

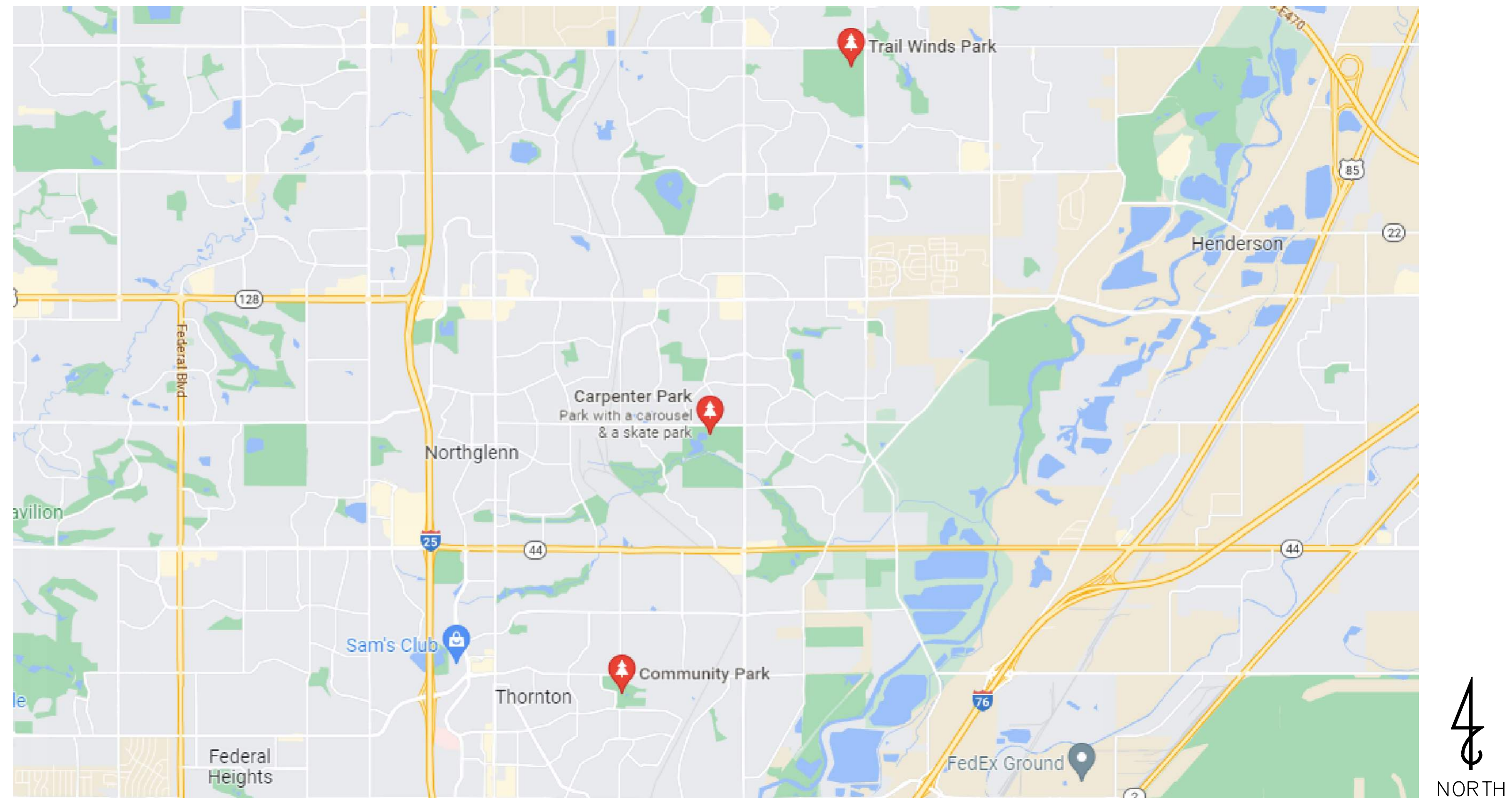
# CITY OF THORNTON SKATE PARKS

## Skate Park Lighting Design

### Project ID #22-217

Construction Documents  
March 2, 2023

**Community Park**  
2211 Eppinger Blvd.  
Thornton, CO 80229



# SITE PLAN GENERAL NOTES

ALL WIRING SHALL BE IN COMPLIANCE WITH THE NEC LATEST EDITION. ALL MULTI-WIRE BRANCH CIRCUITS (120V OR 277V SINGLE PHASE CIRCUITS) IDENTIFIED IN THE PANEL SCHEDULES ORIGINATING FROM SINGLE POLE BREAKER SHALL BE INSTALLED WITH A DEDICATED NEUTRAL CONDUCTOR FOR EACH PHASE CONDUCTOR. THE NEUTRAL CONDUCTOR SHALL HAVE A TRACER STRIPE (THE STRIPE COLOR SHALL MATCH THE COLOR OF THE PHASE CONDUCTOR).

REFER TO THE ELECTRICAL SPECIFICATIONS FOR ADDITIONAL INSTALLATION, CONDUIT DEPTHS, AND SPECIFICATION REQUIREMENTS. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE TO THE MOST CURRENT LOCAL CODES AND THE NEC LATEST EDITION.

ALL UNDERGROUND CONDUIT SHALL BE SCHEDULE 40 PVC WITH PVC COATED GRC ELBOWS AND RISERS TO 4 FEET ABOVE GRADE AND 1 INCH MINIMUM DIAMETER, UNLESS NOTED OTHERWISE.

ALL UNDERGROUND COMMUNICATION, ELECTRICAL FEEDER, AND BRANCH CIRCUITS SHALL BE INSTALLED A MINIMUM OF 30 INCHES BELOW GRADE WITH BURIED ELECTRICAL WARNING TAPE INSTALLED DIRECTLY ABOVE BETWEEN 6 AND 12 INCHES BELOW GRADE. CONTRACTOR SHALL PROVIDE PULL BOXES AS REQUIRED TO MINIMIZE THE NUMBER OF BENDS TO MEET CODE.

ALL SPORT LIGHT POLE LOCATIONS SHALL BE COORDINATED WITH THE SPORTS LIGHTING MANUFACTURER. ALL POLE LIGHTS SHALL BE LOCATED WITHIN 3 FEET OF THE DESIGN LOCATION. ANY VARIATIONS TO THE POLE LOCATIONS, GREATER THAN 3, NEED TO BE BROUGHT TO THE ENGINEER AND SPORTS LIGHTING MANUFACTURER'S ATTENTION PRIOR TO FINAL LIGHTING SHOP DRAWING REVIEW.

UNDERGROUND CONDUIT IS INDICATED BY DASHED LINES, UBE, USE, UPE, OR UC.

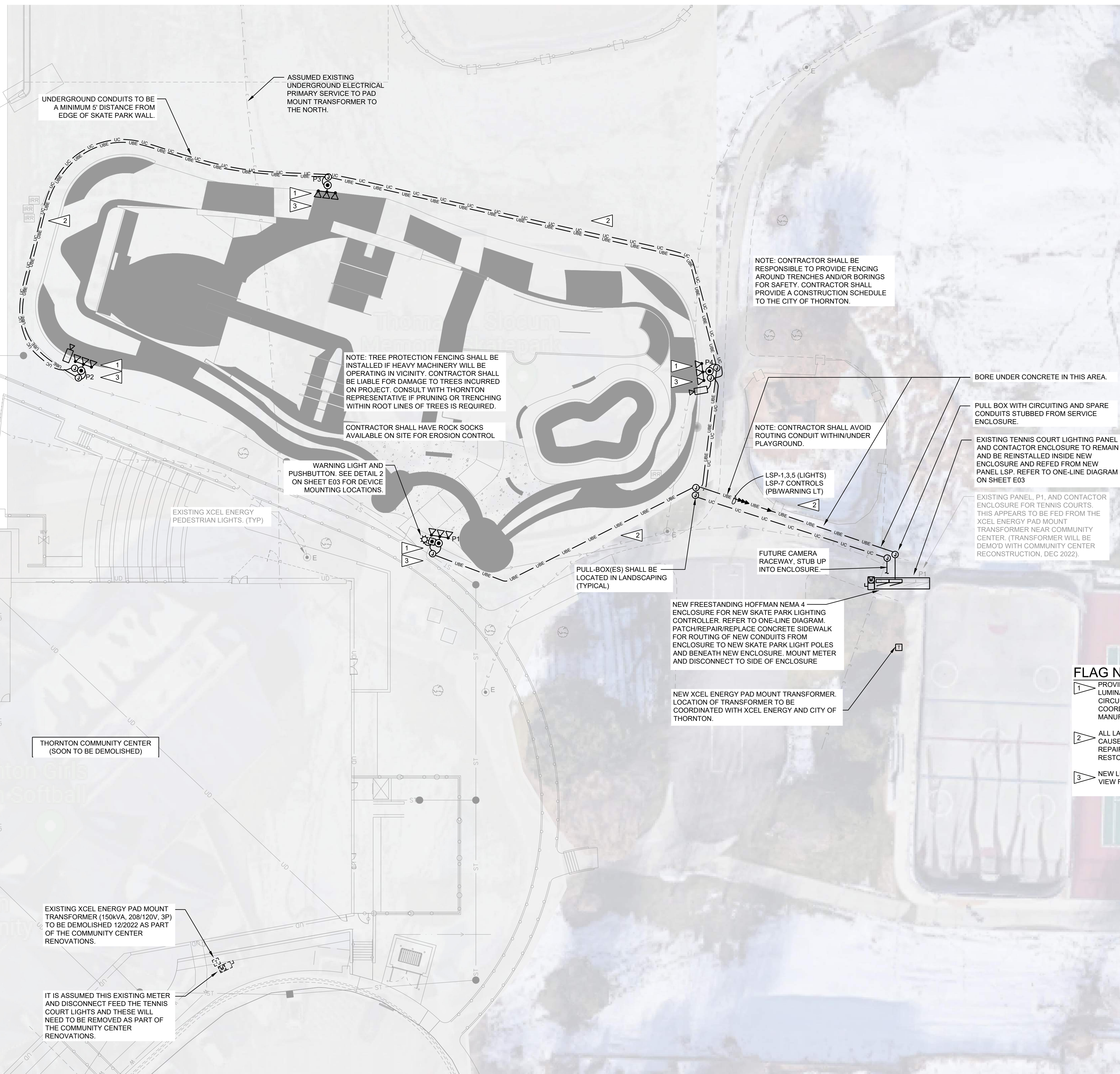
ALL NEW CIRCUITS SHALL HAVE GROUNDING CONDUCTORS IN ALL FEEDERS AND BRANCH CIRCUITS.

CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING EXISTING UNDERGROUND UTILITIES AND CALL FOR UTILITY LOCATES PRIOR TO ANY TRENCHING, BORING, OR DIGGING.

CONTRACTOR SHALL REPAIR AND/OR REPLACE ANY DAMAGED IRRIGATION LINES OR SPRINKLER HEADS AS A RESULT OF TRENCHING OR BORING FOR THE NEW SPORT LIGHTS. REFER TO DIVISION 32 SPECIFICATIONS FOR MORE INFORMATION.

CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING THE GRADE, TURF, OR LANDSCAPING TO MATCH THE ORIGINAL CONDITION PRIOR TO WORK, RESEED OR RESOD AS NECESSARY. REFER TO DIVISION 32 SPECIFICATIONS FOR MORE INFORMATION.

THE SPORTS LIGHTING MANUFACTURER SHALL PROVIDE STAMPED AND SIGNED STRUCTURALLY ENGINEERED POLE BASE SHOP DRAWINGS FOR ALL OF THE POLE BASES REQUIRED. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PROVIDING THE AUTHORITY HAVING JURISDICTION WITH A STAMPED LETTER "GENERAL COMPLIANCE LETTER", VERIFYING THAT ALL NEW LIGHT BASE CAISSONS AND LIGHT ATTACHMENTS TO THE BASES HAVE BEEN INSTALLED IN ACCORDANCE WITH THE STAMPED STRUCTURAL PLANS AND ANY ALL APPLICABLE CODES. THE POLE BASE DETAILS PROVIDED IN THE ELECTRICAL DRAWINGS ARE FOR GENERAL STYLE AND DIMENSIONS ONLY.



### ELECTRICAL LEGEND

	J-BOX
	DUPEX RECEPTACLE
	HEAVY DUTY DISCONNECT SWITCH
	TRANSFORMER
	SURGE SUPPRESSION DEVICE
	METER
	THERMAL OVERLOAD SW
	BRANCH CIRCUIT PANEL
	PARKING LOT POLE LIGHT
	SPORT POLE LUMINAIRE
	FLOOD LUMINAIRE
	SWITCH
	PHOTOCELL
	TIME CLOCK
	PUSH BUTTON STATION
	SECURITY CAMERA
	REVISION NUMBER
	EQUIPMENT TAG
	DRAWING NOTE
	FLAG NOTE
	BREAKLINE
	MATCHLINE
	WIREMOLD
	OVERHEAD PRIMARY ELECTRIC
	OVERHEAD SECONDARY ELECTRIC
	UNDERGROUND PRIMARY ELECTRIC
	UNDERGROUND SECONDARY ELECTRIC
	UNDERGROUND BRANCH ELECTRIC
	OVERHEAD BRANCH ELECTRIC
	UNDERGROUND COMMUNICATION
	BOLD LINEWEIGHT AND/OR "N" INDICATES NEW DEVICE OR EQUIPMENT
	BOLD LINEWEIGHT AND/OR "R" INDICATES DEVICE OR EQUIPMENT TO BE REPLACED
	LIGHT LINEWEIGHT AND/OR "E" INDICATES EXISTING DEVICE TO REMAIN
	DASHED LINETYPE AND/OR "D" INDICATES DEVICE TO BE REMOVED / DEMOLISHED

- ### FLAG NOTES:
- 1 PROVIDE NEW CONCRETE POLE BASE, POLE, AND LUMINAIRES AS SPECIFIED. CONNECT TO NEW LIGHTING CIRCUIT. REFER TO ONE-LINE FOR LIGHTING CONTROLS. COORDINATE EXACT LOCATIONS PER SKATE PARK LIGHTING MANUFACTURE'S LOCATION.
  - 2 ALL LANDSCAPING AND IRRIGATION SYSTEM DAMAGE CAUSED BY SKATE PARK LIGHTING INSTALLATION SHALL BE REPAIRED OR REPLACED BY CONTRACTOR AS REQUIRED TO RESTORE TO PRE-CONSTRUCTION CONDITIONS.
  - 3 NEW LUMINAIRE LIGHT SOURCE SHALL BE SHIELDED FROM VIEW FROM NEIGHBORING PROPERTIES.

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THOMAS J. SLOCUM (COMMUNITY) PARK  
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Key Plan

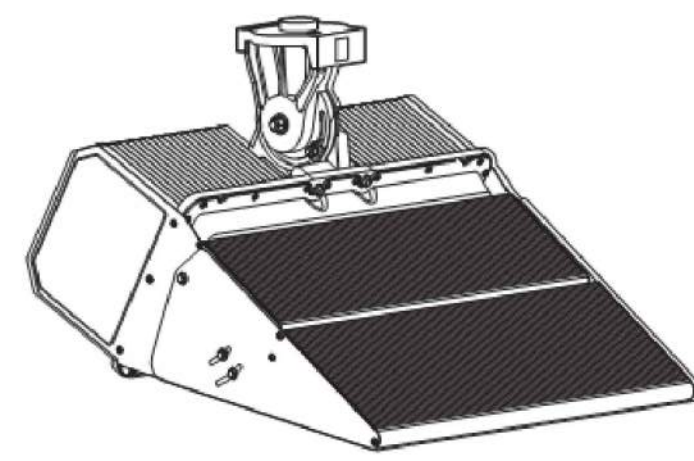
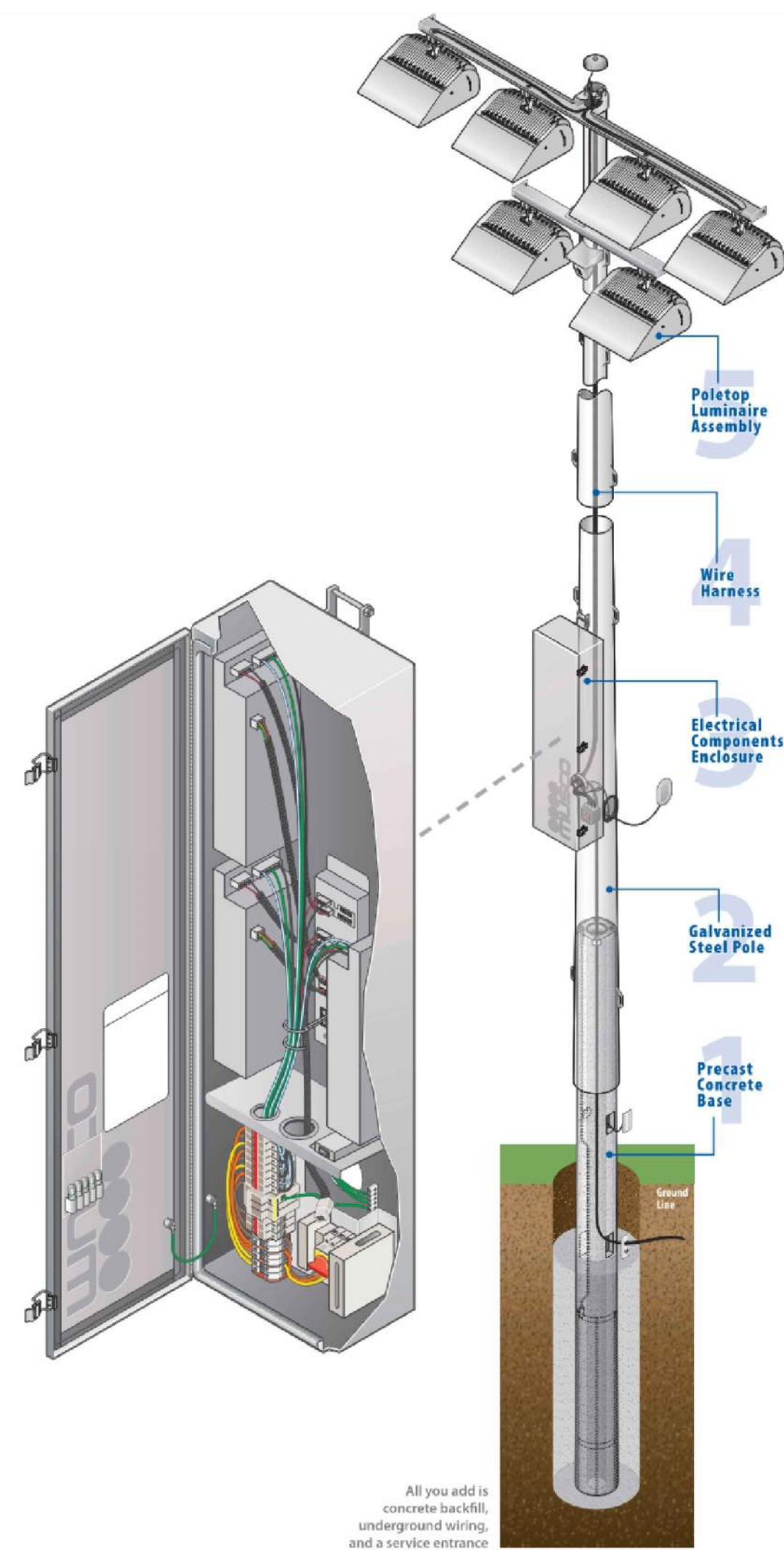
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March 2, 2023

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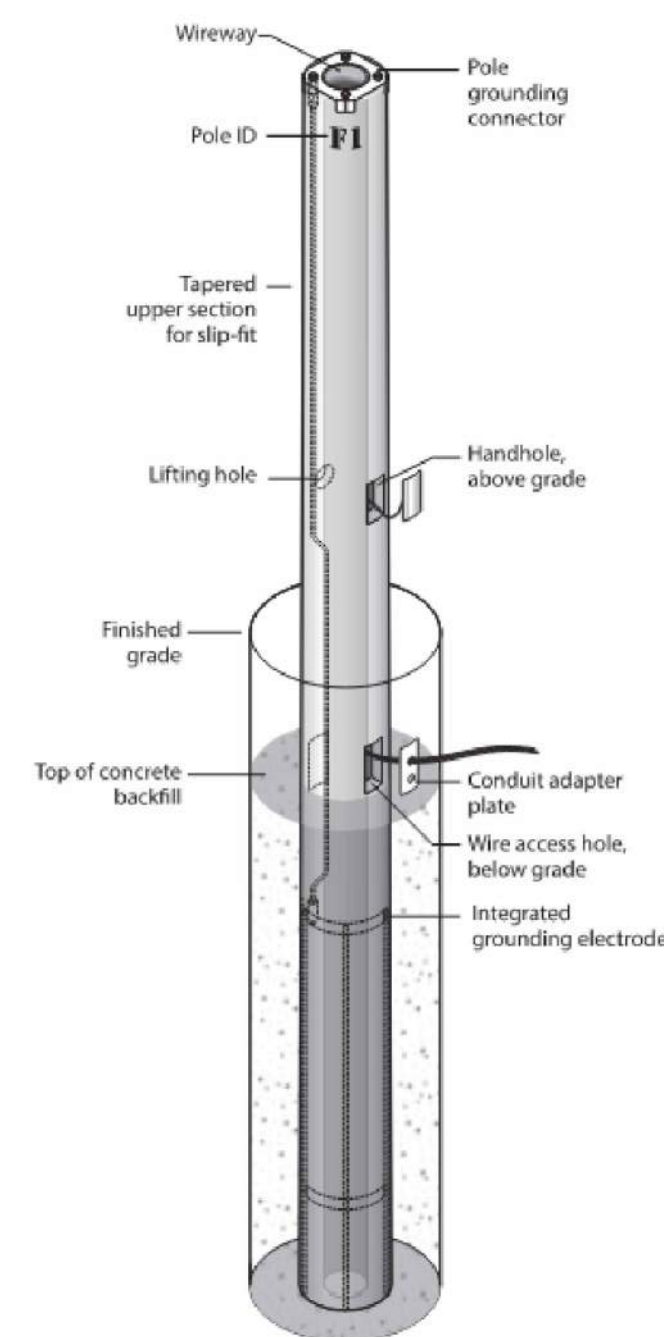




**TYPE P1 - SKATE PARK LUMINAIRE:**  
 POLE MOUNTED LED LUMINAIRES, FULL CUT OFF, LOW GLARE, 5700K, 600W LUMINAIRES. MULTIPLE HEADS PER POLE. MOUNT ON A 50' TALL POLE  
 MUSCO - LIGHT STRUCTURE LED LUMINAIRE  
 50' TALL ROUND, TAPERED, STEEL POLE WITH MULTIPLE LUMINAIRE HEADS. REFER TO SPECIFICATIONS ON LUMINAIRE SCHEDULE.

**TYPE P# SERIES PERFORMANCE REQUIREMENTS:  
 MUSCO LIGHT STRUCTURE SYSTEM OR OWNER APPROVED EQUAL:**

- THE TYPE P# SERIES POLES INDICATE THE LOCATIONS OF LIGHTING CONFIGURATION UTILIZING 50' TALL POLES AND MULTIPLE LED LUMINAIRE HEADS PER POLE.
- SKATING SURFACES SHALL BE LIT TO AN AVERAGE OF 30FC TARGET LIGHT LEVELS, MAX TO MIN UNIFORMITY RATIO OF 3:1, UTILIZING A CALCULATION GRID SPACING OF 10'x10'.
- SPORTS LIGHTING MANUFACTURER SHALL PROVIDE ENGINEERED SITE PHOTOMETRIC PLANS FOR ENGINEER/OWNERS REVIEW COMPLYING TO THE REQUIREMENTS NOTED HEREIN. PHOTOMETRIC GRID SHALL EXTEND FIFTY FEET BEYOND THE PERIMETER OF THE SKATE PARK TO ILLUSTRATE LIGHTING CUT-OFF PERFORMANCE OF SYSTEM.
- ALL LUMINAIRES SHALL UTILIZE SPILL LIGHT AND GLARE CONTROL DEVICES INCLUDING, BUT NOT LIMITED TO, INTERNAL SHIELDS, LOUVERS, AND EXTERNAL SHIELDS. LUMINAIRE LIGHT SOURCE SHALL NOT PRODUCE GLARE TO VIEWERS FROM NEIGHBORING PROPERTIES.
- ASSOCIATED LIGHT POLES WILL BE AROUND THE PERIMETER OF THE SKATE PARK. NO POLES WILL BE ON WITHIN THE SKATE PARK AREA OR SURFACE.
- PROVIDE A CENTRALIZED LIGHTING CONTROL SYSTEM AS WELL AS ONE MANUAL PUSH BUTTON AVAILABLE FOR THE ENTIRE SKATE PARK AREA, WITH A STROBE LIGHT MOUNTED ABOVE TO FLASH PRIOR TO LIGHTS TURNING OFF TO WARN SKATERS.
- SPORTS LIGHTING POLE FOUNDATION DETAIL SHALL BE PROVIDED BY THE SPORTS LIGHTING MANUFACTURER AND BE STRUCTURALLY ENGINEERED, SIGNED AND STAMPED BY A STRUCTURAL ENGINEER.
- ALL SPORTS LIGHT POLES SHALL BE PROVIDED WITH LIGHTNING PROTECTION BY MANUFACTURER.
- REFER TO THE SPECIFICATIONS FOR MORE INFORMATION.

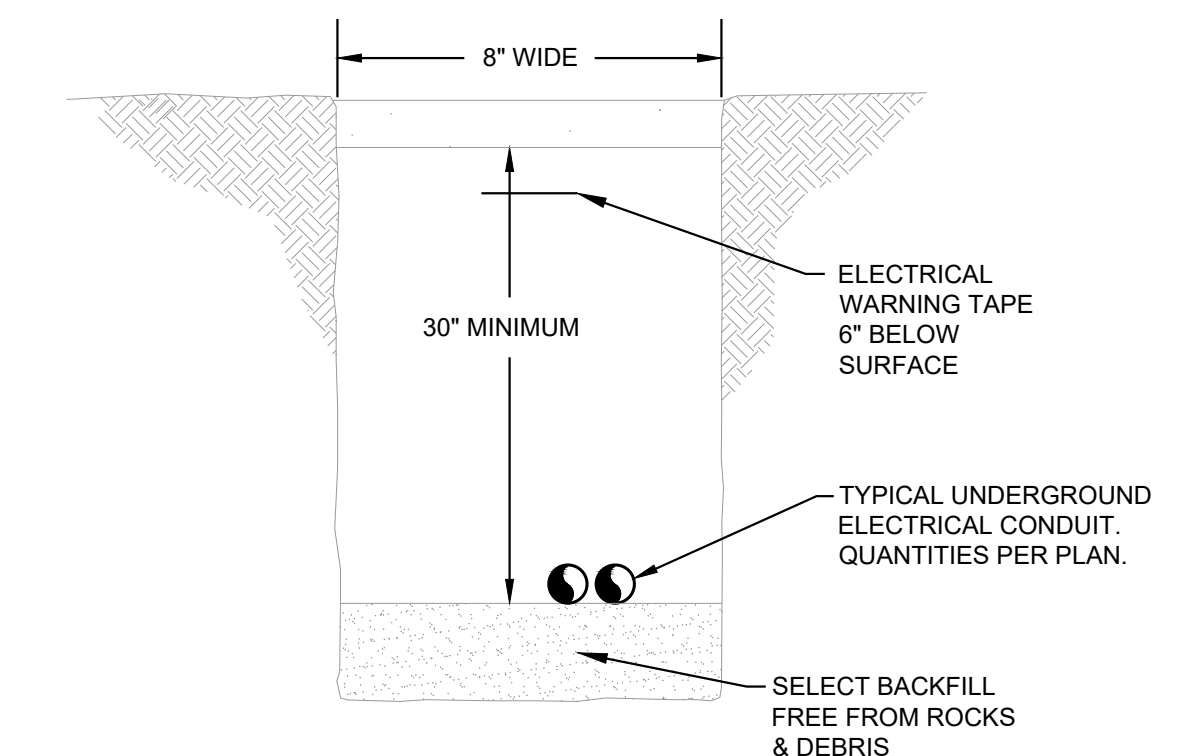
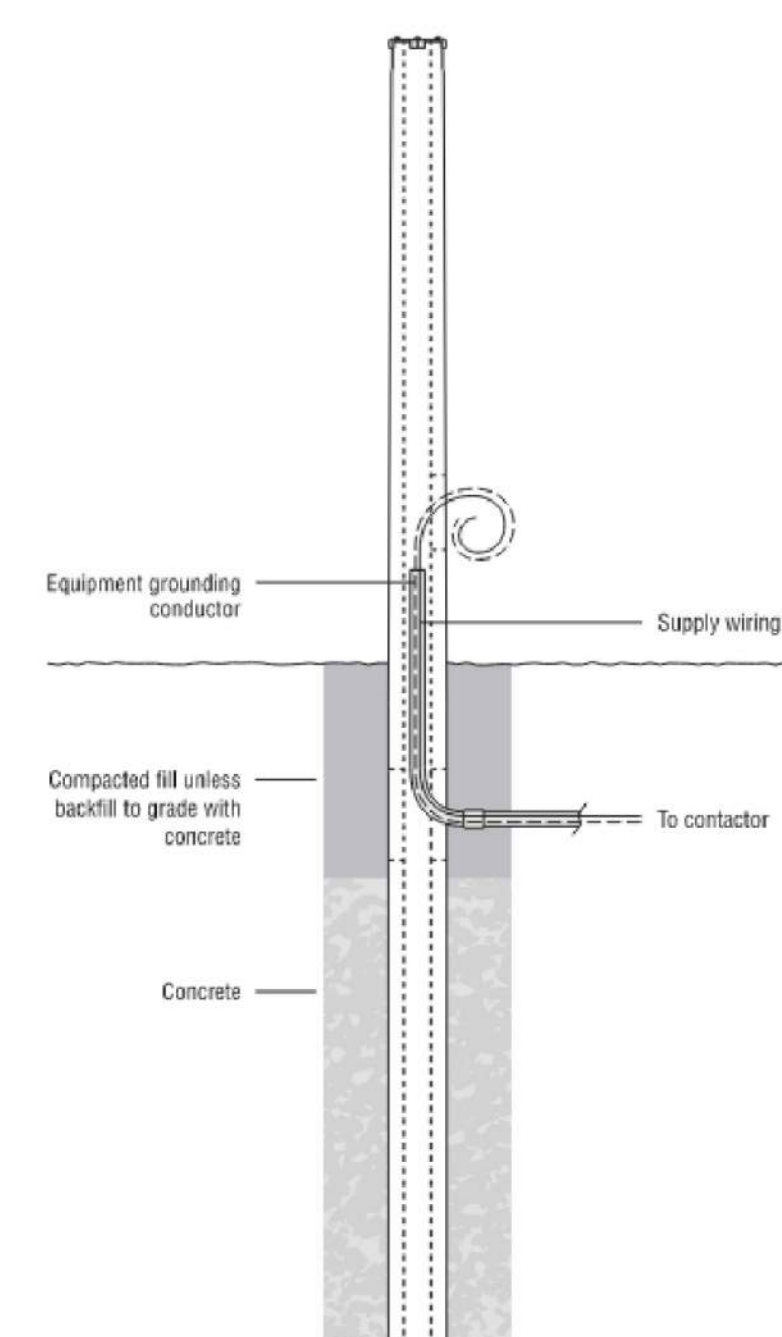


**MUSCO POLE BASE DETAIL**

SCALE: NONE

MUSCO LIGHTING IS THE BASIS OF DESIGN

3  
E02



**TYPICAL FLUSH WITH GRADE PULL BOX DETAIL**

SCALE: NTS

TYPICAL POWER FEEDER PULLBOX (18"x24"x36" DEEP) QUAZITE PG STYLE SERVICE BOX WITH HEAVY DUTY BOLT ON COVER AS MANUFACTURED BY STRONGWELL. STACK MULTIPLE BOXES TO ACHIEVE THE OVERALL INDICATED DEPTH. PULLBOXES SHALL BE INSTALLED IN LANDSCAPING.

2  
E02

Community Skate Park - Luminaire Schedule											
Key	Wattage, LED Color	Delivered Lumens	Driver & Dimming	Description	Finish	Mount	Specification				Notes
							Manufacturer	Catalog Number	Volt	Max Input Wattage	
P1	600W PER HEAD 5700K	65600 PER HEAD		(3) 585W LED LUMINAIRES MOUNTED ON 50' TAPERED GALVANIZED STEEL POLE, DRIVER ENCLOSURE ON BACKSIDE OF POLE. PROVIDE PUSHBUTTON FOR USER CONTROL MOUNTED AT 4' AFG WITH WARNING LIGHT ABOVE MOUNTED AT 10' AFG. PUSHBUTTON & WARNING LIGHT ON FRONT SIDE OF POLE.		50' GALV. TAPERED STEEL POLE	MUSCO OR APPROVED EQUAL	(FIXTURE) TLC-LED-600 (POLE) 50' GALV STEEL PUSHBUTTON @ 4' AFG WARNING LIGHT @ 10' AFG	208	1800	1,3
P2 P4	600W PER HEAD 5700K	65600 PER HEAD		(3) 585W LED LUMINAIRES MOUNTED ON 50' TAPERED GALVANIZED STEEL POLE, DRIVER ENCLOSURE ON BACKSIDE OF POLE. PROVIDE MNTG PROVISIONS FOR CAMERA MOUNTING AT 14' AFG, HANDHOLE AT 13' AFG, BOTH ON FRONT SIDE OF POLE.		50' GALV. TAPERED STEEL POLE	MUSCO OR APPROVED EQUAL	(FIXTURE) TLC-LED-600 (POLE) 50' GALV STEEL CAMERA @ 14' AFG HANDHOLE @ 13' AFG	208	1800	1,2
P3	600W PER HEAD 5700K	65600 PER HEAD		(3) 585W LED LUMINAIRES MOUNTED ON 50' TAPERED GALVANIZED STEEL POLE, DRIVER ENCLOSURE ON BACK SIDE OF POLE.		50' GALV. TAPERED STEEL POLE	MUSCO OR APPROVED EQUAL	(FIXTURE) TLC-LED-600 (POLE) 50' GALV STEEL	208	1800	1

Not all parts and pieces may be identified in the catalog number. It shall be the Contractor's and Supplier/Manufacturer's responsibility to ensure all necessary parts, pieces, and hardware are provided with the luminaire for a complete installation.

**Notes:**

1. Provide (1) conduit into pole for lighting power
2. Provide (1) 1" conduit from flush with grade security pullbox into pole for security camera wiring/cable/fiber
3. Provide power for push button / strobe light.



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**CITY OF THORNTON  
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Key Plan

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NORTH

Issue:  
 100% CD's 03.02.2023

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 LUMINAIRE SCHEDULE

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 March 2, 2023

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Key Plan

Issue:  
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### FEEDER SCHEDULE

ALL WIRE SHALL BE COPPER UNLESS NOTED OTHERWISE

Feeder Key	# of Runs	Wire Size	Ground	Conduit	Notes
20A.2G	1 Set	2#12	+1#12G	3/4"C	1,2,3
20A.3G	1 Set	3#12	+1#12G	3/4"C	1,2
20A.4G	1 Set	4#12	+1#12G	3/4"C	1,2,3
30A.2G	1 Set	2#10	+1#10G	3/4"C	1,2,3
30A.3G	1 Set	3#10	+1#10G	3/4"C	1,2,3
30A.4G	1 Set	4#10	+1#10G	3/4"C	1,2,3
40A.3G	1 Set	3#8	+1#8G	3/4"C	1,2,3
40A.4G	1 Set	4#8	+1#8G	3/4"C	1,2,3
50A.3G	1 Set	3#6	+1#6G	1"C	2,3
50A.4G	1 Set	4#6	+1#6G	1"C	2
60A.3G	1 Set	3#4	+1#6G	1 1/4"C	2
60A.4G	1 Set	4#4	+1#6G	1 1/4"C	2
70A.3G	1 Set	3#4	+1#6G	1 1/4"C	2
70A.4G	1 Set	4#4	+1#6G	1 1/4"C	2
80A.3G	1 Set	3#3	+1#6G	1 1/4"C	2
80A.4G	1 Set	4#3	+1#6G	1 1/4"C	2
100A.3G	1 Set	3#1	+1#6G	1 1/2"C	2
100A.4G	1 Set	4#1	+1#6G	1 1/2"C	2
100A.4SG	1 Set	4#1	+1#6G	1 1/2"C	2
125A.3G	1 Set	3#1	+1#6G	1 1/2"C	2
125A.4G	1 Set	4#1	+1#6G	1 1/2"C	2
125A.4SG	1 Set	4#1	+1#6G	1 1/2"C	2
150A.3G	1 Set	3#1/0	+1#6G	2"C	
150A.4G	1 Set	4#1/0	+1#6G	2"C	
150A.4SG	1 Set	4#1/0	+1#6G	2"C	
175A.3G	1 Set	3#2/0	+1#6G	2"C	
175A.4G	1 Set	4#2/0	+1#6G	2"C	
175A.4SG	1 Set	4#2/0	+1#4G	2"C	
200A.3G	1 Set	3#3/0	+1#6G	2 1/2"C	
200A.4G	1 Set	4#3/0	+1#6G	2 1/2"C	
200A.4SG	1 Set	4#3/0	+1#4G	2 1/2"C	

- NOTES:
- 1 Min 1" Conduit for all underground installations
  - 2 Min 2" Sch 80 Conduit for all under roadway installations
  - 3 Refer to one-line for skate park lighting conduit size

Name: LSP (New)      Mt:      Method:      Surface  
 Volt: 208/120      Bus Rating: 225  
 Ph: 3      Main Breaker: 150  
 Wire: 4      AIC Rating: 22,000

Code	Description	Load VA	Bkr	P	Ph	Ph	Ph	P	Bkr	Load VA	Description	Code		
1	Skate Park-Lights	6996	30	3	*	*	*	*	3	100	26000	Tennis Court Panel P1	7	2
3		/	/	/	/	/	/	/	/	/	/			4
5		/	/	/	/	/	/	/	/	/	/			6
7	Skate Park Warm Light	200	20	1	*	*	*	*	1	20		Spare		8
9	Future Six Prk-Cameras		20	1	*	*	*	*	1	20		Spare		10
11	Receipt at Service Pad	180	20	1	*	*	*	*	1	20		Spare		12

Shading indicates existing circuit / breaker - No Change >>>> Unshaded indicates new circuit / breaker

Code	Description	Load VA	Dem	Per	Phase	Load Summary
1	Lighting	6996	125%			
2	Rec up to 10,000	180	100%	Ph A	11199	VA
3	Rec over 10,000		50%	Ph B	10999	VA
4	Motor		100%	Ph C	11179	VA
5	Largest Motor		125%			
6	Heater		100%	Connected		33376 VA
7	Kitchen		100%	Code Demand		35125 VA
8	Miscellaneous	200	100%			
9	Sub Panel	26000	100%	Code Demand		97.61 Amps

Name: P1 (Existing)      Mt:      Method:      Surface  
 Volt: 208/120      Bus Rating: 100  
 Ph: 3      Main Breaker: 100  
 Wire: 4      AIC Rating: Assume 10,000

Code	Description	Load VA	Bkr	P	Ph	Ph	Ph	P	Bkr	Load VA	Description	Code		
1	Court Lights	4500	40	3	*	*	*	*	3	40	4500	Court Lights	1	2
3		/	/	/	/	/	/	/	/	/	/			4
5		/	/	/	/	/	/	/	/	/	/			6
7	Court Lights	4500	40	3	*	*	*	*	3	40	4500	Court Lights	1	8
9		/	/	/	/	/	/	/	/	/	/			10
11		/	/	/	/	/	/	/	/	/	/			12
13	Space Only	-	-	-	-	-	-	-	1	20	1000	Existing Load	6	14
15	Space Only	-	-	-	-	-	-	-	1	30	2500	Existing Load	6	16
17	Space Only	-	-	-	-	-	-	-	-	-	-	Space Only		18

Shading indicates existing circuit / breaker - No Change >>>> Unshaded indicates new circuit / breaker

Code	Description	Load VA	Dem	Per	Phase	Load Summary
1	Lighting	18000	125%			
2	Rec up to 10,000		100%	Ph A	7000	VA
3	Rec over 10,000		50%	Ph B	8500	VA
4	Motor		100%	Ph C	6000	VA
5	Largest Motor		125%			
6	Heater		100%	Connected		21500 VA
7	Kitchen		100%	Code Demand		26000 VA
8	Miscellaneous	3500	100%			
9	Sub Panel		100%	Code Demand		72.25 Amps

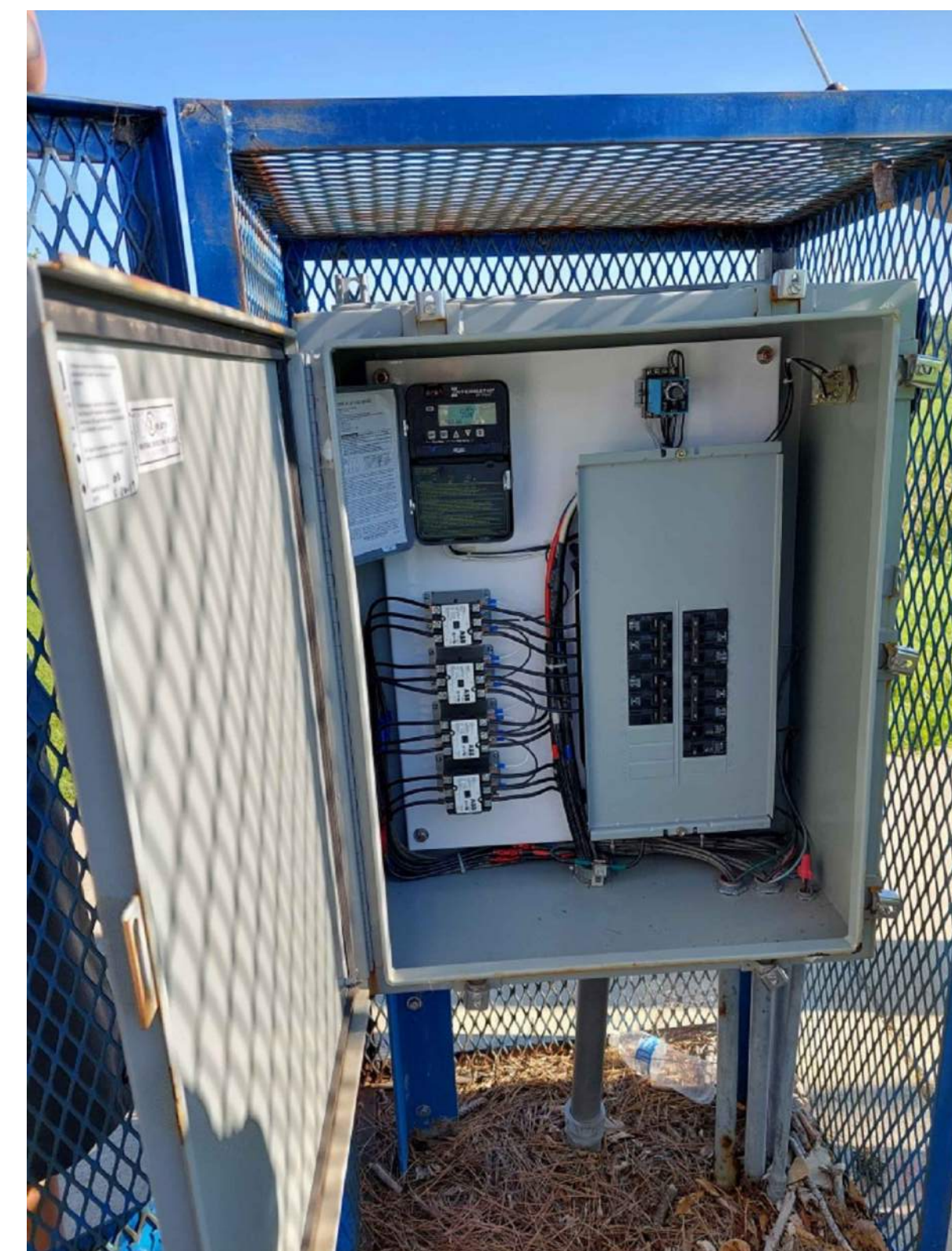
Community Skate Park - Short Circuit Summary  
 Point-to-Point \* Feeder Summary

Description	Phase	Length	Isc Avail	# Runs	C	V(L-L)	Isc @ Device
New Xcel 75kVA Trans							13000
New Panel LSP	3	50	13000	1	9317	208	8227
Existing panel P1	3	25	8227	1	7493	208	6698

### VOLTAGE DROP REPORT

Project Title: City of Thornton Skate Park Lighting - Community Park  
 Project #: 220074

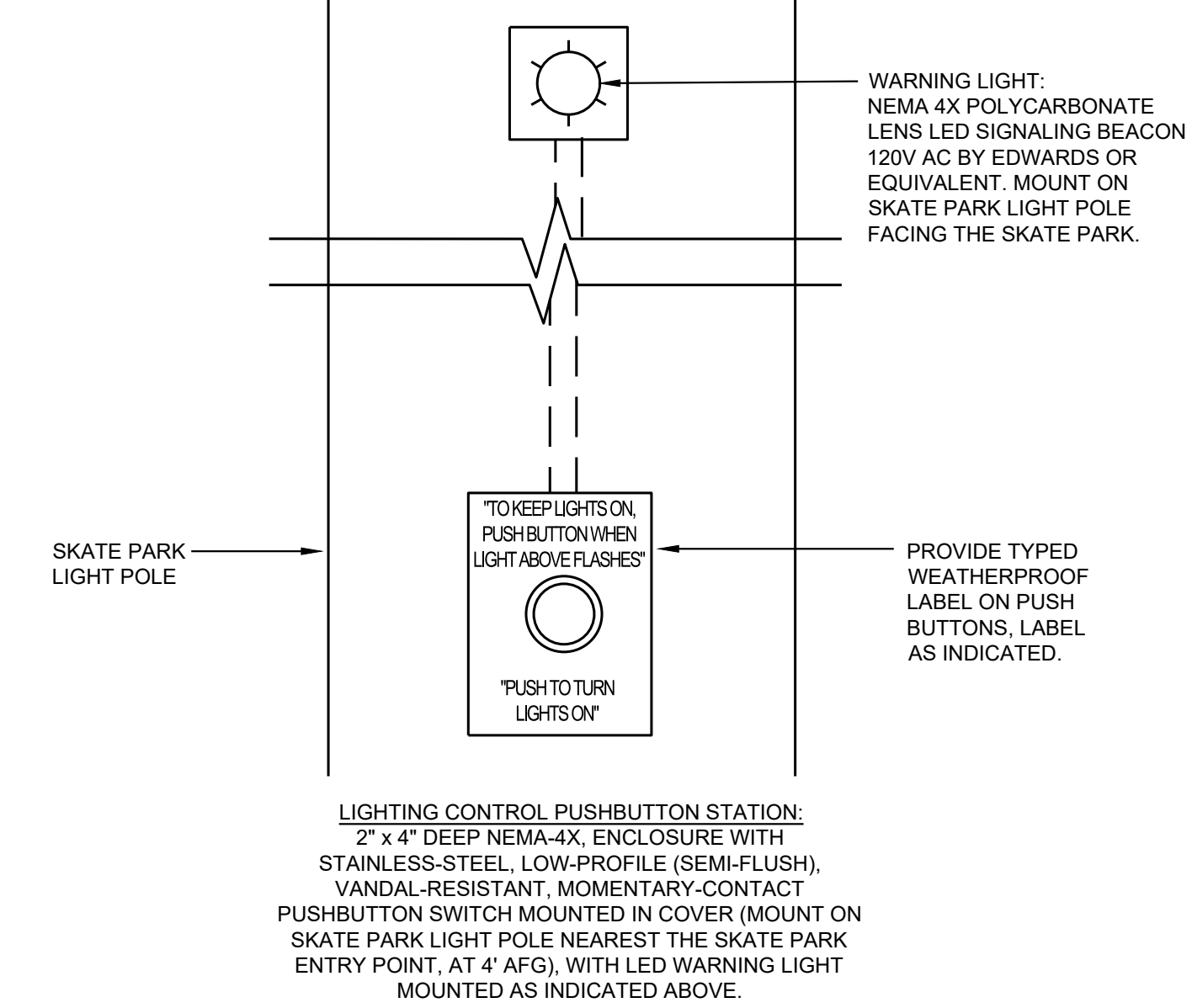
Description	Wire Size	# Ph	Circuit Length Feet	1=CU 2=AL	Volts Ph	Load VA	Load Amps	Volt Drop	Result % Drop	
Feeder to Pole P4	8	1	150	1	208	3	5220	14.5	2.5	1.21
Feeder to Pole P1	8	1	225	1	208	3	1740	4.8	1.3	0.60
Feeder to Pole P3	8	1	200	1	208	3	3480	9.7	2.2	1.07
Feeder to Pole P2	8	1	225	1	208	3	1740	4.8	1.3	0.60
Warning Light Pole P1	12	1	330	1	120	1	200	1.7	1.9	1.54



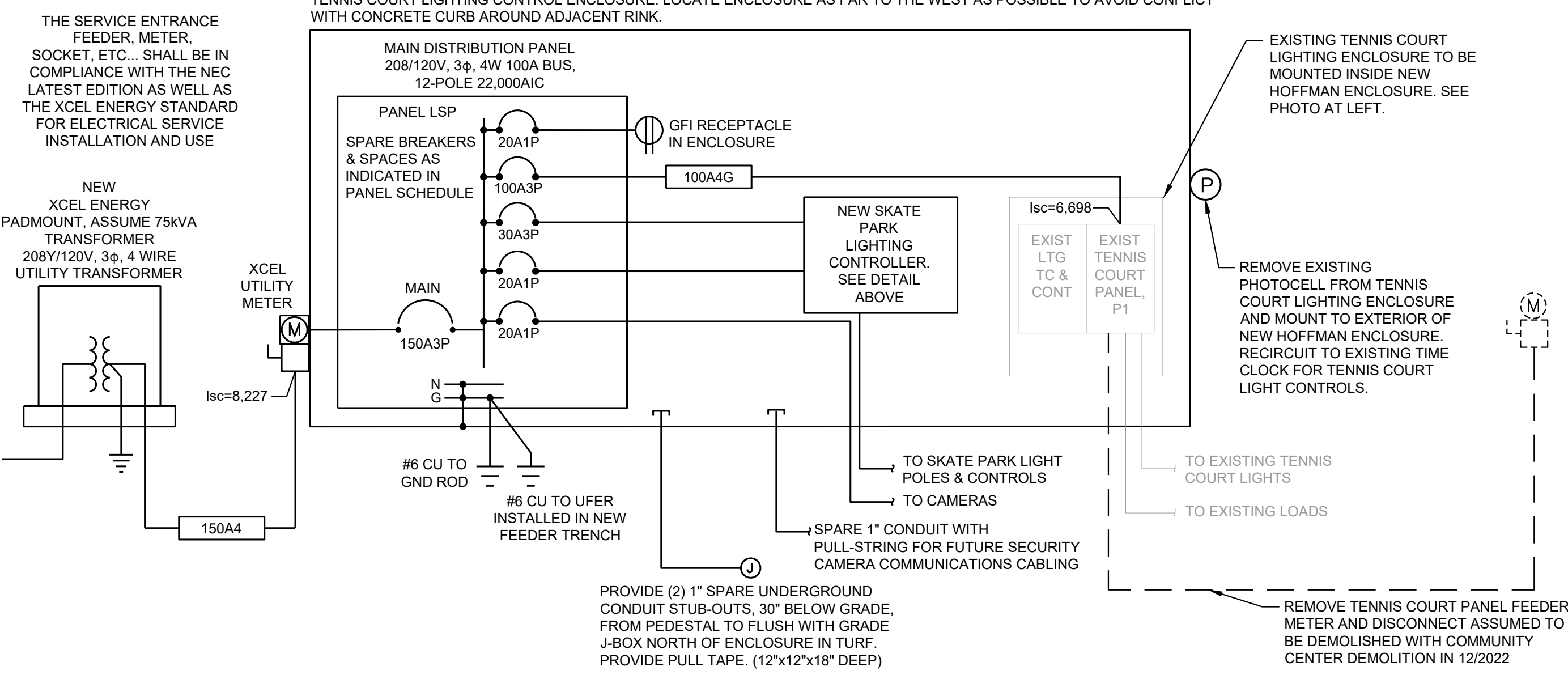
EXISTING TENNIS COURT LIGHTING ENCLOSURE:  
 REMOVE EXISTING BLUE CAGE AROUND EXISTING ENCLOSURE. PRESERVE AND PROTECT EXISTING NEMA 4 ENCLOSURE AND ASSOCIATED CONDUITS. MOUNT NEW HOFFMAN ENCLOSURE AROUND THIS EXISTING TENNIS ENCLOSURE.

LIGHTING CONTROL SEQUENCE (SKATE PARK LIGHTING PROGRAMMED BY MUSCO):  
 THE MUSCO CONTROLLER SHALL PROVIDE CONTROL FOR THE SKATE PARK LIGHTS. SYSTEM SHALL BE PROGRAMMED TO ENABLE THE LIGHTS TO OPERATE FROM DUSK TO 10:00PM (OR OTHER TIME DETERMINED BY THE CITY OF THORNTON) AND FROM 5:00AM (OR OTHER TIME DETERMINED BY THE CITY OF THORNTON) UNTIL SUNRISE. THE LIGHTS SHALL BE TURNED ON BY ACTIVATION OF THE LOCAL PUSH BUTTON OR A PREDETERMINED SPECIAL EVENT SCHEDULE BY CITY OF THORNTON.

ACTIVATION OF THE LOCAL PUSHBUTTON WILL TURN LIGHTS ON FOR 60 MINUTES. THE WARNING LIGHT SHALL ILLUMINATE 5 MINUTES BEFORE THE 60 MINUTE TIMER AUTOMATICALLY TURNS LIGHTS OFF. ACTIVATING THE LOCAL PUSHBUTTON, BEFORE OR AFTER 60 MINUTE TIMER AUTOMATICALLY TURNS LIGHTS OFF, WILL RESET THE TIMER RELAY FOR ANOTHER 60 MINUTES. THE WARNING LIGHT SHALL TURN OFF WITH THE SKATE PARK LIGHTING. THE LOCAL PUSH BUTTONS RESET SIGNAL SHALL BE DISABLED DURING THE NON-ENABLED TIME OF DAY.



LIGHTING CONTROL PUSHBUTTON  
 SCALE: NONE  
 2  
 E03



ELECTRICAL ONE-LINE DIAGRAM  
 SCALE: N/A  
 1  
 E03