

RACEWAY SYSTEMS

DEVICE BOXES:

1. PROVIDE 3-1/2" ONE-GANG OUTLET BOX ASSEMBLIES FOR ALL DATA OUTLET LOCATIONS.
2. PROVIDE NEMA-RATING FOR MOISTURE RESISTANCE PER PROJECT STANDARD AS SPECIFIED BY ELECTRICAL ENGINEER.
3. PROVIDE PROTECTIVE BUSHINGS ON ALL CONDUIT ENDS, INCLUDING INSIDE OF BOXES. REMOVE ANY CONDUIT BURRS OR SHARP POINTS THAT MAY DAMAGE CABLE.
4. PROVIDE SECURED PULL STRING IN ALL CONDUITS AND BOXES.
5. DO NOT TERMINATE CONDUITS IN BACKS OR SIDES OF OUTLET BOXES.
6. DO NOT SHARE CONDUIT RUNS WITH MORE THAN ONE OUTLET BOX.
7. HOME RUN ALL CONDUITS TO END POINT LOCATIONS. EXPOSED CABLE SHALL NOT BE PERMITTED OUTSIDE OF IDF ENCLOSURES OR THE MDF ROOM.
8. BOXES FOR TELECOMMUNICATIONS SHALL BE DEDICATED FOR THAT PURPOSE AND SEPARATE FROM POWER AND OTHER FUNCTIONS.

CONDUITS:

1. PROVIDE HOME RUN CONDUITS FROM ALL OUTLET BOXES TO NEAREST IDF.
2. SIZE CONDUITS ACCORDING TO CONDUIT SIZING TABLE BELOW BASED ON CABLE COUNTS INDICATED IN SYMBOL LEGEND. 3/4" CONDUITS SHALL ONLY BE PERMITTED FOR SYSTEMS REQUIRING ONLY ONE CABLE.
3. CONDUIT MATERIAL SHALL RIGID METALLIC (RMC) OR AS OTHERWISE SPECIFIED BY THE ELECTRICAL ENGINEER.
4. CONDUIT RUNS SHALL NOT EXCEED 100 FT. BETWEEN PULL POINTS.
5. CONDUIT RUNS SHALL NOT CONTAIN MORE THAN 180 DEGREES OF BEND BETWEEN PULL POINTS. OFFSETS SHALL BE COUNTED AS 90 DEGREES OF BEND. A THIRD BEND SHALL BE PERMITTED IF THE CONDUIT IS UPGRADED BY ONE TRADE SIZE WHILE MAINTAIN THE MAXIMUM CABLE COUNT OF THE ORIGINAL SIZE.
6. CONDUITS FOR TELECOMMUNICATIONS SHALL BE DEDICATED TO THAT PURPOSE AND SEPARATE FROM POWER AND ANY OTHER FUNCTION.

CABLE COUNT	CONDUIT TRADE SIZE
1	3/4"
2 - 6	1"
7 - 10	1-1/4"
11 - 13	1-1/2"
14 - 22	2"
23 - 31	2-1/2"
32 - 49	3"
50 - 65	3-1/2"
66 - 83	4"
> 83	USE MULTIPLE

PULL BOXES:

1. PROVIDE PULL BOXES WITH COVERS WHERE REQUIRED IN CONDUIT RUNS. PROVIDE MIN. NEMA 3R RATING OR AS OTHERWISE SPECIFIED BY THE ELECTRICAL ENGINEER.
2. INSTALL PULL BOXES IN READILY ACCESSIBLE LOCATIONS WITH COVERS FACING INWARD TO ROOM.
3. DO NOT USE PULL BOXES IN LIEU OF CONDUIT BENDS. LOCATE CONDUIT BENDS OUTSIDE OF PULL BOXES AND INSTALL PULL BOXES ONLY IN STRAIGHT SECTIONS OF CONDUIT.
4. MAINTAIN ALIGNMENT OF CONDUITS ON OPPOSITE SIDES OF (ENTERING AND LEAVING) PULL BOXES.
5. SIZE PULL BOXES PER PULL BOX SIZING TABLE BELOW (BOX DIMENSIONS SHOWN ARE BASED ON SERVING ONE CONDUIT).

CONDUIT TRADE SIZE	MIN. BOX WIDTH (1)	MIN. BOX LENGTH (2)	MIN. BOX DEPTH	WIDTH INCREASE PER ADDITIONAL CONDUIT
1"	4"	16"	3"	2"
1-1/4"	6"	20"	3"	3"
1-1/2"	8"	27"	4"	4"
2"	8"	36"	4"	5"
2-1/2"	10"	42"	5"	6"
3"	12"	48"	5"	6"
3-1/2"	12"	54"	6"	6"
4"	15"	60"	8"	8"

- (1) WIDTH DIMENSION IS PERPENDICULAR TO CONDUIT RUN.
- (2) LENGTH DIMENSION IS PARALLEL TO CONDUIT RUN. FOR PULL BOXES SERVING MULTIPLE CONDUITS WITH DIFFERENT DIAMETERS, DETERMINE LENGTH BY LARGEST DIAMETER.

MDF ROOM DESIGN

GENERAL:

1. LOCATE MDF ROOM TO AVOID BEING BELOW OR ADJACENT TO SOURCES OF POTENTIAL FLOODING, SUCH AS KITCHENS AND RESTROOMS.
2. MINIMUM INTERIOR DIMENSIONS SHOULD BE AS INDICATED IN ENLARGED PLANS.
3. MINIMUM DOOR WIDTH SHOULD BE 3'-0" AND DOOR SHOULD BE LOCATED IN ROOM CORNER OR AS OTHERWISE SHOWN.
4. HEIGHT OF MDF ROOM SHOULD EXTEND TO DECK ABOVE AND SUSPENDED CEILINGS SHOULD BE OMITTED.
5. ALL SURFACE FINISHES SHOULD BE LIGHT IN COLOR TO ENHANCE ROOM LIGHTING SHOULD BE TREATED TO MINIMIZE DUST.
6. CONCRETE FLOORS SHOULD BE SEALED AND/OR COVERED WITH ANTI-STATIC FLOOR TILE.
7. FLOOR LOADING BENEATH EQUIPMENT RACKS SHOULD SUPPORT 500 LB/SF.
8. EQUIPMENT SUCH AS PIPING, DUCTWORK, POWER CONDUITS AND OTHER ELEMENTS NOT RELATED TO THE SUPPORT OF THE MDF ROOM SHOULD NOT BE LOCATED IN OR PASS THROUGH THE MDF ROOM.
9. THE MDF ROOM SHOULD NOT SHARE SPACE WITH ANY OTHER FUNCTIONS (E.G., STORAGE).

PLYWOOD BACKBOARDS:

1. PROVIDE 3/4" PLYWOOD BACKBOARDS IN MDF ROOM ON ALL WALL SURFACES WIDER THAN 12", INCLUDING ABOVE DOORS.
2. INSTALL PLYWOOD WITH SHEETS ORIENTED VERTICALLY AND WITH ADJACENT SHEETS ABUTTED TIGHTLY.
3. SECURELY MOUNT ALL PLYWOOD TO WALL STRUCTURE FROM 0'-8" TO 8'-8" A.F.F.
4. PROVIDE PLYWOOD WITH AT LEAST ONE SMOOTH SIDE AND MOUNT PLYWOOD WITH SMOOTH SIDE FACING INTO ROOM.
5. THOROUGHLY COVER ALL SURFACES OF PLYWOOD WITH TWO COATS OF WHITE OR LIGHT-COLORED PAINT.
6. PROVIDE FIRE RETARDANT PLYWOOD AND PAINT AS PERMITTED OR REQUIRED BY LOCAL CODE.

POWER:

1. PROVIDE DEDICATED CIRCUITS TO EQUIPMENT RACKS AS INDICATED IN ENLARGED POWER PLAN.
2. PROVIDE CONVENIENCE POWER OUTLETS (MAY BE ON SHARED CIRCUITS) AS INDICATED ON ENLARGED POWER PLAN OR AT 6-FOOT INTERVALS AROUND ROOM PERIMETER.
3. SUPPORT RACK POWER WITH EMERGENCY GENERATOR SYSTEM.
4. FEED RACK POWER FROM CLEAN POWER SOURCE.

LIGHTING:

1. COORDINATE POSITIONING OF LIGHTING FIXTURES WITH EQUIPMENT LAYOUT SO THAT LIGHT IS NOT OBSTRUCTED.
2. PROVIDE LIGHTING FROM SEPARATE PANEL FROM RACK POWER.
3. AVOID USE OF DIMMERS.
4. SUPPORT LIGHTING WITH EMERGENCY GENERATOR BACKUP.
5. PROVIDE 500 LUX (50 FOOT-CANDLES) OF LIGHT INTENSITY, MEASURED AT 36" A.F.F. IN FRONT OF EQUIPMENT RACKS.
6. MOUNT LIGHTING FIXTURES ABOVE 8'-6" A.F.F. OR AS CLOSE TO OVERHEAD DECK AS PRACTICABLE.

HVAC:

1. PROVIDE COOLING TO BE FULLY FUNCTIONAL ON A CONTINUOUS (24/7) BASIS AND SUPPORTED BY EMERGENCY POWER.
2. DESIGNED COOLING SYSTEM TO PRODUCE A POSITIVE AIR PRESSURE WITHIN THE MDF ROOM.
3. DESIGNED COOLING SYSTEM TO PROVIDE A MINIMUM OF ONE AIR CHANGE PER HOUR.
4. PROVIDE HEAT DISSIPATION SUFFICIENT TO MAINTAIN A TEMPERATURE RANGE OF 65 - 75 DEGREES FAHRENHEIT.
5. CONTROL HUMIDITY TO MAINTAIN 40% TO 55% RH NON-CONDENSING.

CABLING SYSTEMS

GENERAL:

1. ALL COMPONENTS AND INSTALLATION SHALL COMPLY WITH THE LATEST EDITION OF ANSII/TIA-568.
2. ALL SIGNAL-CARRYING COMPONENTS SHALL BE LISTED BY AN INDEPENDENT TESTING LABORATORY FOR RATED PERFORMANCE AND SHALL BEAR THE APPROPRIATE MARKINGS.
3. ALL CABLE ASSEMBLIES SHALL LISTED AS BEING BE RATED FOR PLACEMENT IN THEIR INTENDED ENVIRONMENTS PER NEC AND SHALL BEAR THE APPROPRIATE CABLE MARKINGS.
4. PROVIDE SUBMITTALS OF MANUFACTURER'S PRODUCT DATA FOR ALL COMPONENTS INTENDED FOR INSTALLATION, INCLUDING ALL CABLE AND CONNECTOR TYPES, CONNECTOR PANELS, RACKS AND CABLE RUNWAY COMPONENTS.

HORIZONTAL STRUCTURED CABLING:

1. PROVIDE HORIZONTAL CABLING TO DATA OUTLETS AS INDICATED IN SYMBOL LEGEND.
2. PROVIDE CATEGORY 6 TYPE CM-LS CABLE CONSTRUCTION RATED FOR DUCT PLACEMENT FOR ALL HORIZONTAL CABLING.
3. TERMINATE ALL CABLE ENDS WITH CATEGORY 6 CONNECTORS.
4. PROVIDE OUTLET FACEPLATE CONSTRUCTED OF SAME MATERIAL AS FOR ELECTRICAL OUTLETS. PROVIDE SAME DEGREE OF MOISTURE RESISTANCE AS SPECIFIED FOR ELECTRICAL OUTLETS.
5. ROUTE ALL HORIZONTAL CABLES TO NEAREST IDF AND TERMINATE ON RACK-MOUNTED PATCH PANELS.
6. CERTIFY ALL CABLES FOR CATEGORY 6 PERFORMANCE AFTER INSTALLATION IS COMPLETE. ANY REWORK AT OUTLETS OR PATCH PANELS WILL NULLIFY PRIOR TESTING AND REQUIRE RE-CERTIFICATION OF AFFECTED CABLES. PROVIDE DETAILED CERTIFICATION REPORT FOR EACH CATEGORY 6 CABLE.
7. PROVIDE (2) CATEGORY 6 PATCH CORDS FOR EACH CATEGORY 6 CABLE INSTALLED. ONE HALF OF PATCH CORD QUANTITY SHALL BE 8 FT. LONG, FOR USE AT THE MDF, AND THE OTHER HALF SHALL BE 3 FT. LONG, FOR USE AT IDFS.

BACKBONE STRUCTURED CABLING:

1. PROVIDE BACKBONE CABLING BETWEEN MDF AND EACH IDF, AND BETWEEN MDF AND CENTRAL LOCATIONS ON 3RD FLOOR (COPPER) AND 4TH FLOOR (FIBER) OF WORTHAM BUILDING.
2. PROVIDE CABLE TYPES AND PAIR/FIBER COUNTS AS INDICATED IN PLANS.
3. TERMINATE COPPER CABLES ON BOTH ENDS ON WALL-MOUNTED TERMINATION BLOCKS AND EXTEND TO RACK-MOUNTED MODULAR PATCH PANELS.
4. CERTIFY COPPER BACKBONE CABLES FOR CATEGORY 5e PERFORMANCE. PROVIDE DETAILED CERTIFICATION REPORT.
5. TERMINATE FIBER OPTIC CABLES ON BOTH ENDS ON DUPLEX-LC FIBER OPTIC ADAPTOR PANELS IN RACK-MOUNTED FIBER OPTIC ENCLOSURES.
6. CERTIFY PERFORMANCE OF ALL OPTICAL FIBERS AT 1310 AND 1550 NM. TOTAL LINK LOSS SHALL NOT EXCEED MANUFACTURER'S FIGURES FOR CHARACTERISTIC INSERTION LOSS FOR FIBER AND CONNECTORS. PROVIDE DETAILED CERTIFICATION REPORT.
7. ANY REWORK AT CABLE TERMINATION WILL NULLIFY PRIOR TESTING AND REQUIRE RE-CERTIFICATION OF AFFECTED CABLES.

CABLING FOR "PARC" SYSTEM:

1. PROVIDE ADDITIONAL CATEGORY 6 CABLING FOR THE PARKING ACCESSED REVENUE CONTROL SYSTEM (PARC) PER THE "PARC" SYSTEM CABLING TABLE ON THIS SHEET.
2. COMPLY WITH ALL REQUIREMENTS FOR HORIZONTAL STRUCTURED CABLING AS GIVEN ABOVE.
3. VERIFY ALL DATA OUTLET LOCATIONS AND COORDINATE INSTALLATION DETAILS WITH SYSTEM EQUIPMENT REQUIREMENTS.

"PARC" SYSTEM CABLING

ADDITIONAL CABLING SCOPE FOR PARKING ACCESSED REVENUE CONTROL (PARC) SYSTEM:

PROVIDE (1) CAT 6 FROM THE NEAREST IDF TO EACH ITEM OF EQUIPMENT IN THE FOLLOWING LIST. PROVIDE (4) CAT 6 TO EACH PARKING BOOTH. VERIFY ALL LOCATIONS AND COORDINATE ALL MOUNTING DETAILS WITH SYSTEM REQUIREMENTS.

PARKING EQUIPMENT - BG, YG & GG GARAGES			
STREET	ENTRANCE	EQUIPMENT	QUANTITY
RUSK	1	AVI	2
		BAR CODE	2
		EXIT VERIFIER	2
		GATES	2
		INTERCOM	2
		KEYPAD	1
		PARKING BOOTH	1
		POS	1
		TICKET SPITTER	1
		NEW RUSK	2
		BAR CODE	4
		EXIT VERIFIER	2
		GATES	4
		INTERCOM	4
		KEYPAD	2
		POS	2
		TICKET SPITTER	2
CAPITOL	4	AVI	3
		BAR CODE	2
		EXIT VERIFIER	1
		GATES	3
		INTERCOM	3
		KEYPAD	2
		PARKING BOOTH	1
		POS	1
		TICKET SPITTER	2
		NEW CAPITOL	5
BAR CODE	2		
EXIT VERIFIER	1		
GATES	2		
INTERCOM	2		
KEYPAD	2		
PARKING BOOTH	1		
POS	1		
TICKET SPITTER	1		
TEXAS	6		
		BAR CODE	2
		EXIT VERIFIER	1
		GATES	2
		INTERCOM	2
		KEYPAD	2
		PARKING BOOTH	1
		POS	1
		TICKET SPITTER	1
		TEXAS	7
BAR CODE	2		
EXIT VERIFIER	1		
GATES	2		
INTERCOM	2		
KEYPAD	2		
PARKING BOOTH	1		
POS	1		
TICKET SPITTER	1		
PRARIE	6 & 8		
		BAR CODE	3
		EXIT VERIFIER	3
		GATES	3
		INTERCOM	3
		KEYPAD	1
		PARKING BOOTH	1
		POS	1
		TICKET SPITTER	2

SYMBOL LEGEND

△	STANDARD WALL-MOUNTED DATA OUTLET. PROVIDE (2) CAT 6 TYPE CM-LS RATED FOR DUCT PLACEMENT. VERIFY LOCATION. PROVIDE ADJACENT DUPLEX POWER OUTLET.*
▲	DATA OUTLET FOR TALK-A-PHONE EMERGENCY PHONE AND CAMERA SYSTEM. PROVIDE (2) CAT 6 TYPE CM-LS RATED FOR DUCT PLACEMENT. VERIFY LOCATION AND COORDINATE INSTALLATION DETAILS WITH SYSTEM EQUIPMENT REQUIREMENTS.
☀	DATA OUTLET FOR WIRELESS ACCESS POINT. FASTEN OUTLET ASSEMBLY TO OVERHEAD DECK STRUCTURE. PROVIDE (2) CAT 6 TYPE CM-LS RATED FOR DUCT PLACEMENT. VERIFY LOCATION.
■	DATA OUTLET FOR PARKING GUIDANCE SYSTEM MATRIX DISPLAY. PROVIDE (2) CAT 6 TYPE CM-LS RATED FOR DUCT PLACEMENT. VERIFY LOCATION AND COORDINATE INSTALLATION DETAILS WITH EQUIPMENT REQUIREMENTS. PROVIDE DISPLAY POWER AS REQUIRED.
⊙	DATA OUTLET FOR SECURITY CAMERA. PROVIDE (1) CAT 6 TYPE CM-LS RATED FOR DUCT PLACEMENT. VERIFY LOCATION AND COORDINATE INSTALLATION DETAILS WITH EQUIPMENT REQUIREMENTS.
⊗	DATA OUTLET RADIO REPEATER. PROVIDE (4) CAT 6 TYPE CM-LS RATED FOR DUCT PLACEMENT. VERIFY LOCATION AND COORDINATE INSTALLATION DETAILS WITH SYSTEM EQUIPMENT REQUIREMENTS.

NOTE: PROVIDE A STANDARD WALL-MOUNTED DATA OUTLET IN ALL ELECTRICAL AND MECHANICAL ROOMS AND AT ALL INTERFACE PANELS FOR BAS AND OTHER SYSTEMS.

UNIT PRICING

1. PROVIDE A UNIT PRICE FOR THE ADDITION OR DELETION OF ONE COMPLETE DATA OUTLET ASSEMBLY, INCLUDING CONDUIT, FOR EACH OF THE DATA OUTLET TYPES INDICATED IN THE SYMBOL LEGEND, ASSUMING THE OUTLET TO BE WITHIN A 200-FOOT RADIUS OF AN IDF.
2. PROVIDE A UNIT PRICE FOR THE ADDITION OR DELETION OF ONE COMPLETE IDF INSTALLATION AS SPECIFIED IN THE PLANS, INCLUDING THE FOLLOWING
 - A. ENCLOSURE/CABINET ASSEMBLY
 - B. AIR CONDITIONER
 - C. ALL INTERNAL COMPONENTS
 - D. ALL CONDUIT, INCLUDING JUNCTION BOX, AS SHOWN IN PLANS
 - E. POWER FOR EQUIPMENT AND AIR CONDITIONER (SEPARATE CIRCUITS)
 - F. TBB AS SPECIFIED FOR GROUNDING AND BONDING SYSTEM

IT / LOW VOLTAGE 03-27-2018

THEATER CENTER GARAGE (BG) REHABILITATION

511 Rusk St., Houston, TX 77002

TRANQUILITY GARAGE (YG) REHABILITATION

500 Rusk St., Houston, TX 77002

CIVIC CENTER GARAGE (GG) REHABILITATION

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Revisions

NO.	DESCRIPTION	DATE

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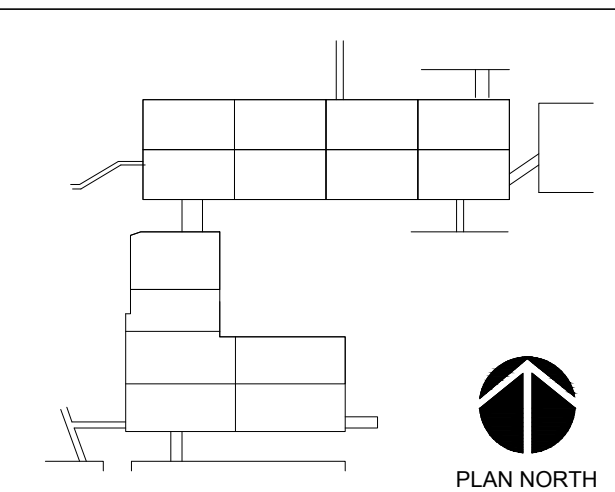
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Key Plan



TELECOM NOTES AND SYMBOLS

BG/YG/ GG-T001

Scale: NTS

TRANQUILITY GARAGE (YG) and THEATER CENTER GARAGE (BG) REHABILITATION

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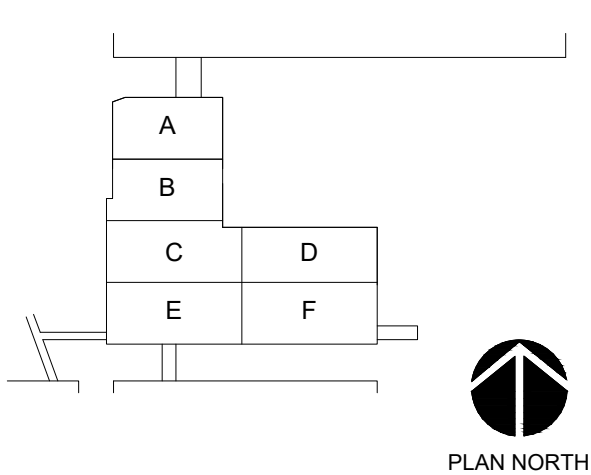
Revisions

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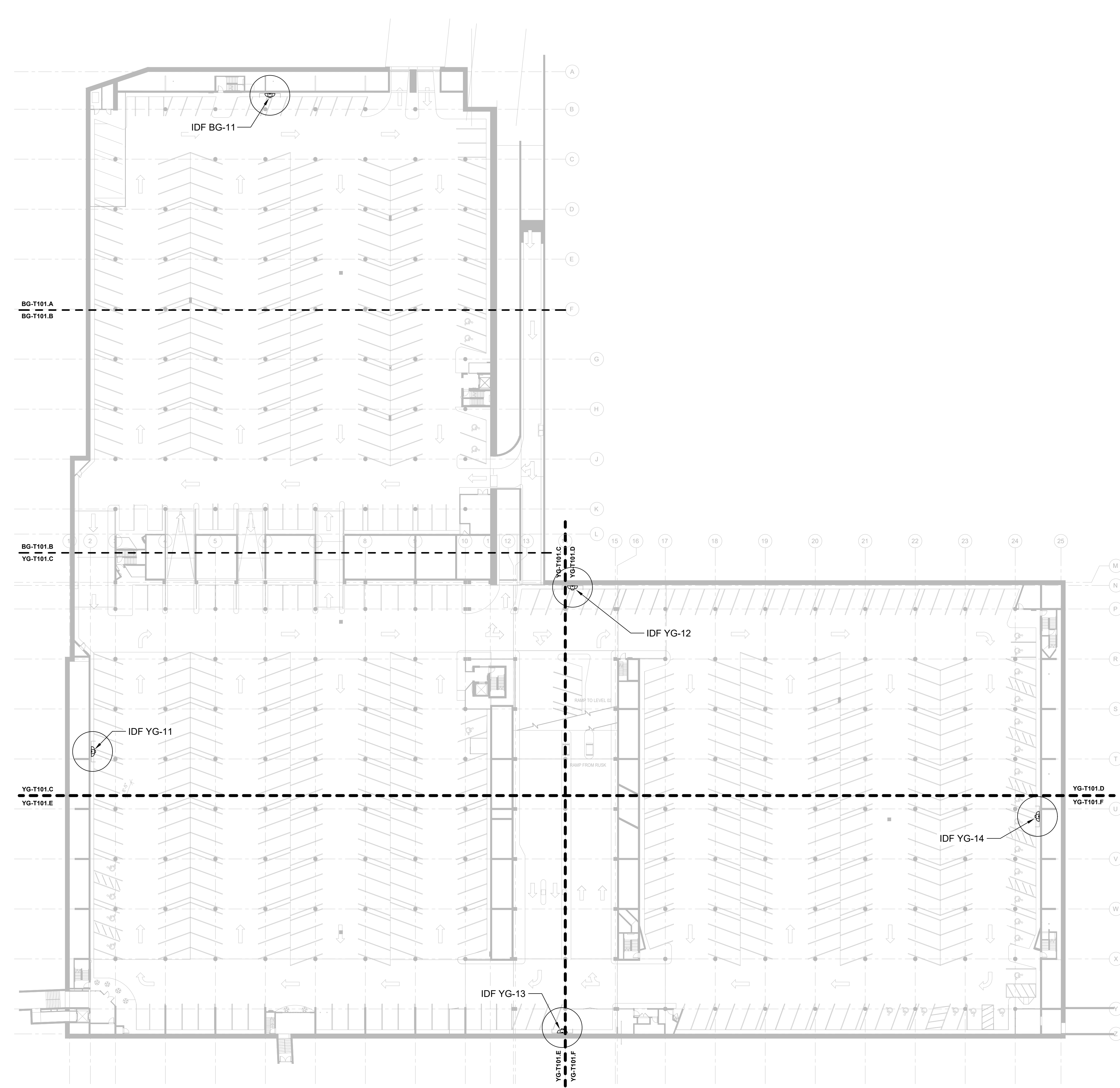
Key Plan



TELECOM PLAN
BASEMENT LEVEL 1
OVERALL

BG/YG-T101

Scale: 1/32" = 1'-0"



1 Basement Level 1 - Overall
1/32" = 1'-0"

