

CITY OF DULUTH ENERGY EFFICIENCY LIGHTING PROJECT - BID PACKAGE #1

DULUTH, MN

ELECTRICAL GENERAL NOTES:

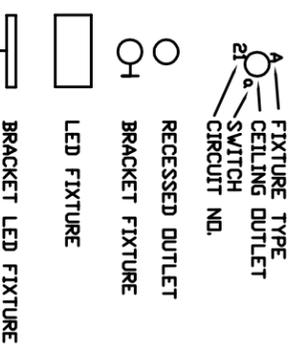
- PROVIDE CABLE OR CONDUIT AND WIRE AS REQUIRED TO ACHIEVE CIRCUITING SHOWN. SITE CONDUCTORS PER NEC AMPACITY AND WIRE FILL CRITERIA. PROVIDE DEDICATED NEUTRAL AND GROUND CONDUCTORS FOR ALL CIRCUITING CU (UNO). INCREASE BRANCH CIRCUIT CONDUCTORS INCLUDING EQUIPMENT GROUNDING CONDUCTORS PROPORTIONALLY FOR NO MORE THAN 3% VOLTAGE DROP PER NEC 210.
- PROVIDE CUTTING, PATCHING AND RESTORATION OF FINISHES NECESSARY FOR THIS WORK. SURFACES DAMAGED BY THIS WORK AND SPACES AROUND CONDUITS PASSING THROUGH FLOORS AND WALLS SHALL BE NEATLY PATCHED AND FINISHED TO MATCH EXISTING. STRUCTURAL MEMBERS SHALL NOT BE CUT OR PENETRATED IN ANY MANNER. THE SPACES AROUND THE CONDUITS SHALL BE SEALED TO PREVENT ENTRANCE OF MOISTURE. PROVIDE FIRE STOPPING PER UL APPROVED METHODS.
- PROVIDE TEMPORARY LIGHTING AS REQUIRED TO FACILITATE LIGHT FIXTURE REPLACEMENT.
- PROVIDE POWER WIRING AND CONNECT TO EACH ITEM OF EQUIPMENT FURNISHED BY OWNER AND OTHER TRADES AS SHOWN ON THE DRAWINGS. VERIFY ROUGH-IN REQUIREMENTS FOR EACH ITEM. FINISH AND INSTALL MINOR ITEMS WHICH ARE OBVIOUSLY AND REASONABLY NECESSARY FOR COMPLETION.
- LEAVE THE SITE CLEAN AND READY FOR OCCUPANCY. REMOVE DIRT, DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT AND WIRE SCRAPS AND MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THIS DIVISION OF THE WORK DURING CONSTRUCTION. COMPONENTS SHALL BE FREE OF DUST, GRIT AND FOREIGN MATERIALS AND LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK.
- PROVIDE NECESSARY DEMOLITION TO FACILITATE NEW CONSTRUCTION WORK ASSOCIATED WITH THIS PROJECT. COORDINATE ALL OUTAGES WITH OWNER MINIMUM 72 HOURS IN ADVANCE. OWNER RETAINS RIGHT TO FIRST SALVAGE. PROVIDE DISPOSAL OF ALL REMOVED MATERIAL. MAINTAIN CIRCUIT CONTINUITY AS REQUIRED.
- OWNER RETAINS FIRST RIGHT TO SALVAGE LIGHT FIXTURES, CONTROLS, AND/OR OTHER EQUIPMENT/DEVICES.
- IT IS THE INTENT OF THESE DIAGRAMATIC DESIGN BUILD/ASSIST DRAWINGS TO PROVIDE THE PROJECT SCOPE INCLUDING BUT NOT LIMITED TO PHASED DEMOLITION AND NEW CONSTRUCTION. EXISTING INFORMATION INDICATED ON THESE PLANS IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY ALL INFORMATION AND CONDITIONS PRIOR TO BID SUBMISSION. NO EXTRA WILL BE ALLOWED DUE TO THE LACK OF KNOWLEDGE OF EXISTING CONDITIONS.
- PROVIDE COMPLETE O&M MANUAL INCLUDING APPROVED SUBMITTAL DRAWINGS, WARRANTY INFORMATION FOR ALL PRODUCT SUPPLIED, AND MANUFACTURES OPERATION AND MAINTENANCE INSTRUCTIONS.
- PROVIDE ELECTRONIC MANUFACTURES SUBMITTAL DRAWINGS FOR APPROVAL PRIOR TO RELEASE. ASSOCIATED WITH THE FOLLOWING: POWER DISTRIBUTION EQUIPMENT; LIGHTING FIXTURES; VOICE AND DATA SYSTEM EQUIPMENT.
- ELECTRICAL WORK SHALL BE PERFORMED UNDER THE SUPERVISION OF A LICENSED MASTER ELECTRICIAN. PROCURE PERMITS AND LICENSES AND PAY FEES ASSOCIATED WITH THIS WORK.
- REMOVE ALL ELECTRICAL RELATED EQUIPMENT (IE, JUNCTION BOXES, RECEPTACLES, SWITCHES DEVICES, ETC.) AFFECTED/ABANDONED AS A RESULT OF DEMOLITION AND NEW CONSTRUCTION.
- MATERIALS FURNISHED FOR THIS PROJECT SHALL BE NEW, COMMERCIAL GRADE, FREE OF DEFECTS, AND LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY UNO.
- PERFORM WORK TO COMPLY WITH THE STANDARD PRACTICES FOR GOOD WORKMANSHIP PUBLISHED BY NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA) COMPL WITH THE LATEST ENFORCED EDITION OF THE NATIONAL ELECTRICAL CODE (NEC), LOCAL CODES, AMENDMENTS, AND ORDINANCES.
- COORDINATE WORK IN PHASES WITH GENERAL CONTRACTOR(S) AND OWNER TO FACILITATE DEMOLITION AND NEW CONSTRUCTION.
- REMOVE ALL ABANDONED WIRING AT CONTRACTORS OPTION UTILIZE EXISTING ABANDONED RACEWAY TO EXTENT AVAILABLE. ALL ABANDONED EXPOSED RACEWAY SHALL BE REMOVED.
- PROVIDE ALL DEVICES AND EQUIPMENT ASSOCIATED WITH THE ECHELON LUMINAWE LIGHTING CONTROL SYSTEM AT EACH SITE FOR A COMPLETE AND OPERATIONAL SYSTEM. COORDINATE EXACT LIGHTING CONTROL PROGRAMMING WITH THE CITY OF DULUTH.
- REFER TO PROJECT MANUAL FOR SITE SPECIFIC LIGHT FIXTURE SCHEDULE.
- COORDINATE FINAL LIGHTING CONTROL DEVICE/EQUIPMENT LAY-OUT WITH ECHELON SHOP DRAWINGS.

LIGHT FIXTURE

IDENTIFICATION ID SYSTEM

- TV-S1A1
① ② ③ ④ ⑤
- ① SITE LOCATION:
TV = TECH VILLAGE PARKING RAMP
MP = EAST FIRST STREET MEDICAL PARKING RAMP
SM = 5TH AVENUE WEST & MICHIGAN STREET PARKING RAMP
LP = LAKE PLACE PARK
- ② MOUNTING:
P = POLE MOUNTED
S = SURFACE MOUNTED
- ③ POLE/LOCATION NUMBER:
1 = POLE/LOCATION #1
2 = POLE/LOCATION #2
3 = POLE/LOCATION #3
ETC.
- ④ LIGHT FIXTURE:
A = LIGHT FIXTURE A
B = LIGHT FIXTURE B
C = LIGHT FIXTURE C
ETC.
- ⑤ PARKING RAMP LEVEL
G = GROUND LEVEL
1 = LEVEL 1
2 = LEVEL 2
3 = LEVEL 3
4 = LEVEL 4
ETC.

LIGHTING



PROJECT TEAM

PROJECT OWNER/MANAGER

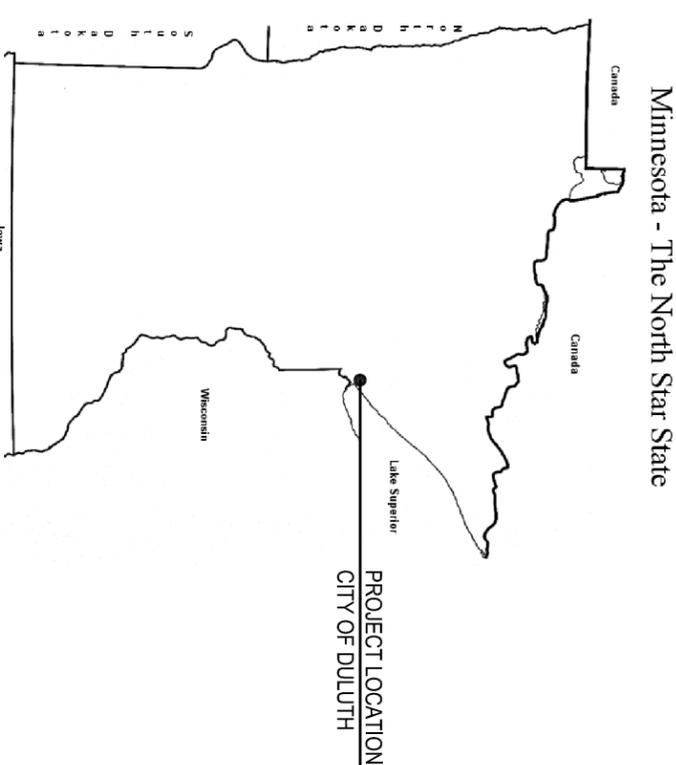
CONTACT: ALEX JACKSON
CITY OF DULUTH
1532 WEST MICHIGAN STREET
DULUTH, MN 55802
PH: 218-730-4433
E-MAIL: AJACKSON@DULUTHMN.GOV

ELECTRICAL ENGINEER

CONTACT: LYSSA HATTENBERGER
GAUSMAN & MOORE
501 SOUTH LAKE AVENUE, SUITE 310
DULUTH, MN 55802
PH: 218-302-6566
FAX: 218-722-9306
E-MAIL: LHATTENBERGER@GAUSMAN.COM

SHEET INDEX

SHEET NO.	DESCRIPTION
E000	TITLE SHEET
E100	EAST FIRST STREET MEDICAL PARKING RAMP GROUND LEVEL LIGHTING PLAN
E101	EAST FIRST STREET MEDICAL PARKING RAMP 1ST LEVEL LIGHTING PLAN
E102	EAST FIRST STREET MEDICAL PARKING RAMP 2ND LEVEL LIGHTING PLAN
E103	EAST FIRST STREET MEDICAL PARKING RAMP 3RD LEVEL LIGHTING PLAN
E104	EAST FIRST STREET MEDICAL PARKING RAMP 4TH LEVEL LIGHTING PLAN
E105	TECH VILLAGE PARKING RAMP ALLEY LEVEL LIGHTING PLAN
E106	TECH VILLAGE PARKING RAMP LEVEL 1 LIGHTING PLAN
E107	TECH VILLAGE PARKING RAMP LEVEL 2 LIGHTING PLAN
E108	TECH VILLAGE PARKING RAMP LEVEL 3 LIGHTING PLAN
E109	TECH VILLAGE PARKING RAMP LEVEL 4 LIGHTING PLAN
E110	TECH VILLAGE PARKING RAMP LEVEL 5 LIGHTING PLAN
E111	5TH AVENUE & MICHIGAN STREET PARKING RAMP LIGHTING PLAN
E112	LAKE PLACE PARK LIGHTING PLAN



Date: 07/22/16
Drawn: LAH
Checked: SLH
Proj No: 84493

E000

Gausman & Moore
Mechanical and Electrical Engineers



TITLE SHEET

City of Duluth Energy Efficiency Lighting Project - Bid Package #1

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Dave T. Blume

Date 07/22/2016 Reg No 24671

LIGHTING CONTROL MATRIX

SYSTEM INPUTS		SYSTEM OUTPUTS	
ZONE 1-MP (Z1)	●	CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR	●
ZONE 2-MP (Z2)	●	CONTROLLED BY LOCAL PHOTOCELL DEVICE	●
	●	CONTROLLED BY A SET TIME ON/OFF	●
	●	CONTROLLED BY WIRELESS INTEGRAL COMBINATION OCCUPANCY SENSOR	●

GENERAL NOTES:

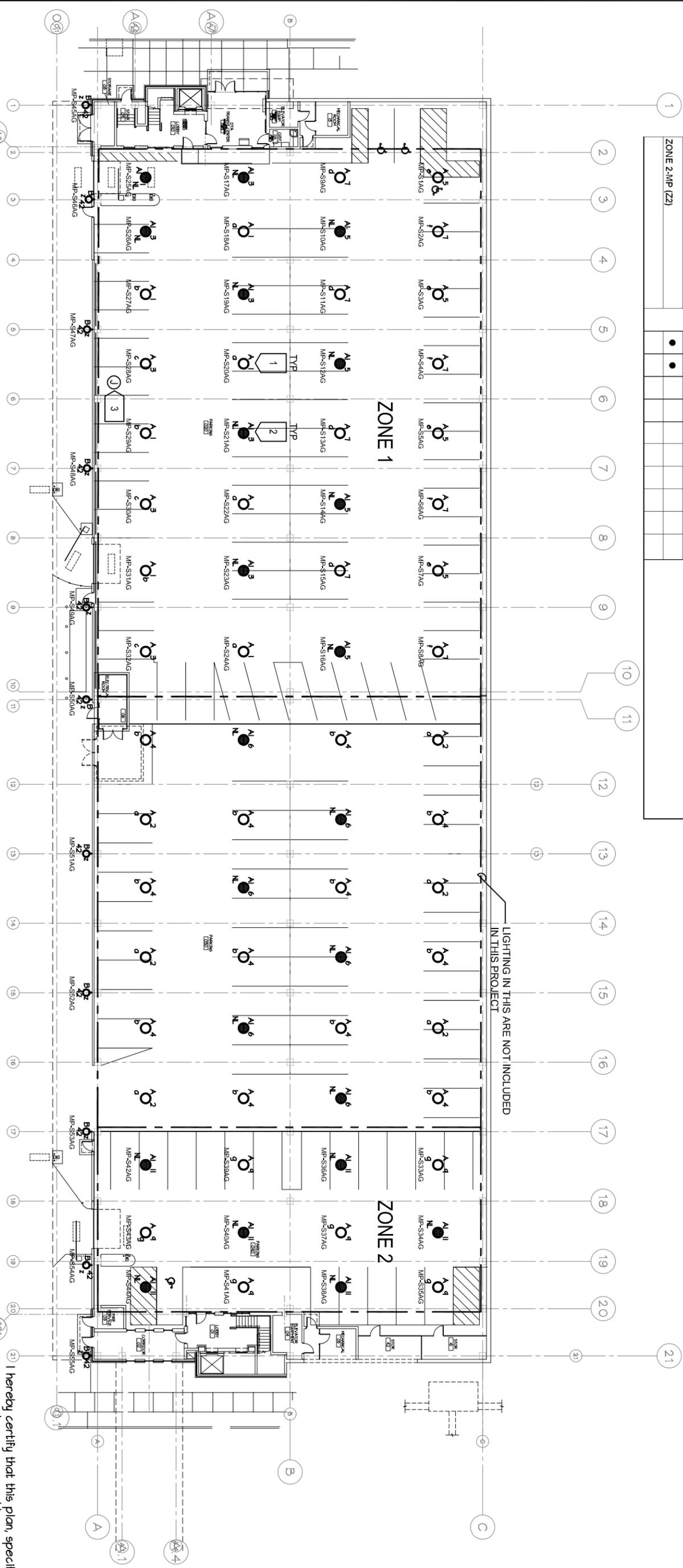
- A TYPICAL, DISCONNECT AND REMOVE EXISTING LIGHTING CONTROLS ASSOCIATED WITH TYPE 'A' AND 'A1' LIGHT FIXTURES. LIGHTING CONTROLS TO REMAIN FOR ALL OTHER LIGHTING ASSOCIATED WITH PARKING RAMP BUILDING.
- B TYPICAL, REPLACE LIGHT FIXTURE TYPES 'A', 'A1' AND 'B' WITH OWNER FURNISHED LED TYPE GARAGE STYLE FIXTURE. REFER TO LIGHT FIXTURE SCHEDULE INCLUDED IN SPECIFICATION.
- C EXISTING CIRCUITS AND/OR SWITCHING SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
- D THIS PROJECT INCLUDES LIGHTING AND ASSOCIATED CONTROLS. MISCELLANEOUS ELECTRICAL ITEMS SHOWN ARE NOT PART OF THIS PROJECT SCOPE AND ARE SHOWN FOR REFERENCE ONLY UNLESS NOTED OTHERWISE.

NUMBERED NOTES:

- 1 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITH RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMENWAVE SERIES OR APPROVED EQUIVALENT.
- 2 TYPICAL, RECORD DRAWINGS INDICATE 'NL' FIXTURES TO BE ON A NIGHT LIGHT CIRCUIT. UNLESS NOTED OTHERWISE, CONTROL THESE LIGHTS WITH OTHER LIGHTS IN THE SAME ZONE.
- 3 PROVIDE WIRELESS PHOTOCELL AS MANUFACTURED BY ACURTY BRANDS CONTROLS OR APPROVED EQUIVALENT. VERIFY EXACT LOCATION PRIOR TO INSTALLATION.

GROUND LEVEL OVERALL LIGHTING AND CONTROL PLAN

E100 SCALE: 0' = 32'



LIGHTING IN THIS AREA IS NOT INCLUDED IN THIS PROJECT

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Dave T. Blume

Dave T. Blume
Date: 07/22/2016 Reg No: 246711

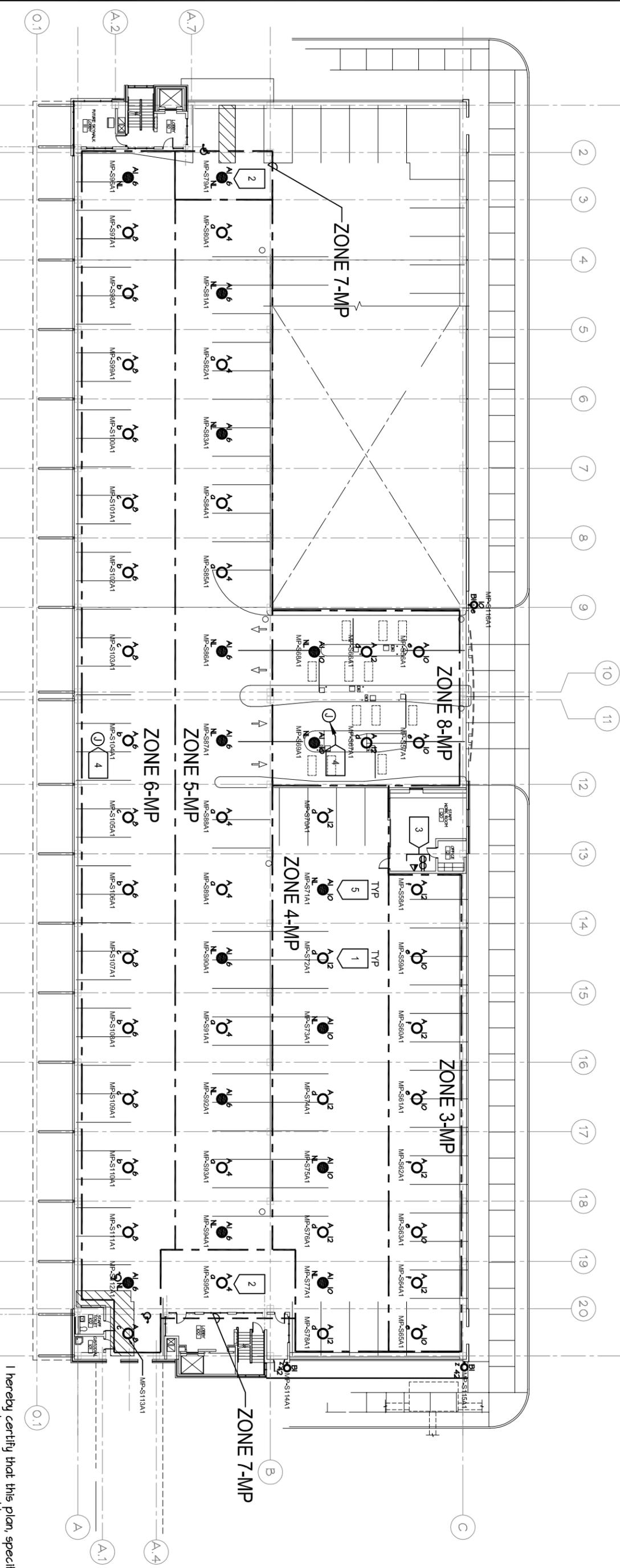
LIGHTING CONTROL MATRIX	
SYSTEM INPUTS	SYSTEM OUTPUTS
	CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR
	CONTROLLED BY LOCAL PHOTOCELL DEVICE
	CONTROLLED BY A SET TIME ON/OFF NIGHT LIGHT
ZONE 3-MP (Z3)	•
ZONE 4-MP (Z4)	•
ZONE 5-MP (Z5)	•
ZONE 6-MP (Z6)	•
ZONE 7-MP (Z7)	•
ZONE 8-MP (Z8)	•

GENERAL NOTES:

- A TYPICAL, DISCONNECT AND REMOVE EXISTING LIGHTING CONTROLS ASSOCIATED WITH TYPE 'A' AND 'A1' LIGHT FIXTURES. LIGHTING CONTROLS TO REMAIN FOR ALL OTHER LIGHTING ASSOCIATED WITH PARKING RAMP BUILDING.
- B TYPICAL, REPLACE LIGHT FIXTURE TYPES 'A', 'A1' AND 'B1' WITH OWNER FURNISHED LED TYPE GARAGE STYLE FIXTURE. REFER TO LIGHT FIXTURE SCHEDULE INCLUDED IN SPECIFICATION.
- C EXISTING CIRCUITS AND/OR SWITCHING SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
- D THIS PROJECT INCLUDES LIGHTING AND ASSOCIATED CONTROLS. MISCELLANEOUS ELECTRICAL ITEMS SHOWN ARE NOT PART OF THIS PROJECT SCOPE AND ARE SHOWN FOR REFERENCE ONLY UNLESS NOTED OTHERWISE.

NUMBERED NOTES:

- 1 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITH RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT.
- 2 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITHOUT RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT.
- 3 PROVIDE DEDICATED 120V, 20A QUAD RECEPTACLE (CONNECTED TO NEAREST 120/208V PANEL WITH 20A SPARE BREAKER) AND VOICEDATA OUTLET FOR WIRELESS LIGHTING CONTROL SYSTEM GATEWAY (ECHELON LUMEWAVE SYSTEM). VERIFY EXACT LOCATION OF GATEWAYS WITH OWNER PRIOR TO ROUGH-IN.
- 4 PROVIDE WIRELESS PHOTOCELL AS MANUFACTURED BY ECHELON CONTROLS TO INSTALLATION. VERIFY EXACT LOCATION PRIOR TO INSTALLATION.
- 5 TYPICAL, RECORD DRAWINGS INDICATE 'NL' FIXTURES TO BE ON A NIGHT LIGHT CIRCUIT. UNLESS NOTED OTHERWISE, CONTROL THESE LIGHTS WITH OTHER LIGHTS IN THE SAME ZONE.



1 FIRST LEVEL OVERALL LIGHTING AND CONTROL PLAN
 SCALE: 0' = 32'

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Dave T. Blume
 Date: 07/22/2016 Reg No: 246711

LIGHTING CONTROL MATRIX

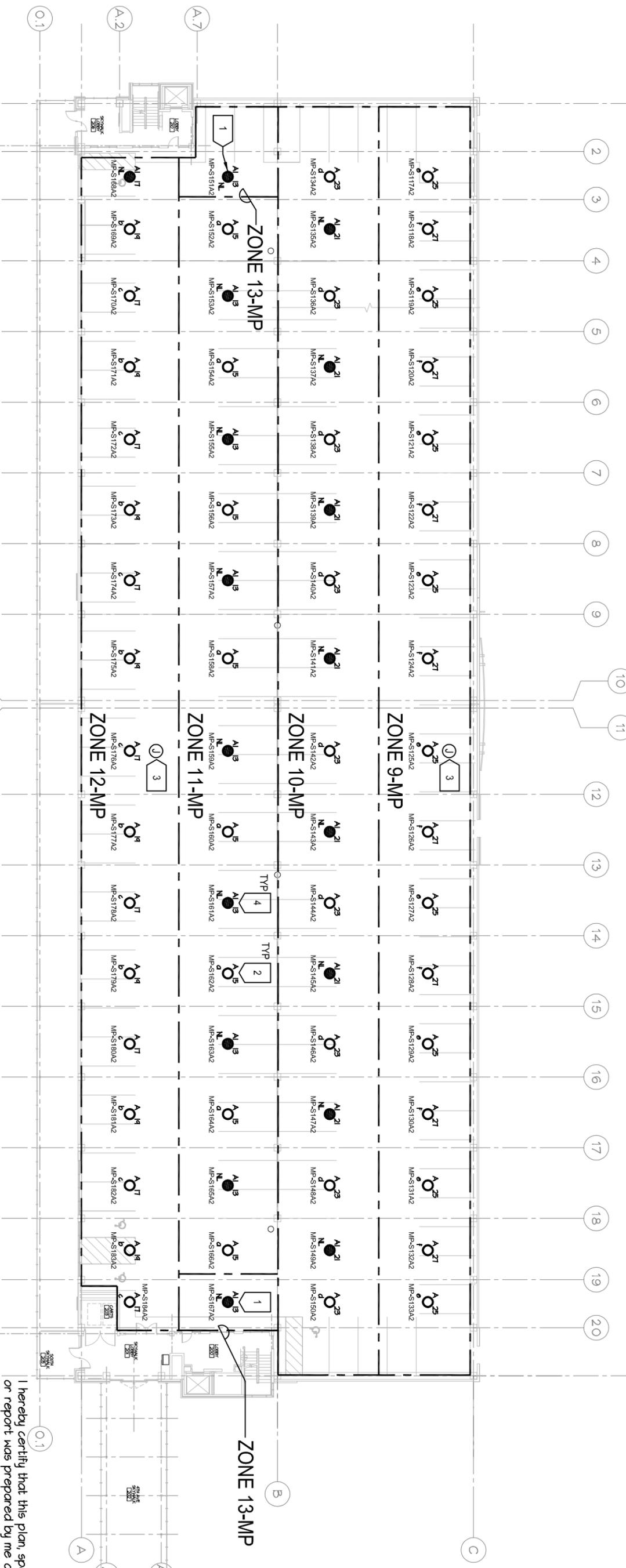
SYSTEM INPUTS	SYSTEM OUTPUTS		
	CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR	CONTROLLED BY LOCAL PHOTOCELL DEVICE	CONTROLLED BY A SET TIME ON/OFF NIGHT LIGHT
ZONE 9-AMP (Z9)	•	•	•
ZONE 10-AMP (Z10)	•	•	•
ZONE 11-AMP (Z11)	•	•	•
ZONE 12-AMP (Z12)	•	•	•
ZONE 13-AMP (Z13)	•	•	•

GENERAL NOTES:

- A DISCONNECT AND REMOVE EXISTING LIGHTING CONTROLS ASSOCIATED WITH TYPE 'A' AND 'A1' LIGHT FIXTURES. LIGHTING CONTROLS TO REMAIN FOR ALL OTHER LIGHTING ASSOCIATED WITH PARKING RAMP BUILDING.
- B REPLACE LIGHT FIXTURE TYPES 'A' AND 'A1' WITH OWNER FURNISHED LED TYPE GARAGE STYLE FIXTURE. REFER TO LIGHT FIXTURE SCHEDULE INCLUDED IN SPECIFICATION.
- C EXISTING CIRCUITS AND/OR SWITCHING SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
- D THIS PROJECT INCLUDES LIGHTING AND ASSOCIATED CONTROLS. MISCELLANEOUS ELECTRICAL ITEMS SHOWN ARE NOT PART OF THIS PROJECT SCOPE AND ARE SHOWN FOR REFERENCE ONLY UNLESS NOTED OTHERWISE.

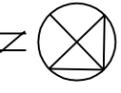
NUMBERED NOTES:

- 1 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITH RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES MODEL EMB900 OR APPROVED EQUIVALENT.
- 2 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITHOUT RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES MODEL EMB900 OR APPROVED EQUIVALENT.
- 3 PROVIDE WIRELESS PHOTOCELL AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT. VERIFY EXACT LOCATION PRIOR TO INSTALLATION.
- 4 TYPICAL. ALL FIXTURES INDICATED WITH 'NL' WILL NOT BE NIGHT LIGHTS UNLESS NOTED OTHERWISE.



1 SECOND LEVEL OVERALL LIGHTING AND CONTROL PLAN

E102 SCALE: 0' = 32'



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Date: 07/22/2016 Reg No: 246711

LIGHTING CONTROL MATRIX

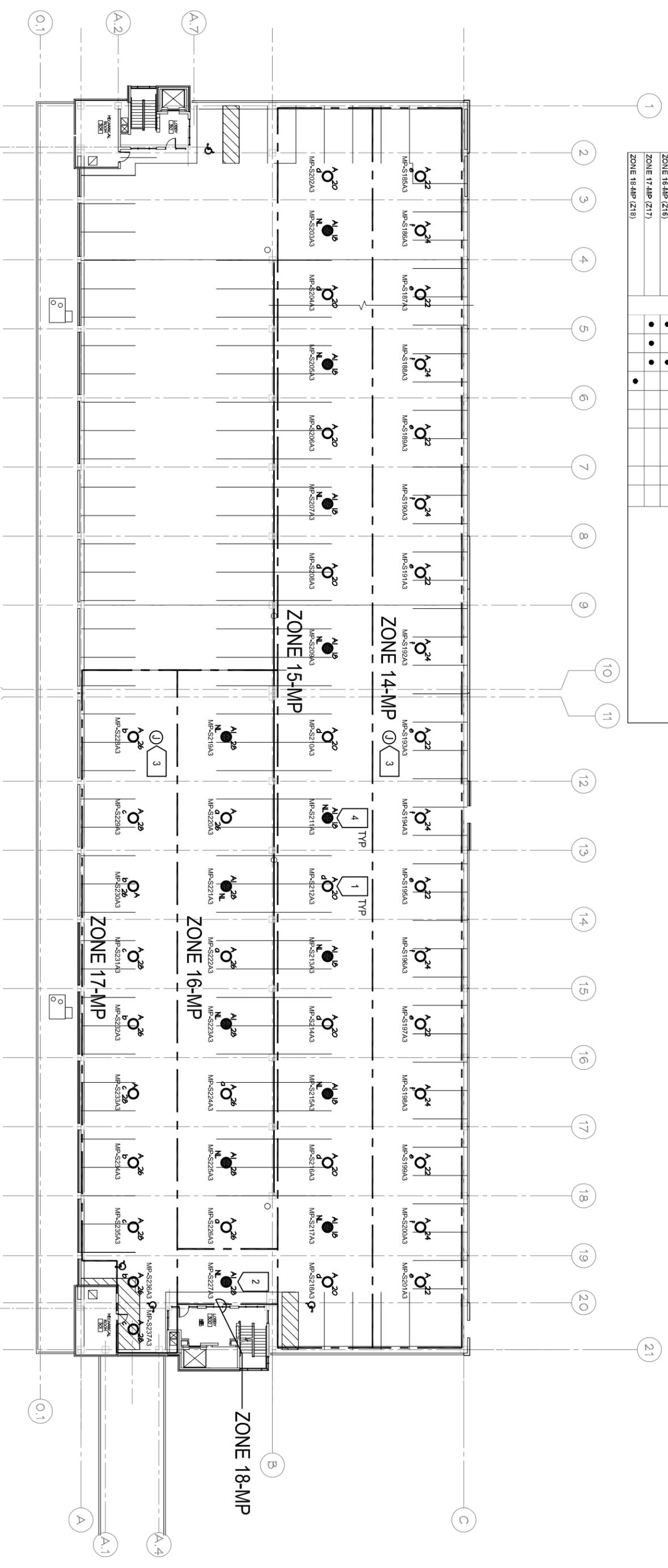
SYSTEM INPUTS	SYSTEM OUTPUTS											
	CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR											
	CONTROLLED BY LOCAL PHOTOCELL DEVICE											
	CONTROLLED BY A SET TIME ON/OFF NIGHT LIGHT ON 24/7											
ZONE 14-HP (Z14)	•	•	•	•	•	•	•	•	•	•	•	•
ZONE 15-HP (Z15)	•	•	•	•	•	•	•	•	•	•	•	•
ZONE 16-HP (Z16)	•	•	•	•	•	•	•	•	•	•	•	•
ZONE 17-HP (Z17)	•	•	•	•	•	•	•	•	•	•	•	•
ZONE 18-HP (Z18)	•	•	•	•	•	•	•	•	•	•	•	•

GENERAL NOTES:

- A DISCONNECT AND REMOVE EXISTING LIGHTING CONTROLS ASSOCIATED WITH TYPE 'A' AND 'A1' LIGHT FIXTURES. LIGHTING CONTROLS TO REMAIN FOR ALL OTHER LIGHTING ASSOCIATED WITH PARKING RAMP BUILDING.
- B REPLACE LIGHT FIXTURE TYPES 'A' AND 'A1' WITH OWNER FURNISHED LED TYPE GARAGE STYLE FIXTURE. REFER TO LIGHT FIXTURE SCHEDULE INCLUDED IN SPECIFICATION.
- C EXISTING CIRCUITS AND/OR SWITCHING SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
- D THIS PROJECT INCLUDES LIGHTING AND ASSOCIATED CONTROLS. MISCELLANEOUS ELECTRICAL ITEMS SHOWN ARE NOT PART OF THIS PROJECT SCOPE AND ARE SHOWN FOR REFERENCE ONLY UNLESS NOTED OTHERWISE.

NUMBERED NOTES:

- 1 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITH RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES MODEL EMB900 OR APPROVED EQUIVALENT.
- 2 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITHOUT RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES MODEL EMB900 OR APPROVED EQUIVALENT.
- 3 PROVIDE WIRELESS PHOTOCELL AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT. VERIFY EXACT LOCATION PRIOR TO INSTALLATION.
- 4 TYPICAL. RECORD DRAWINGS INDICATE 'NL' FIXTURES TO BE ON A NIGHT LIGHT CIRCUIT. UNLESS NOTED OTHERWISE, CONTROL THESE LIGHTS WITH OTHER LIGHTS IN THE SAME ZONE.



1 THIRD LEVEL OVERALL LIGHTING AND CONTROL PLAN
E103 SCALE: 0' = 32'

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Dave T. Blume
Dave T. Blume
Date: 07/22/2016 Reg No: 24671

LIGHTING CONTROL MATRIX

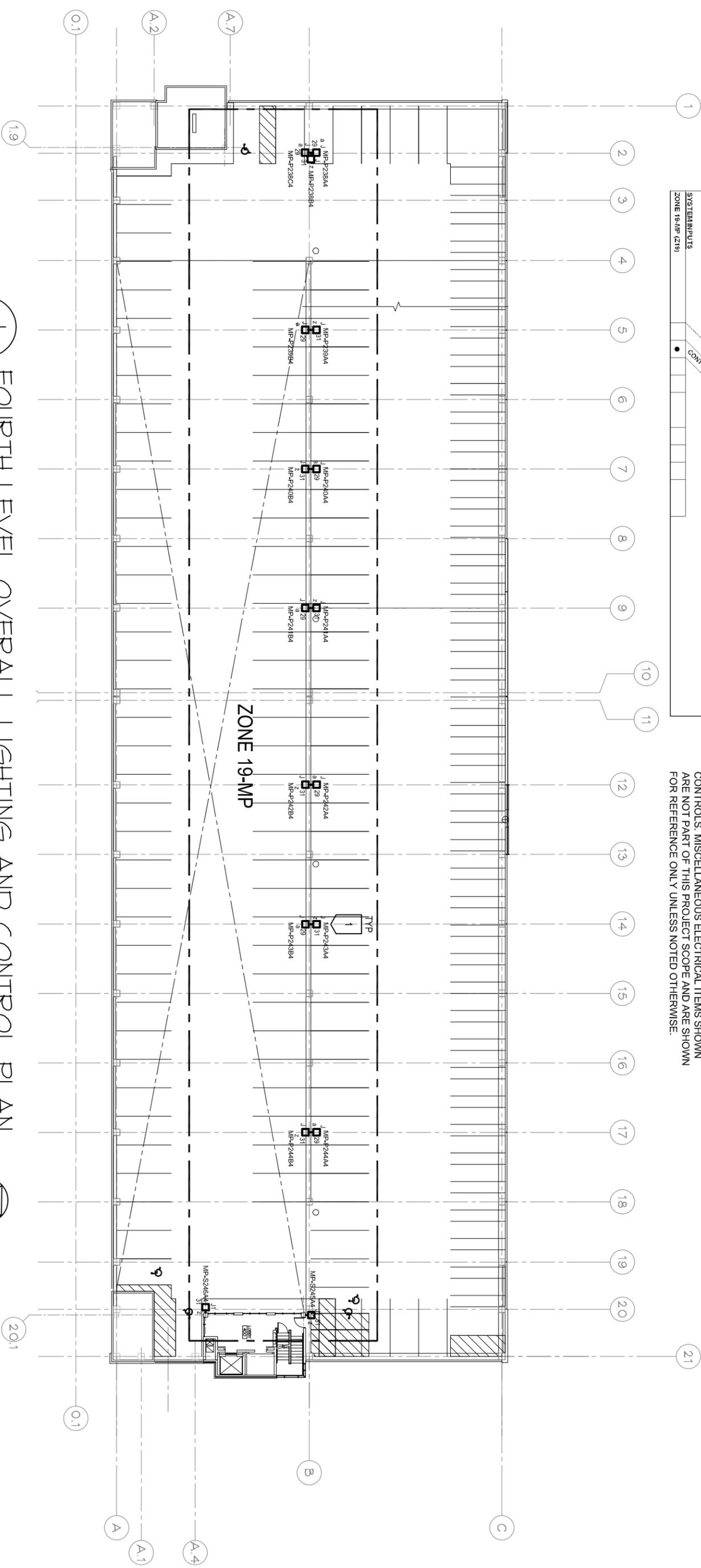
SYSTEM INPUTS	SYSTEM OUTPUTS
ZONE 19-MP (219)	CONTROLLED BY COMBINATION WIRELESS INTEGRAL OCCUPANCY SENSOR AND PHOTOCELL

GENERAL NOTES:

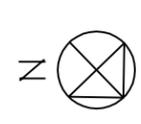
- A DISCONNECT AND REMOVE EXISTING LIGHTING CONTROLS ASSOCIATED WITH TYPES 'J', AND 'J1' LIGHT FIXTURES. LIGHTING CONTROLS TO REMAIN FOR ALL OTHER LIGHTING ASSOCIATED WITH PARKING RAMP BUILDING.
- B LIGHT FIXTURE TYPES 'J' AND 'J1' TO BE REPLACED WITH OWNER FURNISHED LED TYPE POLE MOUNTED FIXTURE, REFER TO LIGHT FIXTURE SCHEDULE INCLUDED IN SPECIFICATION.
- C EXISTING CIRCUITS AND/OR SWITCHING SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
- D THIS PROJECT INCLUDES LIGHTING AND ASSOCIATED CONTROLS. MISCELLANEOUS ELECTRICAL ITEMS SHOWN ARE NOT PART OF THIS PROJECT SCOPE AND ARE SHOWN FOR REFERENCE ONLY UNLESS NOTED OTHERWISE.

NUMBERED NOTES:

- 1 PROVIDE COMBINATION WIRELESS OCCUPANCY SENSOR AND PHOTOCELL INTEGRAL OR EXTERNAL TO TYPE 'J', 'J1', AND 'J2' LIGHT FIXTURES AS MANUFACTURED BY ECHELON CONTROLS LUMENWAVE SERIES OR APPROVED EQUIVALENT.



1 FOURTH LEVEL OVERALL LIGHTING AND CONTROL PLAN
 E104 SCALE: 0' = 32'



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Dave T. Blume
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LIGHTING CONTROL MATRIX

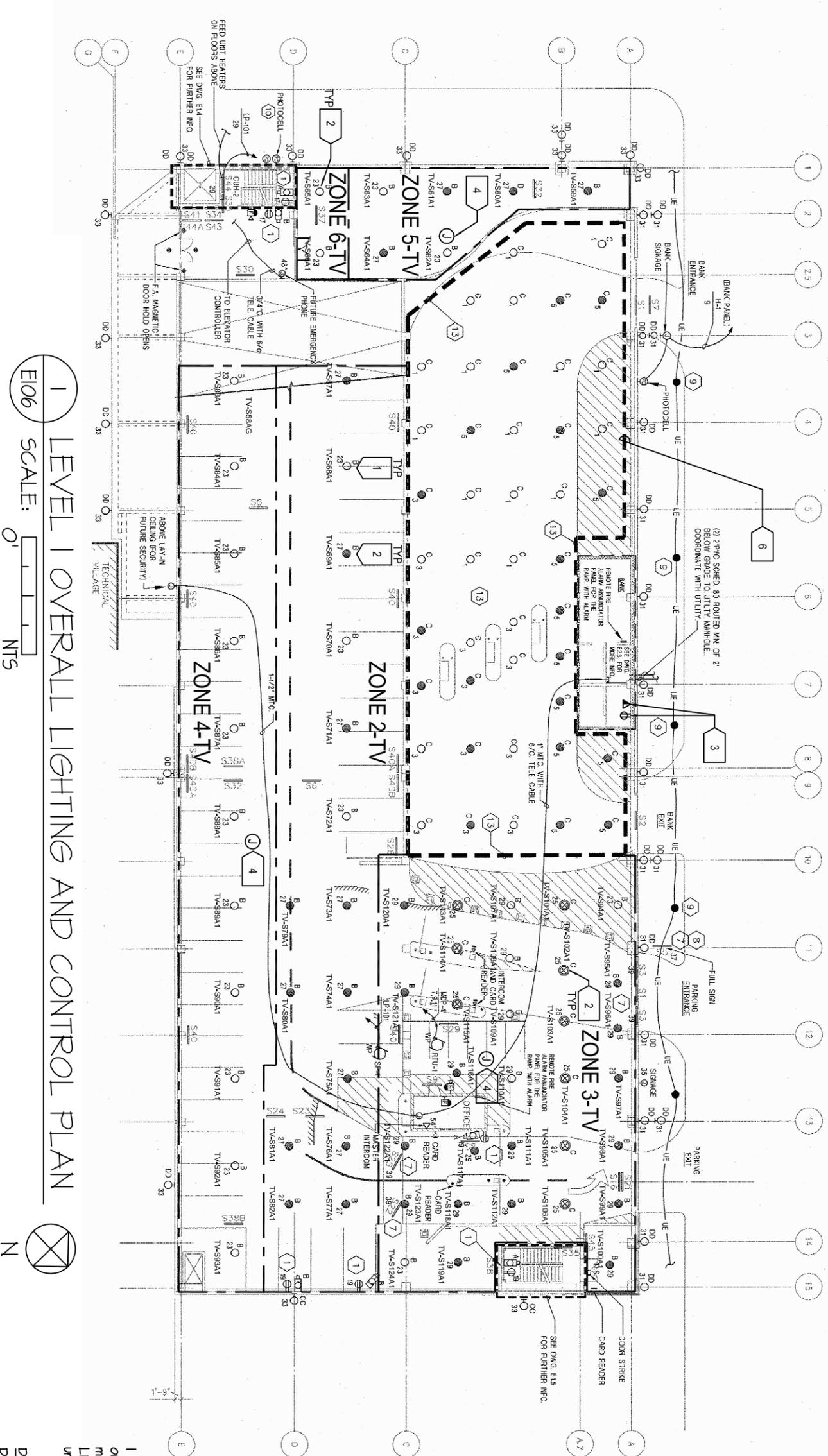
	SYSTEM OUTPUTS	
ZONE 2-TV (Z2)	•	CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR
ZONE 3-TV (Z3)	•	CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR
ZONE 4-TV (Z4)	•	CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR
ZONE 5-TV (Z5)	•	CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR
ZONE 6-TV (Z6)	•	CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR
	•	CONTROLLED BY LOCAL PHOTOCELL DEVICE
	•	CONTROLLED BY A SET TIME ON/OFF
	•	NIGHT LIGHT

GENERAL NOTES:

- A DISCONNECT AND REMOVE EXISTING LIGHTING CONTROLS ASSOCIATED WITH TYPE 'B' AND 'C' LIGHT FIXTURES. LIGHTING CONTROLS TO REMAIN FOR ALL OTHER LIGHTING ASSOCIATED WITH PARKING RAMP BUILDING.
- B REPLACE LIGHT FIXTURE TYPES 'B' AND 'C' WITH OWNER FURNISHED LED TYPE GARAGE STYLE FIXTURE. REFER TO LIGHT FIXTURE SCHEDULE INCLUDED IN SPECIFICATION.
- C EXISTING CIRCUITS AND/OR SWITCHING SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
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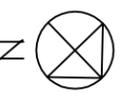
NUMBERED NOTES:

- 1 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITH RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'B' OR 'C' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT.
- 2 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITHOUT RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'B' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT.
- 3 PROVIDE DEDICATED 120V, 20A QUAD RECEPTACLE (CONNECTED TO NEAREST 120/208V PANEL WITH 20A SPARE BREAKER) AND VOICE/DATA OUTLET FOR WIRELESS LIGHTING CONTROL SYSTEM GATEWAY (ECHELON LUMEWAVE SYSTEM); VERIFY EXACT LOCATION OF GATEWAYS WITH OWNER PRIOR TO ROUGH-IN.
- 4 PROVIDE WIRELESS PHOTOCELL AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT. VERIFY EXACT LOCATION PRIOR TO INSTALLATION.
- 5 TYPICAL RECORD DRAWINGS INDICATE FIXTURES SHADING TO BE ON A NIGHT LIGHT CIRCUIT. UNLESS NOTED OTHERWISE, CONTROL THESE LIGHTS WITH OTHER LIGHTS IN THE SAME ZONE.
- 6 PROVIDE ADD ALTERNATE FOR FIXTURE REPLACEMENT IN THIS AREA. REFER TO BID TAB FOR ADDITIONAL INFORMATION.



LEVEL 1 OVERALL LIGHTING AND CONTROL PLAN

E106 SCALE: 0' NTS



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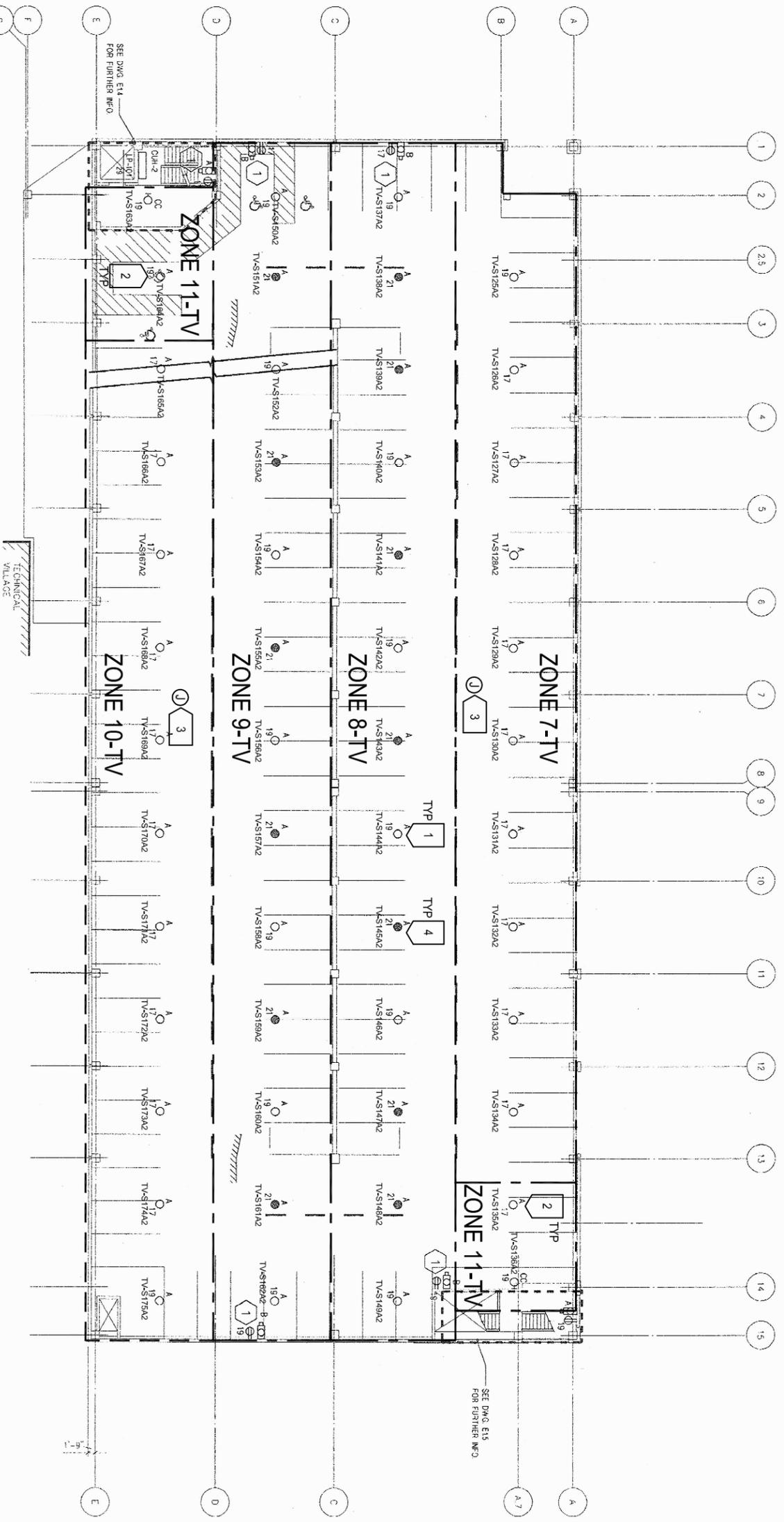
LIGHTING CONTROL MATRIX	
	SYSTEM OUTPUTS
ZONE 7-TV (Z7)	CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR
ZONE 8-TV (Z8)	CONTROLLED BY LOCAL PHOTOCELL DEVICE
ZONE 9-TV (Z9)	CONTROLLED BY A SET TIME ON/OFF
ZONE 10-TV (Z10)	
ZONE 11-TV (Z11)	

GENERAL NOTES:

- A DISCONNECT AND REMOVE EXISTING LIGHTING CONTROLS ASSOCIATED WITH TYPE 'A' AND 'CC' LIGHT FIXTURES. LIGHTING CONTROLS TO REMAIN FOR ALL OTHER LIGHTING ASSOCIATED WITH PARKING RAMP BUILDING.
- B REPLACE LIGHT FIXTURE TYPES 'A' WITH OWNER FURNISHED LIGHT FIXTURE. REFER TO LIGHT FIXTURE SCHEDULE INCLUDED IN SPECIFICATION.
- C EXISTING CIRCUITS AND/OR SWITCHING SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
- D THIS PROJECT INCLUDES LIGHTING AND ASSOCIATED CONTROLS. MISCELLANEOUS ELECTRICAL ITEMS SHOWN ARE NOT PART OF THIS PROJECT SCOPE AND ARE SHOWN FOR REFERENCE ONLY UNLESS NOTED OTHERWISE.

NUMBERED NOTES:

- 1 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITH RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMENAVE SERIES OR APPROVED EQUIVALENT.
- 2 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITHOUT RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMENAVE SERIES OR APPROVED EQUIVALENT.
- 3 PROVIDE WIRELESS PHOTOCELL AS MANUFACTURED BY ECHELON CONTROLS LUMENAVE SERIES OR APPROVED EQUIVALENT. VERIFY EXACT LOCATION PRIOR TO INSTALLATION.
- 4 TYPICAL. RECORD DRAWINGS INDICATE SHADED FIXTURES TO BE ON A NIGHT LIGHT CIRCUIT. UNLESS NOTED OTHERWISE, CONTROL THESE LIGHTS WITH OTHER LIGHTS IN THE SAME ZONE.



1 LEVEL 2 OVERALL LIGHTING AND CONTROL PLAN
 E107 SCALE: 0' NTS

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota

Dave T. Blume
 Dave T. Blume
 Date: 07/22/2016 Reg No. 246711

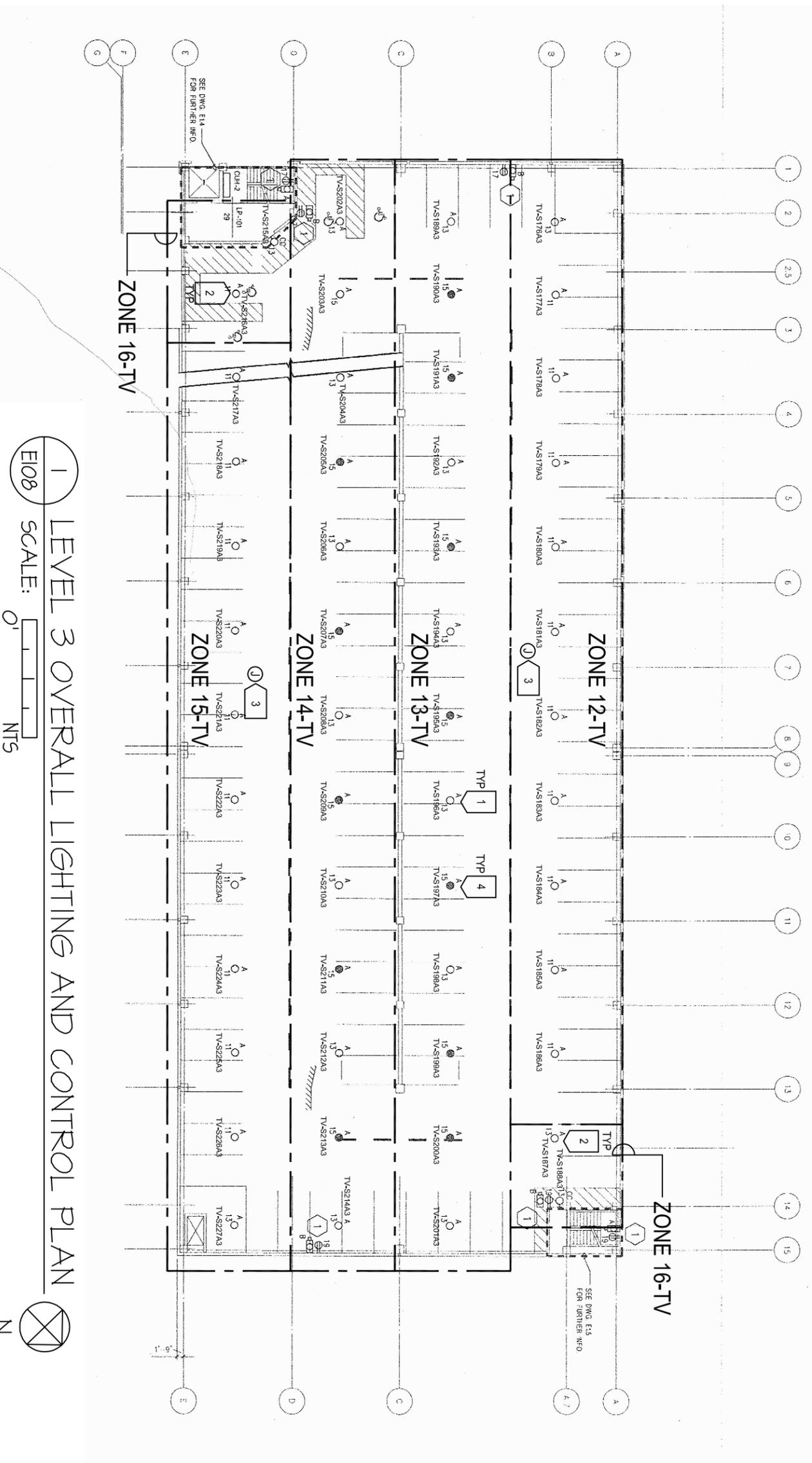
LIGHTING CONTROL MATRIX	
SYSTEM INPUTS	
ZONE 12-TV (Z12)	•••••
ZONE 13-TV (Z13)	•••••
ZONE 14-TV (Z14)	•••••
ZONE 15-TV (Z15)	•••••
ZONE 16-TV (Z16)	•••••
SYSTEM OUTPUTS	
CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR	
CONTROLLED BY LOCAL PHOTOCELL DEVICE	
CONTROLLED BY A SET TIME ON/OFF	
NIGHT LIGHT ON 24/7	

GENERAL NOTES:

- A DISCONNECT AND REMOVE EXISTING LIGHTING CONTROLS ASSOCIATED WITH TYPE 'A' AND 'CC' LIGHT FIXTURES. LIGHTING CONTROLS TO REMAIN FOR ALL OTHER LIGHTING ASSOCIATED WITH PARKING RAMP BUILDING.
- B REPLACE LIGHT FIXTURE TYPES 'A' AND 'CC' WITH OWNER FURNISHED LED TYPE LIGHT FIXTURE. REFER TO LIGHT FIXTURE SCHEDULE INCLUDED IN SPECIFICATION.
- C EXISTING CIRCUITS AND/OR SWITCHING SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
- D THIS PROJECT INCLUDES LIGHTING AND ASSOCIATED CONTROLS. MISCELLANEOUS ELECTRICAL ITEMS SHOWN ARE NOT PART OF THIS PROJECT SCOPE AND ARE SHOWN FOR REFERENCE ONLY UNLESS NOTED OTHERWISE.

NUMBERED NOTES:

- 1 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITH RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT.
- 2 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITHOUT RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT.
- 3 PROVIDE WIRELESS PHOTOCELL AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT. VERIFY EXACT LOCATION PRIOR TO INSTALLATION.
- 4 TYPICAL. RECORD DRAWINGS INDICATE SHADED LIGHT FIXTURES TO BE ON A NIGHT LIGHT CIRCUIT. UNLESS NOTED OTHERWISE, CONTROL THESE LIGHTS WITH OTHER LIGHTS IN THE SAME ZONE.



1 LEVEL 3 OVERALL LIGHTING AND CONTROL PLAN
 E108 SCALE: 0' NTS

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Dave T. Blume
 Dave T. Blume
 Date: 07/22/2016 Reg No. 24671

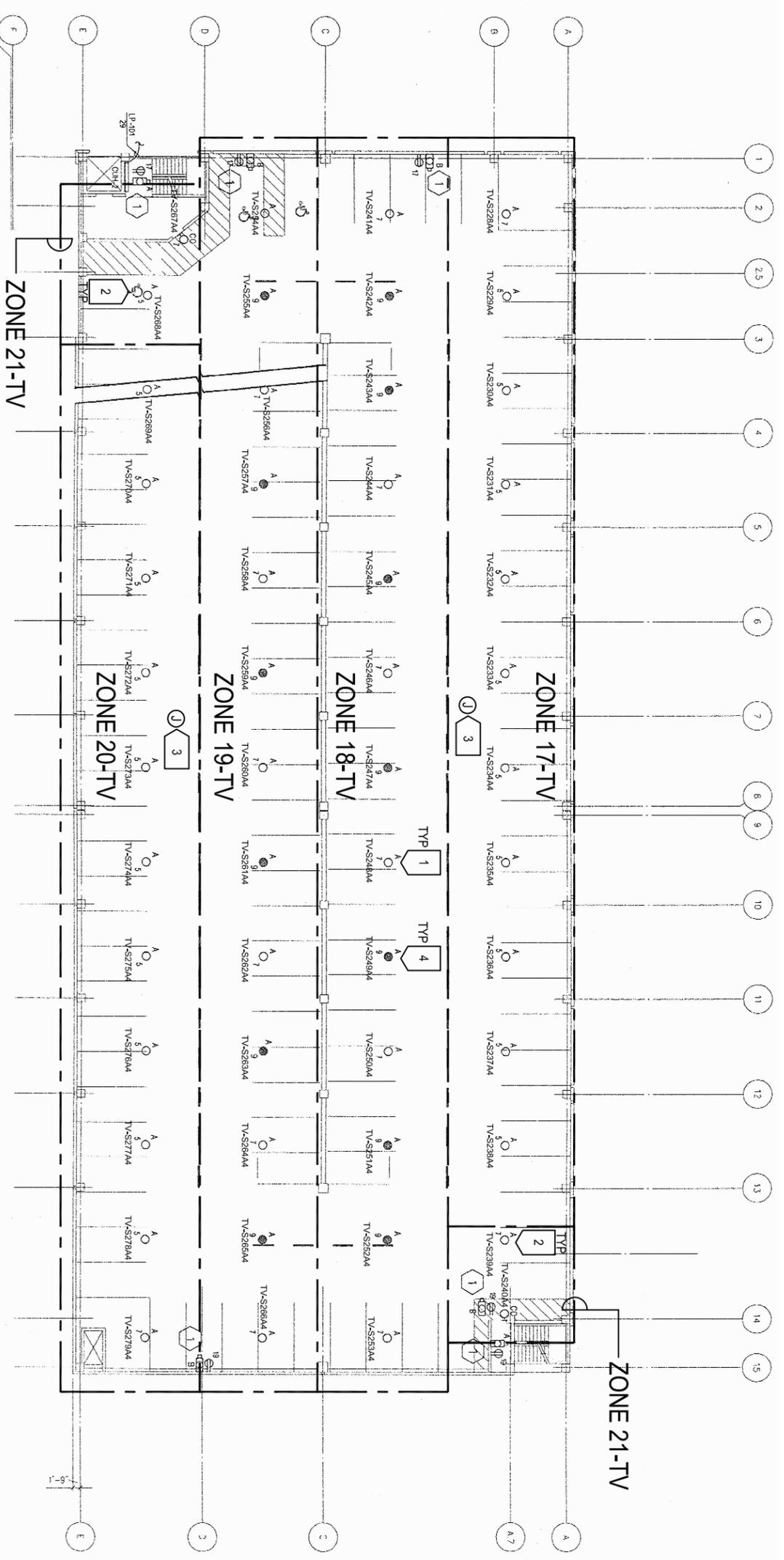
LIGHTING CONTROL MATRIX

SYSTEM OUTPUTS															
ZONE 17-TV (Z17)															
ZONE 18-TV (Z18)															
ZONE 19-TV (Z19)															
ZONE 20-TV (Z20)															
ZONE 21-TV (Z21)															

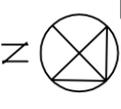
CONTROLLED BY WIRELESS INTEGRAL OCCUPANCY SENSOR
 CONTROLLED BY LOCAL PHOTOCELL DEVICE
 NIGHT LIGHT ON 24/7

- GENERAL NOTES:**
- A DISCONNECT AND REMOVE EXISTING LIGHTING CONTROLS ASSOCIATED WITH TYPE 'A' AND 'CC' LIGHT FIXTURES. LIGHTING CONTROLS TO REMAIN FOR ALL OTHER LIGHTING ASSOCIATED WITH PARKING RAMP BUILDING.
 - B REPLACE LIGHT FIXTURE TYPES 'A' AND 'CC' WITH OWNER FURNISHED LED TYPE LIGHT FIXTURE. REFER TO LIGHT FIXTURE SCHEDULE INCLUDED IN SPECIFICATION.
 - C EXISTING CIRCUITS AND/OR SWITCHING SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
 - D THIS PROJECT INCLUDES LIGHTING AND ASSOCIATED CONTROLS. MISCELLANEOUS ELECTRICAL ITEMS SHOWN ARE NOT PART OF THIS PROJECT SCOPE AND ARE SHOWN FOR REFERENCE ONLY UNLESS NOTED OTHERWISE.

- NUMBERED NOTES:**
- 1 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITH RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT.
 - 2 PROVIDE WIRELESS OCCUPANCY TYPE SENSOR WITHOUT RELAY INTEGRAL OR EXTERNAL TO EACH TYPE 'A' OR 'A1' LIGHT FIXTURE AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT.
 - 3 PROVIDE WIRELESS PHOTOCELL AS MANUFACTURED BY ECHELON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT. VERIFY EXACT LOCATION PRIOR TO INSTALLATION.
 - 4 TYPICAL, RECORD DRAWINGS INDICATE LIGHT FIXTURES SHADED TO BE ON A NIGHT LIGHT CIRCUIT. UNLESS NOTED OTHERWISE, CONTROL THESE LIGHTS WITH OTHER LIGHTS IN THE SAME ZONE.



1 LEVEL 4 OVERALL LIGHTING AND CONTROL PLAN
 E109 SCALE: 0' NTS



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota

Dave T. Blume
 Dave T. Blume
 Date: 07/22/2016 Reg No: 246711

City of Duluth Energy Efficiency Lighting Project - Bid Package #1	Tech Village Parking Ramp Level 4 Lighting Plan		<p style="font-size: small;">Mechanical and Electrical Engineers</p>	Date: 07/22/16 Drawn: LAH Checked: SLH Proj No: 84493	E109
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LIGHTING CONTROL MATRIX

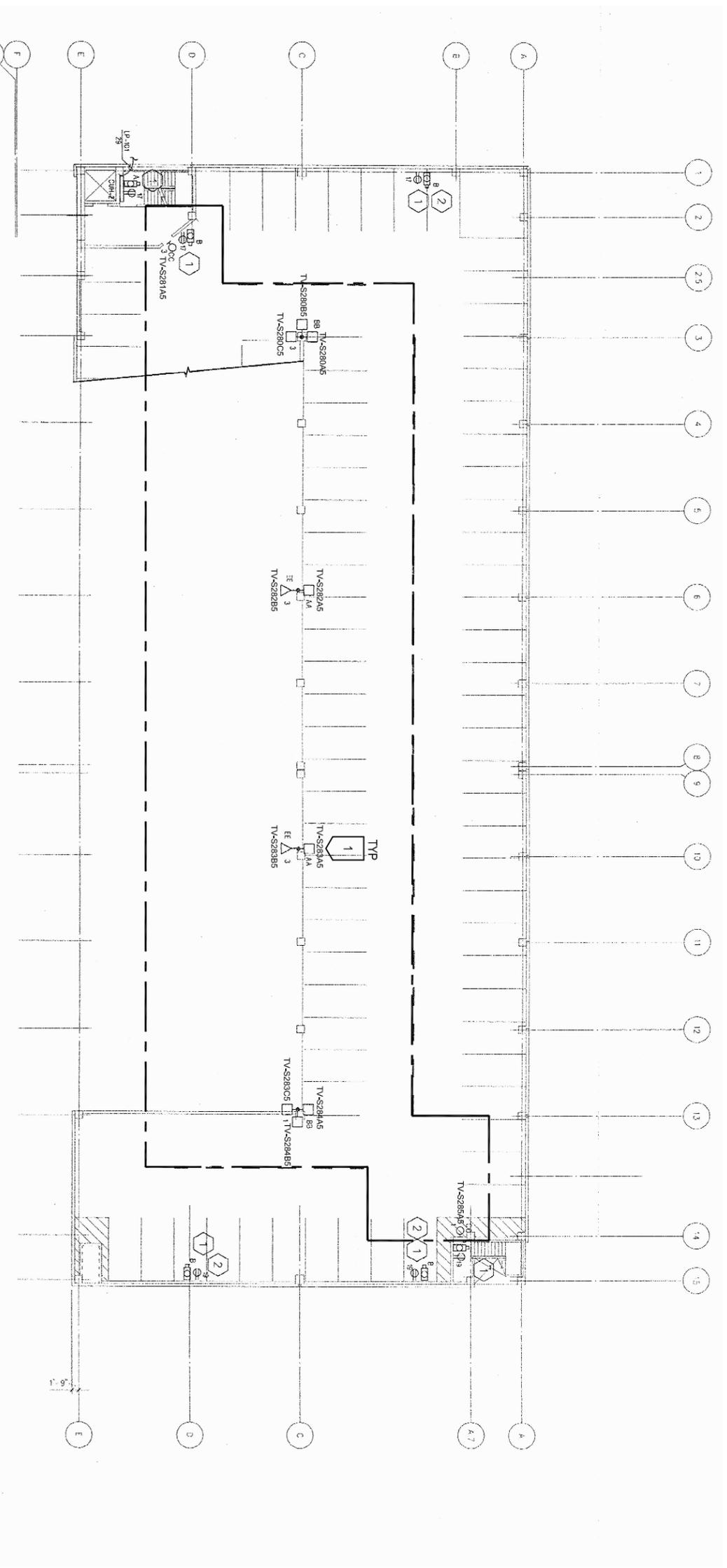
SYSTEM OUTPUTS		CONTROLLED BY COMBINATION WIRELESS INTEGRAL OCCUPANCY SENSOR AND PHOTOCELL														
ZONE 22-TV (Z22)		CONTROLLED BY LOCAL PHOTOCELL DEVICE														
		CONTROLLED BY A SET TIME ON/OFF NIGHT LIGHT ON 24/7														
SYSTEM INPUTS																

GENERAL NOTES:

- A DISCONNECT AND REMOVE EXISTING LIGHTING CONTROLS ASSOCIATED WITH TYPE 'AA', 'BB', 'CC' AND 'EE' LIGHT FIXTURES. LIGHTING CONTROLS TO REMAIN FOR ALL OTHER LIGHTING ASSOCIATED WITH PARKING RAMP BUILDING.
- B REPLACE LIGHT FIXTURE TYPES 'AA', 'BB', 'CC', AND 'EE' WITH OWNER FURNISHED LED TYPE POLE MOUNTED FIXTURES. REFER TO LIGHT FIXTURE SCHEDULE INCLUDED IN SPECIFICATION.
- C EXISTING CIRCUITS AND/OR SWITCHING SHOWN FOR REFERENCE ONLY. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
- D THIS PROJECT INCLUDES LIGHTING AND ASSOCIATED CONTROLS. MISCELLANEOUS ELECTRICAL ITEMS SHOWN ARE NOT PART OF THIS PROJECT SCOPE AND ARE SHOWN FOR REFERENCE ONLY UNLESS NOTED OTHERWISE.

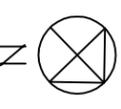
NUMBERED NOTES:

- 1 PROVIDE COMBINATION WIRELESS OCCUPANCY TYPE SENSOR AND PHOTOCELL INTEGRAL OR EXTERNAL TO EACH TYPE 'AA', 'BB', 'CC', AND 'EE' LIGHT FIXTURES AS MANUFACTURED BY ECHOLON CONTROLS LUMEWAVE SERIES OR APPROVED EQUIVALENT.



1 LEVEL 5 OVERALL LIGHTING AND CONTROL PLAN

E110 SCALE: 0' NTS



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota

Dave T. Blume

Dave T. Blume
Date: 07/22/2016 Reg No: 246711

<p>City of Duluth Energy Efficiency Lighting Project - Bid Package #1</p>	<p>Tech Village Parking Ramp Level 5 Lighting Plan</p>		<p>Gausman & Moore Mechanical and Electrical Engineers</p>	<p>Date: 07/22/16 Drawn: LAH Checked: SLH Proj. No: 84493</p>	<p>E110</p>
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