some remedial action at the site, but not to the satisfaction of the City. This open item has impeded communications with Consumers on the Rivers Edge Project. NEI recommends that the City review the letter issued by NEI earlier on this subject and move toward resolving the environmental concerns with the DNR, EPA and Consumers Energy. NEI is prepared to assist where needed.

II. PROJECT DESCRIPTION

Bay City is developing a prime waterfront site south of City Hall along the Saginaw River. This development is called Uptown at Rivers Edge and centers around existing empty industrial buildings. One of the buildings is to be converted to a market place and is called Foundry Marketplace. The complex will also involve a residential development, Columbus Cove, and a 300-slip marina. Bay City Electric Light and Power and Consumers Energy have major facilities on or adjacent to the development. Bay City has its main downtown substation, Saginaw Street Sub, overhead distribution lines and the 46kV transmission tap in the area, and Consumers Energy facilities include the Water Street 46kV Switching Station, an overhead 46kV transmission line crossing the Saginaw River and transmission line connecting the switching station and river crossing to the 46kV system serving Bay City's East Side. To enhance the aesthetics of the development site and to simplify the development of this project, the City has requested that these facilities be relocated or removed.

The electrical utility participation in this development includes four major projects: relocation of the Consumers Energy 46kV transmission line river crossing, relocation of the Consumers Energy Water Street Switching Station, relocation or rehabilitation of the Bay City Saginaw Street Substation, and construction of distribution facilities to serve the Uptown at Rivers Edge complex.

III. ELECTRIC SYSTEM DESCRIPTION

- A. Bay City Electric Light & Power serves the residents and businesses of Bay City and the adjoining townships. Bay City serves 20,000 customers with a combined peak demand of 65 megawatts (MW). On the east side of the Saginaw River, Bay City owns eight substations of which three are distribution subs: Saginaw Street, Trumbull and 26th Street. These three stations serve a peak summer load of 40MW.

Bay City receives its electric supply over Consumers Energy's 46kV Subtransmission power lines. The east side of the river is served from two overhead lines over the river at Water Street and two lines over the river near the Weadock Power Plant. There is also a 138-46kV feed at Weadock. On the east side, Bay City owns 46kV lines from Trumbull Sub to 26th Street Sub which serves Trumbull, Waste Water, Bay Medical, Webster, Ultra Carbon, 26th Street and the Peaking Plant Substations.

The distribution voltage is 4800/8320V grounded wye with 68 miles of overhead lines and 13 miles of underground lines on the east side. Saginaw Street is the main distribution sub for the downtown area and City Hall. Trumbull ties to the north and 26th Street to the south.

- B. Consumers Energy serves many of the Bay City substations on the east side, its own major customers' substations in the city and distribution subs outside the city. Consumers Energy has two major power plant complexes east of Bay City on the

Saginaw River: the Weadock Plant and Karn Plant. Besides the major substations at the power plants, Consumers has 46kV breakers at the Water Street Switching Station and Crotty Substation, which serves a General Motors complex.

Consumers Energy does not serve any distribution customers in the city but does have distribution in the surrounding townships.

- C. Uptown at Rivers Edge Electric Service - The Rivers Edge project consists of recreational, residential and commercial office and retail electric loads. The planned marina has slips for overnight use, which will require dockside electrical connections. The marina would be metered at three or four locations, and it would be the responsibility of the marina developer to install a distribution panel, dockside receptacles and distribution wiring. The planned residential on the south end of the development includes condominiums with 150 condos estimated by this report for the site. The electrical requirements are based on the units being upscale with most modern conveniences.

The commercial office/retail includes service to three existing buildings and an estimated two new buildings. The electrical load of the commercial buildings was estimated based on square footage and expected use.

An electrical load estimate was tabulated with the development load expected to be 2000kVA. This additional load on the East Side Distribution will require an additional circuit and will be loading the substation transformers near nameplate. The proper service extension to the development and

IV. 46KV TRANSMISSION LINES

The Consumers Energy and Bay City 46kV lines involved in this study include the river crossing and the lines that exit Water Street Station and serve the east side of the city looping through the Weadock Substation and the tap to Saginaw Street Substation. The river crossing is the most prominent overhead line associated with this area. The relocation of this line is discussed first. The relocation of the other overhead lines while not as noticeable is important to include in this study.

A. Existing Transmission Line River Crossing

The existing river crossing was installed by Consumers Energy as a tie between the east and west side of Bay City. The crossing consists of three circuits, of which two are presently in service. The east side terminus is the Consumers Water Street Switching Station. The development plans call for the relocation of Water Street Station and the two lattice towers on the east side of the river. The present structures are on concrete foundations. The towers were constructed to provide sufficient clearance for large cargo ships and sail boats to pass underneath on the Saginaw River, based on the National Electric Safety Code (NESC). Any changes to the river crossing will require permitting applications with the Army

Corp. of Engineers and with the State of Michigan Dept of Natural Resources (DNR). The permit application process must be included in any project schedule.

B. New River Crossing

1. NEI has reviewed the installation of new steel poles in line with 9th Street. The poles on the west side will basically be in the same location as the existing lattice tower, and the east poles would be on the north side of 9th Street west of Water Street. This will significantly reduce the span length across the river. The present crossing is 1025' and the proposed crossing would be 785'.

The poles will be 80 foot galvanized steel poles built for three transmission circuits and one distribution circuit. Only two transmission circuits will be installed initially. During the design stage the engineer should consider retaining the west side structure, and propose to the City whether to retain this tower based on structure strength, configuration, construction costs and aesthetics.

The transition from standard height poles to the crossing structures should be as short as possible to minimize the number of structures that will be above the city skyline.

2. An alternative to constructing a new overhead crossing of the Saginaw River is to bore under the river. Due to periodic dredging and use of anchors by large ships, laying a crossing in the river bottom was not considered. The depth below the channel bottom will be determined during the Army Corp. of Engineers permit process.

The river bore would consist of one 20" PVC conduit with three or four 8" PVC conduits inserted in the main conduit. The bore would go from the edge of 9th Street to the park. While the total underground will be 1675 feet, the bore under the river will be approximately 800 feet. Pull boxes will be installed to allow the cable to be pulled under the river and then to the riser terminal structures. Cable tension calculations must be included in the project design, coordinating with the cable manufacturer to insure the cable specifications are not exceeded.

- C. The project costs for the two alternatives are detailed in the exhibits. The underground cost at \$1,000,000 is about 50% more than the overhead crossing of \$686,000. The costs for the river crossing alternatives include engineering, construction and permits. See Exhibit F 1 & 2.
- D. NEI recommends the installation of a new overhead crossing. The overhead crossing is significantly less expensive and a new line with modern steel poles will create a gateway landmark for the Uptown area. The transitions will need to be rebuilt along with the crossing structures. If the Water Street Station and

Saginaw Street Substation are relocated to 9th Street at Water Street, the crossing can terminate at the Water Street Switching Station. This will create an electric facility area, consolidating facilities and preventing the station and pole line sprawl that exists at this time.

Crossing the river underground will remove the electric facilities from the river skyline and, in the view of some, may be more aesthetic than the overhead crossing. Along with additional cost, any repair or future replacement will be more expensive than the overhead option.

V. SAGINAW STREET SUBSTATION

A. Existing Substation

Construction of the Saginaw Street Substation consists of two 46kV taps to two transformer banks. Bank 1 serves circuits 1-4 and Bank 2 serves circuit 5. The 46kV is an open loop from Water Street Substation. The circuits are circuit-regulated with the single-phase voltage regulators in the substation yard within an erecticon-style steel structure. The circuit breakers are housed in a brick control building. From the picture (Exhibit A), the building is on the property line adjoining Saginaw Street. The Westinghouse metal-clad switchgear breakers are controlled by electromechanical relays. The 46kV structure for Bank 1 is an erecticon structure and for Bank 2 a wood-pole structure.

The area around the substation is owned by Bay City. The areas within the block bordered by Saginaw, 10th Street, Water Street and 9th Street which are not part of the substation include parking, storage and the old Sears Automotive sales and garage building.

Historically, there have been discussions of renovating the substation and making it more aesthetic or reconstructing it in a nearby location. Additionally, NEI has reviewed the capability of the surrounding substations to serve the Saginaw Street load and removing the substation.

B. Substation Review and Comments

During the Saginaw Street Substation review, NEI observed some clearance issues at the existing station. The voltage regulators are 167kVA and 250kVA units. The distance from base to the energized terminals of the voltage regulators ranges from 6'3" to 7'8". The National Electric Safety Code (NESC) required 8'0" minimum clearance from the top of the foundation to the lowest energized part of the equipment. The regulators are shown in Exhibit B. These are clearance concerns for the utility operating personnel and do not present a hazard to the general public. Reconfiguring the station to resolve the clearance issues would require extensive field measurements, design and construction.

The brick control house appeared in good condition, the switchgear lineup was well maintained and the cable runs were properly supported and protected. The building is sound with some moisture issues in the basement that were being properly dealt with by BCEL&P.

The distribution bus arrangement allows for flexibility to serve the circuit loads during equipment outage and maintenance. The protection by the metal-clad switchgear and electromechanical relays is adequate. When the switchgear requires replacement due to age and reliability, new metal-clad switchgear can be installed. Any relay replacements should consider microprocessor recloser control relays.

C. Substation Alternatives

The existing substation footprint is approximately 120' by 100'. Depending on the available land, adjoining property uses and location of the 46kV transmission connections, a new substation layout with two transformers, six distribution circuits, a 46kV loop feed and a distribution transfer bus will require a site approximately 150' by 120'. This is a typical low profile steel design with an outdoor distribution bus and reclosers. Metal-clad switchgear would reduce the footprint at a higher construction cost.

Relocating the Saginaw Street Substation in conjunction with the Consumers Energy Water Street 46kV switching station provides an opportunity for space and equipment saving on the high side (46kV) of the Saginaw Street Substation. The 46kV feed from Water Street to Saginaw could be bus work across a shared substation fence. The distribution portion of the substation would remain the same.

NEI also reviewed serving the Saginaw Street Substation load from adjoining substations. The east side distribution system, with its three substations, Saginaw Street, Trumbull and 26th Street, has a peak demand of 40MW so removal of the Saginaw Street transformer capacity will require the expansion of one or more of the other substations to support the peak demand.

The east side distribution was modeled with Windmil Distribution Analysis software. This allowed for the evaluation of conductor loading and voltage drop analysis for the feeders. Saginaw Street Substation and feeders provide proper voltage to the major loads in the downtown area, without heavily loading the feeder conductors.

D. Recommendation

NEI recommends rebuilding Saginaw Street Substation, either on the existing block, swapping the existing site for the parking lot to the west, or on 9th Street west of Water Street. The preferred location will depend on the Water Street Switching Station. The construction of a new site will assist with the logistics of

maintaining service to customers while construction is completed. It will also move the substation further from the City Hall building, which has, in the past, been an aesthetic concern.

- E. Cost Estimates – See Exhibit F 3 & 4.

VI. CONSUMERS ENERGY WATER STREET SWITCHING STATION

- A. Water Street Switching Station is a 46kV circuit breaker switching station on the east side of the Saginaw River owned by Consumers Energy. The station is located directly adjacent to the Monarch Building, which is part of the Rivers Edge development plants.

The station shares a wall with the Monarch Building. This presents a safety concern since the Monarch Building is not secure, and this shared wall has windows that would allow entrance into Water Street. Though the station is planned for relocation, this safety concern should be addressed. A possible remedy would be installation of security bars on the Monarch Building windows to prevent access to the station. Please see Exhibit D for photographs.

This present configuration of Water Street has a 46kV bus connecting five (5) 46kV circuit breakers to five (5) 46kV lines. The five lines are the Salzburg and Henry Lines which cross the Saginaw River, the Tenth Street Line which serves the Saginaw Street Substation, and the Crotty and Knight Lines which form a loop around the east side of Bay City. There was a Water Street distribution substation that has been retired and removed. It was across Water Street from this switching station. The overhead river crossing includes the Henry and Salzburg Lines. A third 46kV circuit used to terminate at Water Street. This circuit is de-energized and is dead-ended just outside Water Street. The station includes switching, circuit breakers and protective relaying for the east side of town, there is no transformation at the station.

The present construction of the station is compact design with a high erecticon steel structure. The control house is prefabricated fiberglass building for metering and relay controls. Saginaw Street is metered at Water Street, with the metering transformers on the Tenth Street exit. The overall condition of the station is poor, with old foundations, the attachment to the Monarch Building and the general grade conditions. The equipment, circuit breakers and metering are all in good condition. Consumers Energy (CECo) owns and operates this station to provide a connection between the east and west side of Bay City and to provide protection and sectionalizing for the four looped lines that terminate at the substation.

- B. Water Street Alternatives

The Water Street Switching Station is one of the few remaining structures in the Rivers Edge development area, aside from a few buildings that are to be renovated as part of the development plan. From the development, the station is

not in the way of building construction. The Monarch Building, adjacent to the station, is anticipated to eventually be redeveloped as a mixed use facility such as a restaurant or office building. The structures supporting the 46kV river crossing are scheduled to be removed or relocated. The tower on the river's edge is tall enough to allow ships and sailboats into the marina; however, the towers and poles from there to the station are in the marina construction area. There are several alternatives for maintaining the tie between West and East Bay City:

1. Relocate Station to Ninth Street and Relocate River Crossing

Construction of a new switching station near the Saginaw River on Ninth Street will remove the electric transmission and substation utilities facilities from the Rivers Edge Development. The final station configuration and dimensions will require review of existing and proposed protection and reliability schemes and depend on the decision concerning the Saginaw Street Substation. Exhibit is the basic layout of a relocated Water Street Station. Fence dimensions of 200' by 200' will be required for the new station. The proposed station design is a low profile rolled steel structure with standard yard stone, chain link fence and prefabricated fiberglass or steel control house. Cost to build the station with the new equipment, excluding the property cost, is \$1,000,000.00.

2. Renovate Existing Station and Relocate River Crossing

The most economical alternative for eliminating conflicts with the Rivers Edge development and the Consumers Energy Water Street Station and 46kV lines is to leave the station in place and relocate the two river crossing lines. The existing station is projected to be in a green space in the project and, while desirable to relocate the station off the project, it is not a requirement for the project.

The station could use a facelift and should be secured from public entry. The facelift as a minimum should include removal of obsolete foundations, leveling of the station yard and addition of surface stone as needed.

The Monarch Building adjacent to the station is proposed to be a restaurant and must be protected from any fire hazard in the station. The 46kV breakers are oil insulated. There are a number of potential transformers and a station power transformer that also contains oil. NEI recommends that a firewall be installed on the south side of the station. This wall will provide fire protection and secure this side of the station from public entry. The cost for this minimal alternative is \$100,000.00 plus transmission line costs. The transmission lines along Water Street presently are wood pole crossarm.

3. Relocate Switch Station to Henry Street - Relocate the 46kV River Crossing

NEI reviewed the logistics of relocating the present Water Street Switching Station to the west side of the Saginaw River near Henry Street Substation. From an electric power flow perspective; the station would be configured with two 46kV lines crossing the river, one line to Sage, one line to Salzburg, the Henry line from Monitor and a tap to Henry Street. This alternative would include reconstruction of the Henry tap with its motor-operated air-break switch scheme replacing it with a breaker protection scheme. This layout would require a minimum of six breakers, which is one additional breaker over the present configuration and the proposed 9th Street location. The location investigated for a west side switching station was north of Henry Street Substation. This area is under the Consumers Energy 46kV Henry line and west of Consumers gas regulator station. This area would be very tight to install a 46kV switch station, which would require a 200' x 200' minimum footprint. Also, this area is not level and would require extensive grading and filling.

Analysis of the protection and reliability of installing the station near Henry as opposed to near Saginaw Street was reviewed. The east side would be exposed to outages on the river crossing, lightning for the overhead and cable issues underground. The switching station would improve reliability and reduce outages for Henry Street, Salzburg and other west side substations. Placement of the station at Henry and reconfiguring the protection scheme will require relaying changes at Monitor, Weadock and Crotty Substations. This cost is included in the cost estimate.

A major consideration for relocating this station to the west side is to complete it in conjunction with serving the downtown and Rivers Edge development from Henry Street. Along with the extensive line work, this would require a doubling of the Henry Substation capacity and installation of three distribution feeders. This cost is listed separately.

4. Remove Water Street Station

The option to remove the Water Street Station was reviewed. This would tie the Salzburg line to the Knight Street line and the Henry line to the Crotty-Trumbull line. The breakers and relay protection would be at Monitor, Crotty and Weadock. Saginaw Street Substation would be a tap off the Henry line. The advantage would be saving the property and capital expense to relocate or renovate the Water Street Station. Expenditures would be required to redesign and configure the relay protection. The disadvantage would be the extended line exposure to all the substations on these lines. Load studies would be required to determine if the Consumers Energy lines can support adequate voltage

under single condition outages, such as loss of the Weadock Station or one of the river crossings. The implementation cost will include removal of the old station and relay, operating and protection changes to properly protect the revised transmission system.

C. Cost Estimates

As detailed in the attached Exhibit F, the cost estimates to renovate, relocate or remove the Water Street 46kV Switch Station are based on industry equipment, material and labor costs. Typical costs for administration are included.

D. Recommendations

The Water Street Switching Station provides efficient sectionalizing and protection of the tie between the Bay City west and east side 46kV transmission system. Though the industrial complexes that were surrounding the existing station are now gone, the east side has some important and, in the case of Bay Medical, critical loads.

The existing location while electrically serviceable is in the center of a major brown field development area. Clearing the station, the river crossing towers and associated 46kV lines from this area will create a more attractive and useable property. The existing station was constructed adjacent to the Monarch Building, and any renovations to this building will be complicated if the station remains in place. If the marina plans move forward, the river crossing structures will be in the way. For these aesthetic and site development issues, NEI does not recommend renovating the existing station.

The 9th Street location is a city-owned parcel currently used for parking that is relatively flat, in close proximity to the relocated 46kV river crossing and it can be connected to the existing east side 46kV loop with minimal effort.

Relative to the other alternatives, this location and breaker protection scheme provides reduced outage restoration and redundant service for the Saginaw Street Substation. The 9th Street site can be configured to reduce congestion of pole lines thus enhancing the aesthetics of the installation.

The Henry Street location would eliminate the need for a large parcel to be used for electric facilities near the riverfront. However, the Henry Street area does not have sufficient room to build the station, bring the 46kV lines into the station in an efficient manner and to provide room for expansion of Henry Street Distribution Substation. Additionally, construction of the station at this location would be more expensive than alternative 1.

The alternative to remove the station does clear electric facilities from the development. However, a switching station on the east side reduces the length of

exposure to 46kV line outages and provides a switching point to reduce the length of the outages.

E. Water Street Distribution Substation Site

When Consumers Energy sold their distribution facilities in the city to BCEL&P in the early 1990's, the Water Street Distribution site was included. The site was contaminated at the time of the sale and while some remediation work has been completed, the City and Consumers Energy have not come to final closure on transfer of this property. Please see Exhibit E, for a detailed explanation of this issue.

VII. BAY CITY SUBSTATION

A. Peaking Plant Substation

The Peaking Plant Substation connects the east side power plant to the Bay City Trumbull to 26th Street 46kV line. The station consists of two generators with 12,705kW of capability connected to two 12,500kVA step-up transformers from 8.32kV to 46kV. The station also has an unregulated 4.8/8.32kV tie circuit to Circuit 1 from Saginaw Street Substation. The Peaking Plant Substation could be used to serve loads south of Saginaw Street and on the west section of 26th Street Substation. This would require installation of a distribution bay at the Peaking Plant. The cost of a two-bay distribution bus, with steel structure, voltage regulators, electronic reclosers and underground exits, is \$475,000.

The space near the Peaking Plant is limited, as it is adjacent to Water Street on the east and a drive on the south. The present fenced area is 65' x 65'. In order to install voltage regulators and two circuit reclosers a fenced space of 50' X 50' is required. Depending tie-ins to the existing structures and equipment, the space requirements may be reduced slightly. A substation feeder with 300 Amp capacity will serve 4000kVA of load with 500 kcmil aluminum underground cable. A feeder can provide adequate voltage to a development of 4000kVA at a distance of one and a half miles from the substation. Based on this analysis, the Peaking Plant Substation can support a development such as Uptown at Rivers Edge. NEI recommends that, as the development energy needs grow, two feeders support the development - one from Saginaw Street and one from the Peaking Plant. This will also provide outage protection since the generation at the Peaking Plant can be funneled to the distribution exits. Care must be taken when designing the distribution bus and exits to not degrade the generator bus reliability with unprotected bus connections.

The installation of distribution exits would be a viable alternative to installing additional transformation at either 26th Street or Saginaw Street Substations. The feeders would allow at least one of the 12,500kVA transformers to be utilized more than the limited peaking generation hours each year.

B. Henry Street Substation

The Henry Street Substation is a main anchor for the BCEL&P distribution on the west side of the river. It is connected to the Consumers Energy 46kV Henry Line with motor-operated air-break switches on either side of the tap to Henry. These switches sense the loss of voltage on the line and will transfer Henry Street to the 46kV line that is still energized. Henry Street has one substation transformer serving four distribution exits.

NEI reviewed the alternative of serving the downtown area and the new Rivers Edge development from Henry Street and eliminating the Saginaw Street Substation. Construction of a Henry 2 Substation would be required with a 46kV structure, a substation transformer and a distribution bus structure with three distribution exits and room for a future fourth exit. Crossing the river can be accomplished with either overhead pole line or underground duct line.

The overhead option will require steel poles on either side of the river with sufficient height to maintain a minimum of forty (40) feet over the high water level of the Saginaw River. The crossing will be shared with a double circuit 46kV crossing.

The underground option will include overhead or underground from Henry Street to the river duct bank terminates on the west side. A duct bank of four 8" conduits under the river would be installed in the vicinity of the 46kV cable crossing. On the east side, a terminal point for the duct bank would be installed between Water Street and the river. The new Henry feeders would be connected to the existing Saginaw Street feeders in existing manholes. This option is not recommended by NEI due to cost, limited space and proximity to residential customers.

C. Bay Medical Substation

Bay City Electric Light and Power is negotiating with Bay Medical hospital to renovate the substation. The main upgrade would be a larger transformer, switchgear and feeders to serve a load addition at the hospital. The other renovation would be installation of a two-feeder distribution substation to support future growth, particularly commercial loads. The area around M-15 (Tuscola Rd) and Cass Ave Rd. is not near an existing distribution substation. Adding a transformer bank and distribution feeders at Bay Medical, will allow BCEL&P to properly serve load expansion and provide support for Saginaw Street and 26th Street Subs.

NEI modeled the new bay at Bay Medical and analyzed serving a significant commercial load at the intersection of Tuscola Rd and Cass. The new feeder provided proper voltage and did not overload the 336 ACSR conductor that was modeled.

NEI recommends that the Bay Medical Substation area be fenced and all below grade work be completed for the future distribution bay. The transformer, voltage regulators and circuit reclosers should be installed when the area load is moiré immanent.

VIII. Distribution Load Studies

The east side of Bay City distribution system was modeled utilizing Milsoft Windmil Distribution Analysis software. The substation loads as provided by BCEL&P were used to allocate loads along the distribution feeders. The software completed voltage drop and feeder loading calculations and NEI reviewed the results. Proper voltage means that the customers had a minimum of 118 volts at the meter. Conductors were not allowed to exceed 50% load to leave room for load growth and emergency switching conditions.

A. Distribution System

The existing system is served by Saginaw Street, Trumbull Street and 26th Street Substations. The distribution analysis determined that the stations and distribution lines provide proper voltage to the customers and do not have any overloaded feeder or branch circuits. NEI also reviewed alternate system configurations to determine if loads could be served from other substations. As an alternative to rebuilding Saginaw Street Substation cases were run to serve the north Saginaw circuits from Trumbull and the south circuits from 26th Street. 26th Street was capable of serving the Saginaw Street south circuits with only minor conductor and route changes. Trumbull was not able to properly serve the north circuits, even with reconductoring and installation of new circuits. In either case, additional transformation was needed to prevent overloading the substation transformer. A second transformer bay with three distribution circuits was modeled at Henry Street and the circuits extended under the river to the Saginaw circuits. These feeders were able to provide proper voltage and not be overloaded.

B. Recommendations

NEI recommends that Saginaw Street Substation remain to serve this core portion of the city. Circuit lengths are kept to a reasonable length, reducing exposure. Conductor loads allow for flexible operating of the system, and provide for emergency switching requirements.

EXHIBIT A

UPTOWN AT RIVERS EDGE

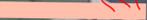
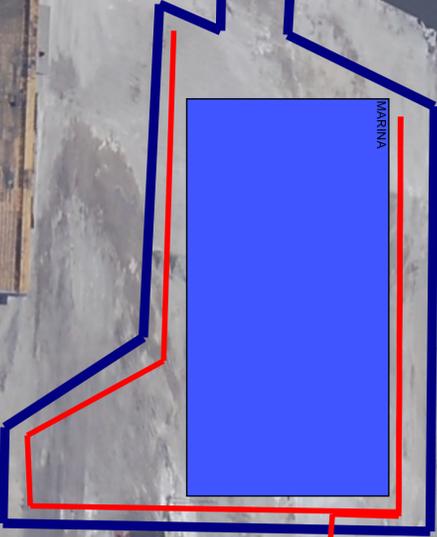
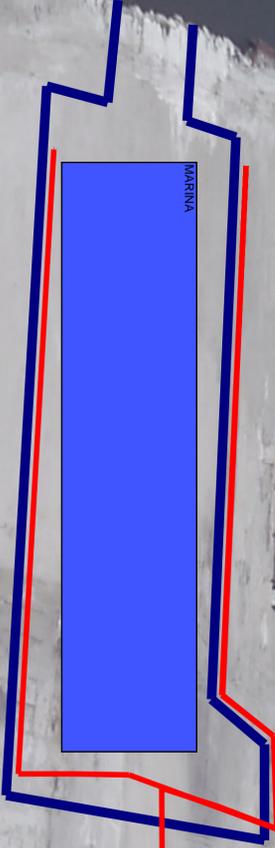
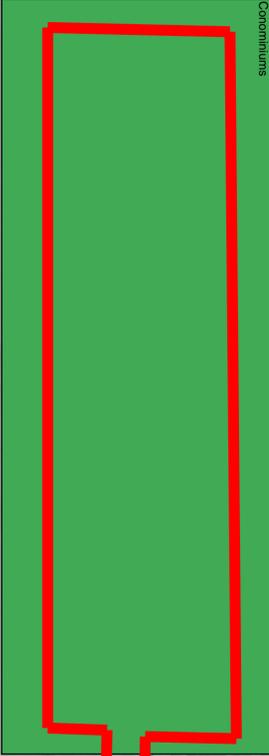
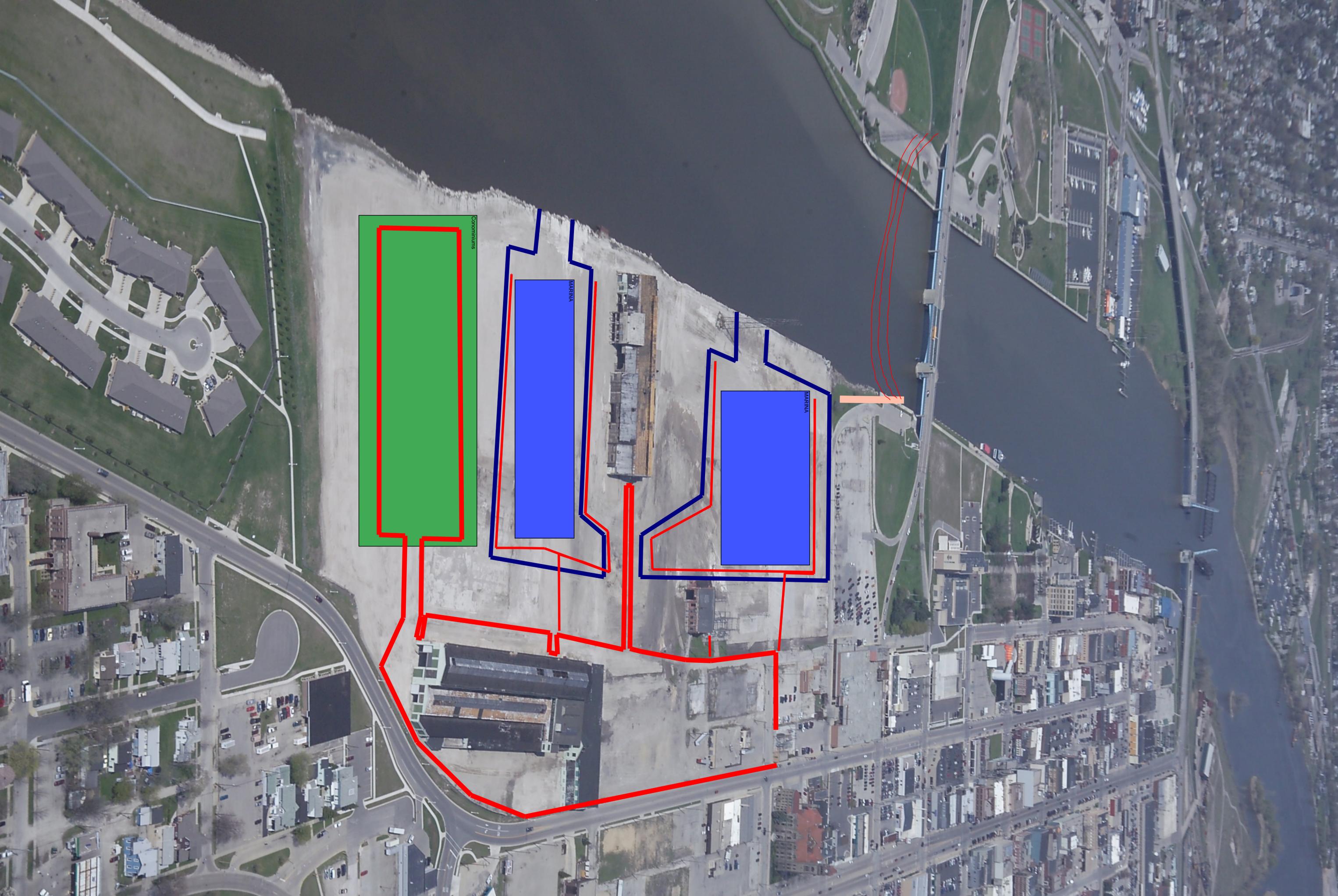
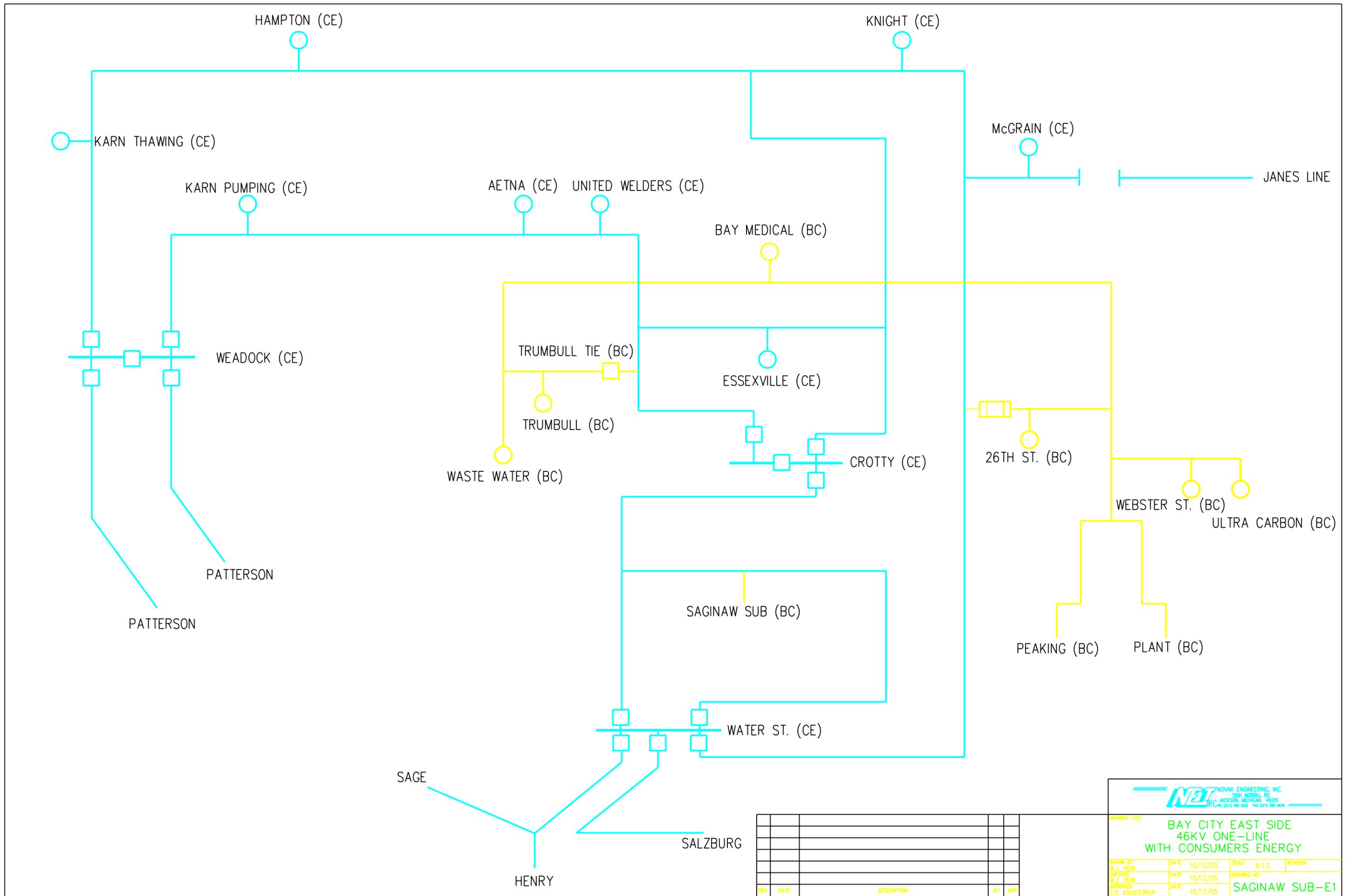


EXHIBIT B

BAY CITY EAST SIDE 46kV TRANSMISSION SYSTEM

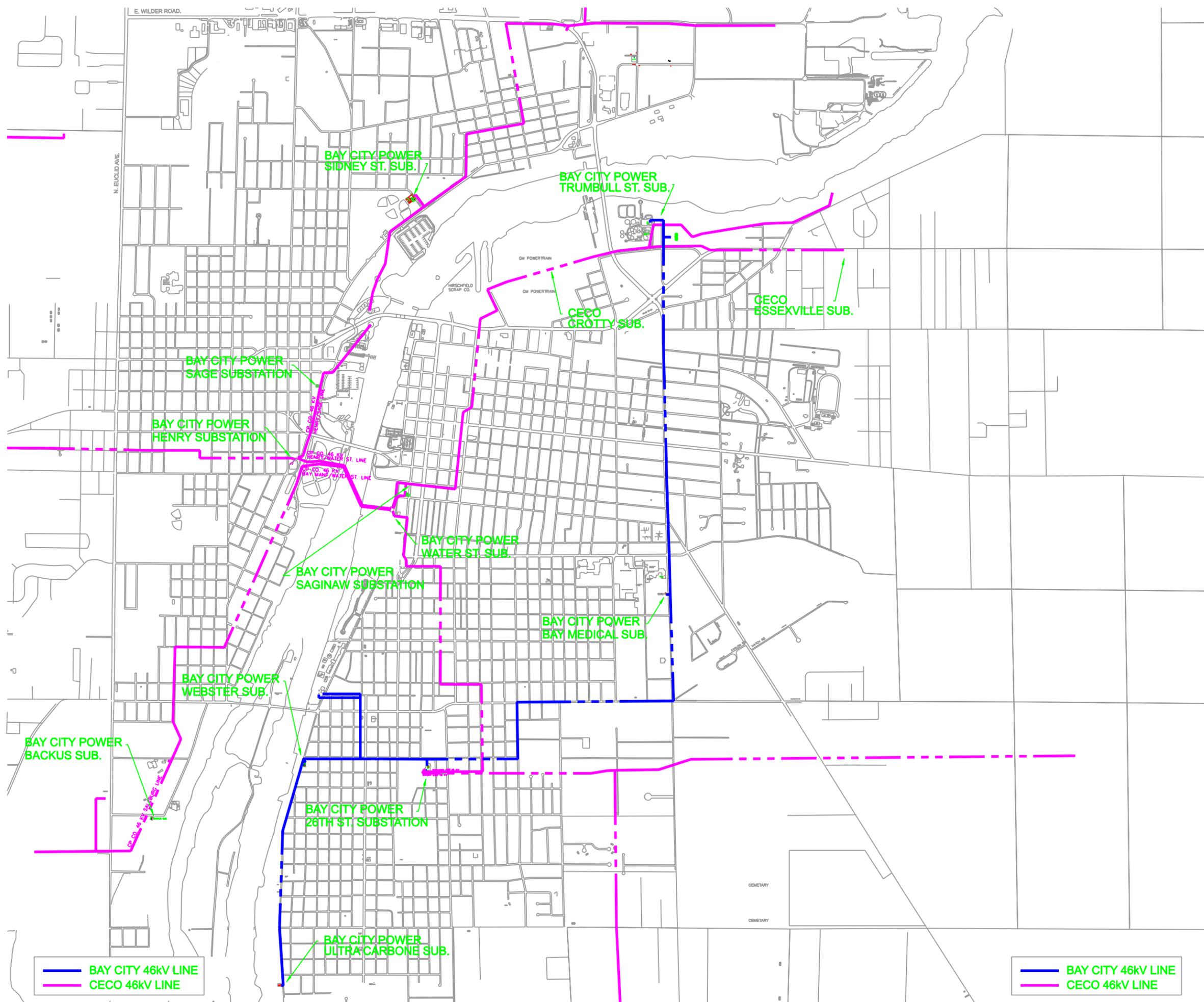



NOVAK ENGINEERING, INC.
 5591 MORRILL RD.
 JACKSON, MICHIGAN 49201
 TEL: (517) 782-2537 FAX: (517) 782-2819

DRAWING TITLE
 BAY CITY EAST SIDE
 46KV ONE-LINE
 WITH CONSUMERS ENERGY

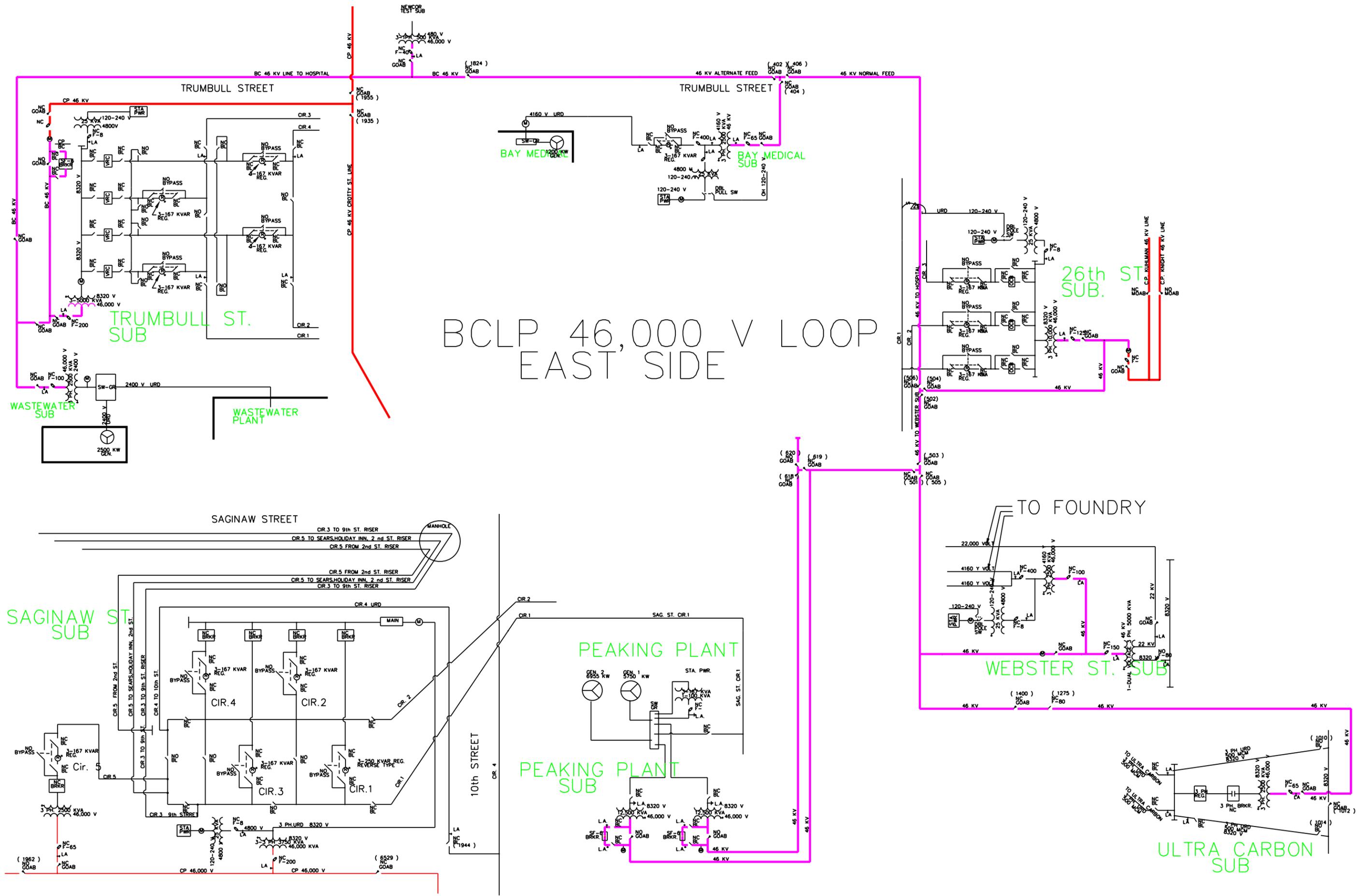
DRAWN BY M.J. HEIN	DATE 10/12/05	SCALE N.T.S.	REVISION
CHECKED M.J. HEIN	DATE 10/12/05	DRAWING NO.	
APPROVED C.R. KNUDSTRUP	DATE 10/12/05	SAGINAW SUB-E1	

REV	DATE	DESCRIPTION	BY	APP



— BAY CITY 46kV LINE
- - CECO 46kV LINE

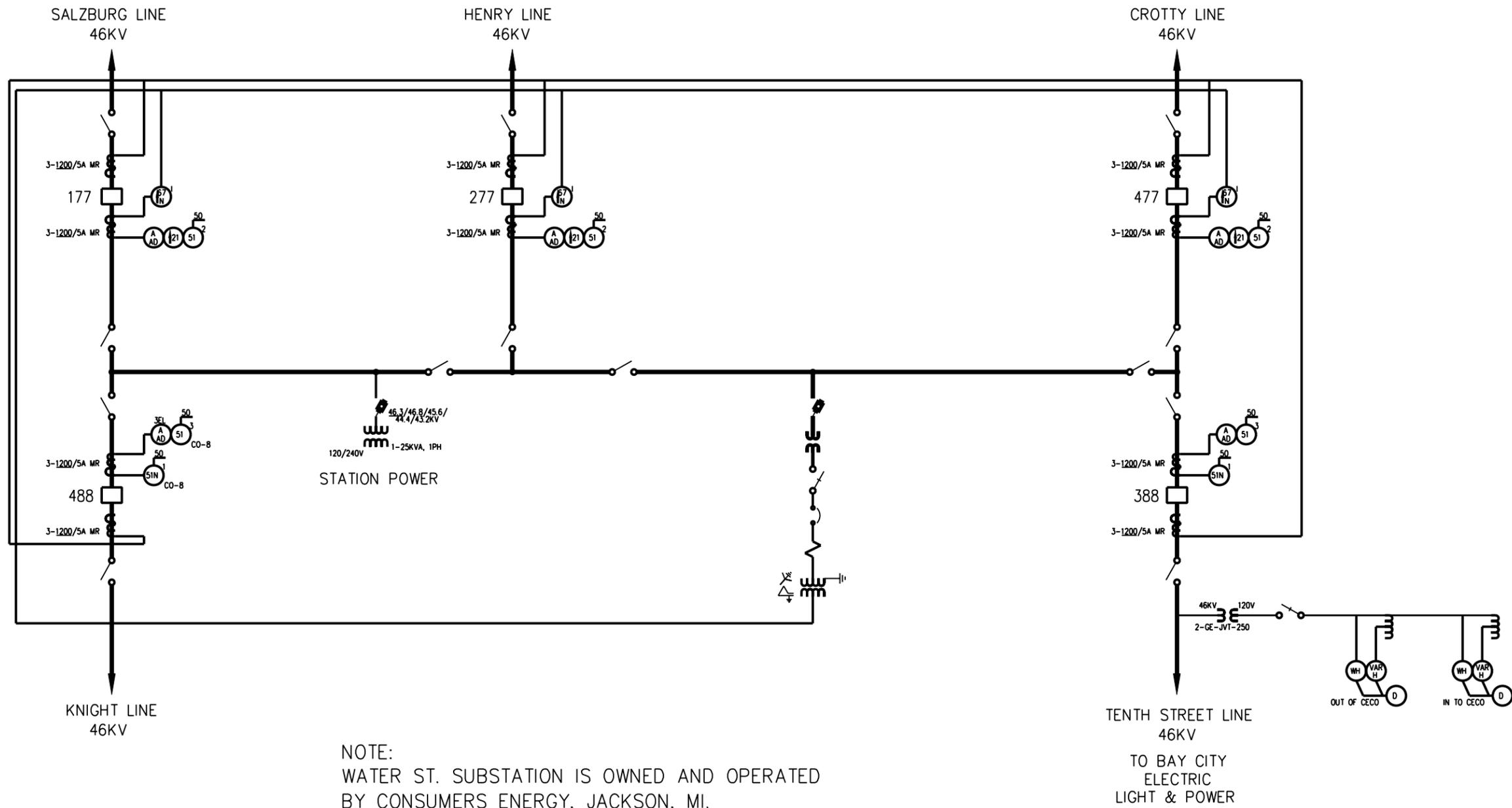
— BAY CITY 46kV LINE
- - CECO 46kV LINE



BCLP 46,000 V LOOP
EAST SIDE

EXHIBIT C

SUBSTATION ONE-LINES



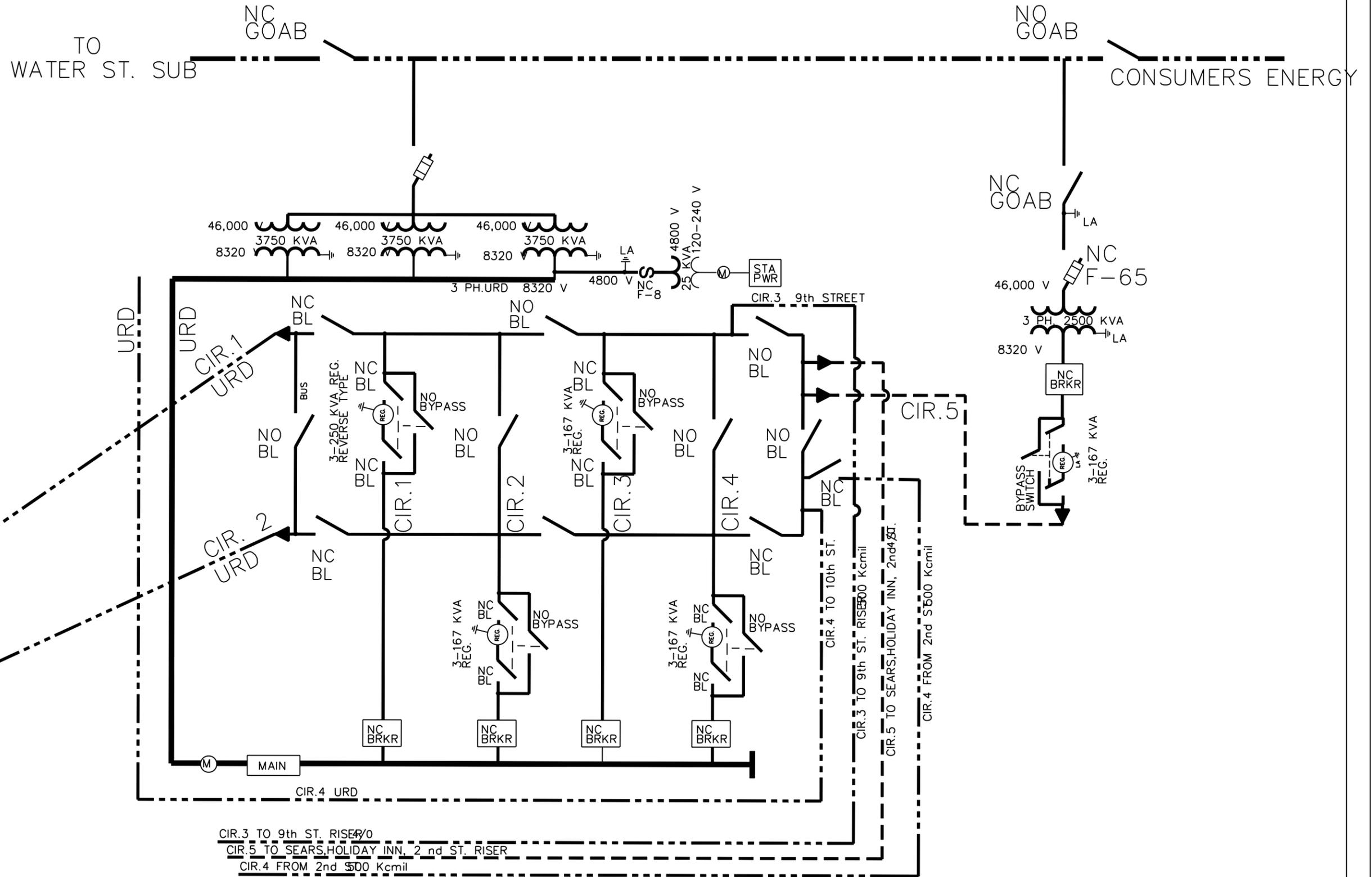
NOTE:
 WATER ST. SUBSTATION IS OWNED AND OPERATED
 BY CONSUMERS ENERGY, JACKSON, MI.

REV	DATE	DESCRIPTION	BY	APP.

NET NOVAK ENGINEERING, INC.
 5591 MORRELL RD.
 JACKSON, MICHIGAN 49201
 P.O. BOX 5817 762-5817 FAX (517) 762-5879

DRAWING TITLE
**WATER STREET SUBSTATION
 ONE LINE DIAGRAM**

DRAWN BY T. STEVENSON	DATE 10/12/05	SCALE N.T.S.	REVISION
CHECKED M.J. HEIN	DATE 10/12/05	DRAWING NO.	
APPROVED C.R. KNUDSTRUP	DATE 10/12/05	WATER ST-E1	

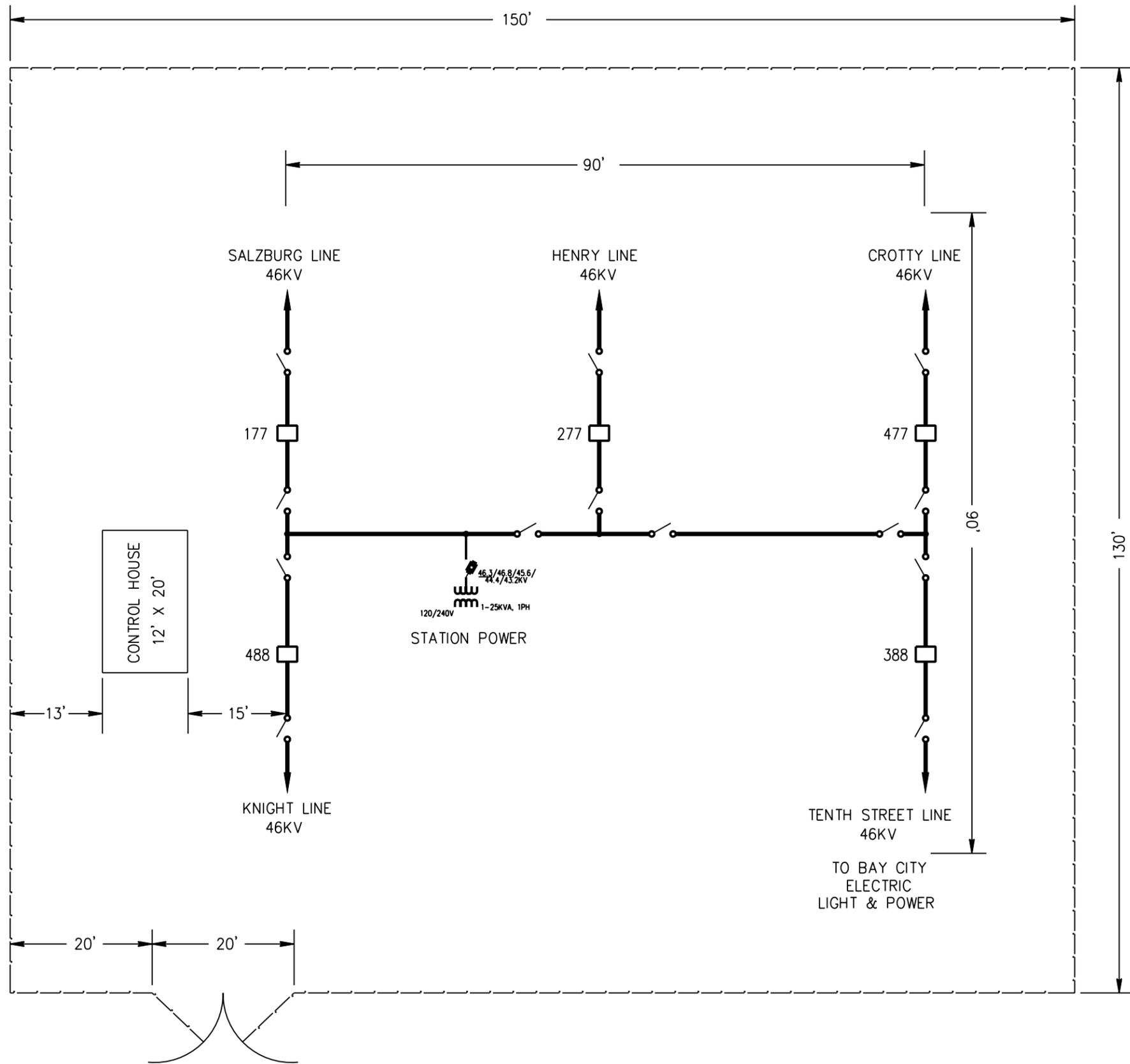


REV	DATE	DESCRIPTION	BY	APP.

NOVAK ENGINEERING, INC.
 5591 MORRILL RD.
 JACKSON, MICHIGAN 49201
 TEL (517) 782-5500 FAX (517) 782-5879

DRAWING TITLE
**SAGINAW SUBSTATION
 ONE LINE DIAGRAM**

DRAWN BY M.J. HEIN	DATE 10/12/05	SCALE N.T.S.	REVISION
CHECKED M.J. HEIN	DATE 10/12/05	DRAWING NO.	
APPROVED C.R. KNUDSTRUP	DATE 10/12/05	SAGINAW SUB-E1	



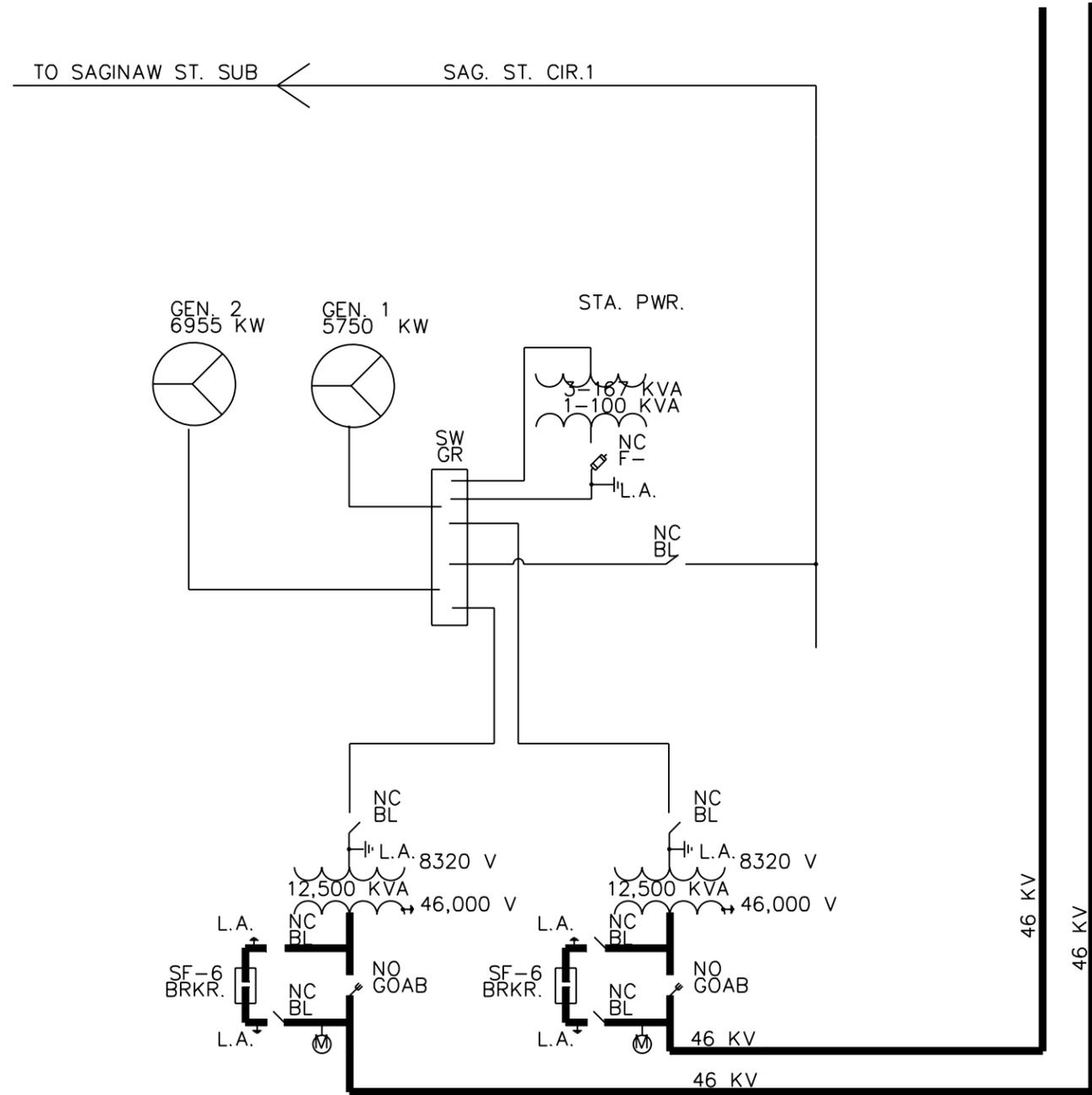
NOTE:
 WATER ST. SUBSTATION IS OWNED AND OPERATED
 BY CONSUMERS ENERGY, JACKSON, MI.

REV	DATE	DESCRIPTION	BY	APP.

NOVAK ENGINEERING, INC.
 5591 MORRILL RD.
 JACKSON, MICHIGAN 49201
 P.O. BOX 1017 761-5537 FAX (517) 761-5679

DRAWING TITLE
 WATER STREET SUBSTATION
 (RELOCATED) PLAN VIEW

DRAWN BY M.J. HEIN	DATE 10/12/05	SCALE N.T.S.	REVISION
CHECKED M.J. HEIN	DATE 10/12/05	DRAWING NO.	
APPROVED C.R. KNUDSTRUP	DATE 10/12/05	WATER ST-P1	

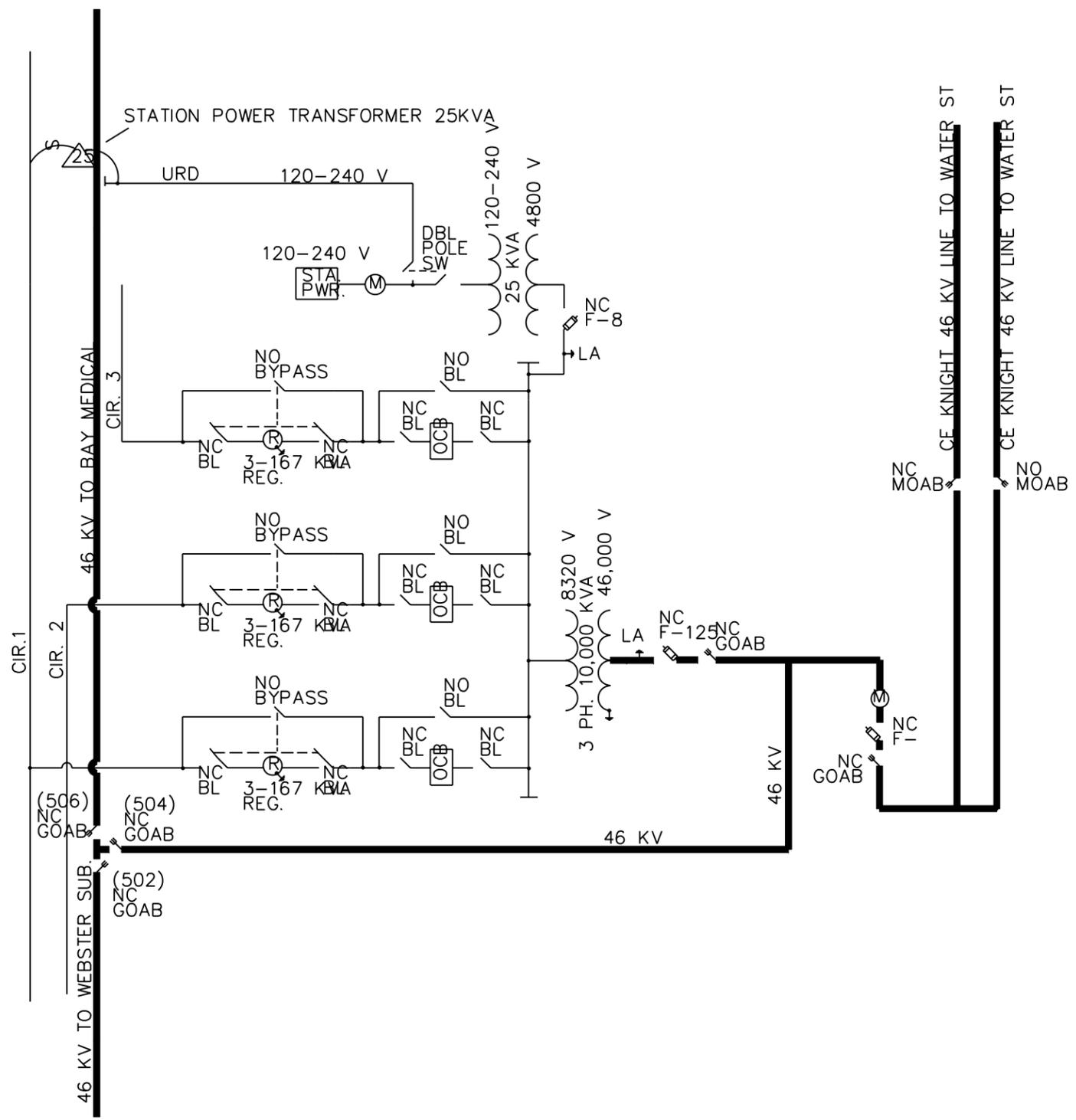


REV	DATE	DESCRIPTION	BY	APP.

NET NOVAK ENGINEERING, INC.
5591 MORRILL RD.
JACKSON, MICHIGAN 49201
TEL (517) 782-5531 FAX (517) 782-5879

DRAWING TITLE
PEAKING PLANT SUB
ONE-LINE DIAGRAM

DRAWN BY M.J. HEIN	DATE 10/12/05	SCALE N.T.S.	REVISION
CHECKED M.J. HEIN	DATE 10/12/05	DRAWING NO.	
APPROVED C.R. KNUDSTRUP	DATE 10/12/05	SAGINAW SUB-E1	

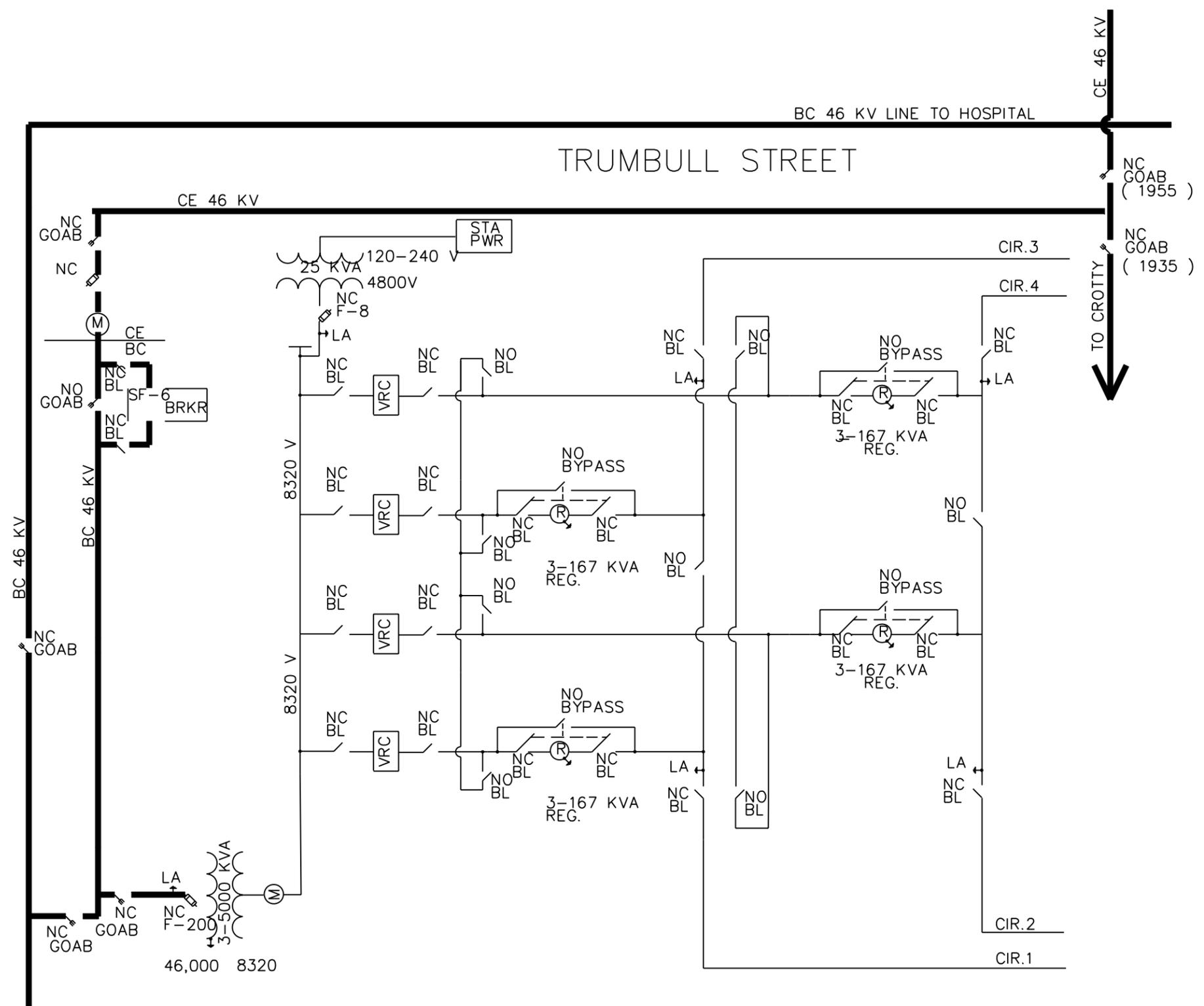


REV	DATE	DESCRIPTION	BY	APP

NET NOVAK ENGINEERING, INC.
5591 MORRILL RD.
JACKSON, MICHIGAN 49201
TEL (248) 782-2525 FAX (248) 782-2579

DRAWING TITLE
**26TH ST. SUBSTATION
ONE-LINE DIAGRAM**

DRAWN BY M.J. HEIN	DATE 10/12/05	SCALE N.T.S.	REVISION
CHECKED M.J. HEIN	DATE 10/12/05	DRAWING NO.	
APPROVED C.R. KNUDSTRUP	DATE 10/12/05	SAGINAW SUB-E1	



REV	DATE	DESCRIPTION	BY	APP.

NET NOVAK ENGINEERING, INC.
5591 MORRILL RD.
JACKSON, MICHIGAN 49201
TEL: (517) 782-5555 FAX: (517) 782-5678

DRAWING TITLE
TRUMBULL ST.
SUBSTATION
ONE LINE DIAGRAM

DRAWN BY M.J. HEIN	DATE 10/12/05	SCALE N.T.S.	REVISION
CHECKED M.J. HEIN	DATE 10/12/05	DRAWING NO.	
APPROVED C.R. KNUDSTRUP	DATE 10/12/05	SAGINAW SUB-E1	

EXHIBIT D

PHOTOGRAPHS



Consumers Energy – Water St. Station
Saginaw St. Substation Line Exit



Consumers Energy Water St. Station
And The Monarch Building



Water St. Station and the Exterior Wall
Of The Monarch Building



Saginaw River Crossing
Looking East from the River



River Crossing Structures
As Viewed from Water St. Substation



River Crossing West Side Structure



River Crossing as Viewed from Henry St.
Substation



**Saginaw St. Substation Control and Circuit
Breaker Building**



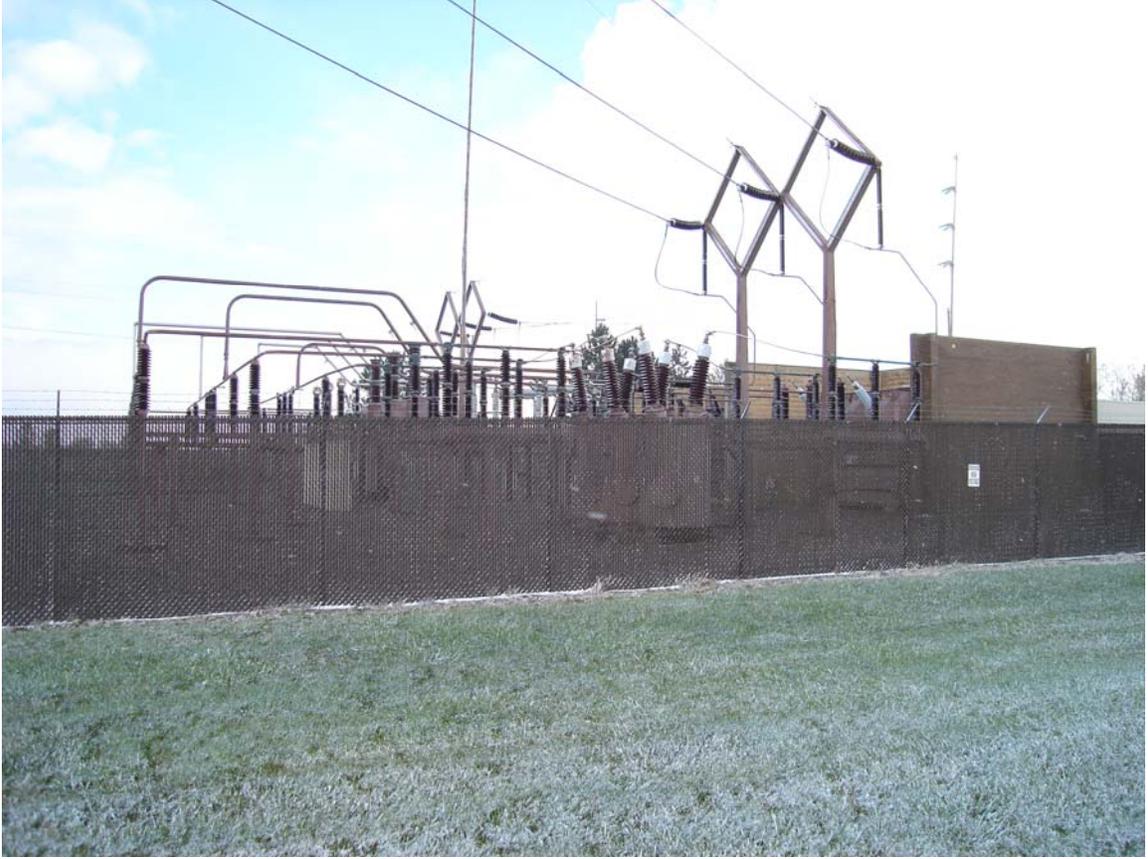
Saginaw St. Substation Voltage Regulators



Saginaw St. Substation Distribution Metal-Enclosed Switchgear



Bay City City Hall as viewed from Water St.
Station



URBAN SUB 1



URBAN SUB 2



URBAN SUB 3



URBAN SUB 4



URBAN SUB 5



URBAN SUB STEEL POLE



INTERNET STEEL POLES

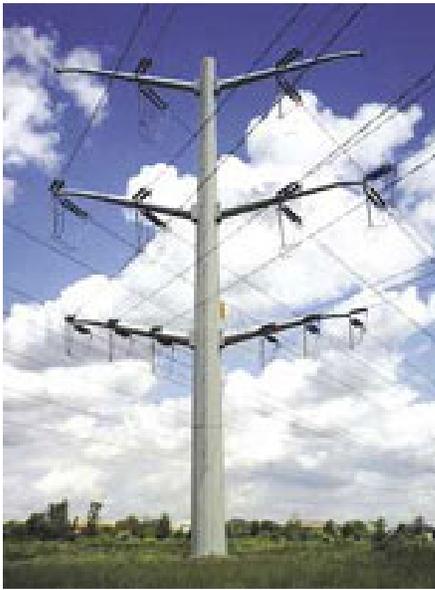


EXHIBIT E

WATER ST. DISTRIBUTION SUBSTATION SITE REVIEW



November 7, 2005

Mr. Phil Newton
Assistant Director
Bay City Power Division
900 S. Water Street
Bay City, MI 48708

Subject: Environmental Contamination at Former Consumers Energy Water Street Substation Property - Lots 9 and 10 in the 112 Block of Lower Saginaw Plat (Sidwell No. 9-13-28-134-008).

Dear Mr. Newton:

Novak Engineering, Inc. (NEI) is pleased to provide Bay City with this summary review and recommendation letter concerning environmental contamination at the subject former Consumers Energy Company (CE), Water Street Substation Property (parcel or site). CE was previously known as Consumers Power Company. The parcel lies approximately 1,000' east of the Saginaw River and near the city's downtown (uptown). This summary presents NEI's current understanding of this complicated situation and is based solely upon numerous documents presented for review. There are a variety of technical and chronological details that need to be confirmed in order to achieve a more consistent basis of understanding. The recommendations presented, at the conclusion of the summary, address the procedure to acquire these details and offer a plan of action.

In 1990, the city began proceedings to purchase the subject parcel which is approximately ¼ acre (100' x 100') in size. As part of the purchase agreement, CE removed polychlorinated biphenyls (PCBs) contaminated vadose (unsaturated) zone soil. The source of contaminant release was (petroleum-based) oil-containing electrical equipment such as voltage transformers and regulators, and circuit breakers. The oil (petroleum distillate) contained PCBs which were added to raise the flammability temperature of the oil mixture. PCBs are aromatic hydrocarbon (benzene) derivatives and organic in nature. PCBs are chronically toxic to humans and are a known carcinogen (causes cancer).



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CE was required by the US Environmental Protection Agency (EPA), Region V, Chicago, Illinois, to clean up (remediate) the soil on the property to a mass concentration of less than 5 ppm (parts per million or mg/kg) of PCBs in order to comply with a prior consent agreement between EPA and CE. This contaminant level (5 ppm) for soil is in excess of the less than 1 ppm categorical (generic) Type B Cleanup Criteria or standard established by the state of Michigan.

Prior to the property transaction, EPA investigation efforts determined that PCBs in soils were far in excess of 7 ppm between the fenced area and the northern boundary. Samples from the northern boundary contained 5,000 ppm. Subsequent testing determined PCBs as high as 9,380 ppm at the northern boundary. Magline, now known as Saginaw Bay Industries, is situated north of the subject parcel.

Under a Consent Agreement between CE, EPA and the state of Michigan, CE is required to reduce soil levels of PCBs to less than 5 ppm. It appears that CE may not be in compliance with the agreement. However, verbal and written representations were made by CE that the site had been cleaned up to meet EPA requirements and that the Michigan Department of Natural Resources (MDNR), now known as the Michigan Department of Environmental Quality (MDEQ), had essentially signed-off on the site. NEI understands that this information may or not been known to the city prior to property purchase.

The property was purchased by the city from Consumers Power Company on August 20, 1991. Until recently, the parcel was zoned "Industrial". The property was recently rezoned by the city as "C-3 Central Business District". The city intends to offer a variety of commercial, office, civic, cultural, entertainment, recreational, residential and tourism-orientated uses for the property. Additionally, residential use is encouraged in the upper floors of retail and office building development. The property is part of the city's Uptown at Rivers Edge development.

NEI understands that at the time of the transaction, CE represented to the city that the subject property was not environmentally contaminated. Unfortunately, and subsequent to the transaction, it was determined that vadose zone soils and groundwater were in fact contaminated with PCBs. In the transaction agreement, CE warranted that there were two soil locations within the fenced area with PCBs contamination of 6 ppm and 7 ppm. Therefore, PCBs in the soil is in excess of the state of Michigan categorical (generic) residential cleanup level of 2.3 ppm. Groundwater impact is believed to be in excess of categorical (generic) residential and industrial cleanup criteria concentration of 0.5 ppb (part per billion or mcg/L) by weight and its use will probably be restricted as well. No substantive site hydrogeology data was included in the documents reviewed by NEI.

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Page 3

CE stated, in writing, that since there is no recorded spill since 1977, on-site contamination is considered the result of a historic spill (release) and, therefore, CE has no legal obligation to perform any cleanup of the site. Further, CE stated that because of the city's concern, CE (in, perhaps, a good faith effort) proceeded to clean up the site to EPA standards. Perhaps the city understood at the time of purchase that additional remediation might be required at the sole cost and expense of the city.

Typically, generic residential cleanup levels for environmental media are lower and more restrictive than generic industrial cleanup levels. Often the extent of remedial activities required in order to achieve residential criteria site closure is more significant than activities necessary for industrial criteria closure. It appears that CE began MDEQ-approved remedial activities to clean up the site to generic residential criteria and not generic industrial criteria. Data collected during the 1994 remediation efforts indicate PCBs contamination in the groundwater at the northern edge of the property. Groundwater impact at the northern property boundary may yet need to be evaluated further.

In August 1998, CE drafted an Environmental (settlement) Agreement for the city's review and comment. Paragraph 6 of the draft agreement required the city to agree to limitations upon future use of the property consistent with categorical cleanup criteria for industrial property including, but not limited to, restricting use of groundwater. Further, NEI understands that Paragraph 7 of the draft agreement states that "in the event of unexpected circumstances" the parties shall consult to determine the necessary appropriate response which may include providing for a limited cleanup in accordance with categorical industrial cleanup criteria.

In 1999, CE remediated contaminated site soils by excavation, removal and disposal of waste off-site. It is reported that 1,240 tons (approximately 1,700 cubic yards) of impacted soil was excavated, transported and disposed at the Wayne Disposal Landfill in Bellville, Michigan. Typically, materials characterized as "hazardous waste" are disposed of at this landfill. No analytical data characterizing the waste was included in the documents reviewed by NEI. CE continues to work with MDEQ to obtain site closure under generic industrial cleanup standards. CE may have cleaned up the site to warranty levels depending upon one's subjective interpretation. It is purported that the generic industrial cleanup criteria is 9.9 ppm for PCBs in soils and 1.2 ppm for PCBs in soils using the generic residential cleanup criterion. No substantive or formal closure information was contained in the documents reviewed by NEI.

Absent of additional remediation, closure to industrial rather than residential standards will require, at a minimum, a permanent deed restriction limiting the property to only industrial and some commercial purposes. It is believed that categorical industrial closure would allow for "Commercial Level II" property development. However, unless closure is ascertained to

Mr. Phil Newton
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Page 4

residential standards, future soil disturbance after closure would require proper disposal of contaminated soil off-site or remediation by other means as to avoid exacerbation of site contamination. Nevertheless, under current regulations, CE's cleanup to generic industrial standards allows for most commercial activity enunciated in the Central Business classification, although there will be a high probably that additional testing and remediation activities will be required if residential development is planned.

As you may be aware, EPA administers the Toxic Substances Control Act (TSCA) independent of MDEQ. CE and MDEQ engaged EPA because PCBs levels in the soil were in excess of 50 ppm as prescribed by TSCA. However, NEI understands that MDEQ believes that TSCA is applicable if site levels are 1 ppm in an unrestricted situation or 10 ppm if contamination is capped. A uniform cap with a perpetual deed restriction shall be a minimum of six inch thick concrete, asphalt or similar material spread over the affected area in order to prevent or minimize human exposure, infiltration of water and erosion. Deed restrictions may only be removed after completion of approved remediation.

Additionally, a differentiation of acceptable PCBs levels for closure is made by occupancy types. The extent of cleanup depends on whether the site is classified as "high occupancy area" or "low occupancy area". High occupancy areas include, but are not limited to, residences, schools, day care center and industrial facilities. Low occupancy areas include electrical substations and other uses. NEI understands that during the time that CE was conducting remediation activities the site has been expected and anticipated to be a high occupancy area. PCBs levels of 25 ppm are permitted in low occupancy areas. Also, a low occupancy area with 25-50 ppm need only be fenced and properly signed and 25-100 ppm if capped. Unrestricted levels are applicable for high occupancy areas.

Therefore, remediation consistent with generic industrial criteria closure is insufficient to meet high occupancy levels. Additional remediation would be required in order to meet the more restrictive contaminant levels of high occupancy areas. Based upon the information presented to NEI, TSCA requires that when an area is to change from a low occupancy to high occupancy area the more restrictive clean-up level is applicable and the owner (the city) must undertake remediation activities.

A diagram prepared by SME in 2002 depicts PCBs contamination in the remaining soils at 3,100 ppm and 210 ppm near the northern boundary. Further, a clay layer/barrier is reported to exist in the soils at depth which may inhibit vertical migration and leaching of contaminants into the groundwater. Therefore, unremediated PCBs remain at the site which CE believes resultant to contaminant migration off-site from the Magline property which adjoins the subject property on its northern boundary. Magline was involved in some type of manufacturing operations but the

Mr. Phil Newton
Bay City Power Division
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Page 5

source of off-site contamination and its transport were not enunciated. Further, if PCBs migration occurred from Magline as well from CE historical on-site activities, it is conceivable that unremediated site contamination may be commingled thus making source delineation and responsibility determination difficult. No substantive local topographic or hydrogeologic information was contained in the documents reviewed by NEI.

At this time, MDEQ has solely required CE to remediate the property and not the city. However, as owner, MDEQ and EPA could conceivably name the city as a potentially responsible party (PRP). It is unclear why Magline and/or its successor, Saginaw Bay Industries, have not been identified as PRPs.

MDEQ enforced "Due Care" provisions to adjacent property owners regarding contaminant migration appear to be applicable. Therefore, it is believed that the city must notify Saginaw Bay Industries/Magline and MDEQ of site contamination and remedial activities. However, CE maintains that this particular situation is reversed in that the contamination has migrated from Magline to the subject property.

In 2003, CE stated there were two vadose zone soil samples at the northern property that contain PCBs in excess of the MDEQ generic industrial/commercial II cleanup criteria of 16 ppm and all other verification of soil remediation (VSR) samples were determined to contain PCBs in levels well below criteria. Furthermore, only six VSR sampling locations had PCBs levels in excess of the generic residential cleanup criteria of 4 ppm. These samples contained 4.3 ppm to 7.9 ppm of PCBs.

Even with MDEQ endorsement, if CE remediated the site to warranted levels or unrestricted TSCA levels, the city, at city expense, may desire to remediate the site to unrestricted residential levels in order to accommodate high occupancy future development. Alternatively, the city could require interested developers to perform necessary remediation, at their own expense, to accommodate a particular type of development.

In order to preserve the city's right to causes of action, for example breach of contract, after the statute of limitation period, a mutual Tolling Agreement was established in 1995 between the city and CE to provide time to negotiate a mutually agreeable settlement regarding site contamination. Unfortunately, the negotiated settlement process has delayed necessitating the need for the agreement to be extended annually since that time. The current extension of October 21, 2004 will expire on December 31, 2005.

Mr. Phil Newton
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November 7, 2005
Page 6

Additionally, the city owns two 30' x 100' parcels separated by a 20' alley located directly to the south and southeast of the subject property. Soil sample analysis indicates that no PCBs exist on the parcels in excess of generic residential criteria. The parcels are currently vacant.

In conclusion, residential (high occupancy or unrestricted) cleanup levels are more conservative than for industrial (low occupancy) cleanup levels and, therefore, the extent of remediation required in order to achieve unrestricted site closure is more significant than that for an industrial criteria closure. Thus, the city must decide the extent of remediation it desires to attempt to impose on CE and evaluate its monetary, environmental and legal risk, and responsibilities of such action.

NEI recommends that a status review meeting be scheduled and include a representative from the city and its legal counsel and NEI as soon as practical to affirm all parties understanding of the situation and city objectives. Then, an information exchange meeting with local MDEQ personnel will most likely be recommended. It is possible that a meeting with EPA may be beneficial later as well. Following these meetings and any subsequent necessary research activities, a meeting with CE would most likely be appropriate. Of course, these meetings and activities must be expedited because the current Tolling Agreement is set to expire on December 31, 2005. Also, be aware that as necessary, NEI can call upon its "sister" company TRC Environmental, Inc., based in Chicago, to aid in resolution of this matter. TRC Environmental can bring significant breadth and depth to the table should it become necessary.

Please contact me at NEI should you have questions, concerns or would like to schedule the recommended meeting.

Sincerely,

Timothy R. Murine, PE, QEP
Vice President

c: C. Knudstrup, PE

EXHIBIT F

ESTIMATES

46kV Overhead Saginaw River Crossing

Item	Unit Cost	Qty	Total Cost
Steel Poles	\$102,700.00	2	\$ 205,400.00
Foundations for Steel Poles (Labor & Material)	\$ 30,000.00	4	\$ 120,000.00
Lead-In Structures	\$ 20,000.00	2	\$ 40,000.00
Conductor 795 ACSS, 3-Three Phase Ckts	\$ 1.80	4500	\$ 8,100.00
Insulators and Hardware, 46kV Three Ckts	\$ 350.00	36	\$ 12,600.00
Shield Wire (OPGW for future communications)	\$ 1.25	1000	\$ 1,250.00
Hardware for OPGW	\$ 100.00	6	\$ 600.00
Surge Arresters	\$ 500.00	6	\$ 3,000.00
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
Sub-Total			\$ 390,950.00
Construction (Installation and Removal - 10 Crew Weel	\$ 11,000.00	10	\$ 110,000.00
Contingencies		15%	\$ 75,142.50
Equipment Specifications & Procurement		10%	\$ 50,095.00
Engineering		7%	\$ 35,066.50
Testing and Startup			\$ 25,000.00
TOTAL			\$ 686,254.00

46kV Underground Saginaw River Crossing

Item	Unit Cost	Qty	Total Cost
Under River Directional Bore (20" Conduit)	\$ 200.00	1675	\$ 335,000.00
Insert 3 - 8" PVC Conduit in 20" Main Conduit	\$ 36.00	1675	\$ 60,300.00
46kV Cable (2 Circuits - 750 kcmil)	\$ 63.50	2200	\$ 139,700.00
46kV Terminations	\$ 750.00	12	\$ 9,000.00
Riser Structures	\$ 20,000.00	2	\$ 40,000.00
Pull Box Structures - with Conduit Duct Bank	\$ 15,000.00	2	\$ 30,000.00
Spare Conduit for Future Communications	\$ 5.00	1675	\$ 8,375.00
Ground Conductor	\$ 2.00	1675	\$ 3,350.00
Surge Arresters	\$ 500.00	6	\$ 3,000.00
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
Total			\$ 628,725.00
Construction (Installation and Removal - 6 Crew Weeks)	\$ 11,000.00	6	\$ 66,000.00
Contingencies		20%	\$ 138,945.00
Equipment Specifications & Procurement		12%	\$ 83,367.00
Engineering		9%	\$ 62,525.25
Testing and Energizing			\$ 25,000.00
		Total	\$ 1,004,562.25

Henry Switching & Breaker Station			
Construction			
Item	Unit Cost	Qty	Total Cost
46kV Breaker	\$150,000.00	6	\$ 900,000.00
Bus 46kV	\$ 20,000.00	1	\$ 20,000.00
46kV Switches (Hook Stick)	\$ 2,000.00	15	\$ 30,000.00
Relaying and Control Panel per Breaker	\$ 15,000.00	5	\$ 75,000.00
Fence (180' X 190') Decorative	\$ 15.00	740	\$ 11,100.00
Site Preparation	\$ 75,000.00	1	\$ 75,000.00
Ground Grid	\$ 30,000.00	1	\$ 30,000.00
Steel	\$ 30,000.00	1	\$ 30,000.00
Control House	\$ 30,000.00	1	\$ 30,000.00
Control Wiring	\$ 10,000.00	1	\$ 10,000.00
Remove existing Henry MOAB Switches	\$ 20,000.00	1	\$ 20,000.00
Relay Changes at Monitor and Crotty	\$ 75,000.00	2	\$ 150,000.00
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
Total			\$ 1,381,100.00
Construction			\$ 400,000.00
Equipment Specifications & Procurement		10%	\$ 138,110.00
Engineering		7%	\$ 96,677.00
Intercompany coordination			\$ 50,000.00
Testing and Startup			\$ 40,000.00
		Total	\$ 2,105,887.00

Water St. Substation

Removal without a Replacement Station at another location

Item	Unit Cost	Qty	Total Cost
Relaying Changes at Weadock	\$ 75,000.00	2	\$ 150,000.00
Relaying Changes at Crotty	\$ 75,000.00	1	\$ 75,000.00
Relaying Changes at Monitor	\$ 75,000.00	2	\$ 150,000.00
	\$ -	0	\$ -
	\$ -	0	\$ -
	\$ -	0	\$ -
	\$ -	0	\$ -
	\$ -	0	\$ -
	\$ -	0	\$ -
	\$ -	0	\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
Total			\$ 375,000.00
Construction			\$ -
Equipment Specifications & Procurement		0%	\$ -
Engineering		7%	\$ 26,250.00
Interaction between Utilities			\$ 50,000.00
		Total	\$ 451,250.00

Peaking Plant Substation			
Add Two Distribution Regulated Feeders			
Item	Unit Cost	Qty	Total Cost
Install Group Regulation (250kVA Regulators)	\$ 13,000.00	3	\$ 39,000.00
Install Outdoor Circuit Reclosers	\$ 22,000.00	2	\$ 44,000.00
Site Prep	\$ 2,500.00	1	\$ 2,500.00
Rework Distribution Bus to Tie to Generation Bus	\$ 75,000.00	1	\$ 75,000.00
Install Ground Grid	\$ 10,000.00	1	\$ 10,000.00
Controls and Control Wiring	\$ 7,500.00	5	\$ 37,500.00
Replace Circuit 5-46kV Wood Structure	\$ 30,000.00	1	\$ 30,000.00
Install Fence	\$ 7.50	200	\$ 1,500.00
Steel Structure (Erecticon)	\$ 15,000.00	1	\$ 15,000.00
			\$ -
			\$ -
			\$ -
			\$ -
Sub-Total			\$ 254,500.00
Construction			\$ 150,000.00
Equipment Specifications & Procurement		10%	\$ 25,450.00
Engineering		7%	\$ 17,815.00
Testing and Startup			\$ 25,000.00
		TOTAL	\$ 472,765.00

