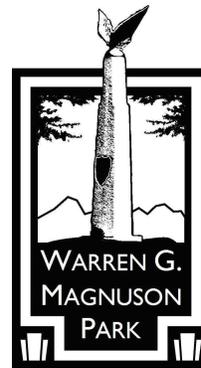


Seattle Parks and Recreation
Warren G. Magnuson Park
Primary Electrical Distribution Overview Report
January – 2013



SPARLING

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1. Executive Summary

This study provides an overview of the existing primary electrical distribution systems serving Warren G. Magnuson Park (WGMP), including the Sand Point Historic District. It has been commissioned to update the report completed in 2008 due to recent failures of portions of the Navy 4.16KV medium voltage distribution system. The report addresses the feasibility to convert the remaining loads on the 4.16KV system over to the Seattle City Light 26KV distribution system.

2. Existing Data

The information reviewed from existing available drawings consisted of the following:

Primary Electrical Distribution Overview. This project was conducted in 1986. These drawing sheets numbered E2-E30 were located and are stored in archival drawing cabinets located at WGMP. These drawings identify the configuration of the Navy 4.16KV primary electrical distribution system which was in operation at that time.

Construction drawings from the Repairs to Existing Electrical Distribution System Phase III and IV. This project was conducted in 1986. These drawing sheets numbered E2-E30 were located and are stored in archival drawing cabinets located at WGMP. These drawings identify the configuration of the Navy 4.16KV primary electrical distribution system which was in operation at that time.

“Record” drawings from the primary\communication duct bank installation project completed by SDOT and\or SPU in 1999 (Plan #777-478 constructed 1998\1999). These drawing sheets numbered E1-E33 were located in the archival drawing cabinets located at WGMP. These drawings identify the configuration of the duct bank used for the build out of the SCL 26KV primary electrical distribution system. These drawing are also available from SPU Virtual Vault E1-E33 as part of a larger project.

“Record” drawings from the primary electrical distribution system installed in 1978 that serves the existing central lift station and shore facilities. These drawings were provided by Seattle Parks project management staff.

“Record” drawings from athletic field construction project completed in 2010.

“Record” drawings from 26KV Shore Power Extension completed in 2010.

Seattle City Light Distribution drawings of the 26KV cable and secondary transformer layout serving SPMP. These drawings were provided and updated in the 2008 report. An update to this information was provided by SPMP staff and subsequent meeting with Seattle City Light Engineering Department. Recent additions include the athletic fields, Building 67 and the new Sand Point Tennis Center. Seattle City Light would not provide their updated distribution drawing\map.

Data was compiled from these sources to develop a combined schematic drawing of these separate systems for this report. Also provided is an inventory spreadsheet of the existing buildings located within WGMP and the Sand Point Historic District identifying to which primary electrical system it is connected. Contained are the physical addresses of each of the buildings provided by Seattle Parks planner, Kevin Bergsrud.

3. Existing Conditions

4.16 KV Distribution System

The medium voltage cables serving the existing 4.16KV system are failing. Recent failures to the system include feeder B-1 during initial construction of the tennis center and feeder B-2 serving building 308. Feeder B-1 was repaired. Building 308 was removed from feeder B-2 and connected to the existing ball field electrical service on the SCL 26KV system. Feeder B-2 was subsequently decommissioned during recent testing of the secondary cables completed in December of 2012. During this testing it was reported by Sequoyah Electric that B-2 was damaged by copper thieves entering the vaults and cutting into the 4.16KV cables. Portions of these feeders were also stolen during these events. A recent break in of building 42 was reported by SPMP staff in January of 2013.

Of the six 5KV, 400A multi conductor feeders serving the site from the main switchboard located inside Building 42 only A-1, A-2 and B-1 remain energized. Feeders B-2, C-1 and C-2 are disconnected with the breakers racked out.

Hazardous materials testing of the 4.16KV feeders completed for this report concluded that they contain no asbestos.

26 KV Distribution System

Recent meeting with SCL engineers have reconfirmed that the two existing Seattle City Light 26KV feeders are at full capacity. They have indicated that all current development has been provided for connection to their system and any future conversions at WGMP will require the installation of two six position primary switches. SCL has indicated verbally that they will pay for and install these switches. Seattle Parks will need to include the infrastructure to connect these switches to the existing 26KV vaults and feeders.

Seattle City Light will support the extension of the 26KV system to pick up the remainder of the buildings that are being served by the 4.16KV system. They will connect the services to separate electrical meters when they are converted. All future development on site will be connected to the SCL 26KV system.

Schematic drawings and estimated electrical loads will be provided to Seattle City Light for the conversion of the remaining buildings off of the 4.16KV system. The schematic drawings are based on the updated list of the buildings to be converted and building programming provide by WGMP staff. SCL staff will be able to start preliminary engineering analysis and be able to order the switches that are to be installed on site. They expect a minimum lead time of six months for delivery of these switches when ordered.

4. Recommendations

- Convert all remaining buildings on the 4.16KV system over to the SCL 26KV system as soon as practical. Repair as necessary to continue operation until all of the buildings on the site are decommissioned or converted over to the 26KV system.
- Complete the electrical design for the remaining buildings served by the 4.16KV system on to the 26KV system. Seattle City Light will require these documents prior to them completing their engineering work and the customer service agreement letter outlining all costs and requirements for their work.

Appendices:

- Appendix A: Building List
- Appendix B: Photos
- Appendix C: Budgetary Cost Estimates
- Appendix D: Schematic Electrical Drawings

Appendix A

Building List

Building	Address	Street	SF	Official Building Name - Use	Electrical Service	Substation & Breaker Size	Feeder/Size	Building Substation & Transformer Size (480V-120/208V)	Building Main service Size (Amps)	Estimated Connected Load (KVA)	Notes
47	7110	62nd Avenue NE	50,060	Magnuson Community Center - operated by Seattle Parks	4.6 KV	Sub G - 750KVA	Feeder B-1/B-2 600A, 3P	Sub. 15, 500KVA	600A, 3P	657	RECHECK DISCOVERED JUL 2012 STILL CONNECTED. 4KV Disconnected. Open 600A CB at Substation C. 250A CB at Substation A
11	7777	62nd Avenue NE	59,206	Non-motorized boating offices, Sail Sand Point, etc.	4.6 KV	Sub A - 750KVA	Feeder A-1 250A, 2P	Sub. 48 100KVA & 15KVA	(2) 200A, 2P	444	
31		62nd Avenue NE	7,940	Boat house	4.6 KV	Sub A - 750KVA	Feeder A-1 500A, 3P	Sub. 36 225KVA	100A, 3P from 400A Dist. PNL 36	60	Fed from 100A CB at Panel 36 from Substation A
31		62nd Avenue NE		Marina Dock							
2	7727	63rd Avenue NE	144,232	North Wing - Seattle Conservation Corps offices and storage, Hangar 2 North - Arena Sports indoor participant sports, Hangar 2 South - Arena Sports indoor participant sports, South Wing Workshops - vacant	4.6 KV	Sub C - 750KVA & Sub D - 750KVA	Feeder A-1/A-2 450A, 3P (Sub C) 450A, 3P (Sub D)	Sub. 33, 300KVA Sub. 33P, 300KVA Sub. 71, 300KVA	900A, 3P (Sub. 33) 900A, 3P (Sub. 33P) (2) 450A, 3P (Sub. 71)	1082	Substation 33 fed from 450A CB at Substation C. Substation 33P fed from 450A CB at Substation C. Substation 71 fed from 450A CB at Substation D
41	6327	NE 74th Street	2,030	Seattle Parks grounds maintenance.	4.6 KV	Sub G - 750KVA	Feeder B-1/B-2 350A, 3P	Sub. 22, 225KVA	Load center	15	Fed from 300A CB at Substation G shared with Building 30
406	6344	NE 74th Street	29,270	The Brig at Magnuson Park - operated by Seattle Parks	4.6 KV		Feeder A-1		600A, 3P	384	
299		NE 80th Street		Paint Storage	4.6 KV	Sub B - 750KVA	Feeder A-1 350A, 3P	Sub. 34, 225KVA	400A, 3P from 800A, 3P Bus		Sub. 34 shared with Bldg 67
138	7400	Sand Point Way NE	12,806	Administrative offices, managed by Seattle Parks	4.6 KV	Sub F - 750KVA	Feeder B-1 450A, 3P	Sub. 16, 300KVA	150A, 3P from 900A, 3P Bus	168	Sub. 16 shared with Bldg 29
116		Sand Point Way NE		Sewage Pump Station	4.6 KV	Sub A - 750KVA	Feeder A-1 350A, 3P	Sub. 67 225KVA	100A, 3P from 400A Dist. PNL 36		100A CB at Panel 36 from 500A CB at Substation A
Pier#1		62nd Ave NE		Marina Dock	4.6 KV	Sub A - 750KVA	Feeder A-1 500A, 3P	Sub. 36 225KVA	100A, 3P from 400A Dist. PNL 36		Fed from 100A CB at Panel 36 from Substation A

27	7751 63rd Ave NE	105,000	Indoor sports complex, health club. Opened 2010	4.6 KV	Sub B - 750KVA	-	-	800A, 3P	788	Fed Directly from 750KVA Transformer.
40	Sand Point Way NE		Paint Storage - vacant.	4.6 KV	Sub A - 750KVA	Feeder A-1 500A, 3P	Sub. 36 225KVA	60A, 3P from 400A Dist. PNL 36		
115	Sand Point Way NE		Storage - vacant	4.6 KV	Sub A - 750KVA	Feeder A-1 350A, 3P	Sub. 67 225KVA	200A Fused switch, 3P from 350A Bus		200A shared with buildings 321 & 402. 350A Bus shared with Building 116
275	Sand Point Way NE		Boat Offices	4.6 KV	Sub A - 750KVA	Feeder A-1 500A, 3P	Sub. 36 225KVA	100A, 3P from 400A Dist. PNL 36		Fed from 100A CB at Panel 36 from Substation A
38	7400 Sand Point Way NE		Sentry House (Main) - vacant	4.6 KV						
18	6305 NE 74th St	14137	Firehouse - Vacant, serious building damage	4.6 KV	Sub G - 750KVA	Feeder B-1/B-2 125A, 3P	Sub. 18, 75KVA	250A, 3P Dist PNL - (1) 225A, 3P & (2) 100A, 3P	106	Fed from 125A CB at Substation G
403	NE 74th St		Generator Bldg - provide emergency power to IT vault Bldg 138 north	??						Unknown connection, likely 26 KV

Appendix B

Photos

Appendix B
Photos



Building 42 – Switchgear



Building 42 – Switchgear



Building 42 – Main SCL Incoming Feed



Building 42 – Main Transformer 26-4.6KV



Substation A



Substation A

Appendix B
Photos



Substation B



Substation B



Substation C



Substation C



Substation D



Substation D

Appendix B
Photos



Substation F



Substation F



Substation G



Substation G



4.16KV Vault



4.16KV to 480V Transformer

Appendix C
Budgetary Cost Estimates

SAND POINT MAGNUSON PARK
MEDIUM VOLTAGE REPLACEMENT
SCHEMATIC ESTIMATE OF PROBABLE COSTS

22-Jan-13

PHASE 1

Installation of Seattle City Light Primary Switches

Intercept Existing Primary Vault	2 Each	\$7,500.00	Each	\$15,000.00
Switch Pad	2 Each	\$6,000.00	Each	\$12,000.00
Asphalt Sawcut and Repair	250 Feet	\$25.00	Per Foot	\$6,250.00
Misc. Labor & Materials @ 10%				\$4,500.00
Sub-Total				\$55,750.00
Overhead & Profit @ 20%				\$11,150.00
SUB TOTAL				\$66,900.00
Primary Switch (City Light Charge)	2 Each	\$40,000.00	Each	\$80,000.00
Primary Wire (City Light Charge)	900 Feet	\$15.00	Per Foot	\$13,500.00
SUB TOTAL (City Light Charges)				\$93,500.00
TOTAL PHASE 1				\$160,400.00

PHASE 2

Extension of SCL 26KV Primary to NOAA Overpass

Intercept Existing Primary Vault	5 Each	\$7,500.00	Each	\$37,500.00
Pad Mount Transformer Vault	5 Each	\$12,000.00	Each	\$60,000.00
Demo Existing Transformer	5 Each	\$7,500.00	Each	\$37,500.00
Extend and Connect Existing Secondary	5 Each	\$6,000.00	Each	\$30,000.00
Incoming Primary Trenching & Conduit	700 Feet	\$30.00	Per Foot	\$21,000.00
Asphalt Sawcut and Repair	250 Feet	\$25.00	Per Foot	\$6,250.00
Misc. Labor & Materials @ 10%				\$18,600.00
Sub-Total				\$210,850.00
Overhead & Profit @ 20%				\$42,170.00
SUB TOTAL				\$253,020.00
750 KVA Transformer (City Light Charge)	5 Each	\$30,000.00	Each	\$150,000.00
Primary Wire in Existing Conduit (City Light Charge)	1300 Feet	\$15.00	Per Foot	\$19,500.00
SUB TOTAL (City Light Charges)				\$169,500.00
TOTAL PHASE 2				\$422,520.00

PHASE 3

Extension of SCL 26KV Primary North of NOAA Overpass

Intercept Existing Primary Vault	1 Each	\$7,500.00	Each	\$7,500.00
Primary Vault	3 Each	\$20,000.00	Each	\$60,000.00
Pad Mount Transformer Vault	2 Each	\$12,000.00	Each	\$24,000.00
Demo Existing Transformer	2 Each	\$7,500.00	Each	\$15,000.00
Extend and Connect Existing Secondary	2 Each	\$6,000.00	Each	\$12,000.00
Incoming Primary Trenching & Conduit	1200 Feet	\$30.00	Per Foot	\$36,000.00
Asphalt Sawcut and Repair	1000 Feet	\$25.00	Per Foot	\$25,000.00
Misc. Labor & Materials @ 10%				\$15,450.00
Sub-Total				\$194,950.00
Overhead & Profit @ 20%				\$38,990.00
SUB TOTAL				\$233,940.00
750 KVA Transformer (City Light Charge)	2 Each	\$30,000.00	Each	\$60,000.00
Primary Wire (City Light Charge)	1200 Feet	\$15.00	Per Foot	\$18,000.00
SUB TOTAL (City Light Charges)				\$78,000.00
TOTAL PHASE 3				\$251,940.00

PHASE 4

Demolish Existing 4KV System

Demo Existing 4KV Wire	10000 Feet	\$7.50 Per Foot	\$75,000.00
Demo Main Distribution Switchboard	1 Each	\$25,000.00 Each	\$25,000.00
Misc. Labor & Materials @ 10%			\$10,000.00
Sub-Total			\$110,000.00
Overhead & Profit @ 20%			\$22,000.00
SUB TOTAL			\$132,000.00

TOTAL PHASE 4 **\$132,000.00**

TOTAL PHASE 1 **\$160,400.00**

TOTAL PHASE 2 **\$422,520.00**

TOTAL PHASE 3 **\$251,940.00**

TOTAL PHASE 4 **\$132,000.00**

TOTAL **\$966,860.00**

Appendix D
Schematic Electrical Drawings

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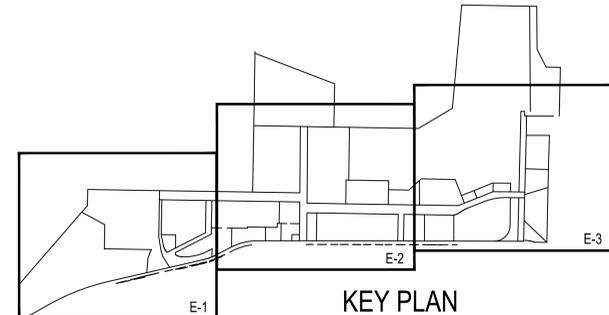
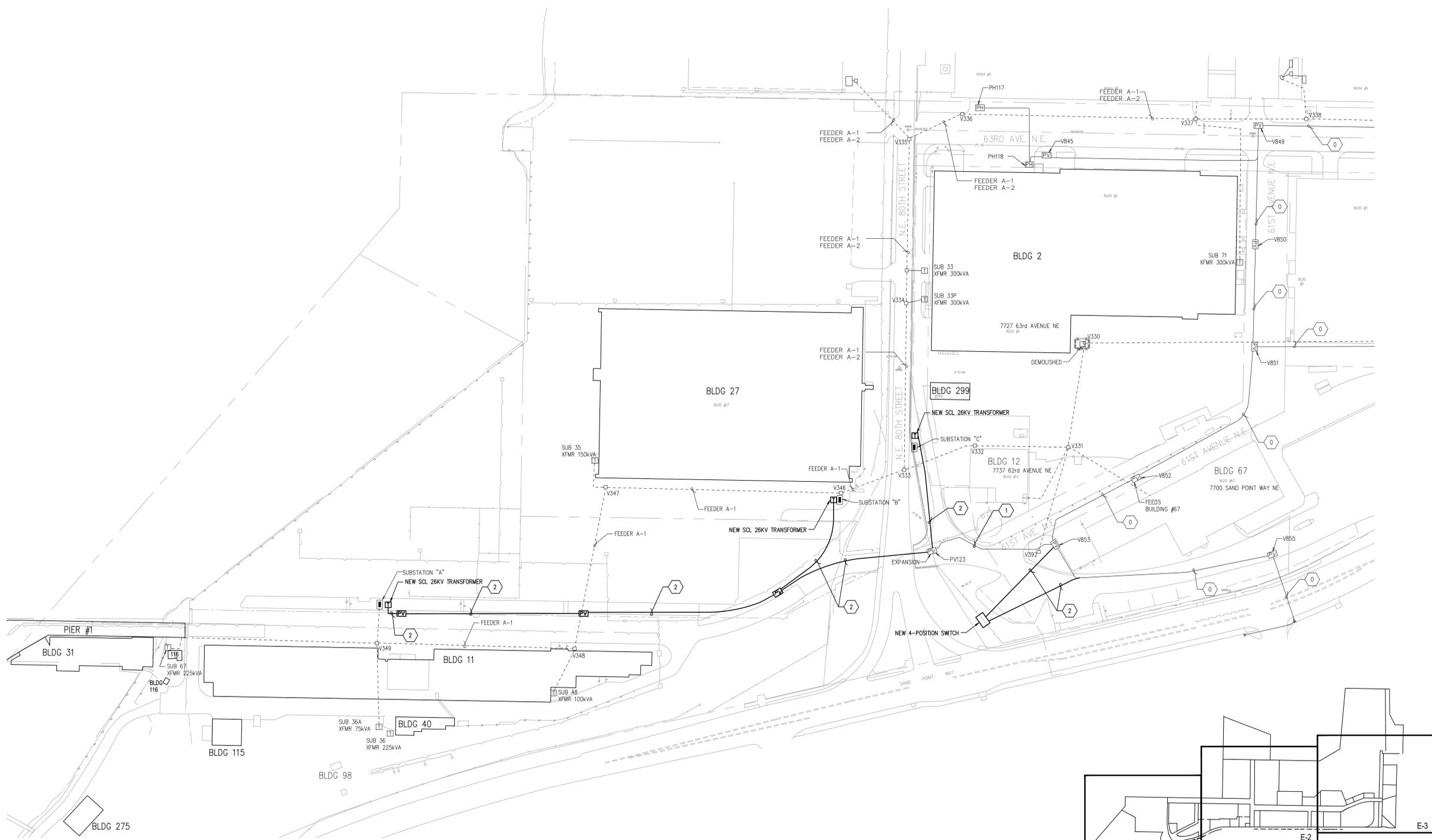
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 DRAWN: RJK
 SUBMITTAL: XXX
 DATE: DATE:

OWNER:
WARREN G. MAGNUSON PARK
 PRIMARY ELECTRICAL DISTRIBUTION
 4KV REPLACEMENT

TITLE:
PRIMARY ELECTRICAL DISTRIBUTION
SITE PLAN
SCHEMATIC

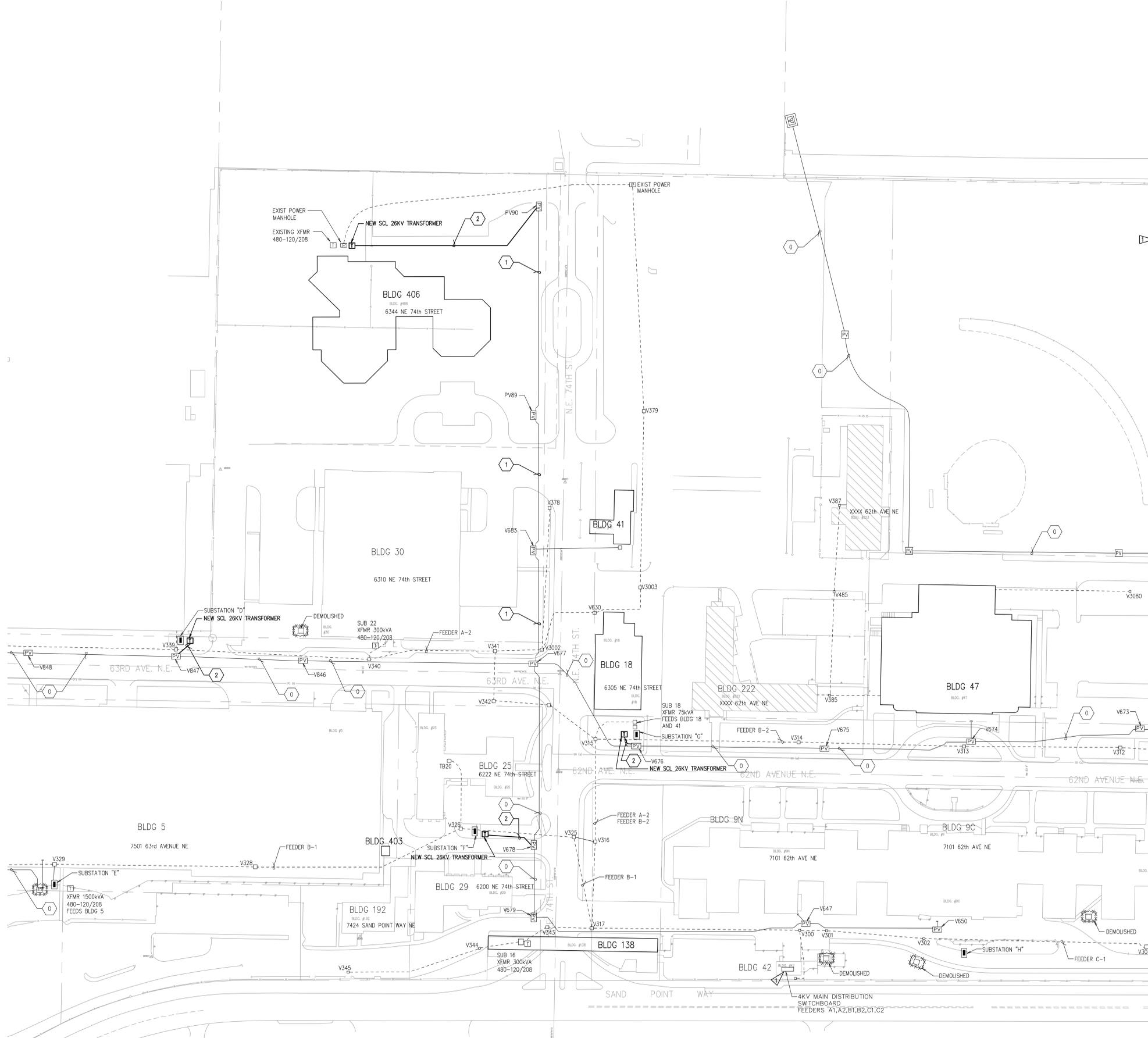
SHEET:
E-1

- LEGEND:**
- EXISTING 4KV ELECTRICAL VAULT
 - [EV] EXISTING 26KV ELECTRICAL VAULT
 - [NV] NEW 26KV ELECTRICAL VAULT
 - EXISTING 4KV CONDUIT
 - EXISTING 26KV DUCT BANK
 - NEW 26KV DUCT BANK
 - SEATTLE CITY LIGHT 26KV FEEDER
 - ① ADD SEATTLE CITY LIGHT 26KV FEEDER TO EXISTING DUCT BANK
 - ② ADD NEW PRIMARY DUCT BANK WITH SEATTLE CITY LIGHT 26KV FEEDER



ELECTRICAL SITE PLAN
 SCALE: AS INDICATED
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 1 inch plotted
 If measurement is other than 1 inch then the plot is reduced.

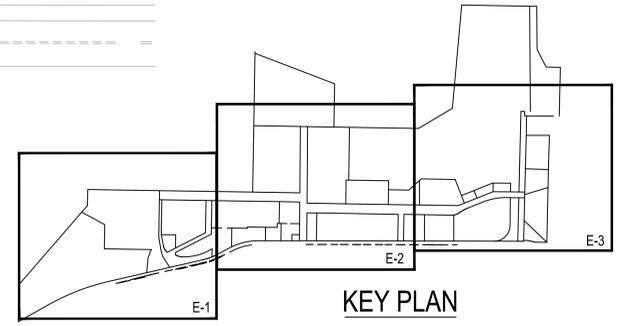
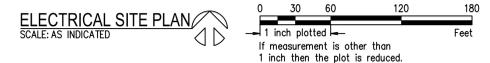
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- LEGEND:**
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 - ▣ EXISTING 26KV ELECTRICAL VAULT
 - ▤ NEW 26KV ELECTRICAL VAULT
 - EXISTING 4KV CONDUIT
 - EXISTING 26KV DUCT BANK
 - NEW 26KV DUCT BANK
 - SEATTLE CITY LIGHT 26KV FEEDER
 - ① ADD SEATTLE CITY LIGHT 26KV FEEDER TO EXISTING DUCT BANK
 - ② ADD NEW PRIMARY DUCT BANK WITH SEATTLE CITY LIGHT 26KV FEEDER

FLAG NOTES:

▽ FEEDERS A1, A2, AND B1 ARE ENERGIZED. FEEDERS B2, C1, AND C2 ARE DE-ENERGIZED AND CIRCUIT BREAKERS ARE REMOVED.



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REVISIONS:

CHECKED: CBF

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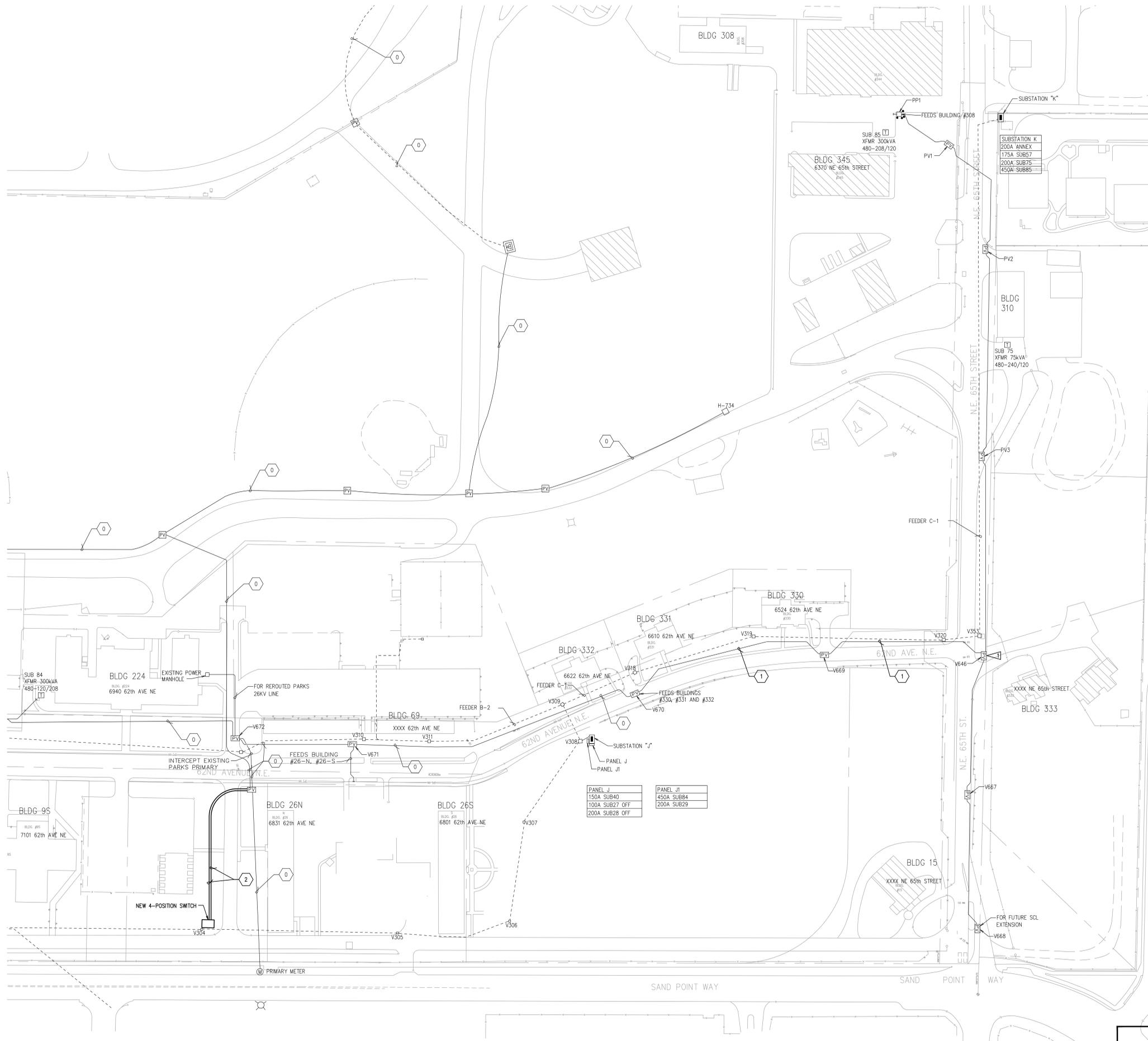
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DATE: DATE

OWNER:
WARREN G. MAGNUSON PARK
PRIMARY ELECTRICAL DISTRIBUTION
4KV REPLACEMENT

TITLE:
PRIMARY ELECTRICAL DISTRIBUTION
SITE PLAN
SCHEMATIC

SHEET:
E-2



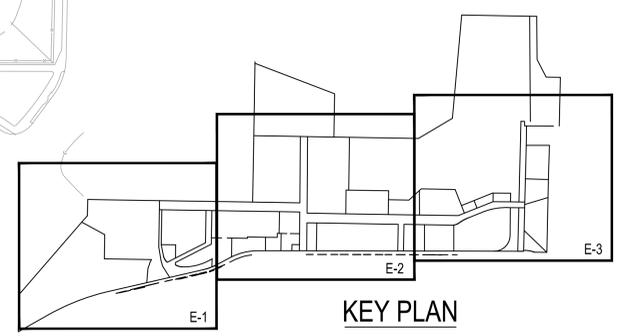
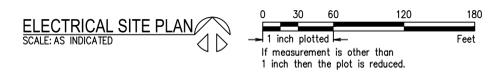
LEGEND:

- EXISTING 4KV ELECTRICAL VAULT
- [V] EXISTING 26KV ELECTRICAL VAULT
- [V] NEW 26KV ELECTRICAL VAULT
- EXISTING 4KV CONDUIT
- EXISTING 26KV DUCT BANK
- NEW 26KV DUCT BANK
- SEATTLE CITY LIGHT 26KV FEEDER
- ADD SEATTLE CITY LIGHT 26KV FEEDER TO EXISTING DUCT BANK
- ADD NEW PRIMARY DUCT BANK WITH SEATTLE CITY LIGHT 26KV FEEDER

FLAG NOTES:

- ▽ LOCATION OF FUTURE CONNECTION OF BUILDING 308 TO MAIN SPMP 26KV SCL PRIMARY DISTRIBUTION SYSTEM.

PANEL J	150A SUB40
PANEL J1	450A SUBB4
	100A SUB27 OFF
	200A SUB28 OFF



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DRAWN: RRB

SUBMITTAL: XXX

DATE: DATE

OWNER:
WARREN G. MAGNUSON PARK
PRIMARY ELECTRICAL DISTRIBUTION
4KV REPLACEMENT

TITLE:
PRIMARY ELECTRICAL DISTRIBUTION
SITE PLAN
SCHEMATIC

SHEET:
E-3