

COMMUNITY DEVELOPMENT DEPARTMENT

45175 Ten Mile Road Novi, MI 48375 (248) 347-0415 Phone (248) 735-5600 Facsimile www.cityofnovi.org

ZONING BOARD OF APPEALS STAFF REPORT

FOR: City of Novi Zoning Board of Appeals

ZONING BOARD APPEALS DATE: October 11, 2022

REGARDING: 46844 West 12 Mile Road, Parcel # 50-22-09-300-032 (PZ22-0046)

BY: Larry Butler, Deputy Director Community Development

GENERAL INFORMATION:

Applicant

Andrew Falzarano – Crown Enterprises LLC

<u>Variance Type</u> Dimensional Variance

Property Characteristics

Zoning District:	This property is zoned General Industrial (I-2)
Location:	Twelve Mile Road east of Napier
Parcel #:	50-22-09-300-032

<u>Request</u>

The applicant is requesting two variances from the City of Novi Zoning Ordinance. From Section 3.1.19.D for building height variance for two (2) silos with a proposed building height of 90' from finish grade (building height standard is 60 feet, variance of 30 feet). Also, from Section 5.4.3 to allow a loading space in the front yard. These variances will accommodate the building of Novi Concrete Plant. This property is zoned General Industrial (I-2).

II. STAFF COMMENTS:

III. RECOMMENDATION:

The Zoning Board of Appeals may take one of the following actions:

difficulty requiring _____

- (a) Without the variance Petitioner will be unreasonably prevented or limited with respect to use of the property because_____
- (b) The property is unique because_____

		·
	(c)	Petitioner did not create the condition because
	(d)	The relief granted will not unreasonably interfere with adjacent or surrounding properties because
	(e)	The relief if consistent with the spirit and intent of the ordinance because
	(f)	The variance granted is subject to:
		1
		2.
		3
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		···
2. I	mo	ve that we deny the variance in Case No. PZ22-0046 , sought by
pi pi	ractic	cal difficulty requiring
·	(a)	The circumstances and features of the property including are not unique because they exist generally throughout the City.
	(b)	The circumstances and features of the property relating to the variance request are self-created because
	(c)	The failure to grant relief will result in mere inconvenience or inability to attain higher economic or financial return based on Petitioners statements that
	(d)	The variance would result in interference with the adjacent and surrounding properties by
	(e)	Granting the variance would be inconsistent with the spirit and intent of the ordinance to
		•

Should you have any further questions with regards to the matter please feel free to contact me at (248) 347-0417.

Larry Butler - Deputy Director Community Development - City of Novi



45175 Ten Mile Road Novi, MI 48375 (248) 347-0415 Phone (248) 735-5600 Facsimile www.cityofnovi.org

ZONING BOARD OF APPEALS

APPLICATION

RECEIVED

AUG 3 0 2022

ROJECT NAME / SUBDIVISION	dress of subject ZBA	Case)	Application Fee:	<u> </u>
Novi Concrete Plant			Meeting Date: (CTOBER 1,21
6844 West 12 Mile Road		LOT/SIUTE/SPACE #		02 00110
IDWELL # 50-22-09300032	May be	obtain from Assessing	ZBA Case #: PZ	22-0046
ROSS ROADS OF PROPERTY	Dapan			
THE PROPERTY WITHIN A HOMEOWNER'S A	SSOCIATION JURISDICTION	? REQUEST IS FOR:		
YES 🗹 NO		🗆 RESIDENTIAL 🗹 CC	MMERCIAL 🗌 VACAN	t property 🗖 Signage
does your appeal result from a no	DTICE OF VIOLATION OI	r citation issued?	yes 🗹 no	
I. APPLICANT INFORMATION		The second second		
A. APPLICANT	EMAIL ADDRESS	leasing app	CELL PHONE NO.	
JAME	araizarano@crownenterpr		TELEPHONE NO.	
Andrew Falzarano			586-939-7000, ext. 2136	
DRGANIZATION/COMPANY			FAX NO. 586-467-0114	
DDRESS		CITY	STATE	ZIP CODE
12225 Stephens		Warren	MI	48089
B. PROPERTY OWNER CHECK	HERE IF APPLICANT IS AL	SO THE PROPERTY OWNER		
dentify the person or organization that while the subject property:	EMAIL ADDRESS	Provisesing com	CELL PHONE NO. 248-978-2666	
IAME	alazarano@orownon.c		TELEPHONE NO.	
Crown Enterprises LLC			586-939-7000, ext. 213	36
Crown Enterprises LLC			FAX NO	
ADDRESS		CITY	STATE	ZIP CODE
12225 Stephens		Warren	M	48089
A. ZONING DISTRICT		and the second		
\square R-A \square R-1 \square R-2	🗆 R-3 🛛 R-4	□ RM-1 □ RM-2	ПМН	
B. VARIANCE REQUESTED				
NDICATE ORDINANCE SECTION (S) ANI	D VARIANCE REQUESTE	D:		
1. Section Sec. 3.1.19.D	Variance requested	Height variance		
2. Section Sec. 5.4.3	Variance requested	Loading spaces in	the Front Yard	
3. Section	Variance requested			
4. Section	Variance requested	4		
A. FEES				and the state of the
 Sinale Family Residential (Existing) 	na) \$200 🗌 (With Vic	plation) \$250 🗌 Single Fo	mily Residential (Nev	v) \$250
Multiple/Commercial/Industria	L\$300 [(With Vic	$(ation)$ \$400 \square Signs \$3	\square \square (With Violation	1 \$400
		Meetings (At discretion of		η φπου
B. DRAWINGS 1-COPY & 1 DIC		D AS A PDF	BOAIA) 4000	
 Dimensioned Drawings and Plan 	s	 Existing & propos 	ed distance to adjac	cent property lines
Site/Plot Plan		 Location of existing 	ng & proposed signs	, if applicable
Existing or proposed buildings or	addition on the prov	perty 🔹 Floor plans & ele	vations	



ZONING BOARD OF APPEALS APPLICATION

V. VARIANCE

A. VARIANCE (S) REQUESTED

There is a five-(5) hold period before work/action can be taken on variance approvals.

B. SIGN CASES (ONLY)

Your signature on this application indicates that you agree to install a **Mock-Up Sign** ten-(10) days before the schedule ZBA meeting. Failure to install a mock-up sign may result in your case not being heard by the Board, postponed to the next schedule ZBA meeting, or cancelled. A mock-up sign is **NOT** to be actual sign. Upon approval, the mock-up sign must be removed within five-(5) days of the meeting. If the case is denied, the applicant is responsible for all costs involved in the removal of the mock-up or actual sign (if erected under violation) within five-(5) days of the meeting.

C. ORDINANCE

City of Novi Ordinance, Section 3107 – Miscellaneous

No order of the Board permitting the erection of a building shall be valid for a period longer than one-(1) year, unless a building permit for such erection or alteration is obtained within such period and such erection or alteration is started and proceeds to completion in accordance with the terms of such permit.

No order of the Board permitting a use of a building or premises shall be valid for a period longer than one-hundred and eighty-(180) days unless such use is establish within such a period; provided, however, where such use permitted is dependent upon the erection or alteration or a building such order shall continue in force and effect if a building permit for such erection or alteration is obtained within one-(1) year and such erection or alteration is started and proceeds to completion in accordance with the terms of such permit.

D. APPEAL THE DETERMINATION OF THE BUILDING OFFICIAL

PLEASE TAKE NOTICE:

The undersigned hereby appeals the determination of the Building Official / Inspector or Ordinance made

CONSTRUCT NEW HOME/BUILDING	ADDITION TO EXISTING HOME/BUILDING	SIGNAGE
-----------------------------	------------------------------------	---------

ACCESSORY BUILDING

VI. APPLICANT & PROPERTY SIGNATURES

A. APPLICANT	
Applicant Signature	8/30/22 Date
3. PROPERTY OWNER	
f the applicant is not the owner, the property owner must read and sign below: The undersigned offirms and acknowledges that he, she or they are the owner(s) of the p application, and is fare aware of the contents of this application and related enclosures.	roperty described in this
Property Owner Signature	Date
Property Owner Signature VII. FOR OFFICIAL USE ONLY	Date
Property Owner Standture VII. FOR OFFICIAL USE ONLY DECISION ON APPEAL:	Date
Property Owner Standard VII. FOR OFFICIAL USE ONLY DECISION ON APPEAL: GRANTED DENIED	Date
Property Owner Standard VII. FOR OFFICIAL USE ONLY DECISION ON APPEAL: GRANTED DENIED The Building Inspector is hereby directed to issue a permit to the Applicant upon the follow	Date



Community Development Department 45175 Ten Mile Road Novi, MI 48375 (248) 347-0415 Phone (248) 735-5600 Facsimile www.cityofnovi.org

REVIEW STANDARDS DIMENSIONAL VARIANCE

The Zoning Board of Appeals (ZBA) will review the application package and determine if the proposed Dimensional Variance meets the required standards for approval. In the space below, and on additional paper if necessary, explain how the proposed project meets each of the following standards. (Increased costs associated with complying with the Zoning Ordinance will not be considered a basis for granting a Dimensional Variance.)

Standard #1. Circumstances or Physical Conditions.

Explain the circumstances or physical conditions that apply to the property that do not apply generally to other properties in the same zoning district or in the general vicinity. Circumstances or physical conditions may include:

a. Shape of Lot. Exceptional narrowness, shallowness or shape of a specific property in existence on the effective date of the Zoning Ordinance or amendment.
 If applicable applicable

and/or

b. Environmental Conditions. Exceptional topographic or environmental conditions or other extraordinary situations on the land, building or structure.

and/or

c. Abutting Property. The use or development of the property immediately adjacent to the subject property would prohibit the literal enforcement of the requirements of the Zoning Ordinance or would involve significant practical difficulties.
 If applicable Applicable Applicable

Standard #2. Not Self-Created.

Describe the immediate practical difficulty causing the need for the Dimensional Variance, that the need for the requested variance is not the result of actions of the property owner or previous property owners (i.e., is not self-created).

Section 5.4.3 placement of a loading area in front yard: Exterior loading operation is integral to the plant operation. A 12' high concrete containment wall will be utilized for material storage; the wall additionally acts as an obscuring screen wall.

Section 3.1.19.D exceeding maximum building height: Variance is requested for a necessary component of the operation; the gravity fed cement silo's. The location of the silo's provides substantial set back from Twelve Mile, decreasing visibility.

Standard #3. Strict Compliance.

Explain how the Dimensional Variance in strict compliance with regulations governing area, setback, frontage, height, bulk, density or other dimensional requirements will unreasonably prevent the property owner from using the property for a permitted purpose, or will render conformity with those regulations unnecessarily burdensome.

Section 5.4.3 placement of a loading area in front yard: Relocation of the loading from the screened front yard would expose other yard operation activities; truck queuing, washout, etc.

Section 3.1.19.D exceeding maximum building height: Proposed building height is at elevation of 50' from finish grade; Protruding through the building is two cement silo's. The silo's measure a height of 90' from finish grade. The silo's are a necessary component of the operation; a variance will be required for the feasibility of this project.

Standard #4. Minimum Variance Necessary.

Explain how the Dimensional Variance requested is the minimum variance necessary to do substantial justice to the applicant as well as to other property owners in the district.

The proposed siting of the building, along with the aggregate screen wall will greatly enhance the appearance of the project.

Standard #5. Adverse Impact on Surrounding Area.

Explain how the Dimensional Variance will not cause an adverse impact on surrounding property, property values, or the use and enjoyment of property in the neighborhood or zoning district.

The neighboring property to the east & west; perform similar operations to our proposal. No impact should be noted under approval of the variances

LEGAL DESCRIPTION:

(BY NOWAK & FRAUS)

LAND SITUATED IN THE CITY OF NOVI, COUNTY OF OAKLAND, STATE OF MICHIGAN DESCRIBED AS FOLLOWS:

PART OF THE SOUTHWEST 1/4 OF SECTION 9, TOWN 1 NORTH, RANGE 8 EAST, BEGINNING AT POINT DISTANT SOUTH 89 DEGREES 20 MINUTES OO SECONDS WEST, 584.15 FEET FROM THE SOUTH 1/4 CORNER; THENCE NORTH OO DEGREES 02 MINUTES 05 SECONDS EAST, 1762.97 FEET; THENCE NORTH 89 DEGREES 04 MINUTES 55 SECONDS EAST, 495 FEET; THENCE SOUTH 00 DEGREES 02 MINUTES 05 SECONDS WEST, 1765.13 FEET TO BEGINNING.

<u>SITE DATA:</u> PARCEL #: GROSS AREA NET AREA	22-09-300-032 20.04 ACRES (873,159 SQ.FT.) 9.92 ACRES (431,978 SQ.FT.)
<u>SITE ZONING:</u> Zoning district	I-1 : LIGHT INDUSTRIAL DISTRICT AND I-2 : GENERAL INDUSTRIAL
DEVELOPMENT STANDARDS: MINIMUM LOT AREA MINIMUM LOT WIDTH MINIMUM LOT COVERAGE	EXCEPT WHERE OTHERWISE PROVIDED IN THIS ORDINANCE, THE MINIMUM LOT AREA AND WIDTH, AND THE MAXIMUM PERCENT OF LOT COVERAGE SHALL BE DETERMINED ON THE BASIS OF OFF-STREET PARKING, LOADING, GREENBELT SCREENING, YARD SETBACK OR USABLE OPEN SPACE REQUIREMENTS AS SET FORTH IN THIS ORDINANCE
<u>SETBACKS (I–1):</u> FRONT YARD REAR YARD SIDE YARD MAX. BUILDING HEIGHT	REQUIRED 40' 20' 20' 40'
<u>SETBACKS (I-2):</u> FRONT YARD REAR YARD SIDE YARD MAX. BUILDING HEIGHT	100' 50' 50' 60'

SITE SOILS INFORMATION:

ACCORDING TO THE USDA NATURAL RESOURCES CONSERVATION SERVICE WEB SITE SOIL SURVEY FOR OAKLAND COUNTY, THE SITE CONSISTS OF THE FOLLOWING SOIL TYPES:

10B MARLETTE SANDY LOAM, 1 TO 6 PERCENT SLOPES 11B CAPAC SANDY LOAM. O TO 4 PERCENT SLOPES

NAME OF NEAREST WATERCOURSE: DAVIS DRAIN

DISTANCE TO NEAREST WATERCOURSE IN FEET: 75'+

CITY OF NOVI FIRE DEPARTMENT NOTES:

ALL WEATHER ACCESS ROADS CAPABLE OF SUPPORTING 35 TONS ARE TO BE PROVIDED FOR FIRE APPARATUS PRIOR TO CONSTRUCTION ABOVE THE FOUNDATION.

2. ALL WATER MAINS AND FIRE HYDRANTS ARE TO BE INSTALLED AND BE IN SERVICE PRIOR TO CONSTRUCTION ABOVE THE FOUNDATION.

3. THE BUILDING ADDRESS IS TO BE POSTED FACING THE STREET THROUGHOUT THE CONSTRUCTION. THE ADDRESS IS TO BE AT LEAST 3 INCHES HIGH ON CONTRASTING BACKGROUND.

NOTES:

- DIRECT CONSUMER RETAIL IS PROHIBITED.
- 2) LONG TERM DELIVERY TRUCK PARKING IS PROHIBITED.
- 3) USE OF BUILDING MUST COMPLY WITH SECTION 5.14 PERTAINING TO LIGHTING, NOISE VIBRATION AND ODOR.
- 4) IF DEWATERING IS ANTICIPATED OR ENCOUNTERED DURING CONSTRUCTION, A DEWATERING PLAN MUST BE SUBMITTED TO THE ENGINEERING DIVISION FOR REVIEW.

DEVELOPER

DANIEL ONIFER, (586)939-7000 CROWN ENTREPRISES, INC. 12225 STEPHENS ROAD WARREN, MI 48089

BENCHMARKS

(GPS DERIVED - NAVD88) RR ŠPIKE S. FACE ELEVATION ELEV. - 964.26

NOVI BENCHMARK 931 (DERIVED - NAVD83)

BENCH TIE SET IN SOUTH FACE OF POWER POLE LOCATED 70 FEET WEST OF DRIVE #40844 12 MILE ROAD AND 30 FEET NORTH OF CENTERLINE OF 12 MILE ROAD. ELEV. - 966.29

FLOODPLAIN NOTE

BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN PER FLOOD INSURANCE RATE MAP NUMBER 26125C0607F, DATED SEPTEMBER 29, 2006.

ENGINEER

FADI KHALIL, (313)258-2036 ANGLE DESIGN & ENGINEERING LLC. 22417 CRANBROOKE DRIVE, NOVI, MI 48375

	Characteristic	Existing Conditions	Proposed Conditions
	Total Development Area (ac)	11.99	11.99
	Impervious Area (ac)	0	9.53
	Total Pervious Area (ac)	11.99	2.47
	Runoff Coefficient C		0.81
Data	Pervious Area Breakdown By Cover Type		
Jse	Meadow/Fallow/Natural Areas (non-Cultivated) (ac)	0	0
ם ר	Predominant NRCS Soil Type (A,B,C, or D)	Type B/D	N/A
Lai		·	•
ea/	Improved Areas (Turf Grass, Landscape, Row Crops)	11.99	11.99
A	Predominant NRCS Soil Type (A,B,C, or D)	Туре В	Туре В
sno			
2	Wooded Areas	0.00	0
<u>х</u>	Predominant NRCS Soil Type (A,B,C, or D)	Туре В	N/A
	Pro	posed Pond Area (ACRES)	1.7
	Required	CPVC Volume (cubic feet)	N/A
	Provided	CPVC Volume (cubic feet)	N/A
	Required ED Volume (cubic feet)		66,67
	Provide	d ED Volume (cubic feet)	66,67

LEGEND

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 $TW - x \times x \times x = PROPOSED TOP OF WALK$

969 = PROPOSED CONTOUR LINE

----= EXISTING CONTOUR LINE

— san — san — = PROPOSED SANITARY PIPE

-----st-----= PROPOSED STORM PIPE

---- = PROPOSED HIGH POINT LINE

PROPOSED NOVI CONCRETE PLANT

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CS-´	$ 0\rangle$
CS-´	0
CG-´	10
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CS-J	30
CS-	30
CS-5	50
CS-	50
CW-	10
REFEREN	ICE

a. E-1

d. E-4













CLIENT
CROWN ENTERPRISES INC
COPYRIGHT This drawing has been prepared solely for the intended use, thus any reproduction or distribution for any purpose other than authorized by Angle Design is forbidden. Written dimensions shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job, and Angle Design shall be informed of any variations from the dimensions and conditions shown on the drawing. Shop drawings shall be submitted to Angle Design for general conformance before proceeding with fabrication.
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Angle Design & Engineering 22417 Cranbrooke Drive. Novi, Michigan. 48375 Phone: (313) 258-2036 . Email: Fadi@AngledesignLLC.com
PROJECT NOVI CONCRETE PLANT 46844 12 MILE RD. NOVI, MI 48377 SECTION 9
PROJECT NO: SCALE: 1"=50' 2022-102 CHECKED BY: F. K. DRAWN BY: CHECKED BY: F. K. PROJECT MGR: APPROVED BY: F. K.
SHEET TITLE CIRCULATION PLAN
SHEET NUMBER ISSUE

GENERAL GRADING AND EARTHWORK NOTES:

- 1. CONTRACTOR TO FIELD VERIFY ALL EXISTING TREES AND BRUSH AND REMOVE ALL THAT ARE NECESSARY TO GRADE SITE.
- 2. THE STAGING OF CONSTRUCTION ACTIVITIES SHALL OCCUR ONLY WITHIN THE SITE BOUNDARIES. ANY CONSTRUCTION ACTIVITIES OUTSIDE OF THE SITE BOUNDARIES SHALL BE AT THE SOLE RESPONSIBILITY AND RISK OF THE CONTRACTOR.
- 3. ALL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL MEET THE REQUIREMENTS OF THE CITY OF NOVI. AN EROSION CONTROL PERMIT MUST BE SECURED FROM THE CITY PRIOR TO CONSTRUCTION.
- 4. ALL EARTHWORK AND GRADING OPERATIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE SOILS INVESTIGATION AND REPORT PREPARED BY PEA, INC. DATED SEPTEMBER 28, 2018.
- 5. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ADJUST THE TOP OF ALL EXISTING AND PROPOSED STRUCTURES (MANHOLES, CATCH BASINS, INLETS, GATE WELLS ETC.) WITHIN GRADED AND/OR PAVED AREAS TO FINAL GRADE SHOWN ON THE PLANS. ALL SUCH ADJUSTMENTS SHALL BE INCIDENTAL TO THE JOB AND WILL NOT BE PAID FOR SEPARATELY.
- 6. ALL SLOPES EXCEEDING 1:6 MUST BE STABILIZED BY SODDING OR BY PLACING A MULCH BLANKET PEGGED IN PLACE OVER SEED.
- IN ACCORDANCE WITH THE LANDSCAPE PLANS. PROVIDE A MINIMUM OF 3" OF TOPSOIL IN THESE AREAS UNLESS OTHERWISE NOTED.
- WITHIN AND ADJACENT TO THE SITE. BACKFILL FOR EXISTING UTILITY HAVE SOFT, UNSTABLE OR UNSUITABLE BACKFILL MATERIAL, IN THE OPINION OF THE GEOTECHNICAL ENGINEER, THAT ARE TO BE WITHIN THE ZONE OF INFLUENCE OF PROPOSED BUILDINGS OR PAVEMENT SHALL BE COMPLETELY EXCAVATED AND BACKFILLED WITH SUITABLE MATERIAL.



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<u>F. K.</u> SHEET D PI	RAIN LAN	JA(GE A	REA
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SAND BACKFILL NOTE:

ALL UTILITIES UNDER PAVEMENT OR WITHIN 3' OF THE EDGE OF PAVEMENT (OR WITHIN THE 45° LINE OF INFLUENCE OF PAVEMENT) SHALL HAVE M.D.O.T. CLASS II GRANULAR BACKFILL COMPACTED TO 95% MAX. DRY DENSITY (ASTM D-1557)

PER THE TEN STATES STANDARDS ARTICLE 8.8.3, ONE FULL 20-FOOT PIPE LENGTH OF WATER MAIN SHALL BE USED WHENEVER STORM SEWER OR SANITARY SEWER IS CROSSED, AND THE PIPE SHALL BE CENTERED ON THE CROSSING, IN ORDER TO ENSURE 10-FOOT SEPARATION BETWEEN WATER MAIN AND SEWERS.

CITY OF NOVI STANDARDS AND SPECIFICATIONS.

WATER MAIN QUANTITIES							
ITEM	QUANTITY	UNITS					
2" COPPER 'K'	30	LF					
4" WATER PIPE	30	LF					
6" WATER PIPE	86	LF					
8" WATER PIPE	2,289	LF					
16" WATER PIPE	1,122	LF					
FIRE HYDRANT	8	EACH					
16"X24 TAP SLEEVE AND VALVE	1	EACH					
VALVE & BOX	2	EACH					
8" WATER VALVE	5	EACH					
16" WATER VALVE	3	EACH					

UTILITY CROSSING TABLE						
	STORM	SANITARY	CLEARANCE			
	BOTTOM	ТОР	(FEET)			
XING-3	962.48	957.33	5.15			

	STORM	WATER	CLEARANCE		
	BOTTOM	ТОР	(FEET)		
XING-1	950.39	948.35	2.04		
XING-6	961.20	959.17	2.03		
XING-7	960.84	959.04	1.80		
XING-8	956.66	954.65	2.01		

	SANITARY BOTTOM	WATER TOP	CLEARANCE (FEET)
XING-4	956.95	955.43	1.52
XING-5	960.42	958.63	1.79

	SANITARY	STORM	CLEARANCE	
	воттом	ТОР	(FEET)	
XING-2	954.68	953.10	1.58	







NOTE:

PER THE TEN STATES STANDARDS ARTICLE 8.8.3, ONE FULL 20-FOOT PIPE LENGTH OF WATER MAIN SHALL BE USED WHENEVER STORM SEWER OR SANITARY SEWER IS CROSSED, AND THE PIPE SHALL BE CENTERED ON THE CROSSING, IN ORDER TO ENSURE 10-FOOT SEPARATION BETWEEN WATER MAIN AND SEWERS.







		SAND DACKELL NOTE.					SA	NITARY SEWER LOA	D CALCULATION		
		SAND BACKFILL NUTE:				Total Number o	f equivalent u	inits REU	3.2	REU	
SANITARY S	STRUCTURES	ALL UTILITIES UNDER PAVEMENT O OF PAVEMENT (OR WITHIN THE 45	0R WITHIN 3'O 5° LINE OF INFL	F THE ED UENCE OF	GE	Population Total Populatio	n		3.5 11.2	person/lot/unit persons	0 50 100 Feet
STRUCTURE NAME	.: DETAILS:	PAVEMENT) SHALL HAVE M.D.O.T.	CLASS II GRAN	ULAR BACI	KFILL	Sanitary Flow			100	Gallon/Day/Capita	
SAN MH-1	RIM = 959.64 10" W INV 953.51	COMPACIED IO 95% MAX. DRY DE	NSILY (ASIM L)-1557)		Average Sanita	ry Flow		1120	GPD	
	10" E INV. 953.41	NOTE:				Peak Factor PF=	:18+sart(P/100)0)/4+sart(P/1000)	0.0017 4.41	CFS cfs	
	48" DIA RIM = 960.55					Peak Sanitary F	low = (ave. flo	w X Peak Factor of 4	4) 0.0076	cfs	
SAN MH-2	10" W INV. 954.29 10" E INV. 953.97	PUBLIC AND SHALL BE LOCATED I	larger in dian N A 20' Wide	EASEMENT	. IO BE	Size of Sanitary	Sewer Pipe		8	Inches	
	48" DIA			1		Slope Area			0.40%	Sa ft	LEGEND
SAN MH-3	RIM = 960.86 10" W INV. 955.00	NOTE:				Hydraulic Radiu	s = D/4 feet		0.17	feet	=SANITARY F
	10" E INV. 954.90	ALL WORK SHALL CONFORM TO TH	HE CURRENT			Manning Coeffi	cient		0.011		
SAN MH-4	RIM = 964.18 10" W INV 956.06	CITY OF NOVI STANDARDS AND SF	PECIFICATIONS.			Canacity =(1.48	5/n)vR^(2/3)v	۵ _× ς^∩ 5	0.90	CES	=BACKFILL
	10" E INV. 955.96	NOTE:					5/11/11 (2/5/17	AX3 0.3	0.50	CI 5	
	48" DIA RIM = 964.91	TRAFFIC SIGNS IN THE ROAD COM	MISSION FOR			Velocity			2.59	ft/sec	
SAN MH-5	10" W INV. 956.24 8" N INV. 956.35	OAKLAND COUNTY (RCOC) RIGHT-	OF-WAY WILL					BIF			
	10" E INV. 956.36	NOTE.									
SAN MH-6	$48^{"}$ DIA RIM = 965.75					воттом	ТОР	(FEET)			
	10 E INV. 956.53	LEAST 5 FEET DEEP WHERE UNDER	RIED AI R THE		XING-3	962.48	957.33	5.15			
SAN MH-7	RIM = 965.43 8" N INV. 956.94	INFLUENCE OF PAVEMENT.									
	8" S INV. 956.84	NOTE:				CTODM4		CLEADANCE			
SAN MH-8	48" DIA RIM = 968.73	CONTRACTOR TO VERIFY ALL QUAN	ITITIES.			BOTTOM		(FFFT)			
SAN MIT U	8" N INV. 957.78 8" S INV. 957.68				XING-1	950.39	948.35	2.04			.34°05"W 427.06
	48" DIA				XING-6	961.20	959.17	2.03			
SAN MH-9	8" N INV. 959.21				XING-7	960.84	959.04	1.80			
	48" DIA				XING-8	956.66	954.65	2.01			
SAN MH-10	RIM = 967.30 6" E INV. 960.35										
	8" W INV. 960.29 8" S INV. 960.19	SANITARY QUA	NTITIES			SANITARY	WATER	CLEARANCE			
	48" DIA	ITEM	QUANTITY	UNITS		воттом	ТОР	(FEET)		.67	
SAN MH-11	8" N INV. 961.66	6" PVC SDR 23.5	52	LF	XING-4	956.95	955.43	1.52		W 247	
	0 E INV. 900.30	8" PVC SDR 26	939	LF	XING-5	960.42	958.63	1.79		5.45'52"	
		10" PVC SDR 26	1,081							S S S	21021021021021021002100210021002100210021000_2100000000
		48 SAN WANHULE		EACH		SANITARY	STORM	CLEARANCE	12-12-	1S10	
						BOTTOM	ТОР	(FEET)			
					XING-2	954.68	953.10	1.58			
					(K) (K)	M"90,70.00S	TO STA			15	
(\mathbf{x})											
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											INDICATES COMPACTED SAND
\overline{X}				N N	Notes 1						
				52'- PVC SDR 23	6" @ 1.00% .5 SAN PIPE	20' SANIT	ARY				SAN MH-8
	<u> </u>				0+60		245'-8" @			15 - 3.	32'-8" @ 0.40% SDR 26 SAN PIPE
					SAN MH-10	20.0 [°]	PVC SDR 26	SAIN FIFE	16+00	15100 15100	
						45'-8'	° 0.60%	m - m	WM WW	M WM	
<u>· (x)</u>	·· \		WA			PVC S	DR 26 SAN PIPE				
<u>\</u>	GKAVEL		and an			SAN MH-11			,26.29	/1 M.92,32,30	*





NOTE:

THE SANITARY	IFADS WILL BE BLIRIED AT
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IFAST 5 FFFT	DEEP WHERE LINDER THE
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INFLUENCE OF	PAVEMENT
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THE SANITARY LEADS WILL BE BURIED AT LEAST 5 FEET DEEP WHERE UNDER THE INFLUENCE OF PAVEMENT.





V: 1"=3'

CLIENT
CROWN ENTERPRISES INC
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ISSUESNo.DESCRIPTIONDATE1PRE APPLICATION SET02-27-20222PRELIMINARY SITE PLAN06-07-20223REVISED PRELIMINARY SET08-09-20224
No concilión No co
MISS DIG 811
CONSULTANTS
SEAL OF MICANOR FADI A. KHALIL ENGINEER NO. 53176
Angle Design & Engineering 22417 Cranbrooke Drive. Novi, Michigan. 48375 Phone: (313) 258-2036 . Email: Fadi@AngledesignLLC.com
PROJECT NOVI CONCRETE PLANT 46844 12 MILE RD. NOVI, MI 48377 SECTION 9
PROJECT NO: 2022-102 SCALE: 1"=30'
DRAWN BY: CHECKED BY: M. K. F. K. PROJECT MGR: APPROVED BY:
F. K. F.K. SHEET TITLE
SANITARY SEWER PROFILE SHEETS

ISSUE

					13, (K)	.2971 W"30'20'002	33'-30" @ 0.30% C76 CL IV	MH-5
	CLAR CLAR	WETLA	ND LIMIT	174'-30" @ 0.10%			48'−36" @ 0.	13%
		CB-4-		C76 CL IV	× 59'-3	0" @ 0.10%∠ _C76 CL IV CB-2-	C76 C -CB-1 	L IV MH-1
WE BL	C76 CL C76 CL	MH-2- -5 15" @ 0.24%	137'-18" © 0. С76 СЦ <u>IV</u> 20к ат <u></u> талк +09 +00	20% 9.42% >			PROVIDE A FOUR-FOOT-DEEP SUMP AND AN OIL/GAS SEPARATOR	110'-24 С76 8+00 СВ-13
××××	12" @ 0.32%_/	03,-12" © 0.32%		2±00 173'-18" @ C76 CL I	118'-6" © 1.00% PVC			107'-15" © 0.60%
	C76 CL IV CB-6 CCE ≤ CCE ≤ CE = CE =	CB-8		-CB-9 			-CB-15 104'-12"	C76 CL IV
\otimes	× CB-7-		CB- -11	10= .55% CB-12-	Z76 CL IV			86'-12" @ 0.5 C76 CL IV
WETLANI	D LIMIT			0			51 SAN SAN SAN SAN	CB-17
			им	ума — има				
	STORM STR	RUCTURES		STORM STR	RUCTURES		STORM STR	RUCTURES
	CB-1	COVER: EJ 7045 TYPE M1 60" DIA RIM = 963.74 30" N INV. 956.56 30" S INV. 956.56		CB-10	COVER: EJ 1040 TYPE M1 48" DIA RIM = 964.29 12" S INV. 959.13 12" NW INV. 959.13 15" E INV. 958.93		CB-19	COVER: EJ 1040 TYPE M1 48" DIA RIM = 967.04 15" N INV. 958.33 18" W INV. 958.13 24" E INV. 957.73
	CB-2	COVER: EJ 7045 TYPE M1 60" DIA RIM = 964.03 30" N INV. 956.62 30" S INV. 956.62 COVER: EJ 7045		CB-11	COVER: EJ 7045 TYPE M1 48" DIA RIM = 965.41 12" SE INV. 959.40 COVER: EJ 1040		CB-20	COVER: EJ 1040 TYPE M1 48" DIA RIM = 968.19 15" SW INV. 958.50 18" E INV. 958.30
	CB-3	TYPE M1 60" DIA RIM = 963.41 18" N INV. 957.59 18" W INV. 957.59 30" S INV. 956.79		CB-12	TYPE M1 48" DIA RIM = 964.84 6" S INV. 961.00 12" N INV. 959.37 COVER: EJ 1040		CB-21	COVER: EJ 7045 TYPE M1 48" DIA RIM = 968.57 12" S INV. 959.63 12" N INV. 959.63
	CB-4	COVER: EJ 7045 TYPE M1 60" DIA RIM = 962.40 18" W INV. 957.97 18" S INV. 957.87		CB-13	TYPE M1 60" DIA RIM = 964.32 24" S INV. 957.12 24" E INV. 957.02 COVER: E.L 1040		CB-22	COVER: EJ 7045 TYPE M1 48" DIA RIM = 965.24 12" N INV. 960.13
	CB-5	COVER: EJ 7045 TYPE M1 48" DIA RIM = 963.44 12" W INV. 958.70 15" S INV. 958.50		CB-14	TYPE M1 48" DIA RIM = 965.97 12" N INV. 959.17 12" W INV. 960.90 15" S INV. 958.97		ES-1 ES-2	36" NW INV. 956.01 30" DIA 30" N INV. 955.88
		COVER: EJ 7045 TYPE M1 48" DIA			COVER: EJ 1040 TYPE M1 48" DIA		ES-3	30" DIA 30" S INV. 954.66
	СВ-7	RIM = 964.39 12" W INV. 959.02 12" E INV. 959.02 COVER: EJ 7045 TYPE M1 48" DIA		CB-15	RIM = 965.60 12" NW INV. 960.60 6" N INV. 961.00 12" S INV. 959.80 COVER: EJ 1040 TYPE M1		MH-1	COVER: EJ 1040 TYPE B 72" DIA RIM = 965.69 24" W INV. 956.87 30" N INV. 956.47
	CB-8	RIM = 965.89 12" E INV. 959.34 COVER: EJ 1040 TYPE M1 48" DIA RIM = 964.15 12" E INV 958.81		CB-16 CB-17	48" DIA RIM = 966.28 12" SE INV. 961.08 COVER: EJ 1040 TYPE M1 48" DIA RIM = 967 72		MH-2	36" SE INV. 956.07 COVER: EJ 1040 TYPE B 48" DIA RIM = 963.53 15" N INV. 958.28 12" W INV 958.48
	CB-9	COVER: EJ 1040 TYPE M1 48" DIA RIM = 964.42 15" W INV. 958.57		CB-18	12" E INV. 961.33 COVER: EJ 1040 TYPE M1 60" DIA RIM = 966.45			18" E INV. 958.08



STORM STR	RUCTURES
STRUCTURE NAME:	DETAILS:
MH-3	COVER: EJ 1040 TYPE B 48" DIA RIM = 969.83 12" S INV. 958.83 15" NE INV. 958.63
MH-4	COVER: EJ 1040 TYPE B 48" DIA RIM = 961.56 30" S INV. 955.52 30" N INV. 955.52
MH-5	COVER: EJ 1040 TYPE B 48" DIA RIM = 958.69 30" S INV. 954.76 30" N INV. 954.76
R-1	CMP RISER 48" DIA RIM = 958.79 30" S INV. 956.00
R-2	CMP RISER 48" DIA RIM = 958.54 30" N INV. 955.75
RES-1	12" DIA 12" E INV. 962.84
RES-2	12" DIA 12" W INV. 962.32

STORM SEWER QUANTITIES								
ITEM	QUANTITY							
12" RCP	1,645							
15" RCP	423							
18" RCP	525							
24" RCP	165							
30" RCP	720							
36" RCP	48							
4' DIA STR	20							
5' DIA STR	6							
6' DIA STR	1							
48" CMP RISER	2							
12" END SECTION	2							
30" END SECTION	2							
36" END SECTION	1							



	NOVI CONCRETE PLANT- STORM PIPING DESIGN																							
PROJECT:	CONCRETE PLANT	Г		NOVI					ON-SITE		1	Inter	nsity (i) =	175/(T+	+25)		RCP	PVC						
ANGLE DESIGN JOB NUMBER:			COUNTY	': Oakland				Design Stoı	rm Event :	= 10) Year		T (Initia	I 20		n=	0.013	0.011						
					TOTAL	TTNAC	IINCH	0-014	DIA OF		LENGTH	CAPACIT	VEL.	TIME	RIM E	LEV.	INVER	ΓELEV.	Pipe	Cover	H.G	6.L.	US	DS
FROM Str.	TO Str.	AREA (ACRES)	С	(C*A) ACRES	(C*A) ACRES	MIN	PER HOUR	Q=CIA cfs	PIPE INCH	SLOPE %	OF PIPE Ft	SEWER C.F.S	FULL FLOW FT/S	OF FLOW MIN	UPPER ELEV	LOWER ELEV	UPPER END	LOWER END	U.S.	D.S.	U.S.	D.S.	rim - Hgl	rim - Hgl
CB-17	CB-14	0.49	0.59	0.29	0.29	20.00	3.89	1.13	12	0.50	86	2.53	3.22	0.45	967.72	965.97	961.33	960.90	5.39	4.07	961.79	961.70	5.93	4.27
CB 16	CR 15	0.55	0.60	0.33	0.33	20.00	3 80	1 28	12	0.45	106	2.40	3.05	0.58	066.28	965 60	061.08	960 60	4 20	4.00	961 54	961.40	1 71	4 20
CB-10 CB-15	CB-13 CB-14	0.33	0.00	0.35	0.55	20.00	3.84	2.61	12	0.43	100	2.40	3.53	0.30	965.60	965.97	959 80	959 17	4.20	5.80	960.53	959.97	5.07	6.00
CB-14	CB-19	0.33	0.95	0.31	1.28	21.07	3.80	4.86	15	0.60	107	5.02	4.09	0.44	965.97	967.04	958.97	958.33	5.75	7.46	959.94	959.33	6.03	7.71
CB-22	CB-21	0.34	0.51	0.17	0.17	20.00	3.89	0.67	12	0.32	155	2.02	2.57	1.00	965.24	968.57	960.13	959.63	4.11	7.94	960.48	960.43	4.76	8.14
CB-21	MH-3	0.52	0.48	0.25	0.42	21.00	3.80	1.60	12	0.32	250	2.02	2.57	1.62	968.57	969.83	959.63	958.83	7.94	10.00	960.14	959.63	8.43	10.20
MH-3	CB-20	0.00	0.00	0.00	0.42	22.62	3.67	1.55	15	0.25	52	3.24	2.64	0.33	969.83	968.19	958.63	958.50	9.95	8.44	959.53	959.50	10.30	8.69
CB-20	CB-19	0.45	0.48	0.21	0.64	22.95	3.65	2.32	18	0.20	85	4.71	2.67	0.53	968.19	967.04	958.30	958.13	8.39	7.41	959.37	959.33	8.82	7.71
CB-19	CB-18	0.38	0.95	0.36	2.27	23.48	3.61	8.21	24	0.18	159	9.62	3.06	0.87	967.04	966.45	957.73	957.44	7.31	7.01	959.25	959.04	7.79	7.41
CB-18	CB-13	0.51	0.95	0.48	2.76	24.35	3.55	9.78	24	0.20	110	10.14	3.23	0.57	966.45	964.32	957.34	957.12	7.11	5.20	958.93	958.72	7.52	5.60
CB-13	MH-1	0.51	0.95	0.48	3.24	24.92	3.51	11.36	24	0.28	55	11.89	3.79	0.24	964.32	965.69	957.02	956.87	5.30	6.82	958.61	958.47	5.71	7.22
CB-12	CB-10	0.61	0.68	0.41	0.41	20.00	3 80	1 61	12	0.40	61	2.26	2.88	0.35	964 84	964 29	050 37	959 13	1 17	1 16	960.05	050.03	1 79	1 36
		0.01	0.00	0.41	0.41	20.00	5.08	1.01	12	0.40		2.20	2.00	0.55	304.04	304.23	939.37	959.15	4.47	4.10	900.05	333.33	4.73	4.30
CB-11	CB-10	0.41	0.57	0.23	0.23	20.00	3.89	0.90	12	0.35	77	2.11	2.69	0.48	965.41	964.29	959,40	959.13	5.01	4,16	959.98	959.93	5.43	4.36
CB-10	CB-9	0.47	0.66	0.31	0.96	20.48	3.85	3.68	15	0.40	89	4.10	3.34	0.44	964.29	964.42	958.93	958.57	4.11	4.60	959.86	959.57	4.43	4.85
CB-9	CB-3	0.36	0.95	0.34	1.30	20.92	3.81	4.95	18	0.45	173	7.07	4.00	0.72	964.42	963.41	958.37	957.59	4.55	4.32	959.18	958.79	5.24	4.62
CB-8	MH-2	0.27	0.74	0.20	0.20	20.00	3.89	0.76	12	0.32	103	2.02	2.57	0.67	964.15	963.53	958.81	958.48	4.34	4.05	959.32	959.28	4.83	4.25
CB-7	CB-6	0.25	0.63	0.16	0.16	20.00	3.89	0.61	12	0.32	101	2.02	2.57	0.65	965.89	964.39	959.34	959.02	5.55	4.37	959.85	959.82	6.04	4.57
CB-6	CB-5	0.13	0.91	0.12	0.28	20.65	3.83	1.07	12	0.32	101	2.02	2.57	0.65	964.39	963.44	959.02	958.70	4.37	3.74	959.59	959.50	4.80	3.94
CB-5	MH-2	0.13	0.92	0.12	0.40	21.31	3.78	1.51	15	0.24	91	3.17	2.59	0.59	963.44	963.53	958.50	958.28	3.69	4.00	959.33	959.28	4.11	4.25
MH-2	CB-4	0.00	0.00	0.00	0.60	21.89	3.73	2.22	18	0.20	56	4.71	2.67	0.35	963.53	962.40	958.08	957.97	3.95	2.93	959.19	959.17	4.34	3.23
CB-4	CB-3	0.26	0.91	0.24	0.83	22.25	3.70	3.08	18	0.20	137	4.71	2.67	0.86	962.40	963.41	957.87	957.59	3.03	4.32	958.91	958.79	3.49	4.62
CB-3		0.37	0.95	0.35	2.48	23.10	3.64	9.04	30	0.10	1/4	13.01	2.65	1.09	963.41	964.03	956.79	956.62	4.12	4.91	958.70	958.62	4./1	5.41
		0.40	0.95	0.38	2.0/	24.20	3.50 3.50	10.19	30	0.10	29	13.01	2.65	0.3/	904.03	903.74	9056 56	900.00	4.91 1 69	4.00 6.70	920.59	928.56	5.44 5.20	5.10 7.10
		0.30	0.95	0.20	6 30	24.07	3.00	22 21	36	0.10	<u> </u>	2 <u>4</u> 11	3.41	0.04	965.60	965.09	956.07	956 01	4.00 6.62	5 99	958.04	958 41	7.20	6 50
		0.00	0.00	0.00	0.00	20.11	0.40	<i>22</i> .J I	50	0.15		4-1 .11	0.41	0.20	000.08		000.07	000.01	0.02	0.00		550.41	1.20	0.08



A =	522,38	5 SQ. FT.		BA	SIN #1 STOR				
A =	11.9	9 acres					522.205		
C =	0.81			AREA	11.	99	522,385		
Slope % = S =	1	%				_	0.8	1 0 ofo	
Sheet Flow (max 300 ft), K=	0.48		Qa = 0.1			-	1.2		
Velocity (V) = K x S^0.5 =	0.48	ft/s	Qo = Qa/					Z CTS	ac-imp
Length L=	300	ft			100 YE	AR FLOOD D	ESIGN:	00 770 00	
T = tc (min) = L/(V x 60)=	10.4	min		V100				96,773.89 CT	
	1 2	0/			EXTENDE	DETENTIO	N DESIGN:		
$\frac{1}{1}$	1.5	70		VEL)			66,673.57 cf	
Valerway (swale, valey), K-	1.2	ft /c			FOREBA	AY VOLUME V	OLUME:		
	1.37	ft/S		Vf = A x C	x 545 =			5,268.54 cf	
	0			TOTA					
$\mathbf{I} = \mathbf{IC} (\min) = \mathbf{L} / (\mathbf{V} \times \mathbf{SU}) =$	0.0			TUTA				102,042.43 CT	
Slope % = S =	1	%			FOREB	AY-1 VOLUME			
Small Tributary (ditch), K=	2.1		ELEVATION	AR	EA	VOLU	ME	TOTAL VOL	UME
Velocity (V) = K x S^0.5 =	2.1	ft/s	956.00		437		-		-
Length L=	0	ft	957.00		929		683		683
$T = tc (min) = L/(V \times 60) =$	0.0	min	958.00		1,525		1,227		1,910
			959.00		2,221		1,873		3,783
Sewer Flow Velocity (V) =	3	tt/s	960.00		3,018		2,620		6,403
Length L=	859	tt	Vf =	5,269	, -	Zf=	959.57		I
T = tc (min) = L/(V x 60)=	4.8	min		ŗ	L				
Total to -	15 2	min			BASIN-1 DE	FENTION VOL	UME		
	13.2	11111			saft		cu ft		
			ELEVATION					Cum. VOLUME	E cu.ft.
$I_{10} = 63/(12.33 + 1)^{0.84} =$	3.89	in/hr	955 75	FOND	FUREDAT	FOND	FUREDAT		
I100 =83.3/(9.1/+I)^0.81 =	6.27	in/hr	956.75	12,902	-	-	-		14 546
			957.75	19 580	-	17 885	-		32 430
CPVC (Channel Protection Volume Control)	1.3	Infiltrate inch over site dewater in 72 hrs	958.75	23.071	_	21,326	_		53.756
Vcp-r = A x C x 4,719 =	45,61	9 cu.ft.	959.75	26,662	-	24,867	-		78,622
			961.00	35,499	-	48,563	-		127,185
CPRC (Channel Protection Rate Control)	1.9	Inch Discharge at Minimum 48 hours	962.00	41,099	-	38,299	-		165,484
Ved = A x C x 6,897 =	66,67	4 cu.ft.			<u>.</u>				
			V100 =	96,774		<u>Z100=</u>	<u>960.48</u>		
Vwq = A x C x 3,630 =	35,09	1 cu.ft.	Ved =	66,674		Zed=	<u>959.66</u>		
			V1=	25,509		TOTAL VO	LUME PRO	/IDED = 1	02,042
First Flush	0.5	Inch Discharge at Minimum 48 hours							
Vf = A x C x 545 =	5,26	9 cu.ft.							
					Ori	ifice Calculat	ions		
IF GIVEN Qallow =	0.1	cts/acre		Ou	tlet Restrictor S	Size For CPRC (E	xtended Dete	ntion)	
Qallow =	0.1				QED = VE	D/172,800 =	0.39 cfs	S	
Q_{VRR} (>2 acres & <100 acres) = 1.1055-0.206In(A) =	0.59					hed=	3.91 ft		
Qallow (<2 dcres) =	L	crs/acre		Ανε	erage Head = hav	ve = hED/2=	1.96 ft		
	7 1 2	ofe	E.D. Orifi	ce Area(a)= A =C	lave/(0.62 x (2xgx	have)^0.5) =	0.055 sq	.ft.	
	/.12	CIS			ASSUME	orifice SIZE	1.00 in	ch	
	7 12	cfs			<u>.</u>	A0 =	0.005 sq	.ft.	
	/.12				numner of hole	es required	10.163		
$O_{100 N} = C \times I_{100} \times A =$	60.6	cfs				use	10.0 hc	oles	
	00.0					elevation =	955.75		
100 vr Runoff Volume V100 B = 18.985 x A x C =	183.52	9 cu.ft.	Actual release	rate through ori	$\frac{1100 \text{ QED} = 0.62 \text{ X }}{100 \text{ CED}}$	Aed x (2 x g x have	$\frac{1}{2}$		
Detention V1000=V1008 x $(0.206-0.15ln(O100P/O100N)) =$	96.77	4 cu.ft.			A	ctual QED =	0.380		
								<u> </u>	
Infiltration	NO			Out	iet Restrictor Si			storm)	
					I.	n100 =	4.73 ft		
		4 cu.ft.			Nres =	= 1100 - 1100 = 1000	0.82 ft		
Flood ControlDetention= V1000 = V1000 - Vcp-r =	96.77			പ്പ = AED	Λ U.UZ X (Z X G X	11100/- 0.5 =		>	
Flood ControlDetention= V100D = V100D - Vcp-r =	96,77				\sim	$\Lambda_{000} \cap -$	6 6 6 7 1 - 6		
Flood ControlDetention= V100D = V100D - Vcp-r =	96,77 ments		Eload Control Orifi	ice Arca(a) = A = 4	$Q_{res} = C$	(100P - QED = 0)	6.53 cfs	5 f+	
Flood ControlDetention= V100D = V100D - Vcp-r = Design Require	96,77 ments	cu ft	Flood Control Orifi	ice Area(a)= A =	Qres = C Qres/(0.62 x (2xgx ACCLINAE	(100P - QED = $(hres)^0.5) =$	6.53 cfs 1.454 sq	s .ft. ch	
Flood ControlDetention= V100D = V100D - Vcp-r = Design Require Vcp-r = Vcp-r =	96,77 ments -	cu.ft.	Flood Control Orifi	ice Area(a)= A =	Q _{res} = C Q _{res} /(0.62 x (2xgx ASSUME	Q100P - QED = hres)^0.5) = orifice SIZE	6.53 cfs 1.454 sq 15.00 in 1.227 sq	s .ft. ch	
Flood ControlDetention= V100D = V100D - Vcp-r = Design Require Vcp-r = VED = (If No Infiltration Flood Control =\/S) Flood Control	96,77 ments - 66,67	cu.ft. 4 cu.ft. 4 cu.ft.	Flood Control Orifi	ice Area(a)= A =(Qres = C Qres/(0.62 x (2xgx ASSUME	(100P - QED = hres)^0.5) = orifice SIZE A0 =	6.53 cfs 1.454 sq 15.00 in 1.227 sq 1.2	s .ft. ch .ft.	
Flood ControlDetention= V100D = V100D - Vcp-r = Design Require Vcp-r = VED = (If No Infiltration Flood Control =VS) Flood Control	96,77 ments - 66,67 96,77	cu.ft. 4 cu.ft. 4 cu.ft.	Flood Control Orifi	ice Area(a)= A =	Q _{res} = C Q _{res} /(0.62 x (2xgx ASSUME numner of hole	(100P - QED = hres)^0.5) = orifice SIZE A0 = es required	6.53 cfs 1.454 sq 15.00 inc 1.227 sq 1.2 1.2 1.0 hr	s .ft. .ft. oles	

Actual release rate through orifice Qres =0.62 x Aed x (2 x g x hres)^0.5 = Actual QED = **5.51**

			Zton =				
V100 -	06 773 90		Ziop – 7100 –	959.75			NG
Vf =	5 268 54		2100 - 7f =	950.40		22 32	CES
•1 -	0,200.04	Por	nd (Z out)	955 75			
/ed=	66.673.57		Zed =	959.66			
/04		foreb	av (Z out)	956.00			
Qall =	7.12	CFS		000.00			
••••		OUT	LET SIZ				
		FOREBAY	RISER R	-1 OUTLET PIPE S	SIZE AND SLOPE		
	К =	1.486	10 YE	AR Q (CFS) =	22.321		
	N =	0.013	RCP	Aout =	4.9088		
	D(INCH) =	30.0		R =	0.625		
	S =	0.29614%	ft/ft				
	THEN	S =		0.30%			
	VE	LOCITY V =	4.547218		-		
			V full	4.6	-		
			FOREBA	Y OUTLET WEIR D	DESIGN		
	TOP EL	EVATION BE	TWEEN FO	REBAY AND POND=	<u>976.00</u>		
		H=Max	all Head (ft)	= (top elevation-Zff)=	0.50	Max=0.5	
				Weir Coefficient =	<u>3.33</u>		
) YEAR I	Peak flow rate	entering fore	bay from p	pipe calculations =	60.64		
		0=C*B	*44(2/2) the	$n B=O/(C*(H)^{2})$	51 50	f1	
			, II (3/2) UIG	$ _{CO} W_{Oir width} =$	110.00	11 ft	
			,		960.07	it it	
					000.01		
		ORIFIC	E REST	RICTOR SIZIN	G(100 YEAR)		
	BASIN OVE	ERFLOW F	ROMOU	T MH-1 TO OUTL	ET PIPE SIZE	AND SLOPE	
	K -	1 496		10 Voor -	22.22		
	N =	0.013			1 9088		
	D(INCH) =	30.0			0.6250		
	<u> </u>	0.29614%	 ft/ft	, , , , , , , , , , , , , , , , , , ,	0.0200		
	THEN	S =		0.30%			
	VE	LOCITY V =	4.547218		2		
					1		
			V full	4.6			
		EM	ERGENC	YOVERFLOW WEI	R DESIGN		
				BERM ELEVATION=	<u>976.00</u>		
		F	I= Head (ft):	BERM ELEVATION= = (POND TOP - Z100)	<u>976.00</u> 0.50	Max=0.5	
		ŀ	l= Head (ft)⊧	BERM ELEVATION= = (POND TOP - Z100) Weir Coefficient =	976.00 0.50 3.33	Max=0.5	
	Peak flow rate (⊦ Potering PO	H= Head (ft):	BERM ELEVATION= = (POND TOP - Z100) Weir Coefficient =	976.00 0.50 <u>3.33</u>	Max=0.5	

Q=C*B*H^(3/2) then B=Q/(C*(H)^(3/2))= 51.50

Use Weir width =

ft

ft

<u>110.00</u>

@ ELEV- 961.48

























CATCH BASIN FABRIC F
CONSTRUCTION ACCES

						OF	ΡĒ	RAT	10	Ν	TI	ME	S	SC⊢	IE	DU	LE	-									
				20	22	2	_									2	02	23									
CE	S	EΡ	C	CT	Ν	IOV	D	EC	J.	AN	F	ΈB	Ν	1AF	2	٩P	R	M	AY	J	U١	1	JI	UL	A	JU(G
ASURES																											
CONSTRUCTION																	Ι						Τ	Π	Γ		
DDING													Π		Γ		T	Π					Τ	Π	Γ		
																	Ι						Τ	Π	Γ		
						Π																			Γ		
															L												

				<u>св</u> ,
I QU	ANTITIES			(X) $\langle X \rangle$
	QUANTITY	UNITS		
	3,206	LF		PP
ER	22	EACH		(\mathbb{T})
AD	1,134	SQ. FT.		

LEGEND	
\bigotimes = PROP. GV & W; OR T S V & W	88888 = PRC
\otimes = EX. GV & W; OR I S V & W \bigotimes = PROP. FIRE HYDRANT	= PRC
\Im = EX. FIRE HYDRANT \bigcirc = PROP. SANITARY MH	
\odot = EX. SANITARY MH	$TP - x \times x \times x = PRC$
\mathbf{O} = CLEANOUT	$FG - x \times x \times x = PRC$
= PROP. MANHOLE $ = EX. MANHOLE$	$\begin{array}{rcl} TC-\times\times\times\times\times\\ EP-\times\times\times\times\times\end{array} &=& PRC \end{array}$
ID = PROP. REAR YARD CB	$TW - \times \times \times \times \times = PRC$
= PROP. CATCH BASIN	= PRC
E EX. CATCH BASIN	<u> </u>
= END SECTION	- 970 = EXI
\bigotimes = STROM SEWER STRUCTURE NUMBER	—— san —— san —— san —— = PR(
$\langle X \rangle$ = SANITARYSEWER STRUCTURE NUMBER	stst = PR(
	<u> </u>
① = TELEPHONE MANHOLE	



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10B	Marlette sandy loam, 1 to 6 percent slopes	46.6	62.4%
10C	Marlette sandy loam, 6 to 12 percent slopes	3.2	4.3%
11B	Capac sandy loam, 0 to 4 percent slopes	24.5	32.8%
27	Houghton and Adrian mucks	0.4	0.5%
Totals for Area of Interest		74.6	100.0%

	LEGAL DESCRIPTION: (by nowak & fraus)
	LAND SITUATED IN THE CITY OF NOVI, COUNTY OF OAKLAND, STATE OF MICHIGAN DESCRIBED AS FOLLOWS:
	PART OF THE SOUTHWEST 1/4 OF SECTION 9, TOWN 1 NORTH, RANGE 8 EAST, BEGINNING AT POINT DISTANT SOUTH 89 DEGR 20 MINUTES 00 SECONDS WEST, 584.15 FEET FROM THE SOUTI 1/4 CORNER; THENCE NORTH 00 DEGREES 02 MINUTES 05 SECONDS EAST, 1762.97 FEET; THENCE NORTH 89 DEGREES 04 MINUTES 55 SECONDS EAST, 495 FEET; THENCE SOUTH 00 DEGREES 02 MINUTES 05 SECONDS WEST, 1765.13 FEET TO BEGINNING.
STA NC SO TH AS CO	NDARD SOIL EROSION AND SEDIMENT CONTROL NOTES: EARTH MOVEMENT OR EXCAVATION SHALL BEGINS UNTIL A VALID IL EROSION PERMIT HAS BEEN OBTAINED. E CONTRACTOR SHALL CONDUCT HIS OPERATION IN SUCH A MANNER TO MINIMIZE EROSION AND SEDIMENTATION OF DISTURBED SOIL. THE INTRACTOR SHALL MEET ALL REQUIREMENTS OF THE STATE, COMPANY
AN 1.	D MUNICIPALITY AND THE FOLLOWING: PROMPTLY REMOVE ALL SOIL, MISCELLANEOUS DEBRIS AND OTHER MATERIAL SPILLED, DUMPED OR OTHERWISE DEPOSITED ON PUBLIC STREETS DURING TRANSIT TO AND FROM THE CONSTRUCTION SITE.
2. 3. 4.	PROVIDE TEMPORARY SITE TRAPS BY PLACING FILTER AS SHOWN. MAINTAIN EFFICIENCY OF THE TRAPS BY REMOVING ACCUMULATED SEDIMENT FROM FILTERS ON A REGULAR BASIS OR AS NEEDED. DIRECT RUN-OFF WATER FROM THE CONSTRUCTION AREA TO TEMPORARY
5. 6.	DISCHARGE WATER FROM PUMPING OPERATIONS TO THE SILT TRAPS OR HEAVILY GRASSED AREAS. ALL CONSTRUCTION INCLUDING OPEN CUT AND TUNNEL, CONDUCT, STRUCTURES. SURFACE RESTORATION AND REMOVAL OF EXCESS EXCAVATED MATERIAL SHALL BE ACCOMPLISHED IN ONE CONTINUOUS OPERATION. FINAL OR TEMPORARY STABILIZATION SHALL FOLLOW
7.	PERMANENT SOIL EROSION CONTROLS MEASURES FOR ALL DISTURBED AREAS SHALL BE COMPLETED WHITHIN 5 CALENDAR DAYS AFTER FINAL GRADING HAS BEEN COMPLETED.
8.	WHEN IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA OR WHERE THE ACTIVITY CEASES FOR MORE THEN 15 CALENDAR DAYS, TEMPORARY EROSION CONTROL MEASURES SHALL BE INITIATED WITHIN 5 CALENDAR DAYS OF EXPIRATION OF THE INITIAL 15 DAYS PERIOD AND SHALL BE COMPLETED WITHIN 10 CALENDAR DAYS OF INITIATION. ALL TEMPORARY MEASURES SHALL BE MAINTAINED UNTIL
9.	PERMANENT STABILIZATION IS AFFECTED. ALL TEMPORARY EROSION CONTROL FACILITIES SHALL BE REMOVED AT THE COMPLETION OF CONSTRUCTION UNLESS ORDERED BY ENGINEER TO BE LEFT IN PLACE. CARE SHALL BE TAKEN DURING REMOVAL TO MINIMIZE SILTATION IN NEARBY DRAINAGE COURSES.
10.	THE CONTRACTOR SHALL ADHERE TO THE FOLLOWING GENERAL CONSTRUCTION PRINCIPLES: A. WHENEVER FEASIBLE, NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED. B. WHERE INADEQUATE VEGETATION EXIST. TEMPORARY OR
	PERMANENT VEGETATION SHALL BE ESTABLISHED.
TIM 1. 2. 3. 4. TIM	ING AND SEQUENCE OF CONSTRUCTION OPERATIONS: . each proposed earth change. temporary control measures at each step permanent control measures completion dates or time frames at each step ING REQUIREMENTS
1. 2. 3. 4.	. CRUSHED ROCK CONSTRUCTION DRIVEWAY – DAY 1 SILT FENCE – DAY 1 DETENTION / SEDIMENT BASIN A. APPROVED OUTLET INSTALLED – WITHIN 5 DAYS OF EXCAVATING BASIN B. PERMANENTLY STABILIZED WITH SEED AND MULCH BLANKET WITHIN 5 DAYS CRITICAL SLOPES, CHANNELS, SWALES
5.	A. TEMPORARY STABILIZATION – WITHIN 15 DAYS OF EARTH DISTURBANCE B. PERMANENT STABILIZATION – WITHIN 5 DAYS OF FINAL GRADE ROAD RIGHT OF WAY – TEMP. STABILIZED WITHIN 5 DAYS OF COMPLETE PAVING

6. RIP - RAP WITHIN 24 HOURS OF PLACING OUTLET/CULVERT.

- * STREET SCRAPING DAILY
- * STREET SWEEPING WEEKLY MINIMUM
- * STRUCTURAL SEDIMENT CONTROLS INSPECT AND MAINTAIN AND RECORD IN A LOGBOOK ONCE
- A WEEK AND WITHIN 24 HOURS AFTER A STORM EVENT AS REQUIRED BY THE NPDES PERMIT * SEDIMENT BASIN AND FORE BAY CLEANOUT (ANNUALLY MINIMUM) - MUST HAVE PERMANENT ACCESS FOR CLEANOUT AND FRESH STONE REPLACEMENT OF THE RISER PIPE (STANDPIPE)
- RESTORATION REQUIREMENTS
- DISTURBED EARTH PERMANENTLY STABILIZED
- ACCUMULATED SEDIMENT REMOVED FROM STORM SEWER SYSTEM 2.
- ACCUMULATED SEDIMENT REMOVED FROM DETENTION / SEDIMENT BASINS 3.
- 4. RESTORE DETENTION / SEDIMENT BASIN TO DESIGN STANDARDS
- REMOVE ALL TEMPORARY CONTROLS AFTER GETTING APPROVED 5. BY THE WASHTENAW COUNTY SOIL EROSION INSPECTOR



















WETLAND BUFFER IMPACT											
	FILL AREA	FILL AREA									
	SQ.FT.	Acres	Fill Volume (Cu.Yd.)								
Wetland H (Not Regulated)	4,712	0.11	115.09								
Total Fill	4,712	0.11	115.09								
	FILL AREA	FILL AREA									
	SQ.FT.	Acres	Fill Volume (Cu.Yd.)								
Regulated Wetland A	6,976	0.16	275.59								
Regulated Wetland B	4,163	0.10	105.72								
Regulated Wetland G	4,163	0.10	91.83								
Total Fill	15,302	0.35	473.15								

WETLAND IMPACT			
	FILL AREA	FILL AREA	
	SQ.FT.	Acres	Fill Volume (Cu.Yd.)
Wetland H (Not Regulated)	2,147	0.05	67.60
Total Fill	2,147	0.05	67.60
	FILL AREA	FILL AREA	
	SQ.FT.	Acres	Fill Volume (Cu.Yd.)
Regulated Wetland A	5,172	0.12	242.19
Regulated Wetland B	1,932	0.04	64.41
Regulated Wetland G	1,475	0.03	42.06
Total Fill	8,579	0.20	348.65




PLANT LIST

	-/ \ \						
Nat	./ KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	PERCENT	ΓAGE
Orr	LANI	DSCA	APING ADJACENT TO ROADS -	Twelve Mile Road		SPECIES	GENUS
N	AAB	30	Aronia arbutifolia 'Brilliantissima'	Brilliant Red Chokeberry	24' ht., 3 gal. pot		
N	ALC	6	Amelanchier laevis 'Cumulus'	Cumulus Serviceberry	2" cal. B&B	3%	6%
N	AS	5	Acer saccharum 'Legacy'	Legacy Sugar Maple	3" cal. B&B	8%	12%
N	AR	5	Acer rubrum 'Brandywine'	Brandywine Red Maple	3" cal. B&B	8%	12%
N	CC	7	Cercis canadensis	Eastern Redbud	2" cal. B&B	4%	6%
	PAR	KING	LOT PLANTINGS				
N	ASA	4	Acer saccharum 'Apollo'	Apollo Sugar Maple	3" cal. B&B	8%	12%
N	LT	2	Liriodendron tulipifera	Tuliptree	3" cal. B&B	11%	6%
0	HHR	90	Hemerocallis sp. 'Happy Returns'	Happy Returns Daylily	1 gal. pot, 24" o.c.		
	PAR	KING	LOT PERIMETER PLANTINGS		0		
N	СО	6	Celtis occicentalis	Northern Hackberry	3" cal. B&B	3%	6%
N	LT	3	Liriodendron tulipifera	Tuliptree	3" cal. B&B	11%	6%
N	ТА	7	Tilia americana	American Basswood	2-1/2" cal. B&B	6%	6%
	ACC	ESS	WAY PERIMETER PLANTINGS				
N	PG	5	Picea qlauca	White Spruce	7' ht, B&B	15%	6%
N	QPP	4	Quercus palustris 'Pingreen'	Green Pillar Pin Oak	2-1/2" cal. B&B	2%	25%
N	QR	11	Quercus rubra	Red Oak	2-1/2" cal. B&B	10%	25%
	DETI	ΞΝΤΙ	ON POND PLANTING				
N	ACO	10	Abies concolor	Concolor Fir	7' ht. B&B	5%	6%
Ν	AM	80	Aronia melanocarpa	Black Chokeberry	24"-30" ht., 5 gal, pot		
N	AR	10	Acer rubrum	Red Maple	2-1/2" cal. B&B	8%	12%
N	CS	76	Cornus sericea	Red Twig Dogwood	24"-30" ht., 5 gal. pot		
N	IVJ	6	<i>llex verticillata</i> 'Jim Dandy'	Jim Dandy Winterberry	24"-30" ht., 5 gal. pot		
N	IVR	18	<i>llex verticillata</i> 'Red Sprite'	Red Sprite Winterberry	24"-30" ht., 5 gal. pot		
N	QB	7	Quercus bicolor	Swamp White Oak	2-1/2" cal. B&B	4%	25%
Ν	SC	38	Sambucus canadensis	American Elderberry	30" ht., 5 gal. pot		
	REP	LACE	EMENT TREES				
N	ASR	5	Acer saccharum	Sugar Maple	2-1/2" cal. B&B	8%	12%
N	CCA	2	Carpinus caroliniana	American Hornbeam	2-1/2" cal. B&B	1%	6%
N	OV	6	, Ostrya virginiana	American Hophornbeam	2-1/2" cal. B&B	3%	6%
N	QRR	7	Quercus rubra	, Red Oak	2-1/2" cal. B&B	10%	25%
N	TAR	4	Tilia americana	American Basswood	2-1/2" cal. B&B	6%	6%
	BUFI	FER	PLANTINGS				
0	PA	24	Picea abies	Norway Spruce	7' ht. B&B	15%	6%
N	PS	17	Pinus strobus	White Pine	7' ht. B&B	9%	6%
N	QM	4	Quercus macrocarba	Bur Oak	2-1/2" cal. B&B	2%	25%
N	PG	21	Picea glauca	White Spruce	7' ht. B&B	20%	6%
IN	STR	EET '	TREES			_0,0	0,0
N		15	Liriodendron tulinifera 'Emerald City	/ Emerald City Tulintree	2-1/2" cal_B&B	11%	6%
1 1	E ! / \	.0	Encountriance and and any			11/0	0,0

PLANT TYPES

NATIVE:

Fourteen (14) species (78%) ORNAMENTAL (NON-NATIVE): Four (4) species (22%)

SOIL TYPE:

The soil on the south portion of the site consists of Marlette sandy loam (10B), with one percent to six percent (1% -6%) slopes and the soil on the north portion of the site consists of Capac sandy loam (11B) with zero percent to four percent (0% -4%) as defined in the United States Soil Conservation Service Soil Survey of Oakland County, Michigan.

LANDSCAPE CALCULATIONS:

- LANDSCAPING ADJACENT TO ROADS Twelve Mile Road
- * Deciduous trees = 10 trees.
- * Ornamental trees = 13 trees.
- PARKING LOT LANDSCAPING (17,950 sq. ft.)
- * 17,950 sq. ft. times 0.05 equals 898 square feet. * Landscaping area required equals 898 sq. ft.
- * Parking lot landscaping area provided 650 sq. ft.
- * One (1) deciduous/canopy tree per 200 sq. ft. or fraction thereof of interior landscaped area = 4.49 trees = 5 trees.
- PARKING LOT PERIMETER LANDSCAPING (550 In. ft.)
- * One (1) deciduous tree per 35 In. ft. = 15.7 trees = 16 trees. ACCESSWAY PERIMETER LANDSCAPING (700 In. ft.)
- * One (1) deciduous tree per 35 ln. ft. = 20 trees.
- **BUILDING FOUNDATION LANDSCAPING**
- * Requesting a landscape waiver for this requirement.
- DETENTION BASIN LANDSCAPING (940 In. ft. of perimeter)
- * One (1) deciduous tree per 35 In. ft. = 26.8 trees = 27 trees.
- * Clusters of large native shrubs in a dense planting shall be planted at and above the high water elevation of the basin. The clusters shall cover seventy percent to seventy five percent (70% - 75%) of the basin rim area at the high water elevation.
- * The bottom and sides of the basin shall be planted with a mix of native grasses, sedges, and wildflowers.
- BUFFER LANDSCAPING
- * Requesting a landscape waiver for the berm (plantings in lieu provided). REPLACEMENT TREES
- * One hundred twenty one (121) 2-1/2" deciduous trees.
- STREET TREES Twelve Mile Road (495 I.f.)
- * One (1) canopy tree / 35 l.f. = 14.14 trees = 15 trees.

COST ESTIMATE

TOTAL MATERIALS SPECI	FIED:		
* Deciduous Trees:	107	\$400	\$42,800.00
* Evergreen Trees:	77	\$375	\$28,875.00
* Ornamental Trees:	13	\$375	\$4,875.00
* Deciduous Shrubs:	243	\$50	\$12,150.00
* Perennials	90	\$15	\$1,350.00
* Underground Irrigation			\$8,000.00
* Seeded Lawn	9,000 sq.	yds. \$1	\$9,000.00
* Wetland Seed Mix			\$5,000.00
* Wetland Seed Mix			\$4,000.00
* Planting Soil	60 cu. y	/ds. \$40	\$2,400.00
* Shredded Hardwood Bark	84 cu. y	/ds. \$35	\$2,940.00
TOTAL			\$121,390.00

NOTES:

- * See Sheet LP 2: LANDSCAPE NOTES & DETAILS for landscape development notes, landscape planting details, detention pond notes, composition for seed mixes, landscape construction details, and snow fencing for tree protection detail.
- * See Sheet TPP 1: TREE PRESERVATION PLAN for proposed action to be taken for existing trees and overall tree preservation plan.
- * See Sheet TPP 2: TREE INVENTORY LIST for tag number, size, common name, botanical name, condition, proposed action, and chart for tree replacement calculations.



PROJECT LOCATION: Novi Concrete Plant 46844 West Twelve Mile Road Novi, Michigan

LANDSCAPE PLAN FOR: Angle Design & Engineering, L.L.C. 22417 Cranbrooke Drive Novi, Michigan 48375 (313) 258-2036

LANDSCAPE PLAN BY: Nagy Devlin Land Design 31736 West Chicago Ave. Livonia, Michigan 48150 (734) 634-9208



LP - 1: LANDSCAPE PLANTING PLAN

* Base data provided by Angle Design & Engineering, L.L.C.

LANDSCAPE PLANTING NOTES:

PLANTING

- 1. Installation of all plant material shall be in accordance with the latest edition of the American Association of Nurserymen Standards for Nursery Stock and with the specifications set forth by the City of Novi, Michigan
- 2. The plant materials shall conform to the type stated on the plant list. Sizes shall be the minimum stated on the plant list or larger. All measurements shall be in accordance with the latest edition of the American Association of Nurserymen Standards for Nursery Stock.
- 3. The plant material shall be nursery grown and inspected by the Owner's representative before planting. The Owner's representative reserves the right to reject any plant material at any time.
- 4. Plants designated "B&B" shall be balled and burlapped with firm balls of
- 5. Dig shrub pits one foot (1') larger than the shrub rootball, tree pits three (3) times the width of the tree rootball and backfill with one (1) part topsoil and one (1) part soil from excavated pit. Plant trees and shrubs at the same grade level at which they were planted at the nursery. If wet, clay soils are evident, plant trees and shrubs slightly higher
- 6. The Contractor is responsible for planting the materials at the correct grades and spacing. The plants shall be oriented to give the best appearance.
- 7. When the plant has been properly set, the pit shall be backfilled with the topsoil mixture, gradually filling, patting, and settling with water.
- 8. Trees in lawn areas to have a four foot (4') circle of mulch, four inches (4') deep, and three inches (3") away from the trunk. Shrub beds are to be mulched with shredded bark mulch to a minimum depth of three inches (3"). Perennial beds are to be mulched with shredded bark mulch to a minimum depth of two inches (2"). Only natural color, finely shredded hardwood bark mulch will be accepted.
- 9. Remove all twine, wire, and burlap from the top one third (1/3) of tree and shrub root balls and from tree trunks. Remove all non-biodegradable material such as plastic or nylon completely from branches and stems. All tree wrap, stakes, and guys are to be removed after one (1) winter season. Include a minimum of one (1) cultivation around installed plantings without damaging roots in June, July, and August for the entire warranty period of two (2) years.
- 10. All plant materials shall be pruned and injuries repaired. The amount of pruning shall be limited to the removal of dead or injured limbs and to compensate for the loss of roots from transplanting. Shrubs along the site perimeter shall be allowed to grow together in a natural form.
- 11. Organic, friable topsoil shall be evenly distributed and fine graded over all areas to receive lawns at uniform depth of four inches (4") after settlement. 12. All lawn areas shall be sodded with a Grade A Kentucky Blue Grass blend over the topsoil.
- 13. All plantings shall be completed no later than November 15 in the fall season. The date of intended installation for landscape plant materials is approximately Spring, 2022. Plantings shall thereafter be reasonably maintained, including permanence and health of plant materials to provide a screen to abutting properties and including the absence of weeds and refuse.
- 14. Backfill directly behind all curbs and along sidewalks and compact to the top of curbs or walk to support vehicle and pedestrian weight without settling.
- 15. Conversion of all asphalt and gravel areas to landscape planting beds shall be done in the following manner: a. Remove all asphalt, gravel, and compacted earth to a depth of six inches to eighteen inches (6"-18") depending on the depth of the sub base and dispose of off site; b. Call the City for an inspection prior to backfilling: c. Replace excavated material with good. medium-textured planting soil (loam or light yellow clay) to a minimum of two inches (2") above the top of the curb and sidewalk, add four inches to six inches (4"-6") of topsoil and crown to a minimum of six inches (6") above the adjacent curb and walk after earth settling, unless otherwise noted on the landscape plan.

If conversion from asphalt to landscape occurs in or between an existing landscape area(s), replace excavated material from four inches to six inches (4"-6") below adjacent existing grade with good, medium-textured planting soil (loam or light yellow clay) and add four inches to six inches (4"-6") of topsoil to meet existing grades after earth settling.

NOTE FOR PLANTING NEAR UTILITIES:

* Maintain twenty feet (20') from the centerline of overhead wires for planting holes. All trees are to be at least ten feet (10') from hydrants and utility structures, five feet (5') from underground lines, four feet (4') from sidewalks, and three feet (3') from curbs.

- MATERIAL
- 1. Required landscape material shall satisfy the criteria of the American Association of Nurserymen Standards for Nursery Stock and be: a.) Northern nursery grown; b.) State Department of Agriculture inspected; c.) No. 1 grade material with a straight, unscarred trunk, and well-developed uniform crown (park grade trees will not be accepted); d.) Staked, wrapped, watered, and mulched according to the details provided; and e.) Guaranteed
- for two (2) years 2. Topsoil shall be friable, fertile soil of clayloam character containing at least five percent (5%) but not more than twenty percent (20%) by weight of organic matter with a pH range between 6.0 and 7.0. The topsoil shall be free from clay lumps, coarse sand, plant roots, sticks, and other foreign materials.
- 3. The seed mixture shall consist of the following types and proportions: Kentucky Blue Grass blend "Baron/Sheri/Adelphi" @ sixty percent (60%), Chewing Fescue @ twenty-five percent (25%), Creeping Red Fescue @ ten percent (10%), and Perennial Rye Grass @ five percent (5%). Weed content shall not exceed one percent (1%). The mix shall be applied at a rate of 200 pounds per acre.
- 4. Sod shall be two (2) year old "Baron/Sheri/Adelphi" Kentucky Blue Grass blend grown in a sod nursery on loam soil.
- Proposed perennials shall be full, well-rooted plants.
- 6. Callery Pear (*Pyrus calleryana*) and Norway Maple (*Acer platanoides*) shall not be substituted for any tree species in the plant list. Contact the Landscape Architect for acceptable plant substitutions.
- GENERAL
- 1. Do not plant deciduous or evergreen trees directly over utility lines or under overhead wires. Maintain a six foot (6') distance from the centerline of utilities and twenty feet (20') from the centerline of overhead wires for planting holes. All trees are to be at least ten feet (10') from hydrants and utility structures. Call MISS DIG forty-eight (48) hours prior to landscape construction for field location of utility lines.
- . The Contractor agrees to guarantee all plant material for a period of two (2) years. At that time, the Owner's representative reserves the right for a final inspection. Plant material with twenty-five percent (25%) die back, as determined by the Owner's representative shall be replaced. This guarantee includes the furnishing of new plants, labor, and materials. These new plants shall also be guaranteed for a period of two (2) years.
- 3. The work shall consist of providing all necessary materials, labor, equipment, tools, and supervision required for the completion as indicated on the drawings.
- 4. Landscape areas shall be irrigated by an automatic underground irrigation system. Lawns and shrub/landscape areas shall be watered by separate zones to minimize overwatering. An irrigation plan for all landscape areas shall be provided with the final plan set.
- 5. All written dimensions override scale dimensions on the plans.
- 6. All substitutions or deviations from the landscape plan must be approved by the City of Novi in writing prior to installation.
- 7. All bidders must inspect the site and report any discrepancies to the Owner's representative.
- 8. All specifications are subject to change due to existing conditions.
- 9. The Owner's representative reserves the right to approve all plant material. MAINTENANCE
- 1. The Owner of the landscaping shall perpetually maintain such landscaping in good condition so as to present a healthy, neat, and orderly appearance, free from refuse and debris.
- 2. The Owner shall conduct a seasonal landscape maintenance program including regular lawn cutting (at least once per week during the growing season), pruning at appropriate times, watering, and snow removal during
- 3. The Contractor is responsible for watering and maintenance of all seed areas until a minimum of ninety percent (90%) coverage, as determined by the Owner's representative.
- 4. All diseased and/or dead material shall be removed within sixty (60) days following notification and shall be replaced within the next appropriate planting season or within three (3) months, whichever comes first.
- 5. Any debris such as lawn clippings, fallen leaves, fallen limbs, and litter shall be removed from the site on a weekly basis at the appropriate season.
- 6. All planting beds shall be maintained by removing weeds, fertilizing, and replenishing mulch as needed.



- * STAKE TREES UNDER FOUR INCH (4") CALIPER. * CONTRACTOR TO VERIFY PERCOLATION OF PLANTING PIT PRIOR TO INSTALLATION. * SET TOP OF BALL THREE INCHES (3") ABOVE FINISH GRADE.
- * SET STAKES VERTICAL & EVENLY SPACED.
- * STAKES OR GUYS TO BE SECURED ABOVE THE FIRST BRANCH. DO NOT PRUNE TERMINAL LEADER. PRUNE ONLY DEAD OR
- REMOVE ROOT BALL SOIL FROM TRUNK TO EXPOSE ROOT FLARE.
 - USING TWO INCH TO THREE INCH (2"-3") WIDE **BELT-LIKE MATERIAL OF FABRIC. (NO WIRE** OR HOSE TO BE USED TO GUY TREES.) THREE (3) GUYS EVENLY SPACED PER TREE. **REMOVE AFTER ONE (1) WINTER SEASON.**
 - (2) 2 x 2 HARDWOOD STAKES. POSITION SIX INCHES TO EIGHT INCHES (6"-8") OUTSIDE OF ROOTBALL AND EXTEND EIGHTEEN INCHES (18") BELOW TREE PIT INTO UNDISTURBED SOIL.
 - BIODEGRADABLE MATERIAL AT TOP AND BOTTOM. REMOVE AFTER ONE (1) WINTER.
 - COLOR AT FOUR INCH (4") MINIMUM DEPTH. LEAVE A THREE INCH (3") CIRCLE OF BARE SOIL AT THE BASE OF THE TREE.

 - 7) CUT AND REMOVE WIRE, BURLAP, AND BINDINGS FROM THE TOP ONE-THIRD (1/3) OF THE ROOTBALL. **REMOVE ROOTBALL DIRT FROM TRUNK TO BELOW** ROOT FLARE.
 - 8) WIDTH OF ROOTBALL ON EACH SIDE.
 - 9) PLANTING MIXTURE SHALL CONSIST OF 50%
 - TOSOIL AND 50% SAND. (10) SCARIFY BOTTOM AND SIDES OF PLANTING
- PIT TO FOUR INCH (4") DEPTH.

- NOTES:
- TO INSTALLATION.
- **OR BROKEN BRANCHES.**

EVERGREEN TREE

ATT THE

DECIDUOUS TREE PLANTING DETAILS

- **BROKEN BRANCHES.**

- - REMOVE ALL TAGS, STRING, PLASTICS, AND OTHER MATERIALS THAT ARE UNSIGHTLY OR COULD CAUSE DAMAGE.
 - (1) STAKE TREE JUST ABOVE THE FIRST BRANCH

 - **3**) APPLY TREE WRAP AND SECURE WITH A
 - (4) SHREDDED BARK MULCH OF A NATURAL
 - 5) MOUND TO FORM TREE SAUCER.
 - 6) FINISH GRADE SLOPED AWAY FROM TREE.

RETENTION BASIN DEVELOPMENT NOTES:

- **DETENTION PLANTING NOTES:** 1. Follow the Supplier's recommended procedures for bed preparation, installation, and soil erosion control measures of the proposed seeded areas. After the plants germinate and begin to grow follow the maintenance guidelines included on this sheet
- 2. Rototill four inches (4") of compost or topsoil into the top six inches (6") of the surface of the retention basin
- 3. Provide a cover crop of annual rye at a rate of ten pounds (10#) per acre and seed oats at a rate of thirty pounds (30#) per acre over the entire area to be seeded.
- 4. Maintain the retention basin with the following actions: Provide initial erosion control with coconut fiber mat on all areas to receive the seed mixture. Once plants start to emerge, establish a regular weeding regimen, water as needed, provide a cut edge bed, cut back flowering plants at appropriate times, thin perennials after establishment as needed, replace plants that are diseased or dead, and remove litter and debris.

MAINTENANCE OF THE RETENTION AREAS

- 1. ESTABLISHMENT: During the first growing season, the native seed areas should be mowed two (2) to four (4) times to a height of four inches to six inches (4"-6") when the plants reach a height of ten inches to twelve inches (10"-12"). Hand pulling may be needed to control unwanted weed populations. If a mower cannot be set high enough, a string trimmer can be used. During the second growing season, the native seed areas should be mowed a few times to a height of about eight inches (8"), when the plants reach a height of ten inches to eighteen inches (10"-18"). Hand pulling may be needed to control unwanted weed populations. By the second growing season it should be apparent if some areas need reseeding. Long term management includes mowing and hand pulling of weeds. The native planting may be mowed to a short height and the clippings removed in the early Spring before birds begin nesting.
- 2. WATERING: Watering should be performed as needed. During the establishment period after the initial planting, watering is very important and should be conducted every two to three (2-3) days. The initial planting should be checked regularly for appropriate moisture availability. Two (2) methods for determining adequate moisture levels include the following: a.) if the plants wilt during the day when the temperature is at its highest, but revive during the night, then watering is not necessary, and b.) by testing the soil moisture at a depth of four inches (4") by inserting a small rod into the soil. If the rod is wet, then the soil is moist at a depth of four inches (4") and watering is not necessary.
- 3. EROSION CONTROL: Provide an erosion control blanket consisting of a coconut fiber mat on all areas proposed for seeding. The erosion control blanket shall be pegged in place.
- 4. EDGING: The edge of the retention basin should be maintained to avoid grass growing into the detention basin. The edge can be maintained with a V-notch cut edge. The channel should be maintained at four inches (4") or greater and renewed every six to eight (6-8) weeks.
- 5. CUTTING BACK: Tall wildflowers should be cut back by one-third. Early flowering plants can be cut back in late June or early July and late flowering plants in late October.
- 6. THINNING: After the plants in the around basin have become established and thriving, it may be necessary to thin perennials by dividing individual plants in Spring or Fall.
- 7. REPLACEMENT: Any plants that die or become diseased should be replaced. Plant health should be checked regularly with replanted material occurring in the Spring or Fall.
- 8. REMOVAL OF LITTER AND DEBRIS: Litter, trash, and debris should be removed on a regular basis to insure that inlets remain free flowing and to keep the area in a neat and attractive appearance.
- 9. INORGANIC APPLICATIONS: In general, retention basins do not need fertilization as nutrients from surrounding areas is usually at an elevated level. If soil fertility appears to be an issue, the soil should be tested and appropriate actions taken based on the results. Insecticides, herbicides, fungicides, and rodenticides should not be used in the retention area. If a plant is diseased or infested with insects, it should simply be removed and replaced.

ADDITIONAL NOTES:

- * No chemicals are allowed in stormwater features or buffer zones except that
- invasive species may be treated with chemicals by a certified applicator * The Landscape Contractor shall provide proof of the seed mixes to be used in the detention basinarea and adjacent to wetlands for approval before installation. Send proof in the form of photos of the seed bag and / or a copy of the seed invoice to rmeader@cityofnovi.org.

SEED MIX COMPOSITIONS

WETLAND SEED MIX **MICHIGAN WILDFLOWER FARM** A composition of wildflowers, sedges,

and grasses. Application rate: 3 oz. per 1000sq. ft. or

7 lbs. per acre **COMMON NAME**

BOTANICAL NAME Wildflowers Asclepias incarnata Aster novae-anglae Aster puniceus Aster umbellatus Eupatorium maculatum Eupatorium perfoliatum Euthamia graminifolia Liatris spicata Pedicularis lanceolata Rudbeckia subtomentosa Silphium serfoliatum Silphium terebinthinaceum Prairie Dock Solidago patula Solidago riddellii Verbena hastata Vernonia missurica Veronicastrum virginicum Culver's Root Sedges/Grasses Andropogon scoparius Carex crinita Carex stricta

Swamp Milkweed New England Aster Swamp Aster Flat-Top Aster Joe-Pye Weed Boneset Grassleaved Goldenrod Marsh Blazing Star Swamp Betony Black-Eyed Susan Cupplant Swamp Goldenrod **Ridell's Goldenrod** Blue Vervain ronweed

> Little Bluestem Fringed Sedge **Tussock Sedge** Wool Grass



Scirpus cyperinus

CUSTOM SHORT GRASS SEED MIX MICHIGAN WILDFLOWER FARM Fifty percent (50%) Forbs/ Fifty percent (50%) Grass. Application rate: 5 oz. per 1000 sq. ft. BOTANICAL NAME COMMON NAME Wildflowers Achillea millefolium Yarrow Aquilegia canadensis Wild Columbine Asclepias tuberosa Butterflyweed Aster laevis Smooth Aster Sand Tickseed Coreopsis lanceolata Purple Coneflower Echinacea purpurea Kuhnia eupatoroides False Boneset Monarda fistulosa Bergamot Penstemon digitalis Fokglove Beardstongue Rudbeckia hirta Black-Eyed Susan Showy Goldenrod Solidago speciosa Sedges/Grasses Andropogon scoparius Little Bluestem Bouteloua curtipendula Side Oats Grama *Koeleria pyramidata* June Grass* Sporobolus heterolepsis Prairie Dropseed* * Supplier to add these species to the mix

MICHIGAN WILDFLOWER FARM

NOTES:

- * See Sheet LP 1: LANDSCAPE PLANTING PLAN for overall landscape plan, plant list, and calculations for landscape requirements.
- * See Sheet TPP 1: TREE PRESERVATION PLAN for proposed
- for tree replacement calculations.

BELT-LIKE MATERIAL OF 7

TREE TRUNK-ROOTBALL



TREE GUYING DIAGRAM

NOTE:

- OF PLANTING PIT PRIOR TO INSTALLATION. * THE PLANTING MIXTURE SHALL CONSIST OF 20% TOPSOIL, 60% SAND, AND 20% COMPOST.
 - (1) SHREDDED BARK MULCH AT THREE INCH (3") MINIMUM DEPTH. MULCH SHALL BE

 - SOIL AROUND SHRUB BED.
 - **3**) CUT AND REMOVE BURLAP AND BINDINGS FROM THE TOP ONE-THIRD (1/3) OF THE ROOTBALL.
 - 4) 3/16" x 4" ALUMINUM EDGING (OR APPROVED EQUIVALENT)
 - 5) EXCAVATE PLANTING BED AND BACKFILL



- (8) WIDTH OF ROOTBALL ON EACH SIDE.
- PIT TO FOUR INCH (4") DEPTH.

SHRUB

* REMOVE ALL TAGS, STRING, PLASTICS, AND OTHER MATERIALS THAT ARE UNSIGHTLY OR COULD CAUSE GIRDLING. REMOVE ROOT BALL SOIL FROM TRUNK TO EXPOSE ROOT FLARE.

- (1) STAKE TREE AS INDICATED USING TWO INCH TO THREE INCH (2"-3") WIDE BELT-LIKE MATERIAL OF FABRIC. (NO WIRE OR HOSE TO BE USED TO GUY TREES.) THREE (3) GUYS EVENLY SPACED PER TREE. REMOVE AFTER ONE (1) WINTER SEASON.
- (2) 2 x 2 HARDWOOD STAKES. POSITION SIX INCHES TO EIGHT INCHES (6"-8") OUTSIDE OF ROOTBALL AND EXTEND EIGHTEEN INCHES (18") BELOW TREE PIT INTO UNDISTURBED SOIL.
- (3) SHREDDED BARK MULCH OF A NATURAL COLOR AT FOUR INCH (4") MINIMUM DEPTH. LEAVE A THREE INCH (3") CIRCLE OF BARE SOIL AT THE BASE OF THE TREE.
- 4) MOUND TO FORM TREE SAUCER.
- 5) FINISH GRADE SLOPED AWAY FROM TREE.
- 6) CUT AND REMOVE WIRE, BURLAP, AND BINDINGS FROM THE TOP ONE-THIRD (1/3) OF THE **ROOTBALL. REMOVE ROOTBALL DIRT FROM** TRUNK TO BELOW ROOT FLARE.
- 7) PLANTING MIXTURE SHALL CONSIST OF 50% TOSOIL AND 50% SAND.
- (9) SCARIFY BOTTOM AND SIDES OF PLANTING

GRASS SEED MIX

- 11770 Cutler Road

Phone: (517) 6476010 Fax: (517) 647 6072

- * CONTRACTOR TO VERIFY PERCOLATION OF PLANTING PIT PRIOR FABRIC (TYP.) NEVER CUT CENTRAL LEADER. PRUNE ONLY TO REMOVE DEAD
 - SHREDDED BARK CIRCLE
 - - * CONTRACTOR TO VERIFY PERCOLATION
 - - NATURAL IN COLOR. (2) FORM A SAUCER WITH MULCH AND

 - OR SPADED EDGE.
 - WITH PREPARED PLANTING MIX.
 - **6** UNDISTURBED SUBGRADE.
 - (7) LAWN.
 - (8) SCARIFY SUBGRADE.









- **CUSTOM SHORT**





not to scale

NOTES & DETAILS





TREE SUMMARY

COLUMN 1: Total:	115	Save: 93	R1: 9	R2: 13	R3: 0	R4: 0	R(N.R.): 0
COLUMN 2: Total:	115	Save: 111	R1: 3	R2: 1	R3: 0	R4: 0	R(N.R.): 0
COLUMN 3: Total:	115	Save: 115	R1: 0	R2: 0	R3: 0	R4: 0	R(N.R.): 0
COLUMN 4: Total:	115	Save: 111	R1: 1	R2: 2	R3: 0	R4: 0	R(N.R.): 1
COLUMN 5: Total:	<u>116</u>	Save: <u>61</u>	R1: <u>17</u>	R2: <u>32</u>	R3: <u>4</u>	R4: <u>0</u>	R(N.R.): <u>2</u>
TOTALS	576	Save: 491	R1:30	R2: 48	R3: 4	R4: 0	R(N.R.): 3
GRAND TOTAL							
Save: T	rees t	o be saved:				491	
Remove1 (R1): T	- ree >8	8" to <11" to	be rem	oved:		30	
Remove2 (R2): 1	- ree > ⁻	11" to <20"	to be rer	noved:		48	
Remove3 (R3): T	- ree >2	20" to <29"	to be rer	noved:		4	
Remove4 (R4): T	⁻ ree >:	30" to be re	moved:			0	
R(N.R.): N	lon-R∉	egulated tre	е			3	
(Ash, Callery Pea	ar, & C	Condition rat	ting at P	, VP, D)			
			•	· · · ·			
Replacement tree	es req	uired:					
Remove1 (R1) C	Dne (1) per >8" to	<11" to	be remo	oved:	30	
Remove2 (R2): T	- wo (2) per >11" to	o <20" to	be rem	noved:	96	
Remove3 (R3): 1	⁻ hree ((3) per >20"	to <29"	to be re	moved	12	
Remove4 (R4): F	our (4) per >30" t	o be ren	noved:		0	
· · · · ·	,	/ 1				====	
Replac	ement	t with 2-1/2"	trees			138	
•							

* Removals and calculations by Nagy Devlin Land Design.

NOTES:

- * See Sheet LP 1: LANDSCAPE PLANTING PLAN for overall landscape plan, plant list, and calculations for landscape requirements.
- * See Sheet LP 2: LANDSCAPE NOTES & DETAILS for landscape development notes, landscape planting details, detention pond notes, composition for seed mixes, landscape construction details, snow fencing for tree protection detail, and detail for proper prunung techniques.
- * See Sheet TPP 1: TREE PRESERVATION PLAN for proposed
- action to be taken for existing trees and overall tree preservation plan. * See Sheet TPP 2: TREE INVENTORY LIST for tag number, size, common name, botanical name, condition, proposed action, and chart for tree replacement calculations.

date: June 6, 2022 revised:

08-08-2022 Revise for site plan changes & City planning review.



PROJECT LOCATION: Novi Concrete Plant 46844 West Twelve Mile Road Novi, Michigan

LANDSCAPE PLAN FOR: Angle Design & Engineering, L.L.C. 22417 Cranbrooke Drive Novi, Michigan 48375 (313) 258-2036

LANDSCAPE PLAN BY: Nagy Devlin Land Design 31736 West Chicago Ave. Livonia, Michigan 48150 (734) 634-9208



TPP - 1: TREE PRESERVATION PLAN

> * Base data provided by Angle Design & Engineering, L.L.C.

ree Tag # 145	DBH (inches) 13.5	Common Name	Scientific Name	Good	Save
146	20.4	Cottonwood	Populus deltoides	Fair	Save
147	11.9 8 3	Black Walnut	Juglans nigra Populus deltoides	Good	Save
149	8.4	Cottonwood	Populus deltoides	Good	R1
150	8.1	Cottonwood	Populus deltoides	Good	R1
151	14.6	Cottonwood	Populus deltoides Populus deltoides	Good	R2 R2
153	11.9	Cottonwood	Populus deltoides	Good	R2
154	11.7	Cottonwood	Populus deltoides	Good	R2
156	9.8	American Elm	Ulmus americana	Good	R1
157	8.2	Cottonwood	Populus deltoides	Good	R1
158	9.6 8.9	Quaking Aspen	Populus tremuloides	Good	Save
160	9.9	Pignut Hickory	Carya glabra	Good	Save
161	9.1	Black Cherry	Prunus serotina	Good	Save
162 163	11.1 9.8	Red Oak Slippery Elm	Quercus rubra	Good	Save
164	8.2	Hop-Hornbeam	Ostrya virginiana	Good	Save
165	18.8	Black Walnut	Juglans nigra	Good	Save
166 167	19.5	Black Walnut Basswood	Juglans nigra Tilia americana	Good	Save
168	12.2	Basswood	Tilia americana	Good	Save
169	19.2	Basswood	Tilia americana	Fair	Save
170	8.6	Basswood	Tilia americana Tilia americana	Good	Save
172	10.1	Hop-Hornbeam	Ostrya virginiana	Good	Save
173	15.7	Sugar Maple	Acer saccharum	Good	Save
1/4 175	8.3	Sugar Maple	Acer saccharum	Good	Save
176	11.9	Sugar Maple	Acer saccharum	Good	Save
177	18.8	Sugar Maple	Acer saccharum	Good	Save
178 179	9.4 18 7	Black Cherry Red Oak	Prunus serotina Quercus rubra	Good	Save
180	8.9	Hop-Hornbeam	Ostrya virginiana	Good	Save
181	17.8	Basswood	Tilia americana	Good	Save
182 183	20.0	Basswood	i ilia americana Tilia americana	Good	Save
184	8.7	Black Walnut	Juglans nigra	Good	Save
185	8.8	Sugar Maple	Acer saccharum	Good	Save
186 187	10. <i>1</i> 8.0	Basswood Slipperv Flm	i ilia americana Ulmus rubra	Good	Save
188	21.0	Black Walnut	Juglans nigra	Good	Save
189	9.8	Black Walnut	Juglans nigra	Good	Save
190 191	12.8	Basswood Red Oak	Tilia americana Quercus rubra	Fair Good	Save
192	13.0	Black Cherry	Prunus serotina	Good	Save
193	8.5, 8.3	Freeman Maple	Acer x freemanii	Good	Save
194 195	24.8	Sugar Maple Basswood	Acer saccharum Tilia americana	Good	Save
196	8.7	Hackberry	Celtis occidentalis	Good	Save
197	9.1	Box-Elder	Acer negundo	Good	Save
190	11.2	Hop-Hornbeam	Ostrva virginiana	Good	Save
200	14.0	Black Cherry	Prunus serotina	Good	Save
201	10.8	Silver Maple	Acer saccharinum	Good	Save
202	10.6	Sugar Maple	Acer saccharum	Good	Save
204	11.2	Red Maple	Acer rubrum	Good	Save
205	21.4	American Elm	Ulmus americana	Fair	Save
200	13.6	Sugar Maple	Acer saccharum	Good	Save
208	10.9	Sugar Maple	Acer saccharum	Good	Save
209	9.1	Black Cherry Black Cherry	Prunus serotina	Good	Save
211	12.3	Black Cherry	Prunus serotina	Good	Save
212	8.3	Black Cherry	Prunus serotina	Good	Save
213	11.7	Cottonwood	Populus deltoides	Good	R2 R2
215	13.5	Cottonwood	Populus deltoides	Good	R2
216	14.4	Cottonwood	Populus deltoides	Good	R2
217	9.6	Cottonwood	Populus deitoides Populus deitoides	Good	R1 Save
219	12.9	Cottonwood	Populus deltoides	Good	R2
220	12.8	Black Cherry	Prunus serotina	Good	Save
∠∠ I 222	9.0 8.0	American Elm	umus americana Ulmus americana	Good	Save
223	17.8	Black Walnut	Juglans nigra	Good	Save
224	10.4	American Elm	Ulmus americana	Good	Save
226	12.1	Red Oak	Quercus rubra	Good	Save
227	17.8	Black Walnut	Juglans nigra	Good	Save
228	20.6 14.2	Sugar Maple	Acer saccharum	Good	Save
230	15.9	Sugar Maple	Acer saccharum	Good	Save
231	16.9	American Beech	Fagus grandifolia	Good	Save
232	12.2 21 0	American Beech	Fagus grandifolia	Good	Save
234	8.7	Hop-Hornbeam	Ostrya virginiana	Good	Save
235	25.4	Red Oak	Quercus rubra	Good	Save
236 237	10. <i>1</i> 8.8	Sugar Maple	Acer saccharum	Good	Save
238	9.9	Sugar Maple	Acer saccharum	Good	Save
239	10.5	Black Cherry	Prunus serotina	Fair	Save
∠ 4 0 241	8.0	Sugar Maple	Acer saccharum	Good	Save
242	14.8	Basswood	Tilia americana	Good	Save
243	9.8	Basswood Red Ook	Tilia americana	Good	Save
<u>∠</u> ++ 245	<u>∠3.9</u> 19.2	White Oak	Quercus rupra	Good	Save
246	11.9	Red Oak	Quercus rubra	Good	Save
247 249	10.0 17 0	White Oak	Quercus alba	Good	Save
∠48 249	17.8 19.2	Black Walnut	Jugians nigra Jugians nigra	Good	Save
250	22.1	Black Walnut	Juglans nigra	Good	Save
251	9.9	Shagbark Hickory	Carya ovata	Good	Save
∠5∠ 253	ठ.अ 15.8	Diack walnut Cottonwood	ugians nigra Populus deltoides	Fair	Save R2
254	14.3	Cottonwood	Populus deltoides	Good	R2
255	11.4		Populus deltoides	Good	R2
200 257	8.3	American Elm Black Walnut	Juglans nigra	Good	r≺∠ R1
250	8.3	Sweet Cherry	Prunus avium	Fair	R1
200		•			-

Tree Tag # 260	DBH (inches) 8.2	Common Name American Elm	Scientific Name Ulmus americana	Condition Good	R1
261	11.1	American Elm	Ulmus americana	Good	R2
262	9.9	American Elm	Ulmus americana	Good	R1
264	13.8	Sugar Maple	Acer saccharum	Good	Save
265	17.2 16.8, 11.2, 10.6, 10.2	Basswood	Tilia americana	Fair	Save
267	10.7, 7.6	Basswood	Tilia americana	Good	Save
268	23.8	Black Walnut	Juglans nigra Juglans nigra	Good	Save
270	15.8	Red Oak	Quercus rubra	Good	Save
271	9.9 8.0	Basswood	Tilia americana Tilia americana	Good	Save
273	9.4	Basswood	Tilia americana	Good	Save
274 275	14.5 9.7	Basswood Basswood	Tilia americana Tilia americana	Good Good	Save
276	9.3	Basswood	Tilia americana	Good	Save
277 278	23.2	Sugar Maple Pignut Hickory	Acer saccharum Carva dlabra	Good Good	Save
279	12.1	Black Cherry	Prunus serotina	Good	Save
280 281	13.5 14.6	American Elm Black Cherry	Ulmus americana Prunus serotina	Good Good	Save
282	17.7	Sugar Maple	Acer saccharum	Good	Save
283 284	17.8	Basswood Black Walnut	Tilia americana Juglans nigra	Good Good	Save
285	10.4	Sugar Maple	Acer saccharum	Good	Save
286 287	8.3 19.8	American Elm American Elm	Ulmus americana Ulmus americana	Good Good	Save
288	8.9	American Elm	Ulmus americana	Good	Save
289	8.2 8.0	Red Oak Sugar Maple	Quercus rubra Acer saccharum	Good Good	Save
291	11.5	Sugar Maple	Acer saccharum	Good	Save
292 293	9.9	Sugar Maple	Acer saccharum	Good Good	Save
294	22.5	Black Walnut	Juglans nigra	Good	Save
295 296	14.5 12 1	Red Oak Black Cherry	Quercus rubra Prunus serotina	Good	Save Save
297	23.3	Cottonwood	Populus deltoides	Good	Save
298 299	9.6 9.8	Black Cherry Black Cherry	Prunus serotina Prunus serotina	Good	Save Save
300	20.9	Red Oak	Quercus rubra	Good	Save
301 302	25.4 9.4	Red Oak Pignut Hickorv	Quercus rubra Carva alabra	Good Good	Save
303	10.2	American Beech	Fagus grandifolia	Good	Save
304	8.3	Red Oak	Acer x freemanii Quercus rubra	Good	Save
306	9.9	Red Oak	Quercus rubra	Good	Save
307	17.9	Red Oak	Quercus rubra	Good	Save
309	17.8	Black Walnut	Juglans nigra	Good	Save
310	11.5	Sugar Maple	Acer saccharum	Good	Save
312	14.6	American Elm Sugar Maple	Ulmus americana	Good	Save
314	21.8	Red Oak	Quercus rubra	Fair	Save
315 316	11.1 11.3	Sugar Maple Sugar Maple	Acer saccharum	Fair Good	Save
317	9.9	Sugar Maple	Acer saccharum	Good	Save
318 319	15.1 9.9	Black Walnut Sugar Maple	Juglans nigra Acer saccharum	Good Good	Save
320	13.8	Sugar Maple	Acer saccharum	Good	Save
321 322	19.6 20.2	White Mulberry Cottonwood	Morus alba Populus deltoides	Fair Good	Save
323	8.5	Cottonwood	Populus deltoides	Fair	Save
324	21.3	Black Walnut	Juglans nigra	Good	Save
326	13.0	Sugar Maple	Acer saccharum	Good	Save
327	9.0	Sugar Maple	Acer saccharum	Good	Save
329	9.6	Sugar Maple	Acer saccharum	Good	Save
331	9.3	Pignut Hickory	Carya glabra	Good	Save
332	19.8 11 3	Cottonwood	Populus deltoides	Fair	Save
334	11.3	Pignut Hickory	Carya glabra	Good	Save
335	15.5	Cottonwood	Populus deltoides	Fair	Save
337	9.6	Sugar Maple	Acer saccharum	Good	Save
338	9.8	Sugar Maple	Acer saccharum	Good	Save
340	15.6	Green Ash	Fraxinus pennsylvanio	Good	Save
341 342	18.1 11 3	Cottonwood American Elm	Populus deltoides	Good	Save
343	13.6	Cottonwood	Populus deltoides	Good	Save
344 345	14.2 25.6	Bitternut Hickory	Carya cordiformis Populus deltoides	Good	Save Save
346	8.3	Pignut Hickory	Carya glabra	Good	Save
347 348	8.0 8.3	Pignut Hickory Red Oak	Carya glabra Quercus rubra	Good	Save Save
349	12.9	Basswood	Tilia americana	Good	Save
350 351	10.1 15.8	Sugar Maple Sugar Maple	Acer saccharum Acer saccharum	Good Good	Save Save
352	13.4	Bitternut Hickory	Carya cordiformis	Good	Save
353 354	9.9 15.8	Bitternut Hickory Bitternut Hickorv	Carya cordiformis Carya cordiformis	Good Good	Save
355	9.5	Sugar Maple	Acer saccharum	Good	Save
356	12.5	Bitternut Hickory	Carya cordiformis Carya cordiformis	Good	Save
358	12.8	Sugar Maple	Acer saccharum	Good	Save
360	12.9	Sugar Maple	Acer saccharum	Good	Save
361 362	10.6 15 3	Sugar Maple	Acer saccharum	Good	Save
363	12.6	Sugar Maple	Acer saccharum	Good	Save
364 365	14.4 18.2	Sugar Maple	Acer saccharum	Good	Save
366	12.4	Sugar Maple	Acer saccharum	Poor	Save
367 368	19.5 10.7	Black Walnut American Beech	Juglans nigra Fagus grandifolia	Good Good	Save Save
369	12.7	Sugar Maple	Acer saccharum	Good	Save
370 371	11.7 9.7	Sugar Maple Sugar Maple	Acer saccharum Acer saccharum	Good Good	Save
372	8.9	Sugar Maple	Acer saccharum	Good	Save
373	0.3 17.5	Sugar Maple	Acer saccharum	Good	Save
Total No.	of Trees: 115				

Remove4 (R4): 0 Remove (N.R.): 0

Save: 111

Remove1 (R1): 3 Remove4 (R4): 0 Remove (N.R.): 0

Remove2 (R2): 1

Remove3 (R3): 0

	275	14.2	Common Name		Cood	Cava
	375 376	14.3	Sugar Maple	Acer saccharum Prunus serotina	Good	Save
	377	10.8	Sugar Maple	Acer saccharum	Good	Save
	378	10.3	Sugar Maple	Acer saccharum	Good	Save
	379	9.8	Sugar Maple	Acer saccharum	Good	Save
	380	9.6	Black Cherry	Prunus serotina	Good	Save
	387	10.9	American Beech	Prunus serotina	Boor	Save
	383	9.8	Sugar Maple	Acer saccharum	Good	Save
	384	8.6	Basswood	Tilia americana	Good	Save
	385	10.2	Sugar Maple	Acer saccharum	Good	Save
	386	11.0	Black Cherry	Prunus serotina	Good	Save
	387	15.9	Red Oak	Quercus rubra	Good	Save
	388	18.8	Black Cherry	Prunus serotina	Good	Save
	389	8.4	Sugar Maple	Acer saccharum	Good	Save
	390	12.4	Basswood	Tilia americana	Good	Save
	392	9.0	Red Oak	Quercus rubra	Good	Save
	393	22.8	Red Oak	Quercus rubra	Good	Save
	394	16.5	Black Cherry	Prunus serotina	Good	Save
	395	11.4	Black Cherry	Prunus serotina	Good	Save
	396	8.4	Black Cherry	Prunus serotina	Good	Save
	397	22.2	Black Cherry	Prunus serolina	Good	Save
	399	15.3	Basswood	Tilia americana	Good	Save
	400	8.2	Sugar Maple	Acer saccharum	Good	Save
	401	10.2	White Oak	Quercus alba	Good	Save
	402	9.3	Basswood	Tilia americana	Good	Save
	403	14.3	Red Oak	Quercus rubra	Good	Save
	404	20.0, 13.4 25.9	Red Oak	Quercus rubra	Good	Save
	406	8.0	Pignut Hickory	Carva dlabra	Good	Save
	407	12.1	Basswood	Tilia americana	Good	Save
	408	12.4	Basswood	Tilia americana	Good	Save
_	409	10.3	Black Walnut	Juglans nigra	Good	Save
	410	25.6	Red Oak	Quercus rubra	Good	Save
	411 412	15.2 13 3	Red Oak Black Cherry	Quercus rubra	Good	Save
	413	11 0	Black Cherry	Prunus serotina	Good	Save
	414	12.0	Black Cherry	Prunus serotina	Good	Save
_	415	9.8	Hop-Hornbeam	Ostrya virginiana	Good	Save
	416	24.9	Red Oak	Quercus rubra	Good	Save
	417	9.8	Red Oak	Quercus rubra	Good	Save
	418 410	21.4	Red Oak	Quercus rubra	Good	Save
	419	19.2	White Oak	Quercus rubra	Good	Save
	421	21.2	Red Oak	Quercus rubra	Good	Save
	422	13.0	Black Cherry	Prunus serotina	Good	Save
	423	8.2	Black Cherry	Prunus serotina	Good	Save
	424	16.6	Black Cherry	Prunus serotina	Good	Save
	425	13.6	Black Cherry	Prunus serotina	Good	Save
	420 427	9.5	Sugar Maple	Acer saccharum	Good	Save
	427	12 1	Black Cherry	Prunus serotina	Good	Save
	429	15.7, 14.0	Black Cherry	Prunus serotina	Good	Save
	430	12.9	Sugar Maple	Acer saccharum	Good	Save
	431	16.2	Black Cherry	Prunus serotina	Good	Save
	432	18.2	Black Walnut	Juglans nigra	Good	Save
	433	13.6	American Elm	Caraya corditormis	Good	Save
	435	17.8	Pignut Hickory	Carva dabra	Good	Save
	436	8.9	Sugar Maple	Acer saccharum	Good	Save
	437	25.3	American Beech	Fagus grandifolia	Good	Save
	438	9.8	Hop-Hornbeam	Ostrya virginiana	Good	Save
	439	14.0	Black Cherry	Prunus serotina	Dead	Save
	440	15.8	Red Oak	Quercus rubra	Good	Save
	442	16.9	Red Oak	Quercus rubra	Good	Save
	443	10.7	Black Cherry	Prunus serotina	Good	Save
	444	19.4	Pignut Hickory	Carya glabra	Good	Save
	445	12.0	White Oak	Quercus alba	Good	Save
	446	17.8	Red Oak	Quercus rubra	Good	Save
	447	12.1	Sugar Maple	Acer saccharum	Good	Save
	44 ୪ 44ଦ	14.1 10 3	American Beech Black Cherry	rayus granditolia Prunus serotina	Good	Save
	450	26.4	White Oak	Quercus alba	Good	Save
_	451	26.8	White Oak	Quercus alba	Good	Save
	452	11.7	Red Oak	Quercus rubra	Good	Save
_	453	21.4	Red Oak	Quercus rubra	Good	Save
	454 455	26.7	Red Oak	Quercus rubra	Good	Save
	400 456	21.3 18 /	Red Oak	Quercus rubra	Good	Save
	457	8.7	Red Oak	Quercus rubra	Good	Save
	458	10.3	Sugar Maple	Acer saccharum	Good	Save
	459	13.8	Red Oak	Quercus rubra	Good	Save
	460	11.9	Red Oak	Quercus rubra	Good	Save
	461	32.4	White Oak	Quercus alba	Fair	Save
	462 162	17.8	Sugar Maple	Acer saccharum	Good	Save
	464	10.8	Pignut Hickory	Quercus rubra Carva dlabra	Good	Save
	465	15.4	Pignut Hickorv	Carya glabra	Good	Save
_	466	21.2	Basswood	Tilia americana	Good	Save
	467	13.1	Black Cherry	Prunus serotina	Good	Save
	468	22.0	Basswood	Tilia americana	Poor	Save
	469	10.1	Pignut Hickory	Carya glabra	Good	Save
	4/U 471	12.2		<i>Uarya glabra</i> Tilia amorioana	Good	Save
	472	<u>0.∠</u> 8.3	Pianut Hickory	rina americana Carva diabra	Good	Save
	473	19.9	Black Walnut	Juglans niara	Good	Save
	474	14.3	Black Cherry	Prunus serotina	Good	Save
	475	9.0	White Ash	Fraxinus americana	Fair	Save
	476	15.8	American Beech	Fagus grandifolia	Good	Save
	477	10.8	Black Walnut	Juglans nigra	Good	Save
	478	13.5, 11.6	Pignut Hickory	Carya glabra	Good	Save
	4/9	0.3, 15.8, 14.2, 14.0, 13.	Basswood	Lilia americana	Good	Save
	480 481	8.9	Fignut Hickory	∪arya glabra Tilia amorioana	Good	Save
	40 I 482	12.9 12 Q	Basswood	Tilla americana	Good	Save
	483	13.2	Basswood	Tilia americana	Good	Save
	484	13.2	Red Oak	Quercus rubra	Good	Save
	485	15.1	Basswood	Tilia americana	Good	Save
		18.1	Pignut Hickory	Carya glabra	Good	Save
	486			O a much and a family set	Cood	Sava
	486 487	12.7	Pignut Hickory	Carya glabra	Good	Save
	486 487	12.7	Pignut Hickory	Carya glabra	Good	Sav

Tree Tag # 490	DBH (inches) 14 2	Common Name Sugar Maple	Scientific Name	Condition Good	Save	Tree Tag # 605	DBH
491	10.6	Red Oak	Quercus rubra	Good	Save	606	1
492 493	8.7	Slippery Elm	Ulmus rubra Nyssa sylvatica	Good	Save	607 608	1
494	14.4	White Oak	Quercus alba	Good	Save	609	
495	22.0, 17.6	Red Oak	Quercus rubra	Good	Save	610	
496 497	9.9	Slippery Elm	Jugians nigra Ulmus rubra	Good	Save	612	
498	8.2	Sugar Maple	Acer saccharum	Good	Save	613	1
499	<u> </u>	Sugar Maple	Acer saccharum	Good	Save Save	614 615	1
501	13.4	Black Walnut	Juglans nigra	Good	R2	616	1
502	9.4	Black Walnut	Juglans nigra	Good	R1	617	:
503	26.5	Black Walnut Silver Maple	Juglans nigra Acer saccharinum	Good	Save	618	
505	9.4	Green Ash	Fraxinus pennsylvanio	Good	R (N.R.)	620	1
506 507	10.2	Black Cherry	Prunus serotina	Good	Save	621 622	1
508	9.8	Red Maple	Acer rubrum	Good	Save	623	1
509	17.8	Black Walnut	Juglans nigra	Good	Save	624	
510 511	9.0	Red Maple	Juglans nigra Acer rubrum	Good Good	Save	625	
512	8.8	Sugar Maple	Acer saccharum	Good	Save	627	-
513 514	10.2, 8.5	Sugar Maple	Acer saccharum	Good	Save	628 629	
515	8.2	Sugar Maple	Acer saccharum	Good	Save	630	
516	8.1	Slippery Elm	Ulmus rubra	Good	Save	631	-
517 518	9.4	Slippery Elm Slippery Elm	Ulmus rubra Ulmus rubra	Good	Save Save	632 633	
519	8.6	Freeman Maple	Acer x freemanii	Good	Save	634	-
520	17.1	Black Cherry	Prunus serotina	Good	Save	635 636	-
521	23.2	Basswood	Tilia americana	Good	Save	637	-
523	13.1	Basswood	Tilia americana	Good	Save	638	
524 525	18.8 25.2	Pignut Hickory Red Oak	Carya glabra Quercus rubra	Good	Save Save	639 640	-
526	30.4	Red Oak	Quercus rubra	Good	Save	641	
527	9.4	Hop-Hornbeam	Ostrya virginiana	Good	Save	642	10.1, 8
ວ∠୪ 529	28.7 10.8	Red Oak Sugar Maple	Quercus rubra Acer saccharum	Good	Save Save	644	-
530	10.6	Shagbark Hickory	Carya ovata	Fair	Save	645	1
531	14.4 10 9	Red Oak Sugar Maple	Quercus rubra	Good	Save Save	646 647	
533	22.3	Red Oak	Quercus rubra	Good	Save	648	
534	13.3	Sugar Maple	Acer saccharum	Good	Save	649	44
535	9.4	Pignut Hickory	Acer saccharum Carva qlabra	Good	Save	651	16.4
537	14.5	Basswood	Tilia americana	Good	Save	652	
538	26.2	Red Oak Basswood	Quercus rubra	Good	Save	653 654	
540	23.7	Shagbark Hickory	Carya ovata	Good	Save	655	
541	9.3	Sugar Maple	Acer saccharum	Good	Save	656	م م
542 543	23.4	Red Oak	Jugians nigra Quercus rubra	Good	Save	658	
544	12.2	Red Oak	Quercus rubra	Good	Save	659	
545 546	16.1	Red Oak Basswood	Quercus rubra	Good	Save Save	660 661	
547	13.7	Red Oak	Quercus rubra	Good	Save	662	2
548	18.8	Red Oak	Quercus rubra	Good	Save	663	•
549	15.5 8.0	Basswood Red Oak	Tilia americana Quercus rubra	Good	Save	665	-
551	13.5	Red Oak	Quercus rubra	Good	Save	666	1
552 553	9.6	Pignut Hickory	Carya glabra	Good	Save Save	667 668	
554	9.5	Pignut Hickory	Carya glabra	Good	Save	669	
555	11.4	Red Oak	Quercus rubra	Good	Save	670	
556	8.4	Basswood Pignut Hickory	Tilia americana Carva diabra	Good	Save	671	
558	8.2	Basswood	Tilia americana	Good	Save	673	-
559 560	9.1	Pignut Hickory	Carya glabra	Good	Save	674 675	
561	14.4	Basswood	Tilia americana	Good	Save	676	-
562	13.5	Red Oak	Quercus rubra	Good	Save	677	
563	18.4	Red Oak Basswood	Quercus rubra Tilia americana	Good	Save	678 679	-
565	25.8	Red Oak	Quercus rubra	Good	Save	680	
566 567	16.3	Red Oak	Quercus rubra	Good	Save	681 682	ر بر
568	18.8	Red Oak	Quercus rubra	Good	Save	683	
569	16.0	Red Oak	Quercus rubra	Good	Save	684	
570 571	16.2 9.1	Red Oak Pignut Hickory	Quercus rubra Carva alabra	Good Good	Save Save	686	2
572	16.5	Black Walnut	Juglans nigra	Good	Save	687	
573	10.1	Black Walnut	Juglans nígra	Good	Save	688	~
575	9.8	Pin Oak	Quercus palustris	Good	Save	690	
576	12.9	Tulip	Liriodendron tulipifera	Good	Save	691	
5778	8.5 13.2	Sugar Maple Black Cherrv	Acer saccharum Prunus serotina	Good	Save Save	693	
579	12.6	Sugar Maple	Acer saccharum	Good	Save	694	2
580	8.6	Black Walnut	Juglans nigra	Good	Save	695 696	-
582	13.3	White Oak	Quercus alba	Good	Save	697	
583	9.4	Slippery Elm	Ulmus rubra	Good	Save	698	
585	8.4 12.1	Rea Maple American Elm	Acer rubrum Ulmus americana	Good Good	Save Save	099 700	2
586	8.0	Sugar Maple	Acer saccharum	Good	Save	701	
587	10.1	Black Cherry	Prunus serotina	Good	Save	702	~
589	11.0	Sugar Maple	Acer saccharum	Good	Save	704	
590	13.6	Tulip	Liriodendron tulipifera	Good	Save	705	
591 592	8.1 11.8	Black Cherry White Oak	Prunus serotina Quercus alba	Good	Save	706 707	-
593	13.0	Sugar Maple	Acer saccharum	Good	Save	708	
594	12.2	Sugar Maple	Acer saccharum	Good	Save	709	•
596	8.0	Sugar maple Slippery Elm	Ulmus rubra	Good	Save	711	
597	12.3	Sugar Maple	Acer saccharum	Good	Save	712	
598 599	8.7 9 1	Black Cherry American Elm	Prunus serotina Ulmus americana	Good	Save Save	/13 714	· ·
200	8.4	Sugar Maple	Acer saccharum	Good	Save	715	12.5
600	13.2	White Oak	Quercus alba	Good	Save	716	-
600 601	Ω 1	Black Chorne	Prunus corotina	Good	Save	717	
600 601 602 603	9.1 15.0	Black Cherry Black Cherry	Prunus serotina Prunus serotina	Good Good	Save Save	717 718	1
600 601 602 603 604	9.1 15.0 8.2	Black Cherry Black Cherry Black Cherry	Prunus serotina Prunus serotina Prunus serotina	Good Good Poor	Save Save Save	717 718 719	1

Remove4 (R4): 0 Remove (N.R.): 0

`ag #	DBH (inches)	Common Name	Scientific Name	Condition	_
5 6	8.4	Basswood	Tilia americana	Good	Save
б 7	12.2	Black Cherry	Prunus serotina	Good	Save
, 8	10.3		Liriodendron tulipifera	Good	Save
9	8.8	Slippery Elm	Ulmus rubra	Good	Save
0	8.3	Slippery Elm	Ulmus rubra	Good	Save
1	8.7	Slippery Elm	Ulmus rubra	Good	Save
2	18.3	Sugar Maple	Acer saccharum	Good	Save
3	11.5	Sugar Maple	Acer saccharum	Good	Save
4 5	14.2	Red Manle		Good	Save
6	12.6	Sugar Maple	Acer saccharum	Good	Save
7	9.3	American Elm	Ulmus americana	Good	Save
8	19.3	Sugar Maple	Acer saccharum	Good	Save
9	8.8	American Elm	Ulmus americana	Good	Save
0	13.3	Black Walnut	Juglans nigra	Good	Save
1	13.3	Silver Maple	Acer saccharinum	Good	Save
2 2	11.1	American Elm	Quercus paiustris	Good	Save
3 4	86	Black Cherry	Prunus serotina	Good	Save
5	8.8	Black Cherry	Prunus serotina	Good	Save
6	8.4	Slippery Elm	Ulmus rubra	Good	Save
7	14.4	Box-Elder	Acer negundo	Good	R2
8	8.3	American Elm	Ulmus americana	Good	R1
9	8.4		Populus deltoides	Good	R1
0 1	<u>δ.∠</u> 10.3	American Elm	Uimus americana Populus deltoides	Good	R1
' 2	8.6	Cottonwood	Populus deltoides	Good	RI R1
2 3	8.7	Cottonwood	Populus deltoides	Good	R1
4	17.1	Cottonwood	Populus deltoides	Good	R2
5	18.4	Cottonwood	Populus deltoides	Good	R2
6	15.2	Cottonwood	Populus deltoides	Good	R2
7	17.4	Cottonwood	Populus deltoides	Good	R2
8	15.3	Red-Cedar	Juniperus virginiana	Good	R2
0	16.6	Sugar Manle	Acer saccharum	Good	r2 R2
- 1	10.5	Norway Maple	Acer platanoides	Good	Save
2	10.1, 8.9, 8.7, 8.1	Black Willow	Salix nigra	Good	Save
3	11.7	Box-Elder	Acer negundo	Good	Save
4	15.8	American Elm	Ulmus americana	Good	Save
5	10.7	Box-Elder	Acer negundo	Good	Save
6 7	10.5	Box-Elder	Acer negundo	Good	Save
/ 8	8.3	Box-Elder	Acer negundo	Good	Save
9	9.5	American Elm	Ulmus americana	Good	Save
0	11.9, 9.8	Box-Elder	Acer negundo	Good	Save
1	16.4, 14.2	Black Willow	Salix nigra	Good	Save
2	8.1	Black Willow	Salix nigra	Good	Save
3	9.6	Red-Cedar	Juniperus virginiana	Good	R1
4 5	9.5	Red-Cedar	Juniperus virginiana	Good	R1
5 6	12.2	American Elm	Ulmus americana	Good	Save
7	14.9	Box-Elder	Acer negundo	Good	R2
8	9.2	Box-Elder	Acer negundo	Good	Save
9	9.5	Box-Elder	Acer negundo	Fair	Save
0	8.8	Box-Elder	Acer negundo	Good	Save
1	8.6	American Elm	Ulmus americana	Good	R1
2	21.8	Cottonwood	Populus deltoides	Good	R3
3 1	87	Box-Elder Red-Cedar	Acer negundo	Good	R2
5	10.7	Box-Elder	Acer negundo	Fair	R1
6	10.8	American Elm	Ulmus americana	Poor	R (N.R.)
7	15.2	American Elm	Ulmus americana	Good	R2
8	16.9	American Elm	Ulmus americana	Good	R2
9	9.0	Red-Cedar	Juniperus virginiana	Good	R1
0 4	13.1	Red-Cedar	Juniperus virginiana	Good	R2
ו 2	13.0		Ulmus americana	Good	R2 D2
2	12.8	Box-Elder	Acer negundo	Good	R2
4	8.6	American Elm	Ulmus americana	Good	R1
5	10.8	American Elm	Ulmus americana	Good	R1
6	13.1	Box-Elder	Acer negundo	Good	R2
7	12.8	Box-Elder	Acer negundo	Good	R2
8 0	17.1	White Pine	Pinus strobus	Good	Save
0	13.7	White Pine	Pinus strobus	Good	R2
1	12.9	White Pine	Pinus strobus	Good	R2
2	13.3	Honey Locust	Gleditsia triacanthos	Good	R2
3	11.9	Cottonwood	Populus deltoides	Good	R2
4	16.0	Cottonwood	Populus deltoides	Good	R2
อ ค	22.7	BIACK WIIIOW	Sallx nigra	Good	Save
5 7	17.0	Cottonwood	Populus deltoides	Good	R2
8	14.2	Cottonwood	Populus deltoides	Good	Save
9	25.7	Cottonwood	Populus deltoides	Good	R3
0	10.8	Pignut Hickory	Carya glabra	Good	Save
1	9.5	Black Cherry	Prunus serotina	Good	Save
2	28.3	Black Willow	Salix nigra	⊢air	Save
3 1	11.0	Box-Elder	Acer negundo	Good	Save
- 5	<u>∠3.5</u> 16.9	Cottonwood	Populus deltoides	Good	Save
6	13.9	American crab	Malus coronaria	Good	Save
7	10.4	American Elm	Ulmus americana	Good	Save
8	11.7	Silver Maple	Acer saccharinum	Good	Save
9	20.6	Cottonwood	Populus deltoides	Good	Save
U 1	16.4	Basswood	l Illa americana	Good	Save
י 2	11.4	r ignut ⊓ickory Basswood	uai ya gidbra Tilia americana	Good	Save
- 3	24.4	Cottonwood	Populus deltoides	Good	R3
4	21.6	Black Walnut	Juglans nigra	Poor	R (N.R.)
5	12.5	Box-Elder	Acer negundo	Good	R2 [′]
6	17.6	Red-Cedar	Juniperus virginiana	Good	R2
7	15.2	Red-Cedar	Juniperus virginiana	Good	R2
ರ ೧	16.6	American crab	Ivialus coronaria	Good	К2 Р2
9 0	8 7	American crab	vuniperus virginiana Malus coronaria	Good	r∿∠ R1
- 1	9.8	Box-Elder	Acer negundo	Good	R1
2	9.5	Box-Elder	Acer negundo	Good	R1
3	18.1	Black Walnut	Juglans nigra	Good	R2
4	20.2	Siberian Elm	Ulmus pumila	Good	Save
5	12.5, 11.8	Box-Elder	Acer negundo	Good	K3
0 7	12.U R Q	Red-Cedar	Juniperus Virginiana	Good	rtz Save
, 8	12 4	Red-Cedar	Juniperus virginiana Juniperus virginiana	Good	Save
9	12.4	Red-Cedar	Juniperus virginiana	Good	Save
0	13.1	Red-Cedar	Juniperus virginiana	Good	Save
No.	of Trees: 116				

Remove1 (R1): 17 Remove2 (R2): 32 Remove3 (R3): 4 Remove4 (R4): 0 Remove (N.R.): 2

TREE SUMMARY

COLUMN 1: Total: 115	Save: 93	R1: 9	R2: 13	R3: 0	R4: 0	R(N.R.): 0
COLUMN 2: Total: 115	Save: 111	R1: 3	R2: 1	R3: 0	R4: 0	R(N.R.): 0
COLUMN 3: Total: 115	Save: 115	R1: 0	R2: 0	R3: 0	R4: 0	R(N.R.): 0
COLUMN 4: Total: 115	Save: 111	R1: 1	R2: 2	R3: 0	R4: 0	R(N.R.): 1
COLUMN 5: Total: <u>116</u>	Save: 61	R1: <u>17</u>	R2: <u>32</u>	R3: <u>4</u>	R4: <u>0</u>	R(N.R.): <u>2</u>
TOTALS 576	Save: 491	R1:30	R2: 48	R3: 4	R4: 0	R(N.R.): 3
GRAND TOTAL						
Save: Trees	to be saved	:			491	
Remove1 (R1): Tree >	8" to <11" to	be rem	noved:		30	
Remove2 (R2): Tree >	11" to <20"	to be re	moved:		48	
		· · · · · ·				

Remove3 (R3): Tree >20" to <29" to be removed: Remove4 (R4): Tree >30" to be removed: R(N.R.): Non-Regulated tree (Ash, Callery Pear, & Condition rating at P, VP, D)

Replacement trees required:

Remove1 (R1): One (1) per >8" to <11" to be removed:	30
Remove2 (R2): Two (2) per >11" to <20" to be removed:	96
Remove3 (R3): Three (3) per >20" to <29" to be removed:	12
Remove4 (R4): Four (4) per >30" to be removed:	0
=	===
Replacement with 2-1/2" trees	138

* Removals and calculations by Nagy Devlin Land Design.

NOTES:

* See Sheet LP - 1: LANDSCAPE PLANTING PLAN for overall landscape plan, plant list, and calculations for landscape requirements.

* See Sheet LP - 2: LANDSCAPE NOTES & DETAILS for landscape development notes, landscape planting details,

detention pond notes, composition for seed mixes, landscape

construction details, and snow fencing for tree protection detail. * See Sheet TPP - 1: TREE PRESERVATION PLAN for proposed action to be taken for existing trees and overall tree preservation plan.

date: June 6, 2022

revised: 08-08-2022 Revise for site plan changes & City planning review.

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Know what's **below.**

PROJECT LOCATION: Novi Concrete Plant 46844 West Twelve Mile Road Novi, Michigan

LANDSCAPE PLAN FOR: Angle Design & Engineering, L.L.C. 22417 Cranbrooke Drive Novi, Michigan 48375 (313) 258-2036

LANDSCAPE PLAN BY: Nagy Devlin Land Design 31736 West Chicago Ave. Livonia, Michigan 48150 (734) 634-9208



TPP - 2: TREE INVENTORY LIST * Tree inventory list provided by ASTI Environmental.



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$5 \qquad \downarrow^{10} \qquad \downarrow^{06} \qquad \downarrow^{08} \qquad \downarrow^{13} \qquad \downarrow^{23} \qquad \downarrow$		$\begin{array}{c} 1^{1}$		V ⁰⁰ V ⁰⁰ V ⁰⁰ V ⁰⁰ V ⁰⁰
⁵ RE "A ^{▲⁴®} ♣ ²³ ♣ ¹⁹ ♣ ³⁴ ♣ ⁶³ ♣	124 + ⁷⁹ + ⁴² + ²² + ²² + ³⁸ FXTU	JRE ^{es} "A" + ^{5.4} + ^{3.7} (+ ^{2.2} + ^{1.8} + ^{1.9})		
¹ • ^{3,4} • ^{2,0} • ^{1,5} • ^{2,6} • ^{3,4} •	47 4 39 4 29 4 17 4 1.8 4 25 4 32	↓ ⁴⁰ ↓ ³¹ ↓ ²⁹ ↓ ²⁶ ↓ ²⁹ ↓ ²	+ ²⁴ + ⁰⁴ + ⁰² + ⁰¹ + ⁰⁰ + ⁰⁰ + ⁰⁰ INSTALL THE POLE BASE ON	♣°°° ♣°°° ♣°°° ♣°°° ♣°°° ♣°°°
0	25 ↓ ²⁴ ↓ ¹ ↓ ¹² ↓ ^{1.1} ↓ ^{1.5} ↓ ^{1.7}	$\mathbf{X} + 1^{17} + 1^{20} + 2^{28} + 3^{38} + 1^{7}$	+4 +10 +04 +01 +01 +00 +00	↓°°° ↓°°° ↓°°° ↓°°°
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2 ↓ ^{0,3} ↓ ^{0,4} ↓ ^{0,3} ↓ ^{0,1} ↓	0.1 4 0.1 4 0.2 4 0.3 4 0.2 4 0.1 4 0.1	↓ ^{0.1} ↓ ^{0.1} ↓ ^{0.8} ↓ ^{2.1} ↓ ^{3.1} ↓ ^{5.4}	38 406 403 401 400 400 400	*oo *oo *oo *oo *oo
3 ↓ ^{0,4} ↓ ^{0,2} ↓ ^{0,1} ↓ ^{0,0} ↓	0.0 4 0.0 4 0.1 4 0.1 4 0.1 4 0.0	↓ ^{0.1} ↓ ^{0.2} ↓ ^{0.7} ↓ ¹ ↓ ^{2.3} ↓ ^{3.0}		•°° •°° •°° •°° •°° •°°
⁶ ↓ ^{1.9} ↓ ^{0.3} ↓ ^{0.1} ↓ ^{0.1} ↓ ^{0.0} ↓	°°° •°° •°° •°° •°° •°°	↓ ^{0.1} ↓ ^{0.2} ↓ ^{0.5} ↓ ^{0.8} ↓ ^{1.0} ↓ ^{1.4}		♣°°° ♣°°° ♣°°° ♣°°° ♣°°°
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+ ³⁵ + ¹⁷ + ⁰¹ + ⁰⁰ + ⁰⁰ + ⊠ IFIXTURE "C"	00 +00 +00 X +00 +00 +00 +00	+ ²⁰ + ²⁰ + ²² + ¹⁴ (+ ³⁵ + ⁷⁸ (FIXTURE "A"	↓111 +22 +08 +02 +0.1 +00 +000	4 ⁰⁰ 4 ⁰⁰ 4 ⁰⁰ 4 ⁰⁰ 4 ⁰⁰ 4 ⁰⁰
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5 ↓ ^{2.8} ↓ ^{0.2} ↓ ^{0.1} ↓ ^{0.2} ↓	_ 05 ↓ 10 ↓ 14 ↓ 17 ↓ ²² ↓ ²⁰ ↓ 13	↓ ^{0,4} ↓ ^{0,1} ↓ ^{0,2} ↓ ^{0,3} ↓ ^{0,6}		
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7 _24 _09 _03 _01 _02 _	0.6 1 ¹⁷ 1 ³⁹ 1 ⁶⁹ 1 ₆₂ 1 ¹⁷	~2 ,02 ,0.1 ,0.1 ,0.1 ,0.2	FIXTURE "B"	
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No.	Label	X	Y	Z	МН	Orientation	Tilt	X	Y	Z
6	A	1115043.00	30428.60	25.00	25'	269.50	0.00	1115043.00	30428.60	0.00
7	A	1115050.00	30280.55	25.00	25'	270.50	0.00	1115050.00	30280.55	0.0
9	A	1114865.00	30128.40	25.00	25'	348.26	0.00	1114865.00	30128.40	0.0
11	A	1114642.00	30118.42	25.00	25'	355.66	0.00	1114642.00	30118.42	0.0
12	A	1114464.00	30109.70	25.00	25'	0.00	0.00	1114464.00	30109.70	0.0
14	A	1114442.00	30207.92	25.00	25'	267.76	0.00	1114442.00	30207.92	0.0
15	A	1114449.00	30208.45	25.00	25'	91.46	0.00	1114449.00	30208.45	0.0
16	Α	1114441.00	30330.59	25.00	25'	88.48	0.00	1114441.00	30330.59	0.0
17	А	1114434.00	30330.13	25.00	25'	268.52	0.00	1114434.00	30330.13	0.0
18	A	1114417.00	30477.71	25.00	25'	180.00	0.00	1114417.00	30477.71	0.0
19	A	1114529.00	30482.72	25.00	25'	178.78	0.00	1114529.00	30482.72	0.0
20	Α	1114655.00	30488.65	25.00	25'	177.81	0.00	1114655.00	30488.65	0.0
21	A	1114792.00	30494.26	25.00	25'	180.00	0.00	1114792.00	30494.26	0.0
22	Α	1114926.00	30501.39	25.00	25'	180.00	0.00	1114926.00	30501.39	0.0
12	В	1114305.00	30329.84	25.00	25'	81.79	0.00	1114305.00	30329.84	0.0
13	В	1114310.00	30228.98	25.00	25'	90.61	0.00	1114310.00	30228.98	0.0
14	В	1115067.00	30137.42	25.00	25'	352.14	0.00	1115067.00	30137.42	0.0
15	В	1115146.00	30173.92	25.00	25'	177.10	0.00	1115146.00	30173.92	0.0
17	В	1115287.00	30181.39	25.00	25'	170.57	0.00	1115287.00	30181.39	0.0
18	В	1115354.00	30155.63	25.00	25'	353.20	0.00	1115354.00	30155.63	0.0
19	В	1115404.00	30194.85	25.00	25'	180.67	0.00	1115404.00	30194.85	0.0
18	С	1114607.00	30333.79	12.00	12'	265.39	0.00	1114607.00	30333.79	0.0
19	С	1114610.00	30283.72	12.00	12'	265.27	0.00	1114610.00	30283.72	0.0
20	С	1114630.00	30267.47	12.00	12'	266.20	0.00	1114630.00	30267.47	0.0
21	С	1114633.00	30225.10	12.00	12'	270.80	0.00	1114633.00	30225.10	0.0
22	С	1114642.00	30206.13	12.00	12'	176.75	0.00	1114642.00	30206.13	0.0
24	С	1114671.00	30207.62	12.00	12'	181.26	0.00	1114671.00	30207.62	0.0
25	С	1114683.00	30223.41	12.00	12'	84.84	0.00	1114683.00	30223.41	0.0
26	С	1114681.00	30271.88	12.00	12'	84.81	0.00	1114681.00	30271.88	0.0
27	С	1114678.00	30321.62	12.00	12'	85.01	0.00	1114678.00	30321.62	0.0
28	С	1114669.00	30344.45	12.00	12'	358.71	0.00	1114669.00	30344.45	0.0



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Angle Design & Engineering 22417 Cranbrooke Drive. Novi, Michigan. 48375 Phone: (313) 258-2036 Email: Fadi@AngledesignLLC.com
PROJECT NOVI CONCRETE PLANT 46844 12 MILE RD. NOVI, MI 48377 SECTION 9
PROJECT NO: 2022-102SCALE: NOT TO SCALEDRAWN BY: VAWCHECKED BY: VAWPROJECT MGR: F.K.APPROVED BY: F.K.SHEET TITLE
FIXTURES SCHEDULE & LUMINARIES LOCATIONS
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Angle Design 22417 Cranbrooke Drive. Novi Phone: (313) 258-2036 . En	& Engir Michigan. 48375 mail: Fadi@Angle@	PEEring
PROJECT NOVI CON	ICRETE F	PLANT
46844 NOVI SEC	12 MILE RD. , MI 48377 CTION 9	
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 High Level (when occupied)
 Photocell
 Dwell Time (occupancy time delay)
 Ramp-up Time (from unoccupied to occupied)
 Ramp-down Time (from occupied)
 PIRHN Approx. 30% Output 100% Output Enabled @ 1.5FC 7.5 minutes 3 seconds *Note: PIRHN default settings including photocell set-point, high/low dim rates, and occupancy sensor time delay are all configurable using the Clairity Pro App. FEATURES & SPECIFICATIONS INTENDED USE The RSX LED area family is designed to provide a long-lasting, energy-efficient solution for the one-for-one replacement of existing metal halide or high pressure sodium lighting. The RSX4 delivers 40,000 to 70,000 lumens and is ideal for replacing 1000W and (2) 1000W HID pole-mounted luminaires in parking lots and other area lighting applications. CONSTRUCTION The RSX LED area luminaire features a rugged die-cast aluminum main body that uses heatdissipating fins and flow-through venting to provide optimal thermal management that both enhances LED performance and extends component life. Integral "no drill" mounting arm allows the luminaire to be mounted on existing pole drillings, greatly reducing installation labor. The light engines and housing are sealed against moisture and environmental contaminants to IP66 The low-profile design results in a low EPA, allowing pole optimization. Vibration rated per ANSI C136.31: 3G Mountings: SPA, RPA, MA, IS, AASP, AARP, ESPA and ERPA rated for 3G vibration. 1.5G Mountings: WBA, WBASC, AAWB and AAWSC rated for 1.5G vibration. Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures superior adhesion as well as a minimum finish thickness of 3 mils. The result is a high-quality finish that is warrantied not to crack or peel. Precision acrylic refractive lenses are engineered for superior application efficiency, distributing the light to where it is needed most. Available in short and wide pattern distributions including Type 3, Type 3, Type 4, Type 4, Type 45, Type 55, AFR (Automotive Front Row) and AFR ELECTRICAL Light engine(s) configurations consist of high-efficacy LEDs mounted on metal-core circuit boards and aluminum heat sinks to maximize heat dissipation. Light engines are IP66 rated. LED lumen maintenance is >L92/100,000 hours. CCT's of 3000K, 4000K and 5000K (minimum 70 CRI) are available. Fixtures ship standard with 0-10v dimming driver. Class 1 electronic drivers ensure system power factor >90% and THD <20%. Easily serviceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2). STANDARD CONTROLS The RSX LED area luminaire has a wide assortment of control options. Dusk to dawn controls include MVOLT and 347V button-type photocells and NEMA twist-lock photocell receptacles. One Lithonia Way • Conyers, Georgia 30012 • Phone: 1-800-705-SERV (7378) • www.acuitybrands.com LITHONIA LIGHTING. © 2019-2022 Acuity Brands Lighting, Inc. All rights reserved. COMMERCIAL OUTDOOR Isofootcandle plots for the DSX1 LED 60C 1000 40K. Distances are in units of mounting height (25'). 4 3 2 1 0 1 2 3 4 4 3 2 1 0 1 2 3 4 T2M 4 3 2 1 0 1 2 3 4 4 3 2 1 0 1 2 3 4 T4M H 4 3 2 1 0 1 2 3 4 4 3 2 1 0 1 2 3 4 🗄 0 ____ -4 4 3 2 1 0 1 2 3 4 4 3 2 1 0 1 2 3 4 -2 - RCCO 4 -4

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CROWN ENTERPRISES INC
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ISSUESNo.DESCRIPTIONDATE1PRE APPLICATION SET02-27-20222PRELIMINARY SITE PLAN06-07-20223REVISED PRELIMINARY SET08-09-20224
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SEAL FADI A. KHALIL ENGINEER NO. 53176
Angle Design & Engineering 22417 Cranbrooke Drive. Novi, Michigan. 48375 Phone: (313) 258-2036 . Email: Fadi@AngledesignLLC.com
PROJECT NOVI CONCRETE PLANT 46844 12 MILE RD. NOVI, MI 48377 SECTION 9
PROJECT NO:SCALE:2022-102NOT TO SCALEDRAWN BY:CHECKED BY:VAWVAWPROJECT MGR:APPROVED BY:F. K.F.K.SHEET TITLE
FIXTURES DETAILS SHEET 2 OF 4
SHEET NUMBER ISSUE

Performance Data

Lumen Ambient Temperature (LAT) Multipliers Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

0°C	32°F	1.04
5°C	41°F	1.04
10°C	50°F	1.03
15℃	50°F	1.02
20°C	68°F	1.01
25°C	77°F	1.00
30°C	86°F	0.99
35℃	95°F	0.98
40°C	104°F	0.97

Electrical Load , Wattage 120 208 240 277 347 480 P1 30 530 54 0.45 0.26 0.23 0.19 0.10 0.12 P2 30 700 70 0.59 0.34 0.30 0.25 0.20 0.16 P3 30 1050 102 0.86 0.50 0.44 0.38 0.30 0.22 P4 30 1250 125 1.06 0.60 0.52 0.46 0.37 0.27 0.51 0.40 0.29 0.59 0.47 0.34 0.66 0.53 0.38 0.76 0.64 0.49

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in 25℃ ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-0 projected per IESNA TM-21-11). To calculate LLF, use the lumen maintenance factor that corresponds to the desired of operating hours below. For other lumen maintenance values, contact factory.

	Operating			umen Mai		actor
	0				1.00	
	25,000)			0.96	
	50,000)			0.92	
	100,00	0			0.85	
		Motion Ser	isor Default	Settings		
Option	Dimmed State	High Level (when triggered)	Phototcell Operation	Dwell Time	Ramp-up Time	Ramp-dowr Time
PIR or PIRH	3V (37%) Output	10V (100%) Output	Enabled @ 5F	C 5 min	3 sec	5 min
*PIR1FC3V or PIRH1FC3V	3V (37%) Output	10V (100%) Output	Enabled @ 1F	C 5 min	3 sec	5 min

				12.30	12.5		0.00	0.51		0.57	
0	Forward Optics				430						
19	(Non-Rotated)	P5	30	1400	138	1.16	0.67	0.58	0.51	0.40	0.29
8	-	P6	40	1250	163	1.36	0.78	0.68	0.59	0.47	0.34
97		P7	40	1400	183	1.53	0.88	0.76	0.66	0.53	0.38
		P8	60	1050	207	1.74	0.98	0.87	0.76	0.64	0.49
		Р9	60	1250	241	2.01	1.16	1.01	0.89	0.70	0.51
		D10	60	530	106	0.90	0.52	0.47	0.43	0.33	0.27
ina		FIU	00	220	100	0.50	0152	••••		0.55	
0-08 and	Rotated Optics	P11	60	700	137	1.15	0.67	0.60	0.53	0.42	0.32
a in a 0-08 and d number y.	Rotated Optics (Requires L90 or R90)	P11 P12	60 60	700 1050	137 207	1.15 1.74	0.67	0.60	0.53	0.42	0.32
a in a 0-08 and d number y. Factor	Rotated Optics (Requires L90 or R90)	P10 P11 P12 P13	60 60 60	700 1050 1250	137 207 231	1.15 1.74 1.93	0.67 0.99 1.12	0.60 0.87 0.97	0.53 0.76 0.86	0.42 0.60 0.67	0.32 0.46 0.49

Nomenclature	Description	Functionality	Primary control device	Notes
FAO	Field adjustable output device installed inside the luminaire; wired to the driver dimming leads.	Allows the luminaire to be manually dimmed, effectively trimming the light output.	FAO device	Cannot be used with other controls options that need the 0-10V leads
DS	Drivers wired independently for 50/50 luminaire operation	The luminaire is wired to two separate circuits, allowing for 50/50 operation.	Independently wired drivers	Requires two separately switched circuits. Consider nLight AIR as a more cost effective alternative.
PER5 or PER7	Twist-lock photocell recepticle	Compatible with standard twist-lock photocells for dusk to dawn operation, or advanced control nodes that provide 0-10V dimming signals.	Twist-lock photocells such as DLL Elite or advanced control nodes such as ROAM.	Pins 4 & 5 to dimming leads on driver, Pins 6 & 7 are capped inside luminaire
PIR or PIRH	Motion sensors with integral photocell. PIR for 8-15' mounting; PIRH for 15-30' mounting	Luminaires dim when no occupancy is detected.	Acuity Controls SBGR	Also available with PIRH1FC3V when the sensor photocell is used for dusk-to-dawn operation.
NLTAIR2 PIRHN	nLight AIR enabled luminaire for motion sensing, photocell and wireless communication.	Motion and ambient light sensing with group response. Scheduled dimming with motion sensor over-ride when wirelessly connected to the nLight Eclypse.	nLight Air rSDGR	nLight AIR sensors can be programmed and commissionec from the ground using the CIAIRity Pro app.

LITHONIA LIGHTING. COMMERCIAL OUTDOOR

Performance Data

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Lumen Output Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here. ated Optic 60 530 P10 106W 700 P11 137W 60 60 1050 P12 207W 60 1250 P13 231W

LITHONIA LIGHTING. -----COMMERCIAL OUTDOOR

Performance Data

Lumen Output Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts Contact factory for performance data on any configurations not shown here. vard Optics

				T1S	6,457	2	0	2	120	6,956	2	0	2	129	7,044	2	0	2	
				T2S	6,450	2	0	2	119	6,949	2	0	2	129	7,037	2	0	2	
				T2M	6,483	1	0	1	120	6,984	2	0	2	129	7,073	2	0	2	
				T3S	6,279	2	0	2	116	6,764	2	0	2	125	6,850	2	0	2	
				T3M	6,468	1	0	2	120	6,967	1	0	2	129	7,056	1	0	2	
				14M	6,32/	1	0	2	11/	6,816	1	0	2	126	6,902	1	0	2	
0	530	P1	54W	TEIM	6,464	1	0	2	120	6,963	1	0	2	129	7,051	1	0	2	-
				15V5	6,722	2	0	1	124	7,242	3	0	1	134	7,334	3	0	1	-
				T5M	6 711	2	0	1	123	7,240	3	0	1	134	7,340	3	0	2	+
				T5W	6 667	3	0	2	124	7,223	3	0	2	134	7,321	3	0	2	
				BLC	5,299	1	0	1	98	5,709	1	0	2	106	5,781	1	0	2	
				LCCO	3,943	1	0	2	73	4,248	1	0	2	79	4,302	1	0	2	
				RCCO	3,943	1	0	2	73	4,248	1	0	2	79	4,302	1	0	2	
				T1S	8,249	2	0	2	118	8,886	2	0	2	127	8,999	2	0	2	
				T2S	8,240	2	0	2	118	8,877	2	0	2	127	8,989	2	0	2	
				T2M	8,283	2	0	2	118	8,923	2	0	2	127	9,036	2	0	2	
				T3S	8,021	2	0	2	115	8,641	2	0	2	123	8,751	2	0	2	_
				T3M	8,263	2	0	2	118	8,901	2	0	2	127	9,014	2	0	2	+
				T4M	8,083	2	0	2	115	8,708	2	0	2	124	8,818	2	0	2	+
0	700	P2	70W	TEVE	8,257	2	0	2	118	8,896	2	0	2	12/	9,008	2	0	2	+
				1585	0,200	3	0	1	123	9,252	2	0	1	132	9,509	2	0	1	+
				T5M	8.573	3	0	2	125	9,239	3	0	2	132	9,370	3	0	2	+
				T5W	8.517	3	0	2	122	9,175	4	0	2	131	9,291	4	0	2	+
				BLC	6,770	1	0	2	97	7,293	1	0	2	104	7,386	1	0	2	t
				LCCO	5,038	1	0	2	72	5,427	1	0	2	78	5,496	1	0	2	Ť
				RCCO	5,038	1	0	2	72	5,427	1	0	2	78	5,496	1	0	2	
				T1S	11,661	2	0	2	114	12,562	3	0	3	123	12,721	3	0	3	
				T2S	11,648	2	0	2	114	12,548	3	0	3	123	12,707	3	0	3	
				T2M	11,708	2	0	2	115	12,613	2	0	2	124	12,773	2	0	2	_
				T3S	11,339	2	0	2	111	12,215	3	0	3	120	12,370	3	0	3	_
				13M	11,680	2	0	2	115	12,582	2	0	2	123	12,742	2	0	2	+
				14M	11,426	2	0	3	112	12,309	2	0	3	121	12,465	2	0	3	+
0	1050	P3	102W	TEVE	12,140	2	0	2	114	12,575	2	0	3	123	12,/34	2	0	3	+
				15V5	12,140	2	0	1	119	13,070	2	0	1	120	13,244	2	0	1	+
				155 T5M	12,130	3	0	2	119	13,009	3	0	2	120	13,234	3	0	2	+
				T5W	12,119	4	0	3	118	12,970	4	0	3	120	13,134	4	0	3	+
				BLC	9,570	1	0	2	94	10.310	1	0	2	101	10,440	1	0	2	+
				LCCO	7,121	1	0	3	70	7,671	1	0	3	75	7,768	1	0	3	+
				RCCO	7,121	1	0	3	70	7,671	1	0	3	75	7,768	1	0	3	
				T1S	13,435	3	0	3	107	14,473	3	0	3	116	14,657	3	0	3	
				T2S	13,421	3	0	3	107	14,458	3	0	3	116	14,641	3	0	3	
				T2M	13,490	2	0	2	108	14,532	3	0	3	116	14,716	3	0	3	
				T3S	13,064	3	0	3	105	14,074	3	0	3	113	14,252	3	0	3	+
				T3M	13,457	2	0	2	108	14,497	2	0	2	116	14,681	2	0	2	+
				14M	13,165	2	0	3	105	14,182	2	0	3	113	14,362	2	0	3	+
0	1250	P4	125W	TEVE	13,449	 	0	5	108	14,400	<u> </u>	0	5 1	10	14,0/2	Z A	0	5	+
				T55	13,96/	4	0	1	112	15 080	4	0	1	121	15 271	4	0	1	+
				T5M	13,953	4	0	2	112	15,000	4	0	2	120	15.233	4	0	2	+
				T5W	13,872	4	0	3	111	14,944	4	0	3	120	15,133	4	0	3	+
				BLC	11,027	1	0	2	88	11,879	1	0	2	95	12,029	1	0	2	t
				LCCO	8,205	1	0	3	66	8,839	1	0	3	71	8,951	1	0	3	Í
				RCCO	8,205	1	0	3	66	8,839	1	0	3	71	8,951	1	0	3	
				T1S	14,679	3	0	3	106	15,814	3	0	3	115	16,014	3	0	3	
				T2S	14,664	3	0	3	106	15,797	3	0	3	114	15,997	3	0	3	
				T2M	14,739	3	0	3	107	15,878	3	0	3	115	16,079	3	0	3	4
				T3S	14,274	3	0	3	103	15,377	3	0	3	111	15,572	3	0	3	
				13M	14,704	2	0	3	107	15,840	3	0	3	115	16,040	3	0	3	+
				14M	14,384	2	0	3	104	15,496	3	0	3	112	15,692	3	0	3	+
0	1400	P5	138W	TSVS	14,095	2 A	0	3	100	16 464	3	0	5	110	16,030	3	0	5	+
				1383	15,265	4	0	1	111	16 477	4	0	1	119	16,686	4	0	1	+
				T5M	15,255	4	0	2	111	16.435	4	0	2	119	16 644	4	0	2	+
				T5W	15,157	4	0	3	110	16,328	4	0	3	118	16,534	4	0	3	+
				BLC	12,048	1	0	2	87	12,979	1	0	2	94	13,143	1	0	2	+
				LCCO	8,965	1	0	3	65	9,657	1	0	3	70	9,780	1	0	3	t
				RCCO	8,965	1	0	3	65	9.657	1	0	3	70	9,780	1	0	3	T

D Count	Drive Current	Power				(3000	30K K, 70 CRI)				(4000	40K K, 70 CRI)				(5000	50K K, 70 CRI,		
40	1250	P6	163W	T1S T2S T2M T3S T3M T4M TFTM	17,654 17,655 17,635 17,726 17,167 17,683 17,299 17,672	3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 3	108 108 109 105 108 106 108	19,018 18,998 19,096 18,493 19,049 18,635 19,038	3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0	3 3 3 3 3 4 4	117 117 117 113 117 113 117 114 117	19,259 19,238 19,337 18,727 19,290 18,871 19,279	3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0	3 3 3 3 3 4 4	1 1 1 1 1 1 1 1 1
				T5VS T5S T5M BLC LCCO RCCO T1S	18,379 18,394 18,348 18,228 14,489 10,781 10,781 19,227	4 4 5 2 1 1 3	0 0 0 0 0 0 0	1 2 3 2 3 3 3 3	113 113 113 112 89 66 66 66 105	19,800 19,816 19,766 19,636 15,609 11,614 11,614 20,712	4 4 5 2 1 1 3	0 0 0 0 0 0 0	1 2 3 3 3 3 3 3 3	121 122 121 120 96 71 71 71	20,050 20,066 20,016 19,885 15,806 11,761 11,761 20,975	4 4 5 2 2 2 2 3	0 0 0 0 0 0 0	1 2 3 3 3 3 3 3 3	
40	1400	Ρ7	183W	T2S T2M T3S T3M T4M TFTM T5VS T5VS T5S T5M T5W BLC	19,206 19,305 18,696 19,258 18,840 19,246 20,017 20,033 19,983 19,852 15,780	3 3 3 3 3 3 3 4 4 4 4 5 2	0 0 0 0 0 0 0 0 0 0 0 0 0	3 3 3 3 4 4 4 1 2 2 3 3 3	105 105 102 105 102 105 103 105 103 105 109 109 108 86	20,712 20,690 20,797 20,141 20,746 20,296 20,734 21,564 21,581 21,527 21,386 16,999	3 3 3 3 3 3 3 3 4 4 4 5 5 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 3 3 3 4 4 4 1 2 3 3 3 3 3	113 113 114 110 113 111 113 111 113 111 113 111 113 111 113 111 113 118 118 118 117 93	20,952 21,060 20,396 21,009 20,553 20,996 21,837 21,854 21,854 21,799 21,656 17,214	3 3 3 3 3 3 3 3 4 4 4 5 5 5 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 3 4 3 4 4 1 2 3 3 3 3 3	
60	1050	P8	207W	LCCO RCCO T15 T2S T2M T3S T3M T4M TFTM T5VS T5S T5S T5S T5S T5W BLC LCCO	11,742 11,742 22,490 22,466 22,582 21,870 22,527 22,038 22,513 23,415 23,434 23,374 23,221 18,458 13,735	2 2 3 3 3 3 3 3 3 3 3 3 5 4 5 5 2 2 2 2 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 3 4 3 4 4 4 4 4 1 2 3 4 3 3 3 3 2	64 64 109 109 109 106 109 113 113 112 89 66	12,649 12,649 24,228 24,202 24,327 23,560 24,268 23,741 24,253 25,224 25,224 25,224 25,181 25,016 19,885 14,796	2 2 3 3 3 3 3 3 3 3 3 3 5 4 5 5 2 2 2 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 3 4 3 4 4 4 4 4 4 4 4 1 2 3 4 4 3 4 4	69 69 117 117 118 114 117 115 117 122 122 122 122 122 121 96 71 71	12,809 12,809 24,535 24,509 24,635 23,858 24,575 24,041 24,560 25,543 25,554 25,499 25,332 20,136 14,983	2 2 3 3 3 3 3 3 3 3 3 3 5 4 5 5 2 2 2 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 3 4 3 4 4 4 4 4 4 4 1 2 3 4 3 4 4 3	
60	1250	Р9	241W	TIS T2S T2M T3S T3M T4M TFTM T5VS T5S T5M T5W BLC LCCO RCCO	25,575 25,548 25,680 24,870 25,617 25,061 25,602 26,626 26,648 26,581 26,648 26,581 26,406 20,990 15,619	2 3 3 3 3 3 3 3 3 3 3 5 4 5 5 2 2 2 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 4 3 4 4 4 4 4 1 2 3 4 3 4 3 4 4	106 106 107 103 106 107 103 106 101 101 111 110 111 110 110 55 65	27,551 27,552 27,564 26,791 27,597 26,997 27,580 28,684 28,707 28,635 28,644 28,707 28,635 28,447 22,612 16,825 16,825	3 3 3 3 3 3 3 5 5 5 5 5 5 2 2 2 2 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 4 3 4 4 4 4 4 1 2 3 4 3 4 3 4 4 4	114 114 115 111 115 111 115 111 115 111 115 111 115 111 115 111 115 111 115 111 119 119 118 94 70 70	27,900 27,871 28,014 27,130 27,946 27,339 27,929 29,047 29,070 28,997 28,807 28,807 22,898 17,038	3 3 3 3 3 3 3 5 5 5 5 5 5 2 2 2 2 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3 4 3 4 4 4 4 4 1 2 3 4 3 4 3 4 4 4	



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FEATURES & SPECIFICATIONS

INTENDED USE

The sleek design of the D-Series Size 1 reflects the embedded high performance LED technology. It is ideal for many commercial and municipal applications, such as parking lots, plazas, campuses, and streetscapes.

CONSTRUCTION

Single-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Modular design allows for ease of maintenance and future light engine upgrades. The LED drivers are mounted in direct contact with the casting to promote low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants (IP65). Low EPA (1.01 ft²) for optimized pole wind loading.

FINISH Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in both textured and non-textured finishes.

OPTICS

Precision-molded proprietary acrylic lenses are engineered for superior area lighting distribution, uniformity, and pole spacing. Light engines are available in standard 3000 K, 4000 K and 5000 K (70 CRI) configurations. The D-Series Size 1 has zero uplight and qualifies as a Nighttime Friendly™ product, meaning it is consistent with the LEED® and Green Globes™ criteria for eliminating wasteful uplight.

ELECTRICAL Light engine configurations consist of high-efficacy LEDs mounted to metal-

core circuit boards to maximize heat dissipation and promote long life (up to L85/100,000 hours at 25°C). Class 1 electronic drivers are designed to have a power factor >90%, THD <20%, and an expected life of 100,000 hours with <1% failure rate. Easily serviceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).

STANDARD CONTROLS The DSX1 LED area luminaire has a number of control options. DSX Size 1, comes standard with 0-10V dimming drivers. Dusk to dawn controls can be

utilized via optional NEMA twist-lock photocell receptacles. Integrated motion sensors with on-board photocells feature field-adjustable programing and are suitable for mounting heights up to 30 feet.

nLIGHT AIR CONTROLS

The DSX1 LED area luminaire is also available with nLight® AIR for the ultimate in wireless control. This powerful controls platform provides out-of-the-box basic motion sensing and photocontrol functionality and is suitable for mounting heights up to 40 feet. Once commissioned using a smartphone and the easy-touse CLAIRITY app, nLight AIR equipped luminaries can be grouped, resulting in motion sensor and photocell group response without the need for additional equipment. Scheduled dimming with motion sensor over-ride can be achieved when used with the nLight Eclypse. Additional information about nLight Air can be found here.

INSTALLATION

Included mounting block and integral arm facilitate quick and easy installation. Stainless steel bolts fasten the mounting block securely to poles and walls, enabling the D-Series Size 1 to withstand up to a 3.0 G vibration load rating per ANSI C136.31. The D-Series Size 1 utilizes the AERIS™ series pole drilling pattern (template #8). NEMA photocontrol receptacle are also available. LISTINGS

UL listed to meet U.S. and Canadian standards. UL Listed for wet locations. Light engines are IP66 rated; luminaire is IP65 rated. Rated for -40°C minimum ambient. U.S. Patent No. D672,492 S. International patent pending. DesignLights Consortium® (DLC) Premium gualified product and DLC gualified product. Not all versions of this product may be DLC Premium qualified or DLC

qualified. Please check the DLC Qualified Products List at www.designlights.org/ QPL to confirm which versions are qualified. International Dark-Sky Association (IDA) Fixture Seal of Approval (FSA) is available for all products on this page utilizing 3000K color temperature only.

BUY AMERICAN Product with the BAA option is assembled in the USA and meets the Buy

America(n) government procurement requirements under FAR, DFARS and DOT. Please refer to www.acuitybrands.com/buy-american for additional information. WARRANTY 5-year limited warranty. Complete warranty terms located at:

www.acuitybrands.com/supp

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.



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CLIENT	
CROW ENTERPRISES	N inc
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ISSUES No. DESCRIPTION 1 PRE APPLICATION SET 2 PRELIMINARY SITE PLAN 3 REVISED PRELIMINARY SET 4	DATE 02-27-2022 06-07-2022 08-09-2022
North Constant	
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CONSULTANTS	
SEAL	
Angle Design & Engir 22417 Cranbrooke Drive. Novi, Michigan. 48375 Phone: (313) 258-2036 . Email: Fadi@Angled	Deering
PROJECT NOVI CONCRETE F 46844 12 MILE RD. NOVI, MI 48377 SECTION 9	PLANT
PROJECT NO: SCALE: 2022-102 1" = 50'-00"	
DRAWN BY: CHECKED BY VAW VAW PROJECT MGR: APPROVED BY	Y: BY:
F. K. F.K. SHEET TITLE	
FIXTURES DETAILS SHEET 3 OF 4	
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⊢ ⊢- ິວ	1

			D-Se LED W	All Lum	Size inaire	1 Catalog Number Notes Type			
Specific Luminai Width: Depth: Height:	d"series	5 ight: 12 lbs (5.4 kg	Back Box Width: Depth: Height:	c (BBW, EL 13-3/4" BBW (34.9 cm) Weig 4" ELCV (10.2 cm) Weig 6-3/8" (16.2 cm)	-CW) 5 5 5 7 10 10 10 10 10 10 10 10 10 10	Introc The D- integra applica abbs and is and is ollos energy and co With a nightin over co the D- lighting except	Juction Series Wall lum ated LED solution ations. It feature carefully engine r-efficient lightin ntrol options fo n expected serv me use and up comparable 2500 Series Wall is a r g solution that p ionally illuminat	inaire is a styli on for building s a sleek, moo ered to provid g with a varie r customized ice life of ove to 74% in ene V metal halide eliable, low-m produces sites ed.	sh, fully p-mount dern design de long-lasting, ty of optical performance. r 20 years of rgy savings e luminaires, naintenance that are
DSXW1 LED Series	LEDs	Drive Current	Color temperature	Distribution	Voltage	Mounting	Control Options	40K 13IM MY	Finish (required)
DSXW1 LED	 10C 10 LEDs (one engine) 20C 20 LEDs (two engines) 	350 350 mA 530 530 mA 700 700 mA 1000 1000 mA (1 A)	30K 3000 K 40K 4000 K 50K 5000 K AMBPC Amber phosphor converted	T2SType II ShortT2MType II MediumT3SType III ShortT3MType III MediumT4MType IV MediumTFTMForward Throw MediumASYDFAsymmetric diffuse	MVOLT ¹ 120 ¹ 208 ¹ 240 ¹ 277 ¹ 347 ² 480 ²	Shipped included (blank) Surface mounting bracket BBW Surface- mounted back box (for conduit entry) ³	Shipped installedPEPhotoelectric cell, button type 4DMG0-10V dim- ming driver (no controls)PIR180° motion/ ambient light sensor, <15' mtg ht 5PIRH180° motion/ ambient light sensor, 15-30' mtg ht 5ELCWEmergency battery backup (includes exter- nal component enclosure) 6	Shipped installed SF Single fuse (120, 277 or 347V) ⁷ DF Double fuse (208, 240 or 480V) ⁷ HS House-side shield ⁸ SPD Separate surge protection ⁹ Shipped separately BSW Bird-deter- rent spikes WG Wire guard VG Vandal guard DDL Diffused	DDBXDDark bronzeDBLXDBlackDNAXDNatural aluminumDWHXDWhiteDSSXDSandstoneDDBTXDTextured dark bronzeDBLBXDTextured blackDNATXDTextured natural aluminumDWHGXDTextured whiteDSSTXDTextured sandstone

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

	Drive	System	Dist.			30K					40K					50K					AMBER		
LEDs	Current (mA)	Watts	Туре	Lumens	В	U	G	LPW	Lumens	В	U	G	LPW	Lumens	В	U	G	LPW	Lumens	В	U	G	LPW
			T2S	1,843	1	0	1	92	1,956	1	0	1	98	1729	1	0	1	86	1,264	0	0	1	63
			T2M	1,756	1	0	1	88	1,864	1	0	1	93	1,648	1	0	1	82	1,205	0	0	1	60
			T3S	1,822	0	0	1	91	1,934	0	0	1	97	1,710	0	0	1	86	1,250	0	0	1	63
	530mA	20 W	T3M	1,804	1	0	1	90	1,914	1	0	1	96	1,693	1	0	1	85	1,237	0	0	1	62
			T4M	1,767	1	0	1	88	1,876	1	0	1	94	1,658	0	0	1	83	1,212	0	0	1	61
			TFTM	1,837	0	0	1	92	1,950	0	0	1	98	1,724	0	0	1	86	1,260	0	0	1	63
			ASYDF	1,642	1	0	1	82	1,743	1	0	1	87	1,541	1	0	1	77	1,127	0	0	1	56
			T2S	2,272	1	0	1	84	2,409	1	0	1	89	2,421	1	0	1	90	1,544	0	0	1	57
			T2M	2,165	1	0	1	80	2,296	1	0	1	85	2,307	1	0	1	85	1,472	0	0	1	55
10C			T3S	2,247	1	0	1	83	2,382	1	0	1	88	2,394	1	0	1	89	1,527	0	0	1	57
	700mA	27 W	T3M	2,224	1	0	1	82	2,358	1	0	1	87	2,370	1	0	1	88	1,512	0	0	1	56
(10 FDs)			T4M	2,179	1	0	1	81	2,310	1	0	1	86	2,322	1	0	1	86	1,481	0	0	1	55
(10 2200)			TFTM	2,265	1	0	1	84	2,401	1	0	1	89	2,413	1	0	1	89	1,539	0	0	1	57
			ASYDF	2,025	1	0	1	75	2,147	1	0	1	80	2,158	1	0	1	80	1,376	1	0	1	51
			T2S	3,011	1	0	1	75	3,190	1	0	1	80	3,202	1	0	1	80	2,235	1	0	1	58
			T2M	2,870	1	0	1	72	3,040	1	0	1	76	3,051	1	0	1	76	2,130	1	0	2	55
			T3S	2,978	1	0	1	74	3,155	1	0	1	79	3,166	1	0	1	79	2,210	1	0	2	57
	1000mA	40 W	T3M	2,948	1	0	1	74	3,123	1	0	1	78	3,134	1	0	1	78	2,187	1	0	2	56
			T4M	2,888	1	0	1	72	3,059	1	0	1	76	3,071	1	0	1	77	2,143	1	0	2	55
			TFTM	3,002	1	0	1	75	3,180	1	0	1	80	3,192	1	0	1	80	2,228	1	0	2	57
			ASYDF	2,684	1	0	1	67	2,843	1	0	1	71	2,854	1	0	1	71	1,991	1	0	2	51
			T2S	3,649	1	0	1	101	3,876	1	0	1	108	3,429	1	0	1	95	2,504	1	0	1	70
			T2M	3,478	1	0	1	97	3,694	1	0	1	103	3,267	1	0	1	91	2,387	1	0	1	66
			T3S	3,609	1	0	1	100	3,833	1	0	1	106	3,390	1	0	1	94	2,477	1	0	1	69
	530mA	36 W	T3M	3,572	1	0	1	99	3,794	1	0	1	105	3,356	1	0	1	93	2,451	1	0	2	68
			T4M	3,500	1	0	2	97	3,717	1	0	2	103	3,288	1	0	1	91	2,402	1	0	1	67
			TFTM	3,638	1	0	1	101	3,864	1	0	1	107	3,418	1	0	1	95	2,496	1	0	1	69
			ASYDF	3,252	1	0	2	90	3,454	1	0	2	96	3,056	1	0	2	85	2,232	1	0	1	62
			T2S	4,502	1	0	1	96	4,776	1	0	1	102	4,794	1	0	1	102	3,065	1	0	1	65
200			T2M	4,290	1	0	1	91	4,552	1	0	1	97	4,569	1	0	1	97	2,921	1	0	1	62
200			T3S	4,452	1	0	1	95	4,723	1	0	2	100	4,741	1	0	2	101	3,031	1	0	1	64
	700mA	47 W	T3M	4,407	1	0	2	94	4,675	1	0	2	99	4,693	1	0	2	100	3,000	1	0	1	64
(20 LEDs)			T4M	4,318	1	0	2	92	4,581	1	0	2	97	4,598	1	0	2	98	2,939	1	0	1	63
(,			TFTM	4,488	1	0	2	95	4,761	1	0	2	101	4,779	1	0	2	102	3,055	1	0	1	65
			ASYDF	4,012	1	0	2	85	4,257	1	0	2	91	4,273	1	0	2	91	2,732	1	0	1	58
			T2S	5,963	1	0	1	80	6,327	1	0	1	84	6,351	1	0	1	85	4,429	1	0	1	61
			T2M	5,683	1	0	2	76	6,029	1	0	2	80	6,052	1	0	2	81	4,221	1	0	2	58
			T3S	5,896	1	0	2	79	6,256	1	0	2	83	6,280	1	0	2	84	4,380	1	0	2	60
	1000mA	74 W	T3M	5,837	1	0	2	78	6,193	1	0	2	83	6,216	1	0	2	83	4,335	1	0	2	59
			T4M	5,719	1	0	2	76	6,067	1	0	2	81	6,090	1	0	2	81	4,248	1	0	2	58
			TFTM	5,944	1	0	2	79	6,307	1	0	2	84	6,330	1	0	2	84	4,415	1	0	2	60
			ASYDF	5,314	1	0	2	71	5,638	2	0	2	75	5,660	2	0	2	75	3,947	1	0	2	54

Performance Data Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F). Ambient 32°F 50°F 0°C 10°C 1.02
 20°C
 68°F

 25°C
 77°F
 1.00 1.00
 30°C
 86°F

 40°C
 104°F
 1.00 0.98

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the **DSXW1 LED 20C 1000** platform in a **25°C ambient**, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11). To calculate LLF, use the lumen maintenance factor that corresponds to the desired number

of operating h	ours belo	ow. For other l	umen ma	aintenance	values, co	ntact fac	:tory
Operating H	lours	0		25,000	50,0	00	
Lumen Maint Factor	enance	1.0		0.95	0.9	3	
Photo	met	ric Dia	grai	ms	Тс	see co	omp
Isofootcandle	plots f	or the DSXW	1 LED 2	:0C 1000 40	0K. Dista	nces ar	e in
LEGEND	4	3 2 1	0 1	2 3 4	vith	4	3
0.1 fc	4				ance v	4	
0.5 fc	2			The state of the s	accord	2	1
1.0 fc	1 0 -1 -2 -3	Se	1	2	o. 22601P22 tested in a LM-79-08.	1	CZ



FEATURES & SPECIFICATIONS

INTENDED USE The energy savings, long life and easy-to-install design of the D-Series Wall Size 1 make it the smart choice for building-mounted doorway and pathway illumination for nearly any facility. CONSTRUCTION Two-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Modular design allows for ease of maintenance. The LED driver is mounted to the door to thermally isolate it from the light engines for low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants (IP65). FINISH Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in textured and non-textured finishes. OPTICS Precision-molded proprietary acrylic lenses provide multiple photometric distributions tailored specifically to building mounted applications. Light engines are available in 3000 K (80 min. CRI), 4000 K (70 min. CRI) or 5000 K (70 CRI) configurations. ELECTRICAL

Light engine(s) consist of 10 high-efficacy LEDs mounted to a metal-core circuit board to maximize heat dissipation and promote long life (L88/100,000 hrs at 25°C). Class 1 electronic drivers have a

LITHONIA LIGHTING.

LITHONIA LIGHTING.

DSXW1-LED Rev. 4/14/15



CLIENT
CROWN ENTERPRISES INC
COPYRIGHT This drawing has been prepared solely for the intended use, thus any reproduction or distribution for any purpose other than authorized by Angle Design is forbidden. Written dimensions shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job, and Angle Design shall be informed of any variations from the dimensions and conditions shown on the drawing. Shop drawings shall be submitted to Angle Design for general conformance before proceeding with fabrication.
ISSUESNo.DESCRIPTIONDATE1PRE APPLICATION SET02-27-20222PRELIMINARY SITE PLAN06-07-20223REVISED PRELIMINARY SET08-09-20224
North
MISSDIG 811
CONSULTANTS
SEAL OF MICHINA
FADIA. KHALIL E MO. SON 53176
Angle Design & Engineering 22417 Cranbrooke Drive. Novi, Michigan. 48375 Phone: (313) 258-2036 Email: Fadi@AngledesignLLC.com
PROJECT NOVI CONCRETE PLANT 46844 12 MILE RD. NOVI, MI 48377
SECTION 9PROJECT NO: 2022-102SCALE: NOT TO SCALEDRAWN BY: VAWCHECKED BY: VAWPROJECT MGR: F. K.APPROVED BY: F.K.
FIXTURES DETAILS SHEET 4 OF 4
SHEET NUMBER ISSUE
E-6



SANDED SE CONNECT		
RNDY		
P635 5/8" X 10'-0" LONG GROUND ROD.		
T IONS ON SITE W/ SINGLE F	POLE.	





GRAVEL

SITE DATA Gross Land Area: Square Feet or Acres. Zoned: I-1 (Light Industrial) and I-2 (General Industrial) Building Setbacks (I-1): Front= 20' Sides= 20' Rear= 30' Building Setbacks (I-2): Front= 100' Sides= 50' Rear= 50'

Max. Building Height permitted (I—1): 40' Max. Building Height permitted (I—2): 60'

Total Parking: 0 spaces including 0 barrier free spaces.

TThe above zoning and zoning requirements were obtained from the City of Novi online Zoning Map and Zoning Ordinance.

NOTE: The setbacks & height restrictions noted above are for reference purposes only and should not be used for design or construction and should not be used to determine compliance. A surveyor cannot make a certification on the basis of an interpretation or opinion of another party. A zoning endorsement letter should be obtained from Novi to insure conformity as well as make a final determination of the required building setback & height requirements.











FAX. (248) 332-8257

LEGAL DESCRIPTION

Land situated in the City of Novi, County of Oakland, State of Michigan Described as follows:

Part of the Southwest 1/4 of Section 9, Town 1 North, Range 8 East, beginning at point distant South 89 Degrees 20 Minutes 00 Seconds West, 584.15 Feet from the South 1/4 Corner; Thence South 89 Degrees 20 Minutes 00 Seconds West, 495 Feet; Thence North 00 Degrees 02 Minutes 05 Seconds East, 1762.97 Feet; Thence North 89 Degrees 04 Minutes 55 Seconds East, 495 Feet; Thence South 00 Degrees 02 Minutes 05 Seconds West, 1765.13 Feet to beginning.

BASIS OF BEARING NOTE

The basis of bearing for this survey was established by the South line of Section 9.

TITLE NOTES

2) Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by making inquiry of persons in possession of the Land.

3) Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.

7) Rights of the public and any governmental unit in any part of the land taken, deeded or used for street, road or highway purposes.

9) Interest of others in oil, gas and mineral rights, if any, whether or not recorded in the Public Records. 10) Interest, if any, of the United States, State of Michigan, or any political subdivision thereof, in the oil, gas and minerals in and under and that may be produced from the captioned Land.

14) Rights of tenants under any unrecorded leases, as to tenants only.

All exceptions shown or noted on this survey were obtained from Title Commitment No. TC13-102000-1, Revision No. 0, with a Commitment Date of 12-06-2021, issued by First American Title Insurance Company.

FLOOD HAZARD NOTE

The Property described on this survey does not lie within a Special Flood Hazard Area as defined by the Federal Emergency Management Agency; the property lies within Zone X of the Flood Insurance Rate Map identified as Map No. 26125C0607F bearing an effective date of September 29, 2006.

CEMETERY NOTE

There was no observable evidence of cemeteries or burial grounds within the subject property.

UTILITY NOTE All utilities are underground unless otherwise noted.

The utilities shown on this survey were determined by field observation. All locations are approximate. The location of any other underground services which may exist can only be depicted if a Utility Plan is furnished to the surveyor.

NOTE: DTE has new regulations that may impact development outside their easement or the public right of way. Client shall contact DTE to determine the "New Structures and Power Line" requirements as they may apply to any future building or renovation of a structure. DTE Energy can be contacted at 800-477-4747

TABLE A NOTES

14. The Southeast corner of the Subject Land is approximate 800' West of W. Park Drive.

16: There was no observable evidence of current earth moving work, building construction or building additions observed in the process of conducting the fieldwork.

17: There are no known proposed changes in street right—of—way lines available from the controlling jurisdiction.

17: There was no observable evidence of recent street or sidewalk construction or repairs observed in the process of conducting the fieldwork.

18: Improvements within offsite easements or servitudes as provided by the Title Company are shown within 25 feet of the subject land only.

SURVEYOR'S CERTIFICATION

Crown Enterprises, LLC MMS Partners, a Michigan co-partnership First American Title Insurance Company

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes items 2, 3, 4, 6(a), 6(b), 7(a), 7(b1), 7(c), 8, 9, 11(a), 13, 14, 16, 17, 18 and 19 of Table A thereof.

The field work was completed on 03-10-2022.

Kevin Christopher Navaroli, P.S. No 4001053503 Dated: 03-16-2022 Revised:



PROJECT LOCATION 46844 W. 12 Mile Road

Part of the Southwest $\frac{1}{4}$ of Section 9 T. 1 North, R. 8 East City of Novi,

Oakland County, Michigan SHEET

ALTA/NSPS Land Title Survey

DATE ISSUED/REVISED 05-06-2019 ORIGINAL SURVEY 03-16-2022 UPDATE

DRAWN BY: A. Eizember **DESIGNED BY:** APPROVED BY:

K. Navaroli DATE: March 16, 2022 SCALE: 1'' = 100'50 100 50 0

NFE JOB NO. SHEET NO.

K525

1 of 1



4. PROVIDE A MINIMUM OF 3' HORIZONTAL CLEARANCE AND 10' VERTICAL CLEARANCE FROM ALL FIXED OBJECTS AND THE EDGE OF PATHWAY SURFACE. RELOCATE EXISTING OBJECTS (I.E. MAIL

7. A CLEAN SAW CUT JOINT SHALL BE PROVIDED WHEREVER NEW

THE THICKNESS OF BITUMINOUS LEVELING/BASE COURSE MIX

WEAKNESS SAW CUT JOINTS AT APPROXIMATELY 8' INTERVALS. SAW 17" WIDE X 1" DEEP JOINTS AND DO NOT SEAL THE JOINTS.

INSTALLING & INCH THICK PREMOLDED JOINT FILLER SET & INCH BELOW THE SURFACE OF THE CONCRETE IN THE JOINTS AT 50'

3. PLACE $\frac{1}{2}$ " FIBER EXPANSION JOINT FILLERS AT MAX. 50' INTERVALS. EXTEND EXPANSION JOINT FILLER THE FULL DEPTH OF THE JOINT WITH THE TOP SLIGHTLY BELOW THE FINISHED SURFACE OF THE PATHWAY. 4. PLACE 1/2" FIBER EXPANSION JOINT FILLERS AT EACH SIDE OF DRIVE.

NOT TO SCAL

NOTE: DUMPSTER PAD SHALL EXTEND MIN. 10' BEYOND DUMPSTER ENCLOSURE OPENING.

16' WIDE MAINTENANCE ACCESS DRIVEWAY <u>DETAIL - 12</u> NOT TO SCALE

> SHEET OF 2

OF 5

FOF	r tees a	ND TAPI	PING SLI	EEVES
D	A	В	С	E MIN
20"	6.5'	4.5'	3.5'	3'
16"	4'-8"	4'-8"	2.5'	2.75'
12"	4'	3'	2.5'	2.5'
10"	3'	2'	2'	2.25'
8"	2'-6"	2'	2'	2.25'
6"	2'	2'	2'	2.25'

THRUST BLOCK DETAILS

A. 3000 PSI CONCRETE TO BE USED. THRUST BLOCK

- TO ABUT & REST AGAINST UNDISTURBED SOIL OR EARTH COMPACTED TO 95% MODIFIED PROCTOR.
- B. THRUST BLOCKS NOT PERMITTED ON THEIR OWN, MUST BE USED IN COMBINATION WITH MEGALUG
- RESTRAINTS. SEE NOTE #19 C. TO BE USED AT THE DISCRETION OF THE CITY'S
- CONSULTANT.

HYDRANT EJ MODEL 5-BR-250

6" DI MJ ANCHORING COUPLING (SWIVEL ADAPTOR BY TYLER PIPE

1/2" GALVANIZED METAL CONDUIT FOR TRACING WIRE PROTECTION BURIED MINIMUM 12" INTO GROUND

VALVE BOX

6" FLOWMASTER RESILIENT WEDGE FJ VALVE IN 8560 SERIES VALVE BOX W/ NON-LOCKING 6800 DROP LID

GATE VALVE

<u>GENERAL NOTES:</u>

STEM GUIDE ASSEMBLY COMPRISED OF "J'

OTHER

BRACKET AND "L" BRACKET FASTENED TO

THE GATE WELL WALL OPPOSITE FROM EACH

1. All construction procedures and materials used on all water main projects shall conform to AWWA and The City of Novi current Standards and Specifications.

- 3. Three (3) working days prior to construction, the Contractor shall telephone MISS DIG (811 or 1-800-482-7171) for underground facilities locations and shall also notify representatives of other utilities located in the vicinity of the work.
- 4. Where work is to be performed in the vicinity of a City of Detroit water main, contractor shall notify the GLWA three (3) working days prior to start of construction and request an inspection of the job.
- 5. All pipe and all pipe fittings shall be made in the U.S.A.
- 6. Unless otherwise specified on plans, top of all water mains shall be six (6) feet below existing or proposed gravel, concrete or asphalt pavements, sidewalks, driveways and parking areas. A minimum cover of six (6) feet shall be maintained when crossing a ditch; water mains shall have a minimum of 5.5 feet of cover when in areenbelt.
- 7. Whenever a water main is installed under existing utility line, 6A stone shall be used to properly support or distribute any concentrated loads to avoid any settlement and all possible failure of the lower main. A vertical separation of at least 18 inches between the utility and the water main shall be provided (measured barrel to barrel).
- 8. All required cross connection devices shall be installed as required by the local plumbing code and in accordance with the standards of the Michigan Department of Environmental Quality Water Resources Division and the Michigan Department of Public Health
- 26. Corporation Stops shall be 1-inch Mueller #H-15000, or approved equal. Corporation 9. Tracing wire shall be provided for all water main, regardless of pipe material. Brass stops shall be securely capped after testing. Must use lead free corps. wedges are not permitted. Wire shall be copper, 8-gauge stranded, blue insulated per City requirements, or Copperhead Industries #8 AWG Blue Coated solid shot extra 27. All service lead corporation stops installed outside of gate wells 1" or less may be strength tracer wire. Connection is required at all service leads, hydrants, and gate direct tapped to main. For corporation stops larger than 1" use bronze double strap wells. Wire shall be brought through each gate well and connected to the top step. tapping saddle. All wire exposed above ground surface shall be encased in $\frac{1}{2}$ " metal conduit. The conduit should extend 12" below the ground surface. Conductivity shall be tested by 28. Gate valves and fittings shall be supported by formed concrete or mortared brick the contractor prior to acceptance of the main. All splices shall be made using a bearing on the floor (minimum four (4) inches of clearance between floor and gel-cap product which provides a water proof seal, such as 3M's Direct Bury Splice bottom of gate valve). kit or approved equal.
- 10. Connection to an existing water main shall be made only after pressure and bacteriological tests have been successfully completed. The city consultant must be present for the tests and review the results. Testing and disinfection procedures shall meet the requirements of ANSI/AWWA-C600/C651. The water main shall pass a test of 150 psi for a two (2) hour period. Water loss shall not exceed a rate of 11.65 U.S. gallons per inch diameter per mile of water main in twenty-four (24)
- 10a. All watermain 8" or larger shall be cleaned with a poly pig.
- 11. The city consultant must witness the connection of the water main to the existing water main. After the city consultants' approval letter has been issued, residential and commercial taps will be allowed. All water service connections two (2) inches and smaller shall be made by the City of Novi DPS.
- 12. Contractor supplied gauges are required for testing. The minimum size shall be 3.5" diameter graduated in one (1) or two (2) pound increments from 1 to 160 psi (minimum range).
- 13. When temporary water main jumpers are used during water main construction, a testable RPZ backflow preventer with current test report shall be placed on the jumper hose that is connected to the new water main.
- 14. The materials specified below may be subsituted with an approved equal as determined by the City. It is at the sole discretion of the City to determine if a material is acceptable and can be utilized. Written authorization must be obtained prior to ordering or installing the approved equal.
- WATER MAIN NOTES:
- 15. All water main shall be ductile iron or concrete. HDPE water main may be permitted upon city approval. Water main shall be per the following specifications: 15.a. Ductile Iron pipe shall be ANSI/AWWA C151/A21.51 cement lined with bituminous seal coat Class 54 for sizes 3" through 16" and Class 55 for 20" through 24" pipe. Ductile Iron pipe shall be designed for a minimum working pressure of
- 15.b. Pre-stressed Concrete Cylinder pipe (P.C.C.P.) shall be AWWA C-301 specification for sizes larger than 24". 15.c. High Density Polyethylene (HDPE) SDR 9 or 11 pipe shall meet the requirements of AWWA C906 (SDR 11) with blue shell or blue stripe.
- 16. Water services up to 2" shall be either Type K soft copper or HDPE DR9 with tracing wire meeting the requirements of ANSI/AWWA C909 for a pressure class of 200 psi. If HDPE is used, a tracing wire shall be run from the meter setup to the curb box (See Item #9 for tracing wire requirements). All water services greater than 2" shall follow the standards listed in Item #15.
- 17. The maximum allowable deflection at joints for ductile iron water main shall be per manufacturers standards (i.e. 4" - 36" water main - 5° per 20').
- 18. Poly-wrap may be required by the city and shall be placed around the water main per manufacturers specifications.
- 19. MEGALUG shall be placed at all valves, bends, tees, plugs, hydrants and mechanical fittings. Surrounding joints shall be restrained using U.S. Pipe Field Lok gaskets or approved equal and shall be per the manufacturer's joint restraining schedule and the latest edition of DIPRA's Thrust Restraint Design for Ductile Iron Pipe.
- 20. Water main joints shall be Tyton, Fastite, Mechanical, or approved equal in accordance with ANSI/AWWA C111/A21.11.
- 21. Restrained joints are required in lieu of thrust blocks. Restrained joints for pipe sizes up to 16" shall be Fast Grip Gaskets, Mega Lug or approved equal.

WATER MAIN CONSTRUCTION NOTES

2. No water main is to be installed without City inspection.

- Restrained joints for pipe sizes over 16" shall be American Ductile Iron Flex-Ring Joint Pipe or approved equal boltless system.
- 22. Thrust restraint design shall be per the Ductile Iron Pipe Research Association's Manual of Thrust Restraint Design for Ductile Iron Pipe, current edition.

23. All bolts on all flanged and mechanical joint fittings shall be domestic origin high

- S MAIN DETAIL NOV WATER N STANDARD I ЮF CITY SHEET J OF 5
- strength, low alloy COR-BLUE steel bolts or approved equal. These bolts shall meet the current provisions of American National Standard ANSI/AWWA C111/A21.11 for rubber gasket joints for ductile iron pressure pipes and fittings. Bolt manufacturer's certificate of compliance must accompany each shipment.
- 24. Backfill shall be compacted above pipe as indicated on construction drawings. Trench backfill shall be a suitable material and shall be free of any organic materials and rocks larger than 3" in size. Under road surfaces, pavement, sidewalks, curbs, driveways and areas where trench is within a 1:1 influence of the pavement, sand backfill shall be used which shall consist of MDOT granular material Class II and shall be compacted in layers not to exceed six (6) inches in thickness to a density of 95% as determined by AASHTO T99. Where water main is to be placed on fill material, all fill material below the pipe must also be compacted to 95% maximum unit density. All backfill placed within a 1:1 influence of structures shall be approved sand, placed in six (6) inch layers and compacted. Trenches that are to be left open overnight shall be enclosed with suitable fencing and lighted barricades.

VALVE & SLEEVE NOTES: 25. All Gate Valves less than 16" shall be EJ ductile iron body, fully bronze-mounted,

- resilient-wedge, non-rising stem (ANSI/AWWA C509), opening counterclockwise.
- 29. All gate valves 6" or larger shall be placed in a well with the exception of a hydrant shut off valve. A valve shall be placed in a box for water main smaller than 6". A stop box and rod is required for services up to 2" and a hydrant valve box is required for services less than 6". If the box falls within a paved area, a hydrant valve box is required for all service sizes.
- 30. Butterfly valves shall be used for valves 16" and larger in diameter and shall be Dezurik AWWA style, or approved equal, manufactured in accordance with ANSI/AWWA C504 and conforming to NSF Standard 61.
- 31. All precast concrete gate well sections shall be manufactured to conform with ASTM C478, except wall thickness shall be as shown on these details. Precast concrete gate well sections shall be modified tongue and groove with premium rubber gasket-type joints manufactured to conform with ASTM C443.
- 32. All gate well covers shall be EJ #1040A with bolted frame and with lettering per detail on this sheet. All cover bolts shall be stainless steel.
- 33. Tapping sleeves shall be manufactured by JCM Industries, Romac Industries, Mueller, EJ. Smith-Blair or approved equal and shall be mechanical joint with DWS Mechanical Joint Tapping Gate Valve. Lead joint sleeves shall not be used. Like size tapping sleeves can only be used when the existing main is ductile iron and equal to/less than 12—inch in diameter. For like size connections greater than 12—inch, a cut-in-tee is required. All tapping sleeves must be mechanical tapping sleeves.
- 34. No tapping of any water main fitting will be permitted.
- 35. No water main fittings or water service fittings shall contain lead.
- HYDRANT NOTES: 36. All hydrants shall be 6' bury EJ #5BR-250-Traffic Model and shall conform to ANSI/AWWA C502, and shall have a minimum 5 1/4" valve opening that closes with the water pressure. Hydrants shall be traffic style with breakable flange and coupling.
- 37. Hydrants shall have a swivel flange to allow bonnet to be turned 360 degrees without removing the bonnet, and barrel flanges shall be integrally cast with the barrel. Inlet shoe shall have a bronze valve seat, which can be removed without digging.
- 38. Inlet connection shall be 6" mechanical joint, conforming to AWWA C111 and ASA-A21.11. Stem threads shall be sealed with double "0" rings and shall be permanently lubricated with all weather grease.
- 39. Hose connections: One (1) 4 1/2" pumper nozzle and two (2) 2 1/2" hose nozzles, with National Standard Thread (NST) threads. Final orientation of the hydrant steamer connection to be determined by City consultant or Fire Department.
- 40. Operating Nut: (1) 1 1/2" P-F pentagon, open left.
- 41. Hydrants shall be factory painted by spray application red above the ground and black below, with a finish coat of Glamortex 501 enamel, color 314 Vermillion, or approved equal.
- 42. Prior to acceptance, hydrants shall be charged, tested and any leaks are to be repaired. Hydrants and valve boxes shall be plumbed and set to finished grade. Valve boxes shall be in line with the valve.

				тирис	DU	TA CTILE IR RAINT I	BLE 23. ON WAT	6.5.A ER MAIN			2				
	PIPE DIAMETER (inches)														
		3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"
	11.25°	1	2	2	3	4	4	5	6	7	7	9	11	13	15
	22.5°	3	3	5	6	8	9	10	12	13	15	17	21	25	29
NGI	30°	4	4	6	8	10	12	14	16	18	20	23	29	34	40
ND A degi	45°	6	7	10	13	16	19	22	25	28	31	36	45	53	61
	60°	8	10	14	18	22	26	30	34	39	43	51	62	74	85
	90° 14 17 24 31 38 46 53 60 67 74 88 108 128 14												148		
									-						
Unit Frictional	Force (ft/lbs)	124	151	217	284	349	415	481	547	613	679	811	1,005	1,203	1,398
Unit Bearing Resis	tance (ft/lbs)	152	185	268	354	437	523	611	699	789	879	1,064	1,344	1,639	1,939

Assumptions: Cover = 6.0 feet

Design Pressure = 150 psi Safety Factor = 1.5 Laying Condition = Type 3 Soil Designation = Clay 1

Non-Polywrapped Pipe

					DU	T <i>A</i> CTILE IR	ABLE 23. ON WAT	6.5.B Er Main	I PIPE						
				THRUS	T REST	RAINT LI	ENGTH F	OR VER		P BEND	S				
	3" 4" 6" 8" 10" 12" 14" 16" 18" 20" 24" 30" 36" 42"														42"
	11.25°	1	2	2	3	4	4	5	6	7	7	9	11	13	15
ES	22.5°	3	3	5	6	8	9	10	12	13	15	17	21	25	29
NGL	30°	4	4	6	8	10	12	14	16	18	20	23	29	34	40
VD A degr	45°	6	7	10	13	16	19	22	25	28	31	36	45	53	61
B E	60°	8	10	14	18	22	26	30	34	39	43	51	62	74	85
	90°	14	17	24	31	38	46	53	60	67	74	88	108	128	148
Unit Frictional	Unit Frictional Force (ft/lbs) 124 151 217 284 349 415 481 547 613 679 811 1,005 1,203 1,398														
Unit Bearing Resis	tance (ft/lbs)	152	185	268	354	437	523	611	699	789	879	1,064	1,344	1,639	1,939

Assumptions: Cover = 6.0 feet

Design Pressure = 150 psi Safety Factor = 1.5 Laying Condition = Type 3

Soil Designation = Clay 1 Non-Polywrapped Pipe

						TA	BLE 23.	6.5.C							
					DU	CTILE IR	ON WAT	ER MAIN							
			THRUST RESTRAINT LENGTH FOR VERTICAL DOWN BENDS												
	PIPE DIAMETER (inches)														
		3"	3" 4" 6" 8" 10" 12" 14" 16" 18" 20" 24 30" 36" 42"												
	11.25°	2	3	4	5	6	7	8	10	11	12	14	18	21	25
)) (22.5°	4	5	8	10	12	15	17	19	22	24	29	36	43	50
NGI	30°	6	7	10	14	17	20	23	26	29	33	39	48	58	67
ND A degi	45°	9	11	16	21	26	31	36	41	45	50	60	75	89	104
E BE	60°	13	16	22	29	36	43	50	57	63	70	84	104	124	145
	90°	90° 22 27 39 51 62 74 86 98 110 122 145 180 215 250												250	
Unit Frictional I	t Frictional Force (ft/lbs) 124 151 217 284 349 415 481 547 613 679 811 1,005 1,203 1,398														
Unit Bearing Resist	tance (ft/lbs)	152	185	268	354	437	523	611	699	789	879	1,064	1,344	1,639	1,939

Assumptions: Cover = 6.0 feet

Design Pressure = 150 psi Safety Factor = 1.5

Laying Condition = Type 3 Soil Designation = Clay 1 Non-Polywrapped Pipe

= Not Permitted (for 60°, use two 30° bends; for 90°, use two 45° bends)

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

					DU		DN WATE	ER MAIN	PIPE						
					THRUS	TRESTR	AINT LE	NGTH F	OR TEES						
						P	PE DIAME	TER OF M	AIN PIPE F	RUN (inche	s)				
		3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"
	3"	8	7	6	4	2	1	0	0	0	0	0	0	0	0
	4"		10	9	8	6	5	3	2	0	0	0	0	0	0
A L	6"			16	15	14	13	12	11	10	9	7	4	1	0
	8"				22	22	21	20	19	19	18	16	14	11	8
Š –	10"					28	27	27	26	26	25	24	22	19	17
	12"						34	33	33	32	32	31	29	27	25
OF hes	14"							40	39	39	38	37	36	35	33
	16"								46	45	45	44	43	41	40
	18"									52	51	51	49	48	47
M	20"										58	57	56	55	54
	24"											69	68	68	67
Ш	30"												87	86	85
	36"													104	104
	42"														122
									-			•			
Unit Frictional Force	(ft/lbs)	249	302	434	569	697	829	961	1,093	1,225	1,357	1,621	2,011	2,406	2,796
Unit Bearing Resistance	(ft/lbs)	152	185	268	354	437	523	611	699	789	879	1,064	1,344	1,639	1,939

Design Pressure = 150 psi Safety Factor = 1.5 Laying Condition = Type 3 Soil Designation = Clay 1 Non-Polywrapped Pipe

ТΔ **DUCTILE IR(** THRUST RESTRAIN 3" 4" 6" 8" 10" 21 27 3" 4 13 4" 6" 25 18 10 19 11 8" 11 10" 12" 14" 16" 18" 20" 24" 30" 36" 42" Unit Frictional Force (ft/lbs) 302 434 569 697 Assumptions: Cover = 6.0 feet = Not Applicable

Design Pressure = 150 psi Safety Factor = 1.5 Laying Condition = Type 3 Soil Designation = Clay 1 Non-Polywrapped Pipe

					TA	BLE 23.	6.5.F							
				DUC	CTILE IR	ON WAT	ER MAIN	PIPE						
			TH	IRUST R	ESTRAI	NT LENG	TH FOR	DEAD E	NDS					
Pipe Diameter (inches)	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"
Restraint Length (feet)	11	14	19	25	31	37	43	49	55	61	73	90	108	125
Unit Frictional Force (ft/lbs)	249	302	434	569	697	829	961	1,093	1,225	1,357	1,621	2,011	2,406	2,796

Assumptions: Cover = 6.0 feet

Design Pressure = 150 psi Safety Factor = 1.5 Laying Condition = Type 3 Soil Designation = Clay 1 Non-Polywrapped Pipe

= Not Permitted (for 60°, use two 30° bends; for 90°, use two 45° bends)

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

= Not Permitted (for 60°, use two 30° bends; for 90°, use two 45° bends)

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

BLE 23	3.6.5.E							
ON WA		IN PIPE						
IT LEN	IGTH FO	R REDU	CERS					
DIAMET		RGER PIPE	(inches)					
12"	14"	16"	18"	20"	24"	30"	36"	42"
34	40	46	53	59	71	89	107	124
32	39	45	52	58	70	88	106	124
27	34	41	48	55	67	86	104	122
20	29	37	45	50	64	83	102	120
11	20	29	37	45	59	79	99	117
	11	21	30	38	54	75	95	114
		11	21	30	47	69	91	110
			11	21	40	63	85	106
				11	31	57	80	101
					22	49	73	96
						31	59	83
							33	60
								32
829	961	1,093	1,225	1,357	1,621	2,011	2,406	2,796

= Not Probable

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

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CITY OF NOVI WATER MAIN STANDARD DETAILS										
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HIGH-DENSITY POLYETHYLENE (HDPE) WATER MAIN NOTES

In addition to the water main notes listed on sheet 3 of the standard details, the following notes will apply to construction projects using HDPE water main:

MATERIALS

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- 1. HDPE pipe, appurtenances, and installation methods shall conform to the most current edition of AWWA standard C906.
- 2. HDPE pipe shall be manufactured out of virgin material as defined in ASTM D3350. The pipe shall be made from high density PE 3408 polyethylene resin and the materials used must be listed and approved for use under NSF/ANSI Standard 14 and 61. HDPE pipe shall have a standard dimension ratio (SDR) of 11 or less, a hydrostatic design basis (HDB) of 1600 psi for water at 73.4LF and a minimum working pressure rating of 160 psi. No rework except that obtained from the manufacturer's own production of the same formulation shall be used. The pipe shall be homogeneous throughout and shall be free of visible cracks, holes, foreign materials, blisters, or other deleterious faults. A "Certificate of Compliance" shall be furnished for all materials supplied.
- 3. The physical appearance of the pipe having deformities such as concentrated ridges, discoloration, excessive spot roughness, pitting, varying wall thickness, etc., shall constitute sufficient basis for rejection. Pipe with gashes, nicks, abrasions or any physical damage that occurred during storage and/or handling which are wider or deeper than 10% of the wall thickness shall not be used and must be removed from the construction site. Any pipe that has been damaged or does not meet the City's approval shall be replaced at the Contractor's expense.
- 4. Mechanical fittings used with HDPE pipe shall be specifically designed for or tested and found to be acceptable for use with HDPE by the fitting manufacturer. Mechanical fittings designed for other materials shall not be used.
- 5. Water service saddles on HDPE water main shall be "VA" Eletrofusion Service Saddles by Friatec, Inc. or approved equal.
- 6. The mechanical joint fittings must conform to outside diameter requirements of ANSI/AWWA C111/A21 or ANSI/AWWA C153/A21.53 depending size. Butt fusion fittings shall meet AWWA C906 dimensional requirements
- 7. Bolts, nuts, gaskets, and glands meeting ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 are required. Mechanical joint components shall be installed in accordance with manufacturer's recommendations.
- 8. Pipe and fittings must be marked as prescribed by AWWA C906 and NSF. Pipe markings shall include nominal size, OD base, dimension ratio, pressure class, working pressure rating, AWWA C906, material code designation PE 3408, manufacturer's name, manufacturer's production code including day, month, year extruded, and manufacturer's plant and extrusion line; and NSF logo. Permanent identification of piping shall be provided by co-extruding longitudinal blue stripes into the outside surface of the pipe (stripes printed or painted shall not be acceptable) or the pipe material shall be black with a blue shell.
- INSTALLATION
- 9. Tracing wire shall be provided for all water main, regardless of pipe material. Brass wedges are not permitted. Wire shall be copper, 8-gauge stranded, blue insulated per City requirements, or Copperhead Industries #8 AWG Blue Coated solid shot extra strength tracer wire. Connection is required at all service leads, hydrants, and gate wells. Wire shall be brought through each gate well and connected to the top step. All wire exposed above ground surface shall be encased in $\frac{1}{2}$ " metal conduit. The conduit should extend 12" below the ground surface. Conductivity shall be tested by the contractor prior to acceptance of the main. All splices shall be made using a gel-cap product which provides a water proof seal, such as 3M's Direct Bury Splice kit or approved equal. Sanitary Sewer Force Main, Directional Drilled Water Main and Bore & Jack Water Main must be provided with two tracer wires per above specifications. For sanitary sewer force main applications the tracer wire must be installed up the side of the sanitary structure, to inside the structure by placing the tracer wire between the casting and adjustment.
- 10. Personnel trained in the use of butt-fusion equipment shall perform the joining of polyethylene pipe by methods recommended for new pipe connections. Personnel directly involved with installing the new pipe shall have received training in the proper methods for handling and installing the HDPE pipe by a qualified representative and certification of this training shall be provided to the
- 11. Connections to HDPE pipe shall not be made immediately after the pipe has been installed. The fused pipe should be laid in the trench and be allowed to reach an equilibrium temperature overnight (24-hour period) in its surrounding environment.
- 12. The HDPE pipe must be properly aligned at all transitions to conventional or HDPE water main and appurtenances.
- TESTING 13. The polyethylene pipe shall be pressure tested after the line and all fittings and valves have been installed. Connections may be left exposed for visual leak inspection. Under no circumstances shall HDPE pipe be pressure tested when the temperature of the pipe is above 80°F.
- 10. Connection to an existing water main shall be made only after pressure and bacteriological test have been successfully completed. The city consultant must be present for the test and review the results. Testing and disinfection procedures shall meet the requirements of ANSI/AWWA-C600/C651. The water main shall pass a test of 150 psi for a two (2) hour period. Water loss shall not exceed a rate of 11.65 U.S. gallons per inch diameter per mile of water main in twenty-four (24) hours. Bacteria sample (24) hours back to back.

PIPE BURSTING PROJECTS

- 11. The method approved for rehabilitation of existing water mains by pipe bursting and installation of new HDPE pipe is T.T. Technologies GRUNDOCRACK SYSTEMS, 8(00-533-2078) or approved equal. All contractors must be licensed to use the particular technology proposed for this work.
- 12. The pipe-bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall be pneumatic and shall generate enough force to burst and compact the existing pipeline.
- 13. The Manufacturer's specifications shall dictate what size tool should be used in what diameter pipe, as well as parameters of what size tool for percentage of upsize allowed.
- 14. Prior to construction, the Contractor shall develop and provide to the City of Novi for review and approval a temporary water system plan to supply water services to area residents and businesses during pipe bursting operations. It is anticipated that the temporary system will be fed from existing fire hydrants. The temporary system and hydrants shall have passed bacteriological testing prior to use.
- 15. All service connections on the existing water main that is to be burst, or will be taken out of service, shall be connected to the temporary water system prior to mainline bursting, disinfection, testing and service reconnection operations. Temporary service connections shall be made at the water service stop box by disconnecting the existing water service and connecting the temporary water line to the stop box.

HDPE FORCE MAIN / WATER MAIN PIPE RESTRAINT SCALE: NONE

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P (248) 347-0456 WWW.CITYOFNOVI.ORG	DATE:						
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COUNTY OAKLAND COUNTY	DATE: 5/17/2017	2/16/2018					
DATE TOWN RANGE 3/2014 1N 8E	REVISIONS: SPALDING DEDECKER	SPALDING DEDECKER					
			WATED MAIN	STANDARD DETAILS			

SHEET

OF 5

- 3. Three (3) working days prior to construction, the Contractor shall telephone MISS DIG (811 or 1-80D-482-7171) for underground facilities locations and shall also notify representatives of other utilities located in the vicinity of the work.
- 4. No ground water, storm water, construction water, downspout drainage or weep tile drainage shall be allowed to enter any sanitary sewer.
- 5. 18 inch minimum vertical separation and 10 foot minimum horizontal separation must be maintained between sanitary sewer and water main.
- 6. No sewer installation shall have an infiltration exceeding 100 gallons per inch diameter per mile of pipe per 24 hour period and no single run of sewer between manholes shall exceed 100 gallons per inch diameter per mile. Air tests in lieu of infiltration tests sholl be as specified in O.C.W.R.C. Standards. All testing gauges shall be calibrated every six (6) months, with the last certification date provided to O.C.W.R.C. prior to testing. Only Modified Groove Tongue, O-Ring, Uniloc, Amvit, Nobel, Ring-Tite, Fluid-Tite or equal, as approved by O.C.W.R.C./City of Novi may be used for sewer joints. All joints sholl meet requirements of ASTM C425 or C443.
- At all connections to an existing sewer or to extensions there to, a temporary watertight bulkhead with a threaded, capped or valved 1 inch diameter pipe to permit measuring infiltration sholl be provided to be removed only after directed by the engineer. A 12 inch temporary sump and a watertight mechanical bulkhead shall be installed on the first manhole upstream of the proposed connection. The temporary sump shall be filled in ofter successful completion of any infiltration test up to the standard fillet provided for the flow chonnel, and the bulkhead shall be removed after directed by engineer. Infiltration testing is required for all sewers twenty-four (24) inch diameter and greater, or for all sewer pipe diameters where the ground water level is seven (7) feet above the tap of the sewer pipe.
- When connections are made to sewers carrying fluids, special care must be taken that no part of the work is built under water. A flume or dam must be installed and pumping maintained, if necessary, and the new work kept dry until completed and any concrete or mortar has set up.
- 9. A NASSCO PACP formatted video of the interior of sanitory sewer 8" or greater in diameter (with log and lead locations) sholl be submitted to and approved by the City's Consultant prior to final acceptance. Said video shall be obtained a minimum of 30 days ofter construction is completed and by a NASSCO PACP Certified CCTV Contractor. Typical items to be reviewed on the videotape will include pipe deflections, pipe settlement, lead connections, joints and pipe cleanliness. If the video review reveals unsatisfactory conditions, the Contractor shall correct the condition at his own cost and shall then re-video the affected pipe for review by the City's Consultant.
- 10. The completed installation shall at no point have out-of-round pipe deflections greater than 5%. Deflectometer or go/no—go gauging tests will be required prior to sewer acceptance.
- 12. The materials specified below may be substituted with on approved equal as determined by the City. It is at the sole discretion of the City to determine if a material is acceptable and con be utilized. Written authorization must be obtained prior to ordering or installing the opproved equal.
- SANITARY_SEWER_NOTES:
- MATERIALS AND CERTIFICATIONS Truss Pipe and Fittings shall be as described under the current ASTM D2680. Appendix XI of said specification shall be as modified by the bedding requirements outlined below.
- 14. Solid wall pipe for 6" house connection sewers shall be PVC SDR 23.5 conforming to ASTM D3034 or ASTM D2665. Solid wall pipe shall be installed in accordance with bedding requirements outlined below.
- 15. Pipe material utilized for force main shall submitted to and approved by the City prior to installation.
- 16. All pipe shall be certified by the manufacturer to meet the applicable ASTM specification requirements. Certification forms, together with a report of the test results. shall be provided to the inspector with pipe deliveries and copies shall be forwarded to the Engineer or the Owner. Certification forms shall include project nome, location, Contractor, and test lot number. Lot sizes sholl be acceptable to the Engineer.
- 17. All pipe and fittings shall be suitably marked to provide manufacturer's name, extrusion code (including date and location of manufacture), ASTM designation, type of plastic, nominal diameter, and SDR number, where applicable. Fittings however, need not contain the extrusion code. Pipe shall have a "home" mork. Truss Pipe with an absence of filler material at the ends greater than 1/4" deep shall be subject to rejection or acceptable repair.
- 18. O.C.W.R.C./City of Novi approved flexible manhole joints shall be used. Where adaptors to other materials are required, only approved adaptors and joints may be used. Where the connections are mode to existing manholes, o rubber waterstop shall be used around the pipe.
- 19. No clay pipe will be allowed for main line sanitary sewer or for sanitary sewer

- 20. Beddina for Truss Pipe and solid wall pipe shall be in accordance with the current ASTM D2321, except, (1) only MDOT Class I ond Class II granulor materials or MDOT 6A stone may be used, (2) embedment sholl extend to minimum 12" above top of pipe, and (3) flooding or puddling shall not be used. The use of flexible and semi-flexible pipe requires that the bedding provide unyielding side support and complete bedding contact under pipe haunches. Bedding material must be properly placed and compacted to provide lateral restraint against deflection in the pipe diameter. Pipe must be bedded to the true line and grade throughout its length. Bell holes shall be provided where required.
- 21. Where unstable bottoms are encountered, the Contractor shall undercut to stable ground and construct a foundation consisting of MDOT 6A stone to act as an impervious mat to prevent migration or vertical movement of unstable soils or bedding materials. Where trench sheeting, plates, or a trench box are used due to severe ground conditions, all voids to the side and below the tap of the pipe caused by the sheeting, plates, or box withdrawol shall be completely filled or the supports left in place below the top of the pipe.
- 22. Due to potential damage to exterior walls of Truss Pipe or solid wall pipe. particularly under cold weather conditions, if rocks, frozen material, or large objects strike the pipe, the Contractor shall carefully avoid dumping any materials other than approved bedding sand or stone on the pipe until 12" cover is placed on it, particularly under cold weather conditions. Pipe walls and ends shall also be protected from abrasion and damage during handling, and shall be fully inspected just prior to placing in the trench.

CAST IRON MANHOLE FRAME AND COVER

SANITARY SEWER CONSTRUCTION NOTES

<u>GENERAL NOTES:</u> 1. All construction sholl conform to the current stondards and specifications of the City of Novi and the Oakland County Water Resource Commissioner (O.C.W.R.C.). All sonitary sewer construction shall have full-time inspection supervised by a State of Michigan professional engineer provided by, or caused to be provided by, the City of Novi. The Contractor shall contact the City Consultant to schedule inspection Two (2) full working days prior to the start of construction.

2. At all connections to O.C.W.R.C. sewers or to extensions thereto, and before the start of construction, the Contractor must request and have in his possession an approved Sewer Inspection Permit issued by the O.C.W.R.C. The Contractor shall be responsible for all O.C.W.R.C. charges and shall contact O.C.W.R.C. for their fees, bonds and deposit requirements. The Contractor shall notify the City's Consultant and the O.C.W.R.C. ((248) 858-1110) three (3) full working days prior to the beginning of ony construction. Final air test must be witnessed by the O.C.W.R.C. personnel and must be scheduled in advance.

- 23. Care shall be taken during bedding compoction to avoid distorting the shape of the pipe or damaging its exterior wall. Mobile equipment shall not be used over the pipe trench until 48" of cover hos been placed.
- 24. Backfill shall be compacted above pipe or as indicated on construction drawings. Trench backfill shall be o suitable material and shall be free of any organic materials and rocks larger than 3" in size. Under road surfaces, pavement, sidewalks, curbs, driveways ond areas where trench is within a 1:1 influence of the pavement, sand backfill shall be used which shall consist of MDOT granular material Class II compocted in layers not to exceed 6" in thickness to a density of 95% as determined by AASHTO T99. All backfill placed within a 1:1 influence of structures sholl be approved sand, placed in 6" layers and compacted. Trenches which are to be left open overnight shall be enclosed with suitable fencing and lighted barricades, unless atherwise approved by the city.
- JOINTS 25. Joints for PVC Truss Pipe, PVC solid wall pipe and fittings shall be of the elastomeric gasket push-on type. Such joints shall conform to the current ASTM D3212 and the pipe manufacturer sholl file with the O.C.W.R.C. a copy of certified test results of its jointing system prior to use. Gasket joints shall be installed in accordance with procedures specified by the pipe manufacturer, such that the gasket will be compressed (not displaced) in the joint to form a positive seal. Care shall be taken to insure all joints be pushed to the full "home" position ond held together in the "home" position during any grade or line adjustments.
- CUTTING AND HANDLING 26. Cutting of pipe lengths, where required, shall be performed with tools or equipment that will provide o neat, perpendicular cut without damage to the plastic or the filler material. All burrs shall be removed by the use of a file, knife, ar abrosive poper. Spigot ends on cut pipe shall be beveled similar to factory beveling to prevent gasket damage.
- Bowing or warping of Truss Pipe or solid wall pipe can occur with temperature 27 fluctuations. The Contractor shall store and protect the pipe to minimize bowing. Nominal 12'6" or longer pipe lengths having deviations from straight greater thon 1", as measured along a straight line, shall not be used.
- STRUCTURE_NOTES:
- 28. All new manholes shall have O.C.W.R.C./City of Novi approved flexible, watertight seals where pipes pass through walls. Manholes shall be precast sections with modified tongue and groove joints with rubber gaskets and shall conform to ASTM C478. Precost manhole sections sholl be O.C.W.R.C./City of Novi approved modified eccentric cone type. All manholes sholl be provided with watertight covers.
- 29. At all connections to manholes on O.C.W.R.C. sewers or extensions thereto. interior drop connections will be required when there is o difference in invert elevations.
- 30. The difference in the invert elevations at a drop connection must be a minimum of 18". If an 18" minimum cannot be obtained, the sewer must be made steeper in order to achieve matching invert elevations for all incoming and outgoing sewers.
- All new manholes requiring on exterior drop connection shall be constructed using a manhole base with a precast drop as shown on sheet 2 of these details.
- Wherever existing manholes are to be tapped, the tap shall be made by coring. The contractor sholl place a KOR-N-SEAL boot (or approved equal) after coring is completed. Blind drilling will only be permitted in lieu of coring with prior approval from both O.C.W.R.C. and City of Novi.
- 33. All manholes constructed or adjusted as part of the system maintained by the City of Novi shall be provided with watertight covers as depicted on this detail sheet.
- New manholes constructed directly on O.C.W.R.C. sewers shall be provided with covers reading "Oakland County Water Resources Commissioner - Sanitary" in raised letters per detail in the O.C.W.R.C. specifications.
- New manholes built over any existing sanitary sewers shall have monolithic poured 35.
- 36. A proper chonnel shall be constructed within the existing structure at the connection point to the existing system. Channel sholl be constructed to create the least amount of turbulence. Any portion of the existing structure which would interfere with such construction shall be removed. When forming a concrete channel in a precast structure that utilizes a flexible joint pipe connector, the channel shall be placed so as not to interfere in any way with the flexibility of the joint. The channel sholl be constructed the same size as the inside diameter of the existing pipe.
- SANITARY SEWER LEAD NOTES:
- All building lead work must be performed under City of Novi inspection. The Department of Public Service conducts inspection of lead from main sewer to ROW line. The Building Deportment conducts inspection of lead from ROW line to building connection.
- 38. No sanitary sewer may be used as a dewatering outlet.
- All building leads and risers shall be 6" SDR 23.5 PVC with rubber gasket joint 39 (ASTM D2665), or a City of Novi approved equal pipe and joint. Sewer pipe wye openings shall contain factory installed premium joint material of the type identical to that of the building lead pipe used. Building leads to be furnished with removable airtight and watertight stoppers. Taps to existing PVC or Truss Pipe shall be made with wye saddle taps.
- 40. Where an existing building lead is being extended, dissimilar types and sizes of pipe shall be joined using an O.C.W.R.C./City of Novi approved adapter. Allowable types of sewer pipe adapters are the Fernco Adopter or the Fernco Flexible Coupling.
- Field tops of existing sanitary sewers shall be mode by installing o wye fitting for house connections. Fernco fittings with stainless steel bands sholl be used to secure the wye fitting to the sanitary sewer pipe. Bedding for house connection sewers shall be equal to that of the main sewer bedding. Risers in deep and unstable trenches should be bedded in MDOT 6A stone, or an approved equal, to avoid settlement. Concrete sholl not be used for bedding. End caps or plugs shall be braced or anchored to withstand air test pressures. Caps or plugs sholl not be chemically welded in place.
- Where sanitary sewer cleanauts fall within a poved area (porking lot, service drive 42. area, etc.), the cleonout shall have a cast iron cover that is centered in a 2'x2'x6" (min.) concrete slab hoving a compressive strength of 3000 psi at 28-day cure time.

LE ROAD NOVI, MI 48375 P (248) 347-0456 WWW.CITYOFNOVI.ORG										
CITY OF NOVI 45175 WEST 10 MILE ROA		DATE:								
SCALE	H: N.T.S. V: N.T.S	REVISIONS:								
COUNTY	OAKLAND COUNTY	DATE: 5/17/2017	2/16/2018							
DATE TOWN RANGE	3/2014 1N 8E	REVISIONS: SPALDING DEDECKER	SPALDING DEDECKER							
CITY OF NOVI SANITARY SEWER STANDARD DETAILS										
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GENERAL NOTES: 1. All materials and workmanship shall be in accordance with the standards and specifications of the City of Novi.

- 3. Three (3) working days prior to construction, the Contractor shall telephone MISS DIG (811 or 1-800-482-7171) for underground facilities locations and shall also notify representative of other utilities located in the vicinity of the work.
- 4. Trenches that are to be left open overnight shall be enclosed with suitable fencing and lighted barricades.
- 5. The materials specified below may be subsituted with an approved equal as determined by the City. It is at the sole discretion of the City to determine if a material is acceptable and can be utilized. Written authorization must be obtained prior to ordering or installing the approved equal.

STORM SEWER NOTES: 6. Type and class of pipe shall be as specified on plans.

- Concrete Pipe Requirements 7. All round reinforced concrete pipe (RCP) shall meet the requirements of ASTM C76 29. Manhole frame and cover shall be EJ 1040, type "B" 16 Hole Cover or as per with modified tongue and groove joints with rubber gaskets manufactured to meet the requirements of ASTM C443. Catch basin sewers shall be Class IV RCP. construction drawings. Lettering shall be per detail this sheet.
- 8. The inside joint of pipe over 36" diameter shall be pointed with mortar upon completion of backfilling operations.
- 9. All elliptical reinforced concrete pipe shall meet the requirements of ASTM C507 with tongue and groove joints with bituminous (DeWitt #10) joint material meeting the requirements of C443. Elliptical concrete pipe joints shall also be wrapped per ASTM C877. In addition, elliptical concrete pipe of 42" equivalent size and larger shall require inside concrete pointing.

Plastic Pipe Requirements

- 10. Per City standards, the maximum allowable pipe size for plastic storm sewer is 12" diameter. Larger diameter plastic storm sewer may be approved by the City, depending on site conditions.
- 11. All plastic storm sewer pipe shall have a smooth interior.
- 12. PVC pipe shall meet the requirements of ASTM D3034 and F949 with push-on type joints meeting the requirements of ASTM D3212 and F477.
- 13. HDPE pipe shall meet the requirements of AASHTO M294 and ASTM D3350 with push-on type joints meeting the requirements of ASTM D3212 and F477. ADS pipe shall meet the requirements of AASHTO M294 and ASTM F2306 with joints meeting the requirements of AASHTO M252, M294, or F2306.
- 14. Plastic pipe will not be permitted in the right-of-way.
- Bedding Requirements 15. Bedding shall be used as called for on the details.
- 16. Where unstable ground conditions are encountered, stone bedding shall be used as directed by the Engineer in order to provide a stable foundation for pipe and manholes

Backfill Requirements

around

- 17. Backfill shall be compacted above pipe or as indicated on construction drawings. Trench backfill shall be of a suitable material and shall be free of any organic materials and rocks larger than 3" in size. Backfill shall be ramped into trench and compacted with a small dozer or other approved method.
- 18. Where trench is within a 1:1 influence of streets, alleys, sidewalks, driveways, parking areas and structures, sand backfill shall be used which shall consist of MDOT aranular material Class II compacted in layers not to exceed 6" in thickness to a density of 95% as determined by AASHTO T99.
- 19. When backfilling trench of PVC or HDPE pipe, manufacturer's specifications must be strictly adhered to.
- 20. No frozen material shall be buried more than 4' below the final elevation of the

DRAINAGE STRUCTURE REQUIREMENTS:

- 21. Shop drawings shall be submitted to and approved by the City's Consultant for each proposed structure prior to installation.
- 22. Precast reinforced concrete sections with modified tongue and groove joint and rubber gaskets shall conform to ASTM C-478. Cone section shall be eccentric and have stud inserts cast in place with a flush top surface.
- 23. Pipe shall be flush with the inside wall of structure and shall not protrude more than 4" into the structure. Pipe shall be pointed up inside and outside with a smooth finish at its intersection with the structure wall.
- 24. No openings shall be made in precast units which would leave less than 6" of undisturbed precast structure wall between pipes (as measured between outside pipe

EJ FRAME AND COVER SET IN MORTAR BED. SEE MANHOLE COVER DETAIL ON THIS SHEET FOR LETTERING REQUIREMENTS. SEE NOTES #29 THRU #32

SEE NOTE #37

STORM SEWER CONSTRUCTION NOTES

- 2. No storm sewer is to be installed without the City's inspector present.

- walls) or would remove more than 40% of the circumference along any horizontal
- 25. Precast riser placed on the concrete base shall be set in a full bed of mortar. All joints & liftholes shall be pointed up with mortar on the outside and inside.
- 26. Plaster all outside masonry surfaces with 1:2½ masonry cement (type II) 1/2"
- 27. All manholes and catch basins shall be 4' or 5' in diameter unless otherwise indicated on construction drawings. Larger diameter drainage structures (6', 7', 8', 10', and 12' diameter) may be needed for large storm sewer pipe or for situations where the angles between entering pipes require a larger diameter structure in order to maintain at least 6" of structure wall between the pipes. 2' diameter catch basins and inlets may be used where approved by the City Engineer.
- 28. Structure steps are to be installed at the plant by the manufacturer of the structure. The steps are to be 16 inches on center located 90° from the centerline of the main sewer line. The steps shall be made of No. 4 deformed steel rod encased with copolymer polypropylene plastic and meet the requirements of ASTM D4101, Type II, Grade 49108 or approved equal.
- 30. Catch Basin and Inlet frame and cover shall be: 30.1. EJ 7045, type "M1" cover and type "T1" back set (with "Dump No Waste"
- logo) with straight face curb and autter. 30.2. EJ 7065, type "M1" cover and 7060 "T1" back set (with "Dump No Waste" Loao) with mountable curb and gutter and integral curb and gutter.
- 30.3. EJ 1040, type "02" cover (beehive grate) to be used on structures located in ditches, swales and rear yard catch basins. If within 8' of road, type "N" cover (oval grate) shall be used. If 1040 casting is used in pavement, Type M1 grate must be provided.
- 30.4. EJ 1030, type "A" solid cover to be used on all 2' cleanouts and structures not located at storm water collection points. EJ 1060, type "A" solid cover may also be used on sump pump cleanout structures. 30.5. EJ 1030, type "01" cover (beehive grate) to be used on all 2' structures

located in ditches, swales and rear yard catch basins.

- 31. The City reserves the right to require a change in structure covers upon final grade and walk-through inspection if deemed necessary due to site conditions.
- 32. Frames shall be set in full bed of mortar and the side shall be overlapped to prevent leakage.
- 33. A proper channel shall be constructed within the existing manhole or other structure at which the connection is to be made to direct the flow to the existing outlet in a manner that will tend to create the least amount of turbulence. The channel shall be constructed to the same size as the inside diameter of the existing pipes, and shall be built to height of 1/3 the existing pipe diameter with a minimum of 2% slope on the benches.
- 34. Concrete base for manhole, catch basin, and inlet shall be MDOT grade 30P, 8" thick, 3000 psi.
- 35. When tapping into an existing structure a brick collar shall be placed 12" thick around the pipe and extended 12" beyond the opening. If pre-cast section is tapped, bend mesh and use as reinforcement with brick collar. Taps through structure joints or cone sections are prohibited unless approved by the City.
- 36. The final accessible structure prior to discharge into a forebay or detention basin shall contain a permanent 4' deep sump.
- 37. A 4' diameter Oil/Gas Separator Structure shall be installed prior to discharge into a forebay, detention basin or open drainage course as directed by the City.
- SUMP PUMP LEAD REQUIREMENTS: 38. All sump pump leads connected to a drain shall be pre-manufactured.
- 39. Sump pump leads shall be (1) PVC Sch. 40 (2) PVC Truss Pipe, or (3) approved equal, with premium joints.
- 40. Sump collection system pipes shall be connected at drainage structures and shall be cored or precast. Taps to 12" storm sewer may be made with a Fernco EZ Tap or approved equal. Taps to other size storm sewer may be made with a Romac saddle, KOR-N-TEE lateral connector for concrete pipe, or approved equal.
- 41. Ends of all 4" sump pump leads shall be temporarily capped and their location staked, witnessed and recorded.
- 42. All sump pump leads are to be taken to the property line, easement line or as indicated on the plan.
- 43. Sump pump cleanouts shall be a minimum inside diameter of 2' and be constructed at changes of alignment ends of sump pump mains or as indicated on approved plans.

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OF 2

ISSUE: PERMIT 06/10/2022

Crown Enterprises, LLC Tenant: Hercules Concrete 12225 Stephens Warren, MI 48089

Novi Batch Plant 46844 West 12 Mile Road Novi, MI 48377

FormSurfaces Design Group, LLC 10913 Marcello Lane Whitmore Lake, MI 48189 248.217.5739

Systems Solution Enginering, LLC 3250 W. Big Beaver Rd., Ste.305 Troy, MI 48084 248.247.1193

Angle Design & Engineering, LLC 6200 Shaefer Road, Ste. 100 Dearborn, MI 48126 313.258.2036

Conn Engineering Consultants, Inc. 107 N. Bridge Linden, MI 48451 810.458.4350

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PROJECT

LOCATION:

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ENGINEER:

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Novi Batch Plant Hercules Concrete

DRAWING INDEX

Sheet #Sheet TitleGENERAL G-000COVER SHEET CODE PLANARCHITECTURAL DRAWINGSA-101FIRST FLOOR PLANA-102SECOND FLOOR PLANA-103REFLECTED CEILING PLANSA-104ROOF PLANA-201EXTERIOR ELEVATIONSA-210INTERIOR ELEVATIONSA-301BUILDING SECTIONSA-401WALL SECTIONSA-410STAIR SECTIONSA-501SCHEDULE AND DETAILSA-502SCHEDULE AND DETAILS		
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STRUCTURAL DRAWINGS

0.1	STRUCTURAL NOTES
0.2	GENERAL NOTES AND SPECIAL INSPECTIONS
1.0	BUILDING FOUNDATION
1.1	BUILDING FOUNDATION
1.2	BUILDING FOUNDATION
2.1	ROOF BRACING
2.2	ROOF FRAMING
2.3	ROOF PURLIN
3.1	elevations
3.2	ELEVATIONS / DETAILS
3.3	SECTIONS
3.4	SECTIONS
4.1	DETAILS
4.2	DETAILS

GRAPHIC SYMBOLS

DETAIL NUMBER

IEET NUMBER WHERE DETA IS REFERENCED FROM Additional sheet number where detail is referenced from

(**4**A4-1

DETAIL NUMBER DARKENED ARROW INDICATES ELEVATED WALL SHEET NUMBER WHERE ELEVATION IS LOCATED NOTE: ELEVATION SYMBOL USED FOR INTERIOR & EXTERIOR ELEVATIONS.

 H-201 MECHANICAL HVAC FIRST FLOOR PLAN H-202 MECHANICAL HVAC SECOND FLOOR PLAN -300 MECHANICAL DETAILS -400 MECHANICAL SPECIFICATIONS ECTRICAL DRAWINGS 100 ELECTRICAL NOTES AND LEGENDS 101 ELECTRICAL ONE LINE DIAGRAM 102 ELECTRICAL SITE PLAN 103 ELECTRICAL LIGHTING SCHEDULES 104 ELECTRICAL LIGHTING FIRST FLOOR PLAN -201 ELECTRICAL LIGHTING SECOND FLOOR PLAN -202 ELECTRICAL LIGHTING ROOF PLAN -203 ELECTRICAL LIGHTING ROOF PLAN -204 ELECTRICAL FIRST FLOOR TUNNEL PLAN 2-201 ELECTRICAL POWER FIRST FLOOR PLAN -202 ELECTRICAL POWER ROOF PLAN -203 ELECTRICAL POWER ROOF PLAN -203 ELECTRICAL POWER ROOF PLAN -203 ELECTRICAL DETAILS
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2-203 ELECTRICAL POWER ROOF PLAN
302 ELECTRICAL DETAILS
400 ELECTRICAL SPECIFICATIONS
LUMBING DRAWINGS
100 Plumbing legends, notes and
-201 PLUMBING SANITARY FIRST FLOOR PLAN
5-203 PLUMBING SANITARY ROOF PLAN
N-201 PLUMBING DOMESTIC WATER & GAS
FIRST FLOOR PLAN
V-202 PLUMBING DOMESTIC WATER & GAS
FIRST FLOOR FLAN N-203 - PLUMBING GAS ROOF PLAN
300 PLUMBING DETAILS
400 PLUMBING SPEFICIATIONS

SHEET NUMBER WHERE SECTION IS LOCATED

NOTE: SECTION SYMBOL USED FOR WALL AND BUILDING SECTIONS

CO	
1.	APPLICABLE CODES
	Michigan Building Code
	National Electrical Code With Michigan Electr
	Michigan Plumbing Code Michigan Energy Code (ASHRAE 90.1 - 2013 y
	International Fire Code with Ammendments
2	Project Description
2.	THIS PROJECT IS A NEW 9,092 GROSS SQUARE OCCUPANCY, WITH AN ACCESSORY TWO STO
3.	Occupancy
	Use Group Low-Hazard Factory Industrial (F-2) Accessory Occupancy: Business (B)
4.	Construction Classification
	Туре IIB
	Fire Suppression: Non-Sprinklered
5.	Allowable Height
	Number of Stories Above Grade: Allowable 3 Allowable Feet Above Grade: Unlimited (Nor
6.	Allowable Area
	Area: Allowable 23 000 sf
	Ground Floor
	Second Floor Total Floor Area:
7.	Occupant Load
	Ground Floor
	Total Occupant Load:
8.	Earess
	Accessible means of egress
9.	Number of Exits and Exit Access
	Ground Floor - 2 Required Second Floor - 1 Required
10.	Exit Access Travel Distance
	Dead End Corridor Limit - 20'-0" Max
	Common Path of Travel - 75'-0" Max
	Corridor Fire-Resistance Rating (Occupancy F
11.	Fire Protection Systems
	Portable extinguishers: Max travel distance 75 Fire Alarm System
12.	Accessibility
	Comply with Chapter 11, and Appendix E Comply with Americans w/ Disabilities Act Ac
13.	Energy
	Climate Zone 5A
	COMCheck
<u>CC</u>	DE PLAN LEGEND
	ROOM NAME

ROOMINAME	
XXX SF XXX OLF XX OL	ROOM AREA (SF) OCCUPANT LOAD FACTOR OCCUPANT LOAD
	EXIT DOOR
	EGRESS ROUTE
FEC	FIRE EXTINGUISHER AND CABINET (FEC)
FE	FIRE EXTINGUISHER (FE)

ADDITIONAL CODE REQUIREMENTS

STORAGE AND DISPENSING ROOM

DESCRIPTION BASED ON THE SDS SHEETS PROVIDED BY THE OWNE THE CHEMICALS USED FOR ADMIXTURES ARE NOT COMBUSTIBLE NOR FLAMMABLE.

THE MATERIAL WILL BE DISPENSED BY A CLOSED SY. S-2 STORAGE HAS NO SEPARATION REQUIREMENT.

CONTAINMENT BASED ON QUANTITIES PROVIDED B OWNER (12) 2,000 GALLON TANKS AND (1) 5,000 G TANK. 5,000 GAL = 668.4 CUBIC FEET OF CONTAIN

			Reference
			2015 2015
ectrical Co	de		2017 2015 2017
nts			2017 2015 2009
ARE FEET CC STORY BUS	DNCRETE BATCH PLANT. THE BUILD INESS USE LOCATED IN NOVI, MICH	ING WILL BE A ONI IIGAN.	STORY F-2
(F-2)		Provided F-2 B	MBC 306 MBC 508.2
		Provided IIB	MBC 601
le 3		Provided 2 stories	MBC 504
(Non-combi	ustible Roof Structure Materials)	59'-4"	MBC 304
		Provided 8,314 sf 778 sf 9,092 sf	MBC 506
		Provided 72 7	MBC1004.1.2
		79 Provided	
		2	MBC 1009.1
		Provided 3 1	MBC 1006.3.1 MBC 1006.2.1
		Provided	MBC 1020.4
Sprinklered) Icy F) - 1 Hr F	Rated	Compliant Compliant	MBC 1020.4 MBC 1017.2 MBC 1006.2.1 MBC 1020.1
o 75 ft		Provided None	MBC 906 3 (1)
		None	MBC 907.2.4
t Accessibilit	ry Guidelines	Provided Compliant Compliant	MBC Ch 11 ANSI 117.1
		Provided	
	PLUMBING FIXTURE MICHIGAN PLUMBING C REQUIRED: a. WATERCLOSETS: 1 W/ b. LAVATORY: 1 LAVATO c. 1 DRINKING FOUNTAL d. 1 SERVICE SINK PROVIDED: SEPERATE FACILITIES NOT OCCUPANT LOAD: 91 C a. 2 WATERCLOSETS a. 2 LAVATORIES b. 1 DRINKING FOUL c. 1 SERVICE SINK	E CALCULATIC ODE 2015 (TABLE 4 ATERCLOSET PER 10 DRY PER 100 OCCU N PER 400 OCCUP REQUIRED- EXCEP OCCUPANTS 5, 2 URNIALS	DNS 103.1) DO OCCUPANTS JPANTS ANTS TION 403.2.1

TYPICAL ROOF NOTES

1. ALL OTHER SURROUNDING MATERIALS AND SUBSTRATES ARE TO BE VIEWED AS "REFERENCE ONLY" AND ARE SUPERSEDED BY DETAILS AS INDICATED ON OTHER ARCHITECTURAL/ STRUCTURAL SHEETS. (EX. WOOD BLOCKING, INSULATION, STRUCTURAL ELEMENTS ETC ...).

2. SPECIFIED ARCHITECTURAL & MECHANICAL ELEMENTS MAY NOT BE GRAPHICALLY CORRECT IN THESE DETAILS. WRITTEN SPECIFICATIONS SUPERSEDE GRAPHIC MATERIAL IN THESE DETAILS.

3. THESE DRAWINGS ARE ONLY A GRAPHIC REPRESENTATION AND ARE NOT INTENDED TO BE SCALED.

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A104

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CLIENT

Door and Window Schedule														
DOOR NO.	door Size	TYPE	DOOR MAT	FINISH	TYPE	FRAME MAT	FINISH	DET. HEAD	ails Jamb	THRES	LABEL	HDWE TYPE	HDWE SET	NOTES
100A	3'-0''x 7'-0''x 1 3/4''	A	ALUM	PREFIN	4	ALUM	PREFIN			4/A501				2, 3, 4
100B	14'-0''x16'-0''x 3/4'' 14'-0''x16'-0''x 3/4''	C C	STL STL	PREFIN PREFIN	3	STL STL	PREFIN PREFIN							1
100D	14'-0''x16'-0''x 3/4''	С	STL	PREFIN	3	STL	PREFIN							1
100E	3'-0'x 7'-0''x 1 3/4'' 14'-0''x16'-0''x 3/4''	A C	HM STL	PT PREFIN	1	HM STL	PT PREFIN			4/A501				2, 3, 4
100G	10'-0''x10'-0''x 3/4''	D	STL	PREFIN	3	STL	PREFIN							
100H	14'-0''x16'-0''x 3/4''	С	STL		3	STL								1
100J	8'-0''x 10'-2"			TREFIN	9	ALUM	PREFIN							
100K	3'-0''x 7'-0''x 1 3/4''	A	НМ	PT PT	1	НМ	PT PT			4/A501				
101A	3'-0''x 7'-0''x 1 3/4''	В	ALUM	PREFIN	2	ALUM	PREFIN			4/A501				2, 3, 4
101B	3'-0''x 7'-0''x 1 3/4''	A	HM	PT	1	НМ								2, 3, 4
101C	7'-0''x 7'-2''				6	ALUM	PREFIN							
101E	7'-0"x 7'-2"				6	ALUM	PREFIN							
101F 101G	5-0 x 4-6 5'-0''x 4'-6''				7	НМ	PT							
101H	5'-0''× 4'-6''				7	НМ	PT							
102A 104A	3'-0''x 7'-0''x 1 3/4'' 3'-0''x 7'-0''x 1 3/4''	A	HM HM	PT PT	1	нм нм	PT PT							
104B	3'-0''x 7'-0''x 1 3/4''	A	НM	PT	1	НМ	PT			4/A501				
201A 201B	3'-0''x 7'-0''x 1 3/4'' 5'-0''x 4'-6''	A	HM	PT	1 7	нм нм	PT PT							2, 3, 4
201C	3'-0''x 7'-0''x 1 3/4''	A	НМ	PT	4	НМ	PT							
201D	5'-0''× 4'-6''				7	НМ	PT PT							
201E 201F	7'-0'× 4'-6''				8	ALUM	PREFIN							
201G	7'-0''x 4'-6''				8	ALUM								
20111 202A	3'-0''x 7'-0''x 1 3/4''	A	НМ	PT	1	HM	PT							
Ge	neral Do	or I	nfor	mc	ntio	n								
 All dor Fire ra Door u Stand dimer Locati 4" to tl Reinfo Reinfo All hol Thickn Facto 1. Full Ver 2. Panic H 3. Key Lo 4. Closure	 All door numbers are the same as the room number noted on plans - if more than one door is indicated at a room, all doors will be numbered for that room. Fire roted doors and frames are listed in minutes. See door schedule. Door undercuts for mechanical requirements require a 5/8" max, clear distance measured from the top of the finished floor material or threshold to the bottom of the door. Standard tolerances of undercutting of doors for thresholds and other floor covering materials are not noted and must be considered in determining the actual overall dimensions of the door. Coordinate with affected trades. Location of doors noted on plans are dimensioned to the face of door jamb unless otherwise noted or detailed. If door location is not dimensioned - face of jamb shall be 4" to the wall. Reinforce all doors and millwork for hardware. All hollow metal door frames must be grouted solid unless specifically noted otherwise. NOTE: coordinate exitines for hardware items. Thickness of doors are 1 3/4" unless noted or detailed. Factory prepare door and frame for installation of card reader or electrical strike as scheduled. Factory prepare door and frame for installation of card reader or electrical strike as scheduled. Full Vertical Track Panic Hardware/Emergency Egress All HM frames to be pointed: alkyd paint, satin finish. All HM frames to be pointed; alkyd paint, satin finish. All HM frames to be pointed; alkyd paint, satin finish. 													
Do	or Types													
F	FLUSH GLASS LITES B C D													
Frc	ime Type	es]								
SAFETY GLASS 2" YPP N N N N N N N N N N N N N														
Wir	ndow Typ	bes										-2"		Ë E
NC	DT USED		Q. E	Q.	×	7'-2''	7	2'-8" 4'-6" 7'-2"	EQ.	EQ.	2'-8" 4'-6"	-2-	EQ.	EQ.





n Finish Material Legend					
MANUFACTURER	DESCRIPTION AND COLOR				
Sherwin Williams	STYLE: GENERAL POLYMERS EPOXY COATING SYSTEM COLOR: 1/4 COLOR FLAKES: LT GREY, DK GREY, BLACK, TAN IN EQUAL PARTS				
SIKA	STYLE: NOVOLAC COLOR: DK GREY				
PORCELAIN TILE	STYLE: AMERICAN OLEAN SIZE: 12 x 24 TILE COLOR: SUNSET FALLS				
SHERWIN WILLIAMS	LATEX PAINT FIELD COLOR: #SW 7647 CRUSHED ICE FINISH: EGGSHELL				
JOHNSONITE	STYLE: 4" VINYL COVE BASE SIZE: 4" COLOR: TBD- TO MATCH EC-1				
SHERWIN WILLIAMS	COLOR: #SW 7068 GRIZZLE GRAY FINISH: SATIN AREA: INTERIOR HM DOORS & FRAMES				
USG	STYLE: MARS 88137 SIZE: 2X2 COLOR: WHITE, GRID: WHITE				
SHERWIN WILLIAMS	COLOR: CEILING BRIGHT WHITE SW7007 FINISH: FLAT				

Room Finish Schedule										
ROOM	OOM			WALLS		CEILING				
NO.	ROOM NAME	FLOOR	BASE	NORTH	EAST	south	WEST	FIN.	HGT.	REMARKS
Ground I	Floor									
100	PLANT			PNT-1	PNT-1	PNT-1	PNT-1		EXP	
	CONTAINMENT	EC-2	EC-2	PNT-1	PNT-1	PNT-1	PNT-1		EXP	
101	DRIVER ROOM	EC-1	VB-1	PNT-1	PNT-1	PNT-1	PNT-1	PNT-2	EXP	
102	REST ROOM	EC-1	PT-1	PT-1	PT-1	PT-1	PT-1	PNT-2	8'-0''	
103	ELECTRICAL ROOM		VB-1	PNT-1	PNT-1	PNT-1	PNT-1		EXP	
201	CONTROL ROOM	EC-1	VB-1	PNT-1	PNT-1	PNT-1	PNT-1	ACT-1	9'-0''	
202	REST ROOM	EC-1	PT-1	PT-1	PT-1	PT-1	PT-1	PNT-2	8'-0''	
Room Finish Remarks										

SIRUCIURAL NOIES:			
<u>GENERAL STRUCTURAL NOTES</u> 1. GOVERNING BUILDING CODE - 2015 MICHIGAN BUILE	DING CODE	15.	
 THE STRUCTURAL NOTES ARE INTENDED TO AUGMENT CONFLICTS EXIST BETWEEN THE DRAWINGS, SPECIFICA PROVISION SHALL GOVERN. 	THE DRAWINGS AND SPECIFICATIONS. SHOULD ATIONS AND THE STRUCTURAL NOTES, THE STRICTEST		SPECIFIED DEPTH
 THE STRUCTURAL DRAWINGS FORM AN INTEGRAL PAR ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTR COORDINATE THE STRUCTURAL DRAWINGS WITH THE F THE CONTRACT DOCUMENTS. 	RT OF THE CONTRACT DOCUMENTS, WHICH INCLUDE PICAL, SITE DRAWINGS AND SPECIFICATIONS. REQUIREMENTS SHOWN IN THE OTHER COMPONENTS OF	<u>BAC</u> 1.	<u>CKFILLING</u> WHERE BACKFILLI BACKFILL AGAINS TEMPORARY LATE
4. TYPICAL DETAILS AND OTHER DETAILS APPLY TO CONE DESCRIBED IN THE DETAILS, EVEN IF THEY ARE NOT SPE	DITIONS THAT ARE SIMILAR TO THE CONDITIONS CIFICALLY REFERENCED ON THE PLANS.	2.	BACKFILL MATERI, PROCTOR METHC
5. THE CONTRACTOR IS RESPONSIBLE FOR MEANS, METH CONSTRUCTION.	ODS, SEQUENCES AND PROCEDURES OF	CA	
5. THE STRUCTURE IS DESIGNED TO BE SELF SUPPORTING A DETERMINE ERECTION PROCEDURE AND SEQUENCE, A COMPONENT PARTS DURING ERECTION. THIS INCLUD	AND STABLE AFTER THE BUILDING IS FULLY COMPLETED. AND TO ENSURE THE SAFETY OF THE BUILDING AND ITS DES THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE	1. 2.	"BUILDING CODE
DOWNS IF NECESSARY. RELAIN OWNERSHIP OF SUCH	MATERIAL AFTER COMPLETION OF THE PROJECT.		AND ACI GUIDE 3
CONSTRUCTION SHALL COMPLY FULLY WITH THE APPL GOVERNING CODES, LATEST EDITION, AND ALL REQUI TO AS IF THEY WERE CALLED FOR OR SHOWN ON THE	ICABLE PROVISIONS OF OSHA AND THE LOCAL IREMENTS SPECIFIED IN THE CODES SHALL BE ADHERED DRAWINGS. THIS SHALL NOT BE CONSTRUED TO MEAN	3.	CEMENT SHALL C
THAT REQUIREMENTS SET FORTH ON THE DRAWING MA THAN THE CODE REQUIREMENTS OR BECAUSE THEY AF	AY BE MODIFIED BECAUSE THEY ARE MORE STRINGENT RE NOT SPECIFICALLY REQUIRED BY CODE.	4.	CONCRETE AGGI AND ASTM C330 '
 TRUSS DRAWINGS TO BE SIGNED AND SEALED BY A LIC MICHIGAN 	CENSED STRUCTURAL ENGINEER IN THE STATE OF	5.	REINFORCING SH
DESIGN LOADS . THE STRUCTURE IS DESIGNED FOR THE FOLLOWING LIV	'E LOADS IN ADDITION TO THE LATERAL LOADS AND	6.	REINFORCEMENT DETAILING OF CC AND PLACING DF
SUPERIMPOSED DEAD LOADS AND SELF-WEIGHT OF TH REDUCED IN ACCORDANCE WITH THE PROVISIONS OF ROOFS ADJACENT TO HIGH ROOFS OR SLOPED ROOF	HE STRUCTURE. WHERE APPLICABLE, THE LIVE LOADS ARE F THE BUILDING CODE. THE SNOW LOADS ON LOWER FS ARE INCREASED FOR THE EFFECT OF DRIFTING.	7.	WELDED WIRE FAI ASTM A-185 AND
2. BUILDING IS NOT DESIGNED FOR FUTURE VERTICAL OR	HORIZONTAL EXPANSION.	8.	WELDING OF REIN TO AWS D1.4 SPE
<u>IVE LOAD</u> ROOF SNOW LOAD: GROUND SNOW LOAD: FLAT ROOF SNOW LOAD (MINIMUM ROOF LOAD):	25 PSF 20 PSF	9.	CONCRETE SHALL FOUNDATIONS: ABOVE GRADE EC
SNOW EXPOSURE FACTOR: SNOW LOAD IMPORTANCE FACTOR:	1.0 1.0		SLAB-ON-GRADE: EXTERIOR CONCR
ADDITIONAL LOADING DUE TO DRIFTING AT CHANGE APPLICABLE CODE.	IS IN ROOF ELEVATIONS AND ICE AT OVERHANGS PER	10.	EXTERIOR AND IN SHALL BE AIR-ENTI
CONTROL ROOM	50 PSF	11.	USE OF CALCIUM
CEILING LIVE LOADS CONTROL CEILING	40 PSF	12.	MINIMUM LENGTH INDICATED OR SH SHOWN ON THE A
<u>DEAD LOAD</u> ROOF CONTROL ROOM FLOOR CONTROL ROOM CEILING	12.0 PSF 15.0 PSF 15.0 PSF	13.	ANCHOR BOLTS A BY TEMPLATE TO V FOUNDATION WA
<u>WIND LOAD</u> ULTIMATE DESIGN WIND SPEED EXPOSURE CATEGORY:	115 МРН С	14.	PROVIDE DOWELS COLUMNS AND V
INTERNAL PRESSURE COEFFICIENT COMPONENTS AND CLADDING LOAD: Zone p1+ p2+ p1- p2-	0.18	15.	UNLESS OTHERWIS OPENINGS IN SLA BEYOND CORNER
(psf) (psf) (psf) (psf) 1 3.84 15.36 -31.35 -19.83 2 3.84 15.36 -44.15 -32.63 3 3.84 15.36 -69.74 -58.22		16.	CONSTRUCTION . THE SIZE OF KEY IS OF THE MEMBER A
4 16.63 28.15 -31.35 -19.83 5 16.63 28.15 -31.35 -19.83			WATER-STOP IN C
SEISMIC LOAD		17.	PROVIDE 3/4" X 3/ CORNERS OF CO

DESIGN CATEGORY SITE CLASSIFICATION: SEISMIC IMPORTANCE FACTOR: Ss = S1 =

ALL EXPOSED SUBGRADE FOOTING LEVELS AND SLAB ON GRADE ARE TO BE INSPECTED BY SOIL ENGINEER BEFORE PLACING CONCRETE.

1.00

0.088

0.046

0.094

0.073

2. THE EXCAVATIONS FOR FOUNDATION WORK SHOULD BE DONE IN A DRY PERIOD AND THE FOUNDATION CONCRETE SHOULD BE PLACED IMMEDIATELY. IF NOT POSSIBLE PLACE A THIN LAYER OF LEAN CONCRETE (MUD MAT) ON THE BASE OF THE EXCAVATION.

- 3. CONTRACTOR SHALL VERIFY ALL CONDITIONS, INCLUDING UNDERGROUND UTILITIES AND FIELD MEASUREMENTS AT JOB SITE AND REPORT ANY DISCREPANCIES TO THE OWNER'S REPRESENTATIVE.
- 4. PROVIDE NECESSARY SHEETING, SHORING, BRACING, ETC. AS REQUIRED DURING EXCAVATIONS TO PROTECT SIDES OF EXCAVATIONS.
- 5. COMPLY FULLY WITH REQUIREMENTS OF OSHA AND OTHER REGULATORY AGENCIES FOR SAFETY PROVISIONS. TOP OF SPREAD FOOTING ELEVATIONS NOTED ON PLAN ARE MINIMUM ELEVATIONS.
- 6. SIDES OF FOUNDATIONS SHALL BE FORMED UNLESS CONDITIONS PERMIT EARTH FORMING. FOUNDATIONS POURED AGAINST THE EARTH REQUIRE THE FOLLOWING PRECAUTIONS: SLOPE SIDES OF EXCAVATIONS AS APPROVED BY GEOTECHNICAL ENGINEER AND CLEAN UP SLOUGHING BEFORE AND DURING CONCRETE PLACEMENT.
- 7. WHERE FOOTING STEPS ARE NECESSARY, THEY SHALL BE NO STEEPER THAN ONE VERTICAL TO TWO HORIZONTAL U.N.O.
- 8. FOOTINGS SHALL BE CENTERED UNDER COLUMNS AND WALLS UNLESS SPECIFICALLY DETAILED OTHERWISE ON THE DRAWINGS.
- 9. NO FOOTINGS OR SLABS SHALL BE PLACED ON OR AGAINST SUB-GRADE CONTAINING FREE WATER, FROST OR ICE. SHOULD WATER OR FROST ENTER A FOOTING EXCAVATION AFTER SUB-GRADE APPROVAL, THE SUB-GRADE SHALL BE RE-INSPECTED BY THE GEOTECHNICAL ENGINEER / TESTING LABORATORY AFTER REMOVAL OF WATER OR FROST.
- 10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY MEASURES TO PREVENT ANY FROST OR ICE FROM PENETRATING ANY FOOTING OR SLAB SUB-GRADE BEFORE AND AFTER PLACING OF CONCRETE UNTIL THE FULL BUILDING ENCLOSURE IS COMPLETED AND HEATED.
- 11. EXCAVATED MATERIAL SHALL BE LEGALLY DISPOSED OFF THE OWNER'S PROPERTY OR STORED AT THE THE SITE OR USED FOR BACKFILLING OPERATIONS AS REQUIRED IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS AND PROJECT SPECIFICATION REQUIREMENTS. ANY CONTAMINATED SOIL ENCOUNTERED SHOULD BE HANDLED PER DEQ REQUIREMENTS.
- 12. CONTRACTOR SHALL FURNISH ALL REQUIRED DE-WATERING EQUIPMENT TO MAINTAIN A DRY EXCAVATION UNTIL BACKFILL IS COMPLETE.
- 13. WHERE NEW FOOTINGS ARE ADJACENT OR ABUT EXISTING FOUNDATIONS, CAREFULLY HAND EXCAVATE AND DETERMINE BOTTOM OF EXISTING FOUNDATION. IF DIFFERENT THAN ANTICIPATED, ADJUST NEW FOUNDATIONS TO MATCH EXISTING. IN NO CASE SHALL THE NEW FOOTING BE LOWER THAN THE EXISTING WITHOUT PROTECTION AGAINST UNDERMINING SUCH AS UNDERPINNING OR SHORING.
- 14. ALL FOUNDATIONS HAVE BEEN DESIGNED BASED UPON A GEOTECHNICAL INVESTIGATION CONDUCTED BY G2 CONSULTING GROUP, DATED 08.12.2020, WITH THE MAXIMUM BEARING PRESSURES OF 2000 PSF AT FOUNDATION BEARING ELEVATIONS ON NATURAL SOILS, SUITABLE EXISTING FILL, OR ENGINEERED FILL.

- ARE DUE TO FILL ENCOUNTERED DURING THE GEOTECHNICAL INVESTIGATION.
- ING IS TO BE PLACED ON BOTH SIDES OF FOUNDATION WALLS, PROVIDE A BALANCED t foundation walls to eliminate lateral load effects, or provide necessary RAL SUPPORT TO THE TOP OF THE WALL UNTIL PERMANENT SUPPORT IS INSTALLED.
- SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY, AS DETERMINED BY THE MODIFIED D (ASTM D1557), IN LIFTS NOT EXCEEDING 6".

REQUIREMENTS FOR STRUCTURAL CONCRETE".

- SHALL CONFORM TO THE REQUIREMENTS OF ACI 301 "SPECIFICATIONS FOR STRUCTURAL LDINGS", AND ACI 318-14 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" 362.1R-12; EXCEPT AS MODIFIED BY STRUCTURAL REQUIREMENTS NOTED ON THE DRAWINGS.

- ALL CONFORM TO ASTM A-615, GRADE 60.
- HALL BE FABRICATED AND ERECTED ACCORDING TO THE ACI STANDARDS: "DETAILS AND NCRETE REINFORCEMENT", ACI 315 - CURRENT EDITION AND "MANUAL OF ENGINEERING AWINGS FOR REINFORCED CONCRETE STRUCTURES" ACI 315R - CURRENT EDITION.
- RIC SHALL BE FURNISHED IN FLAT SHEETS (ROLLS NOT PERMITTED) AND SHALL CONFORM TO AVE A MINIMUM SIDE AND END LAP OF 8".
- FORCING STEEL IS PROHIBITED UNLESS SPECIFICALLY DETAILED. WELDING SHALL CONFORM CIFICATION.

9.	CONCRETE SHALL HAVE A MINIM	UM 28-DAY COMPRESSIVE S
	Foundations:	4,000 PSI
	ABOVE GRADE FOUNDATIONS:	4,500 PSI
	Slab-on-grade:	4,000 PSI
	EXTERIOR CONCRETE:	4,000 PSI

- ERIOR CONCRETE SUBJECTED TO FREEZE/THAW CYCLES, SALT, ETC., INCLUDING WALLS, RAINED 5% +/- 1.5%.
- CHLORIDE, CHLORIDE IONS OR OTHERS SALTS IN CONCRETE ARE NOT PERMITTED.
- 1 OF LAP SPLICES SHALL BE BASED ON ACI 318. LOCATION OF LAP SPLICES SHALL BE AS ALL BE IN ACCORDANCE WITH CONSTRUCTION JOINTS LOCATION AND DETAILS OR AS PPROVED REINFORCING STEEL SHOP DRAWINGS.
- ND STEEL EMBEDDED ITEMS (FURNISHED BY STRUCTURAL STEEL CONTRACTOR) SHALL BE SET /ITHIN A 1/8" TOLERANCE IN ANY PLAN OR VERTICAL DIRECTION IN PIERS, FOOTINGS, AND LL WITH MINIMUM EMBEDMENT AND EXACT PROJECTION INDICATED ON THE DRAWINGS, G CONCRETE.
- INTO FOUNDATION TO MATCH SIZE AND SPACING OF VERTICAL REINFORCEMENT AT ALL VALLS, U.N.O.
- SHOWN OR NOTED, PROVIDE (2) #5 BARS (ONE EACH FACE) AROUND UNFRAMED BS AND WALLS. PLACE BARS PARALLEL TO SIDES OF OPENINGS AND EXTEND THEM 24"
- OINTS SHALL BE FURNISHED WITH A FULL LENGTH KEYWAY CENTERED ON MEMBERS. WHERE NOT SHOWN ON THE DRAWINGS, THE KEY SHALL BE 25% OF THE CROSS SECTION DIMENSION ND MINIMUM 1 1/2" INTO THE FIRST POUR OF CONCRETE. PROVIDE FULL LENGTH INSTRUCTION JOINTS WHERE WALL IS EXPOSED TO EARTH OR WEATHER.
- 4" CHAMFER STRIP AL ALL EXPOSED CORNERS OF CONCRETE WALLS, INCLUDING EXPOSED NCRETE PIERS.
- 18. REFER TO ARCHITECTURAL DRAWINGS FOR SLAB RECESSES AND FOR FLOOR FINISH MATERIALS.
- 19. CONCRETE SHALL BE PLACED TO THE CONSTANT TOP OF SLAB ELEVATIONS, WHILE MAINTAINING THE MINIMUM CONCRETE THICKNESS NOTED ON THE DRAWINGS.
- 20. MINIMUM ELAPSED TIME BETWEEN ADJACENT CONCRETE PLACEMENTS SHALL BE 48 HOURS.
- 21. CURING OF CONCRETE SURFACES SHALL CONFORM TO ACI 308.1-11 "STANDARD SPECIFICATION FOR CONCRETE CURING" AND ACI 308R-16 "GUIDE TO CURING CONCRETE". REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- 22. PRIOR TO PLACING CONCRETE ADJACENT TO EXISTING CONCRETE WITHOUT A CONSTRUCTION JOINT THOROUGHLY CLEAN, DE-GREASE AND MECHANICALLY ROUGHEN EXISTING CONCRETE SURFACES. APPLY EPOXY BONDING AGENT PRIOR TO PLACING FRESH CONCRETE. BONDING AGENT SHALL BE "SIKA ARMATEC 110 EPCHEM BY SIKA CORPORATION OR APPROVED EQUAL. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS FOR SURFACE PREPARATION, MIXING AND APPLICATION.
- 23. PRIOR TO PLACING CONCRETE TOPPING, THOROUGHLY CLEAN, DE-GREASE AND MECHANICALLY ROUGHEN EXISTING CONCRETE SURFACES. SOAK EXISTING CONCRETE SURFACES FOR MINIMUM 12 HOURS. PLACE A CONCRETE-SLURRY OF CEMENT AND WATER WITHIN 1 HOUR OF TOPPING PLACEMENT.
- 24. CONCRETE TOPPINGS SHALL BE REINFORCED WITH COLLATED, FIBRILLATED, POLYPROPYLENE FIBROUS REINFORCEMENT.
- 25. PROVIDE MINIMUM 1" DEEP SAW CUT IN CONCRETE ELEMENTS BEING REMOVED. BREAK REMAINDER ALONG NEAT LINES. PROVIDE AN EPOXY BONDING AGENT ON THE ROUGHENED AND CLEANED SURFACE WHERE NEW CONCRETE IS BEING PLACED ADJACENT TO EXISTING CONSTRUCTION.
- 26. NON-SHRINK GROUT: GROUT SHALL CONFORM TO ASTM C1107 CURRENT EDITION. GROUT SHALL BE PREMIXED, NON-SHRINK NON-CATALYZED NATURAL AGGREGATE GROUT, FOR COLUMN LEVELING PLATES WHICH ARE NOT BOLTED DOWN BEFORE COLUMN ERECTION, AND OTHER STRUCTURAL LOAD BEARING APPLICATIONS, AND FOR ITEMS SETS INTO CONCRETE BLOCK-OUTS OR DEPRESSIONS, OR SET INTO CONCRETE TOPPINGS. L&M "CRYSTEX", W.R. MEADOWS "588 GROUT", MASTER BUILDERS "MASTERFLOW 928 GROUT", OR DAYTON-SUPERIOR "HIGH PERFORMANCE". SEVEN-DAY COMPRESSIVE STRENGTH FOR THE SPECIFIED CONSISTENCY SHALL BE AT LEAST, 7,000 PSI PLASTIC, 6,000 PSI FLOWABLE, AND 5,000 PSI FLUID CONSISTENCY.
- 27. RUNNING SLOPES OF WALKS SHALL NOT EXCEED 4% CROSS SLOPES OF WALKS & RAMPS SHALL NOT EXCEED 1%. SLOPE AT WALK INTERSECTIONS SHALL NOT EXCEED 1% IN EITHER DIRECTION. VERTICAL CHANGE IN LEVEL AT EXPANSION JOINTS. CONSTRUCTION JOINTS & ACCESSIBLE BUILDING ENTRANCES SHALL NOT EXCEED $\frac{1}{4}$ ". NOTIFY BUILDER OF UNABLE TO ACHIEVE.

MASONRY (CONCRETE BLOCK . MASONRY CONSTRUCTION SHALL COMPLY WITH THE REQUIREMENTS OF THE LATEST EDITION OF ACI 530.

- 2. CONCRETE BLOCK SHALL BE HOLLOW LOAD-BEARING CONCRETE MASONRY UNITS CONFORMING TO C90, MEDIUM WEIGHT. USE OPEN END UNITS AS REQUIRED, AND BOND BEAM UNITS AT HORIZONTAL REINFORCING. MINIMUM COMPRESSIVE STRENGTH OF BLOCKS AS REQUIRED TO MEET SPECIFIED COMPRESSIVE STRENGTH OF MASONRY (F'M) SPECIFIED ON THE CONSTRUCTION DOCUMENTS.
- 3. SPECIFIED COMPRESSIVE STRENGTH OF MASONRY, F'M SHALL BE AS FOLLOWS: F'M = 1500 PSI AT 28 DAYS, TYPICAL UNLESS NOTED OTHERWISE.
- 4. MORTAR MIX SHALL CONFORM TO THE ASTM C270 REQUIREMENTS FOR TYPE N. MORTAR SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH AS REQUIRED TO MEET THE SPECIFIED COMPRESSIVE STRENGTH OF MASONRY (F'M). IN NO CASE SHALL THE COMPRESSIVE STRENGTH OF THE MORTAR BE LESS THAN OF 2000 PSI AT 28 DAYS.

NDATIONS MUST BE PLACED AT A MINIMUM DEPTH OF 3'-6" BELOW FINISHED GRADE TO EQUATE FROST PROTECTION. ANY FOUNDATIONS SHOWN DEEPER THAN THE MINIMUM

- URAL FRAMING HAS BEEN DESIGNED BY THE ULTIMATE STRENGTH METHOD PER ACI 318-08
- DNFORM TO ASTM C150 "SPECIFICATION FOR PORTLAND CEMENT" TYPE I OR III.
- regates shall conform to astm c33 "specification for concrete aggregates"; 'SPECIFICATION FOR LIGHT WEIGHT AGGREGATES FOR STRUCTURAL CONCRETE''.
 - STRENGTH AS FOLLOWS:

- 5. PROVIDE GROUT COMPLYING WITH ASTM C476 ATTAINING A MINIMUM COMPRESSIVE STRENGTH AS REQUIRED TO MEET THE SPECIFIED COMPRESSIVE STRENGTH OF MASONRY (F'M). IN NO CASE, THE COMPRESSIVE STRENGTH OF THE GROUT SHALL BE LESS THAN 2000 PSI AT 28 DAYS.
- 6. ADMIXTURES SHALL BE ADDED TO MORTAR OR GROUT RESPECTIVELY PER MANUFACTURER'S RECOMMENDATIONS.
- 7. PROVIDE A MINIMUM OF ONE BAR DIAMETER (1/2 INCH MINIMUM) GROUT BETWEEN MAIN REINFORCING AND MASONRY UNITS.
- 8. PROVIDE A MINIMUM OF ONE BAR DIAMETER (1 INCH MINIMUM) GROUT BETWEEN PARALLEL BARS.
- 9. MAXIMUM GROUT POUR HEIGHT SHALL COMPLY WITH SECTION 1.16 AND TABLE 1.16.1 OF ACI 530.
- 10. ALL CELLS IN CONCRETE BLOCKS SHALL BE FILLED SOLID WITH GROUT, UNLESS NOTED OTHERWISE.
- 11. CELLS SHALL BE IN VERTICAL ALIGNMENT. DOWELS IN FOOTINGS AND FLOORS SHALL BE SET TO ALIGN WITH CORES CONTAINING REINFORCING STEEL AND SHALL MATCH THE SIZE OF THE WALL REINFORCING.
- 12. REFER TO ARCHITECTURAL DRAWINGS FOR SURFACE AND HEIGHT OF UNITS, LAYING PATTERN, AND JOINT TYPE.
- 13. INSTALL CORRUGATED BRICK TIES EVERY 4 COURSES VERTICALLY AND 32" O.X. HORIZONTALLY MAXIMUM 3 SQ. FT. AREA.
- 14. INSTALL BRICK SILLS AT WINDOWS WITH A $\frac{1}{4}$ " SPACE BETWEEN TOP OF SILL AND BOTTOM OF WINDOW FRAME.
- 15. INSTALL MORTAR AROUND ALL SILL COCKS, DRYER VENTS, PHOTO CELLS, ELECTRICAL JUNCTION BOXES, PIPES, VENTS, FIXTURES, ETC. THAT PENETRATE THROUGH THE BRICK VENEER.
- 16. APPROVED WEEP VENTS SHALL BE PROVIDED ABOVE ALL WINDOWS, DOORS AND ABOVE BRICK SILLS.
- 17. ROWLOCK SILLS TO BE PITCHED 20° FROM HORIZONTAL.
- 18. IF WORK IS STOPPED FOR AN HOUR OR LONGER, PROVIDE HORIZONTAL CONSTRUCTION JOINT PER TYPICAL DETAILS AND BY STOPPING GROUT 1 1/2" BELOW TOP OF MASONRY UNIT.
- 19. ALL MASONRY WALLS SHALL HAVE HORIZONTAL JOINTS REINFORCEMENT (LADDER TYPE) AT 16" O.C. PROVIDED PREFABRICATED CORNER PIECES AT ALL CORNERS AND INTERSECTIONS OF WALL
- REINFORCING STEEL
- 15. ALL REINFORCING STEEL SHALL BE DETAILED AND PLACED IN CONFORMANCE WITH THE 'BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE' (ACI 318), AND THE 'MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION' BY THE C.R.S.I. AND THE W.C.R.S.I., OR AS MODIFIED BY THE CONSTRUCTION DOCUMENTS.
- 16. REINFORCING BARS SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE. CLASSIFICATION TYPE

REINFORCING STEEL #7 AND SMALLER:	ASTM A615, 60 KSI
REINFORCING STEEL #8 AND LARGER, REINFORCING STEEL TO BE WELDED & LONGITUDINAL REINFORCING STEEL IN CONCRETE MOMENT FRAME MEMBERS & IN CONCRETE SHEAR WALL BOUNDARY	ASTM A 704 40 KSI
ELEMENIS.	A31M A708, 80 K31
1/2 INCH DIAMETER LOW RELAXATION SEVEN WIRE POST-TENSIONING STRAND:	ASTM A416, 270 KSI
WELDED STEEL WIRE FABRIC:	ASTM A185, 70 KSI

17. MECHANICAL COUPLERS: LENTON THREADED COUPLERS BY ERICO, ICC #3967 LARR 24507), XTENDER BY HEADED REINFORCEMENT CORPORATION, ICC #2794 (LARR 25347) OR BAR-LOCK BY DAYTON SUPERIOR CORP, ICC #2495 (LARR 25342). COUPLERS FOR BEAM AND SLAB BARS AT FORMED CONSTRUCTION JOINTS MAY BE LENTON FORM SAVERS BY ERICO, ICC #3967.

ASTM A36, 36 KSI

- 18. WELDING OF REINFORCEMENT SHALL BE WITH LOW HYDROGEN E90XX ELECTRODES FOR WELDING ASTM A615 BARS AND E80XX ELECTRODES FOR WELDING ASTM A706 BARS. ALL WELDING SHALL BE IN CONFORMANCE WITH AMERICAN WELDING SOCIETY, AWS-D1.4. ONLY WELDERS SPECIFICALLY CERTIFIED FOR REINFORCING STEEL AND IN ACCORDANCE WITH AWS D1.4 SHALL PERFORM WELDING OF REINFORCING STEEL.
- 19. DRAWINGS SHOW TYPICAL REINFORCING CONDITIONS. CONTRACTOR SHALL PREPARE DETAILED PLACEMENT DRAWINGS OF ALL CONDITIONS SHOWING QUANTITY, SPACING, SIZE, CLEARANCES, LAPS, INTERSECTIONS AND COVERAGE REQUIRED BY STRUCTURAL DETAILS, APPLICABLE CODE AND TRADE STANDARDS. CONTRACTOR SHALL NOTIFY REINFORCING INSPECTOR OF ANY ADJUSTMENTS FROM TYPICAL CONDITIONS THAT ARE PROPOSED IN PLACEMENT DRAWINGS TO FACILITATE FIELD PLACEMENT OF REINFORCING STEEL AND CONCRETE.
- 20. ALL REINFORCING BAR BENDS SHALL BE MADE COLD.

SMOOTH DOWELS IN SLAB ON GRADE:

- 21. MINIMUM LAP OF WELDED WIRE FABRIC SHALL BE 12 INCHES, OR ONE FULL MESH PLUS TWO INCHES, WHICHEVER IS GREATER.
- 22. REINFORCING SPLICES SHALL ONLY BE MADE AS INDICATED ON THE DRAWINGS.
- 23. DOWELS BETWEEN FOOTINGS AND WALLS OR COLUMNS SHALL BE THE SAME GRADE, SIZE AND SPACING AS THE VERTICAL REINFORCING, RESPECTIVELY, UNLESS NOTED OTHERWISE.
- 24. DOWELS BETWEEN SLABS AND WALLS OR COLUMNS SHALL BE THE SAME GRADE, SIZE AND SPACING AS THE VERTICAL REINFORCING, RESPECTIVELY, UNLESS NOTED OTHERWISE.
- 25. ALL BARS SHALL BE MARKED SO THEIR IDENTIFICATION CAN BE MADE WHEN THE FINAL IN-PLACE INSPECTION IS MADE.

STRUCTURAL STEEL

- 1. ALL STRUCTURAL STEEL SHALL CONFORM TO THE 14TH EDITION OF THE LOAD AND RESISTANCE FACTOR DESIGN (L.R.F.D.) "MANUAL OF STEEL CONSTRUCTION" OF THE AISC.
- 2. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING ASTM SPECIFICATIONS AND MINIMUM YIELD STRENGTHS:

MEMBER	ASTM	MIN. YIELD STRENG
W SHAPES	A992	50 KSI
RECTANGULAR AND SQUARE HSS TUBES	A500 (GRADE B)	46 KSI
Round HSS TUBES	A500 (GRADE B)	42 KSI
PIPE	A53 (GRADE B)	35 KSI
MISCELLANEOUS PLATES/SHAPES	A992	50KSI
CONNECTION BOLTS	A325	92 KSI
ANCHOR BOLTS	F1554	36 KSI
THREADED RODS	A36	36 KSI

- 3. MASONRY AND BRICK LINTELS SHALL BE GALVANIZED G90 PER ASTM A123
- 4. STRUCTURAL STEEL BOLTING SHALL BE ASTM A325 TYPE N, 3/4" DIAMETER EXCEPT WHERE OTHER, ASTM A490 N OR SLIP CRITICAL TYPE BOLTS ARE INDICATED.
- 5. WELDING SHALL BE DONE WITH APPROPRIATE E70 SERIES ELECTRODES COMPATIBLE WITH THE NEW AND EXISTING STEEL. WELDS AND WELDING PROCEDURES SHALL CONFORM TO THE "STRUCTURAL WELDING CODE -STEEL" OF THE AMERICAN WELDING SOCIETY ANSI/AWS D1.1.

- CONNECTIONS ARE DETAILED.

STEEL ROOF DECK

- BE USED.

6. SUBMIT FOR REVIEW, TYPICAL CONNECTION DETAILS AND CALCULATIONS SEALED BY A PROFESSIONAL ENGINEERING REGISTERED IN THE STATE OF MICHIGAN FOR PROPOSED CONNECTIONS AND FOR CONNECTIONS NOT SPECIFICALLY DESIGNED AND SHOWN. FOLLOW THE DETAILS SHOWN WHERE SPECIFIC

7. ANCHOR RODS, BASE PLATES AND BEARING PLATES SHALL BE LOCATED AND BUILT INTO CONNECTING WORK, PRE-SET BY TEMPLATES OR SIMILAR METHOD. PLATES SHALL BE SET IN FULL BEDS OF NON-SHRINK GROUT.

REFERENCE ARCHITECTURAL DRAWINGS FOR MISC. SHAPES AND PLATES THAT ARE SHOP WELDED TO THE STRUCTURAL FRAMING SECTIONS TO MINIMIZE FIELD WELDING.

9. THE LENGTH, DIMENSION AND CONNECTION DETAIL FROM NEW STRUCTURAL MEMBERS TO THE EXISTING STRUCTURE SHALL BE FIELD VERIFIED BEFORE FABRICATION. FIELD MODIFICATIONS TO THE FABRICATED MEMBER OR CONNECTION ARE NOT ALLOWED WITHOUT PRIOR APPROVAL BY THE ARCHITECT/ENGINEER OF THE CONTRACTOR'S SKETCHES OR SHOP DRAWINGS REFLECTING THESE MODIFICATIONS.

10. NON-COMPOSITE BEAM CONNECTIONS SHALL BE CAPABLE OF SUPPORTING MINIMUM 50% OF THE MAXIMUM TOTAL UNIFORM LOAD, AISC MANUAL TABLE 3-6, UNLESS SPECIFICALLY NOTED ON THE DRAWINGS.

11. BEAM CONNECTIONS SHALL BE STANDARD TWO ANGLE WEB CONNECTIONS U.N.O.

12. CONNECTIONS SHALL BE SHOP WELDED IN ACCORDANCE WITH THE LATEST AWS SPECIFICATIONS FOR E70XX ELECTRODES AND FIELD BOLTED WITH ASTM A325 OR ASTM A490 BOLTS.

13. WELDING SHALL BE DONE BY WELDERS QUALIFIED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT "STRUCTURAL WELDEING CODE - STEEL", AMERICAN WELDING SOCIETY, AWS D1.1

14. STIFFENER PLATES AND BEARING STIFFENERS ARE TO BE PROVIDED IN PAIRS.

15. WOOD BLOCKING SHALL BE FASTENED TO ADJACENT STEEL MEMBERS USING MINIMUM 0.177" DIAMETER POWDER ACTUATED FASTENERS OR EQUIVALENT FASTENERS COORDINATED WITH THE STEEL THICKNESS. INSTALL (2) FASTENERS 3" MINIMUM SPACING ACROSS THE MEMBER SPACED ALONG THE LENGTH AT 24" O.C.

16. ROOF DECK SHALL BE 1-1/2" DEEP. SEE ROOF PLAN FOR GAGE AND PROFILE DESIGNATION.

17. ROOF DECK SHALL BE PLACED SO AS TO COVER AT LEAST TWO SPANS. NO SINGLE SPAN CONDITIONS SHALL

18. DECK SHALL BE FABRICATED SO THAT DECK RUNS CONTINUOUSLY OVER OPENINGS. THE OPENINGS IN THE DECK SHALL NOT BE CUT UNTIL THE OPENING IS NEEDED (PER OSHA).

19. STEEL DECK SHALL CONFORM TO ASTM A653 SQ GRADE 33 (Fy = 33,000 PSI).

20. STEEL DECK SHALL BE GALVANIZED WITH A PROTECTIVE ZINC COATING CONFORMING TO ASTM A924, WITH COATING DESIGNATION G90.

21. SEE ROOF PLAN AND DETAILS FOR ROOF DECK ATTACHMENT AND FORCES IMPOSED DUE TO UPLIFT AND DIAPHRAGM SHEAR UNDER WIND LOADING. SEE SPECIFICATIONS FOR INSPECTION AND REPORTING REQUIRED ON ROOF DECK ATTACHMENT.

22. PROVIDE A MINIMUM END BEARING OF 2" OVER SUPPORTS. END LAPS OF SHEETS SHALL BE A MINIMUM OF TWO INCHES AND SHALL OCCUR OVER SUPPORTS.

23. THE CONTRACTOR SHALL COORDINATE ALL TRADE REQUIREMENTS AND CONFIRM THE SIZE AND LOCATION OF ALL OPENINGS. OPENINGS LARGER THAN 12", AND AS DETAILED, SHALL HAVE STEEL FRAMING SUPPORTING ALL EDGES. SEE TYPICAL ANGLE FRAMING DETAILS.

24. STEEL MEMBERS SUPPORTING STEEL DECK AT THE PERIMETER OF THE BUILDING SHALL BE CONTINUOUS, BUTT WELD PIECES WHERE SPLICES OCCUR.



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SDs = SD1 =

OOTINGS AND FOUNDATION

SPECIAL INSPECTIONS:

REQUIRED SPECIAL INSPECTIONS - CONCRETE	FREQUENCY	REFERENCE
1. INSPECTION OF REINFORCING STEEL, INCLUDING PRESTRESSING TENDONS, AND PLACEMENT.	PERIODIC	ACI 318: 3.5, 7.1-7.7 IBC 1913.4
2. INSPECTION OF REINFORCING STEEL WELDING IN ACCORDANCE WITH DETAIL 2.S3-2 ITEM 5.B.	NA	AWS D1.4 ACI 318: 3.5.2
3. INSPECTION OF BOLTS TO BE INSTALLED IN CONCRETE PRIOR TO AND DURING PLACEMENT OF CONCRETE WHERE ALLOWABLE LOADS HAVE BEEN INCREASED OR WHERE STRENGTH DESIGN IS USED.	CONTINUOUS	ACI318: 8.1.3, 21.2.8 IBC: 1911.5, 1912.1
4. INSPECTION OF ANCHORS INSTALLED IN HARDENED CONCRETE.	PERIODIC	ACI 318: 3.8.6, 8.1.3, 21.2.8; IBC: 1912.1
5. VERIFYING USE OF THE REQUIRED DESIGN MIX.	PERIODIC	ACI 318: CH. 4, 5.2-5.4; IBC: 1904.2.2, 1913.2, 1913.3
6. AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	CONTINUOUS	ASTM C 172, ASTM C 31; ACI 318: 5.6, 5.8; IBC: 1913.1
7. INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	NA	ACI 318: 5.9, 5.10; IBC: 1913.6, 1913.7, 1913.8
8. INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE TECHNIQUES.	PERIODIC	ACI 318: 5.11-5.13; IBC: 1913.9
 9. INSPECTION OF PRESTRESSED CONCRETE: A. APPLICATION OF PRESTRESSING FORCES. B. GROUTING OF BONDED PRESTRESSING TENDONS IN THE SEISMIC-FORCE-RESISTING SYSTEM. 	NA	ACI 318: 18.20 ACI 318: 18.18.4
10. ERECTION OF PRECAST CONCRETE MEMBERS.	PERIODIC	ACI 318: CH. 16
11. VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING TENDONS IN POSTTENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND SRTUCTURAL SLABS.	NA	ACI 318: 6.2
12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	PERIODIC	ACI 318: 6.1.1

NOTES: 1. THE 2015 MICHIGAN BUILDING CODE REQUIRES A SPECIAL INSPECTOR TO OBSERVE THE WORK ASSIGNED FOR THE CONFORMANCE TO THE APPROVED DESIGN DRAWINGS. THE SERVICES OF A CERTIFIED SPECIAL INSPECTOR SHALL BE MAINTAINED DURING CONSTRUCTION ON THE TYPES OF WORK LISTED. 2. IBC SHALL INDICATE THE 2015 MICHIGAN BUILDING CODE.

3. THE OWNER SHALL BE RESPONSIBLE FOR EMPLOYING ALL APPROVED AGENCIES FOR THE PERFORMANCE OF SPECIAL INSPECTIONS.

REQUIRED LEVEL 1 SPECIAL INSPECTIONS – MASONRY	FREQUENCY	REFERENCE					
1. COMPLIANCE WITH REQUIRED INSPECTION PROVISIONS OF THE CONSTRUCTION DOCUMENTS AND THE APPROVED SUBMITTALS SHALL BE VERIFIED.	PERIODIC	ACI 530.1 ART. 1.5					
2. VERIFICATION OF fm' PRIOR TO CONSTRUCTION EXCEPT WHERE SPECIFICALLY EXEMPTED BY THIS CODE.	PERIODIC	ACI 530.1 ART. 1.4B					
3. VERIFICATION OF SLUMP FLOW AND VSI AS DELIVERED TO TO THE SITE FOR SELF-CONSOLIDATING GROUT.	CONTINUOUS	ACI 530.1 ART. 1.5B.1.b.3					
4. AS MASONRY CONSTRUCTION BEGINS, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE:							
 A. PROPORTIONS OF SITE-PREPARED MORTAR. B. CONSTRUCTION OF MORTAR JOINTS. C. LOCATION OF REINFORCEMENT, CONNECTORS, PRESTRESSING TENDONS AND ANCHORAGES. D. PRESTRESSING TECHNIQUE. F. CRADE AND SIZE OF PRESTRESSING TENDONS AND ANCHORAGES. 	PERIODIC PERIODIC PERIODIC	ACI 530.1 ART. 2.6A ACI 530.1 ART. 3.3B ACI 530.1 ART. 3.4, 3.6A ACI 530.1 ART. 3.6B ACI 530.1 ART. 2.4B 2.4H					
L. GRADE AND SIZE OF FRESHRESSING TENDONS AND ANOTOMOUS.	T ENIODIC	ACI 330.1 ANI. 2.40, 2.41					
5. DURING CONSTRUCTION THE INSPECTION PROGRAM SHALL VERIFY:							
 A. SIZE AND LOCATION OF STRUCTURAL ELEMENTS. B. TYPE, SIZE AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES OR 	PERIODIC PERIODIC	ACI 530.1 ART. 3.3F ACI 530 SEC. 1.2.2e, 1.16.1					
 C. SPECIFIED SIZE, GRADE AND TYPE OF REINFORCEMENT, ANCHOR BOLTS, AND PRESTRESSING TENDONS AND ANCHORAGES. D. WELDING OF REINFORCING BARS. E. PREPARATION, CONSTRUCTION, AND PROTECTION OF MASONRY DURING COLD WEATHER, I.E. TEMPERATURE BELOW 40 DEGREES FAHRENHEIT, OR HOT WEATHER, I.E. TEMPERATURE ABOVE 90 DEGREES FAHRENHEIT. F. APPLICATION AND MEASUREMENT OF PRESTRESSING FORCE. 	PERIODIC CONTINUOUS PERIODIC N A	ACI 530 SEC. 1.15, ACI 530.1 ART. 2.4, 3.4 ACI 530 SEC. 2.1.9.7.2, 3.3.3.4b IBC SEC. 2104.3, 2104.4 ACI 530.1 ART. 1.8C, 1.8D ACI 530.1 ART. 3.6B					
6. PRIOR TO GROUTING, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE:							
 A. GROUT SPACE IS CLEAN. B. PLACEMENT OF REINFORCEMENT AND CONNECTORS, AND PRESTRESSING TENDONS AND ANCHORAGES. C. PROPORTIONS OF SITE-PREPARED GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS. D. CONSTRUCTION OF MORTAR JOINTS. 	PERIODIC PERIODIC PERIODIC PERIODIC	ACI 530.1 ART. 3.2D ACI 530 SEC. 1.13 ACI 530.1 ART. 3.4 ACI 530.1 ART. 2.6B ACI 530.1 ART. 3.3B					
7. GROUT PLACEMENT SHALL BE VERIFIED TO ENSURE COMPLIANCE.	CONTINUOUS	ACI 530.1 ART. 3.5					
A. GROUTING OF PRESTRESSING BONDED TENDONS.	NA	ACI 530.1 ART. 3.6C					
8. PREPARATION OF ANY REQUIRED GROUT SPECIMENS, MORTAR SPECIMENS AND/OR PRISMS SHALL BE OBSERVED.	PERIODIC	IBC SEC. 2105.2.2, 2105.3 ACI 530.1 ART. 1.4					

REQUIRED SPECIAL INSPECTIONS - STRUCTURAL STEEL	FREQUENCY	REFERENCE		
1. MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS AND WASHERS:				
A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	PERIODIC	AISC 360 SECTION A3.3 ASTM STANDARDS		
B. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.	PERIODIC			
2. INSPECTION OF HIGH-STRENGTH BOLTING:				
A. SNUG-TIGHT JOINTS.	PERIODIC	AISC 360, SECTION M2.5 IBC		
B. PRETENSIONED AND SLIP-CRITICAL JOINTS USING TURN-OF-NUT WITH MATCHMARKING, TWIST-OFF BOLT OR DIRECT TENSION INDICATOR METHODS OF INSTALLATION.	PERIODIC			
C. PRETENSIONED AND SLIP-CRITICAL JOINTS USING TURN-OF-NUT WITHOUT MATCHMARKING OR CALIBRATED WRENCH METHODS OF INSTALLATION.	CONTINUOUS			
3. MATERIAL VERIFICATION OF STRUCTURAL STEEL AND COLD-FORMED STEEL DECK:	•			
A. FOR STRUCTURAL STEEL, IDENTIFICATION MARKINGS TO CONFORM TO AISC 360.	PERIODIC	AISC 360 SECTION M5.5		
B. FOR OTHER STEEL, IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	PERIODIC	APPLICABLE ASTM MATERIAL STANDARDS		
C. MANUFACTURER'S CERTIFIED TEST REPORTS.	PERIODIC			
4. MATERIAL VERIFICATION OF WELD FILLER MATERIALS:				
A. IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS.	PERIODIC	AISC 360SECTION A3.5 AND AW A5 DOCUMENTS		
B. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.	PERIODIC			
5. INSPECTION OF WELDING:				
A. STRUCTURAL STEEL AND COLD-FORMED STEEL DECK:				
1. COMPLETE AND PARTIAL JOINT PENETRATION GROOVE WELDS.	CONTINUOUS	AWS D1.1 IBC 1704.3.1		
2. MULTIPASS FILLET WELDS.	NA			
3. SINGLE—PASS FILLET WELDS GREATER THAN 5/16 INCH	NA			
4. PLUG AND SLOT WELDS.	CONTINUOUS			
5. SINGLE–PASS FILLET WELDS LESSER THAN 5/16 INCH	PERIODIC			
6. FLOOR AND ROOF DECK WELDS.	PERIODIC	AWS D1.3, IBC 1704.3.1		
B. REINFORCING STEEL:				
1. VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A 706.	NA	AWS D1.4 ACI 318: SECTION 3.5.2		
2. REINFORCING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES, AND BOUNDARY ELEMENTS OF SPECIAL STRUCTURAL WALLS OF CONCRETE AND SHEAR REINFORCEMENT.	NA			
3. SHEAR REINFORCEMENT.	NA			
4. OTHER REINFORCING STEEL.	NA			
6. INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE:	1	l		
A. DETAILS SUCH AS BRACING AND STIFFENING.	PERIODIC	IBC 1704.3		
B. MEMBER LOCATIONS.	PERIODIC			
C. APPLICATION OF JOINT DETAILS AT EACH CONNECTION.	PERIODIC			







OVERALL FOUNDATION PLAN Scale: 1/8" = 1'-0"





FOOTING SCHEDULE

MARK	FOOTING SIZE	REINFORCING
F1	7'-6'' x 7'-6''	(8) #6 BARS EA
F2	6'-0'' × 6'-0''	(6) #6 BARS EA
F3	7'-0'' x 7'-0''	(7) #6 BARS EA
F4	10'-6" x 21'-0"	#6 BARS EA. W
F5	3'-0'' × 3'-0''	(3) #6 BARS EA
F6	28'-0'' x 14'-0''	#6 BARS EA. W

MARK	PER SIZE	REINFORCING			
P1	2'-4'' x 2'-5''	(12) #6 VERTIC.			
P2	1'-5" × 2'-0"	(8) #6 VERTICA			
P3	2'-1" x 2'-0"	(12) #6 VERTIC.			
P4	2'-4'' × 2'-0''	(12) #6 VERTIC.			
P5	1'-6" x 1'-6"	(6) #6 VERTICA			
P6	1'-8" x 1'-2"	(6) #6 VERTICA			
Ρ7	2'-0'' × 2'-0''	(8) #6 VERTICA			
P8	3'-0" × 4'-2"	(22) #6 VERTIC.			
P9	1'-4" × 1'-4"	(4) #6 VERTICA			



MARK	FOOTING SIZE	REINFORCING
F1	7'-6'' x 7'-6''	(8) #6 BARS EA
F2	6'-0'' x 6'-0''	(6) #6 BARS EA
F3	7'-0'' x 7'-0''	(7) #6 BARS EA
F4	10'-6" x 21'-0"	#6 BARS EA. W
F5	3'-0'' × 3'-0''	(3) #6 BARS EA
F6	28'-0" x 14'-0"	#6 BARS EA. W

MARK	PER SIZE	REINFORCING
Ρ1	2'-4" × 2'-5"	(12) #6 VERTIC.
P2	1'-5'' x 2'-0''	(8) #6 VERTICA
Ρ3	2'-1" x 2'-0"	(12) #6 VERTIC.
Ρ4	2'-4'' × 2'-0''	(12) #6 VERTIC.
P5	1'-6" x 1'-6"	(6) #6 VERTICA
P6	1'-8" x 1'-2"	(6) #6 VERTICA
Ρ7	2'-0" × 2'-0"	(8) #6 VERTICA
P8	3'-0'' × 4'-2''	(22) #6 VERTIC.
P9	1'-4" x 1'-4"	(4) #6 VERTICA
SEE SHEET		









	2	1
W12x30	W12x30	
8x3.5X14GA	Z8x3.5X14GA	
8x3.5X14GA	Z8x3.5X14GA	ž
8v3 5Y14CA	78×3.5¥14GA	
W6x15	W6x15	
3x3.5X14GA	C8x3.5X14GA	
8x3.5X14GA		
3x3.5X14GA	78x3 5X14GA	ā
C12x20.7	C8x3.5X14GA	
C13207	Z8x8.5X14GA	
	C8x3.5X14GA	





Scale: 1/2" = 1'-0"













TRUSS NOTES: THE CONTRACTOR SHALL SUBMIT ENGINEERING CALCULATIONS THAT HAVE BEEN SEALED AND SIGNED BY A PROFESSIONAL ENGINEER LICENSED IN MICHIGAN FOR ALL CONNECTIONS OF MEMBERS WITH LOADS INDICATED ALL GUSSET PLATES FOR WEB MEMBERS SHALL BE $\frac{3}{8}$ " THICK.

- ALL WEB MEMBERS SHALL BE FASTENED W/ A MINIMUM OF (2) INTERMEDIATE $\frac{3}{4}$ " ϕ A325 Bolts or welded es W/ $\frac{3}{8}$ " spacer pl. space intermediate connectors equally BET END CONN. WEB MEMBER CONNECTIONS MAY BE BOLTED OR WELDED
- BOLTED WEB MEMBER CONNECTIONS SHALL HAVE A MINIMUM OF (2) $\frac{3}{4}$ " ϕ A325 BOLTS AT EA END

TYP 3/16" ROOF PURLIN PER PLAN CJP FLANGES (TYP) $\frac{3}{4}$ X11X11 CAP PLATE W/ (4) $\frac{3}{4}$ " A325 BOLTS SALL GIRT PER PLAN

(COL)

TRUSS NOTES: 1. THE CONTRACTOR SHALL SUBMIT ENGINEERING CALCULATIONS THAT HAVE BEEN SEALED AND SIGNED BY A PROFESSIONAL ENGINEER LICENSED IN MICHIGAN FOR ALL CONNECTIONS OF MEMBERS WITH LOADS INDICATED 2. ALL GUSSET PLATES FOR WEB MEMBERS SHALL BE ³/₈" THICK.

- ALL GUSSET PLATES FOR WED MEMBERS SHALL BE § THICK.
 ALL WEB MEMBERS SHALL BE FASTENED W/ A MINIMUM OF (2) INTERMEDIATE ³/₄"
 φ A325 BOLTS OR WELDED ES W/ ³/₈" SPACER PL. SPACE INTERMEDIATE CONNECTORS EQUALLY BET END CONN.









	<u>GENERAL NOTES</u>	<u>GENERAL NOTES</u>				MECHANICAL LEGEN
				SYMBOL	ABBR.	DESCRIPTION
1.	SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS AND PARTITIONS.	22. VERIFY DUCT & PIPE CHASE TO BE ADEQUATE TO INSTALL DUCT & PIPE AS SHOWN				DUCT
2.	COORDINATE ALL LOCATIONS, SIZES, AND ELEVATIONS OF ALL SLEEVES THROUGH WALLS AND SLABS WITH	INCLUDING INSULATION & SUPPORT.				
	STRUCTURAL AND ARCHITECTURAL DRAWINGS.	23. PROVIDE FIRE, SMOKE OR COMBINATION FIRE/SMOKE DAMPER FOR ALL RATED PARTITION WHETHER SHOWN ON PLAN OR NOT. SEE ARCHITECTURAL LIFE SAFETY PLAN.			FC	DUCT FLEXIBLE CONNECTION
	ALL WORK AND MATERIALS SHALL CONFORM TO THE CURRENT EDITION OF THE INTERNATIONAL BUILDING	24. ALL EQUIPMENT, DUCTWORK, PIPING, CONTROLS, ETC. TO BE INSTALLED PER INTERNATIONAL				RECTANGULAR TO ROUND DUCT CONVER.
	AND MICHIGAN MECHANICAL CODES, ORDINANCES, AND REGULATIONS: STATE HEALTH AND SAFETY REGULATIONS, STATE FIRE MARSHAL, LOCAL FIRE DEPARTMENT AND HEALTH DEPARTMENT AND ALL OTHER	25 ALL DUCT COVERINGS AND LININGS SHALL NOT FLAME GLOW SMOLDER OR SMOKE WHEN			SAD	SUPPLY AIR DIFFUSER
	AUTHORITIES HAVING JURISDICTION.	TESTED IN ACCORDANCE WITH ASTM C 411 AND THE APPLICABLE PROVISIONS OF SECTION 604.3 OF MECHANICAL CODE.				RETURN AIR DUCT
	COORDINATE INSTALLATION OF MECHANICAL WORK SO AS TO AVOID UNNECESSARY JOB DELAYS OR INTERFERENCE WITH ALL OTHER TRADES.	26. ALL FLEXIBLE DUCT AND CONNECTORS MUST BE TESTED IN ACCORDANCE WITH UL 181.				RETURN AR CRILE W/ ACOUST ROOT
	OBTAIN ALL FIELD APPROVALS ON MECHANICAL WORK FROM REGULATING AGENCIES WHERE REQUIRED.	27. ALL DUCTS MUST BE SEALED IN ACCORDANCE WITH THE PROVISIONS IN THE INTERNATIONAL			RAG	RETURN AIR GRILLE W/ ACCUST. BOOT
	ALL HVAC WORK SHALL BE IN COMPLIANCE WITH NFPA 90A AND 90B, AS APPLICABLE AND IN STRICT	ENERGY CONSERVATION CODE.			EG	EXHAUST AIR GRILLE
	ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTION	28. ALL DUCTWORK SHOULD BE SUPPORTED AT MINIMUM 10' INTERVAL, UNLESS NOTED OTHERWISE IN CONTRACT DOCUMENT.		₽	DL	DOOR LOUVER
	GUARANTEE ALL LABOR AND MATERIALS FOR ONE YEAR FROM DATE OF COMPLETION.	29. ALL FILTERS SHALL MEET 603, 604 & 605				RECTANGULAR ELBOW DOWN
	OF ALL THE EQUIPMENT AND DUCTWORK THAT DEVIATE FROM THE DESIGN CONTRACT DRAWINGS AND	30. ALL DUCT SMOKE DETECTORS MUST BE INSTALLED IN ACCORDANCE WITH NFPA 72 (606.3).				RECTANGULAR ELBOW UP
	ALL MODEL NUMBER USED TO BE VERIFIED WITH MANUFACTURER FOR DESIGN INTENT. SHOWN ON DESIGN	31. TYPE OF REFRIGERANT, QUANTITY, APPLICATION AND USE SHALL COMPLY WITH SECTION 1102.2, 1104.3, TABLE 1103.1 OF MICHIGAN MECHANICAL CODE.				SQUARE ELBOW WITH TURNING VANES
	ALL FOLIEMENT DEVICES ACCESSORIES FTC TO BE INSTALLED DEP MANUEACTURER'S RECOMMENDATION	32. ALL FIRE DAMPERS SHALL BE DYNAMIC FIRE DAMPERS.		 	T-STAT	THERMOSTAT
	PLUMBER SHALL PROVIDE FULL SIZE CONDENSATE DRAIN FROM AIR CONDITIONING LINITS (WITH DEEP	33. CONTRACTOR IS RESPONSIBLE TO LIST ALL MODIFICATION TO ORIGINAL DOCUMENT DURING		$ \longrightarrow $		DIRECTION OF AIR FLOW
	SEAL TRAP AND UNION) AND DISCHARGE TO THE NEAREST APPROVED RECEPTOR.	PARTS, OPTIONS, MATERIAL, CAPACITY, ETC. THAT IS DIFFERENT THAN WHAT IS SHOWN ON DOCUMENT CONTRACTOR WILL REMAIN RESPONSIBLE FOR THE PERFORMANCE OPERATION			VD	VOLUME DAMPER (MANUALLY ADJUSTED)
	ALL CONTROL WIRING 120 V OR LESS SHALL BE MECHANICAL CONTRACTOR'S RESPONSIBILITY.	WARRANTY, ALL REQUIRED MODIFICATIONS ETC. FOR THE PRODUCT.		—B	BDD	BACK DRAFT DAMPER
	INSTALLATION OF VENTILATION OR HEAT PRODUCING EQUIPMENT SHALL BE IN ACCORDANCE WITH NFPA PAMPHIET 91 NEPA 211 NEPA 31 AND NEPA 54 AS APPLICABLE	34. CONTRACTOR TO PROVIDE ALL FITTINGS, ELBOWS, OFFSETS FOR PIPING & DUCTWORK TO SUIT SITE CONDITION.		M	MOD	MOTOR OPERATED DAMPER
	CONTROL CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS INCLUDING WIRING DIAGRAM. SEQUENCE OF	35. PROVIDE INSULATION PER SPECIFICATION FOR ALL PIPING, DUCTWORK FOR HVAC SYSTEM.	(N) —	^ (E)	FD	FIRE DAMPER(HORIZONTAL DUCT RUN)
	OPERATION FOR ALL EQUIPMENT CONTROLLED BY DDC SYSTEM FOR APPROVAL.	INSULATION THICKNESS SHALL COMPLY WITH ASHRAE 90.1 2013.	(N)	(E)	FD	FIRE DAMPER(VERTICAL DUCT RUN)
	CONTRACTOR NEED TO PROVIDE DUCT FABRICATION SHOP DRAWINGS FOR APPROVAL UNLESS NOTED OTHERWISE.	36. UNLESS NOTED OTHERWISE ALL DUCTWORK @ 1000FPM, DUCTWORK TO DIFFUSER SHALL MATCH NECK SIZE.	(N)	SS (E)	SD	SMOKE DAMPER(HORIZONTAL DUCT RUN)
	ALL ACCESSORIES, SENSORS, DEVICES INCLUDING FLOW SENSOR, PRESSURE SENSOR TEMPERATURE	37. ALL MOTOR STARTERS LOCATION TO BE IDENTIFIED DURING CONSTRUCTION AT SITE BY	(N)	- S $-$ Z/S (E)	SD	SMOKE DAMPER (VERTICAL DUCT RUN)
	SENSOR, CONTROL VALVES, SWITCHES, TRANSDUCERS, SHALL BE PROVIDED BY THE CONTRACTOR TO ACHIEVE EXISTING SEQUENCE OF OPERATION OF EXISTING UNIT.	ENGINEER, UNLESS NOTED OTHERWISE.	(N)	FS /7FS(F)	FSD	FIRE/SMOKE DAMPER(HORIZONTAL DUCT RUN
	SEE ELECTRICAL DRAWING AND COORDINATE WITH ELECTRICAL CONTRACTOR FOR NEW CIRCUIT BREAKER,	30. ALL DETUDN AND DUCTWORK SUALL HAVE 1" (MIN.) ACCUSTIC LINED INSULATION			FSD BOC	FIRE/SMOKE DAMPER(VERTICAL DUCT RUN)
	PROVIDE SMOKE DETECTOR IN SUPPLY AND MAIN RETURN DUCT FOR ALL LINIT CONNECT TO BUILDING	40 ALL DUCT SIZES AS SHOWN IS CLEAR AREA FOR PASSAGE OF AIR			P	
	FIRE ALARM SYSTEM.	41. ALL DUCTWORK SHALL BE CLASS A TYPE.			CWS	COLD WATER SUPPLY
	ALL MODEL NUMBERS AS SHOWN IS FOR REFERENCE ONLY, CONTRACTOR IS RESPONSIBLE FOR THE PERFORMANCE AS SHOWN ON SCHEDULE. VERIFY MODEL NUMBER WITH MANUFACTURER.	42. ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED WITH ACCESS AND SERVICE SPACE PER	·	<u></u>	HWS	HOT WATER SUPPLY
	ALL DUCTWORK TO BE INSTALLED PER SMACNA STANDARD & EQUIPMENT MANUFACTURER'S PUBLISHED	MICHIGAN MECHANICAL CODE SECTION 306. MAINTAIN WALL RATINGS.			HWR	HOT WATER RETURN
	CONNECTION DETAIL.			— CWS —	CHWS	CONDENSER WATER SUPPLY
				CWR	CHWR	CONDENSER WATER RETURN
				HWHS	HWHS	HEATING HOT WATER SUPPLY
				HWHR	HWHR	HEATING HOT WATER RETRUN
					STM	STEAM SUPPLY LINE
					COND	CONDENSATE LINE
<u>MI</u>	ECHANICAL:					
	MMERCIAL: MMC 2015 (MICHIGAN MECHANICAL CODE 2015) EFFECTIVE APRIL 12, 2017				BEVA	BUTTERFLY VALVE
JE	L GAS: IFGC 2015 (INTERNATIONAL FUEL GAS CODE 2015) EFFECTIVE APRIL 20, 2015			Q	PRV	PRESSURE REGULATING VALVE
<u> 1</u>	NERGY CODE:				CVA	CHECK VALVE (SWING)
)	MMERCIAL: MBC 2015 (MICHIGAN BUILDING CODE 2015) - CHAPTER 13& MEC 2015 (MICHIGAN ENERGY		\otimes	OR I€I OR 🕅	BAL. V.	BALANCING VALVE
٦L A	ANDARD 90.1-2013) EFFECTIVE SEPTEMBER 20, 2017				CV	CONTROL VALVE (2-WAY)
					CV	CONTROL VALVE (3-WAY)
				ĄRVA	RVA	RELIEF VALVE
					PG	PRESSURE GAUGE WITH GAUGE COCK
				//////		DEMOLITION ITEM
					MA	MAKE UP AIR
			1		MAU	MAKE UP AIR UNIT

EGEND	<u>)</u>		
	SYMBOL	ABBR.	DESCRIPTION
		СС	COOLING COIL
	H/C	НС	HEATING COIL
	——ю	UP	PIPE ELBOW UP
		DN	PIPE ELBOW DOWN
	₽, MAV	MAV	MANUAL AIR VENT
		AD	ACCESS DOOR
		A/C	AIR CONDITIONING
		AFF	ABOVE FINISHED FLOOR
		AHU	AIR HANDLING UNIT
		DB	DRY BULB TEMPERATURE
		DDC	DIRECT DIGITAL CONTROL
		DX	DIRECT EXPANSION
		(E)	EXISTING
		EA	EXHAUST AIR
		EAT	ENTERING AIR TEMPERATURE
)		EDB	ENTERING DRY BULB TEMPERATURE
		ESP	EXTERNAL STATIC PRESSURE (IN. WC.)
		EWB	ENTERING WET BULB TEMPERATURE
		EWT	ENTERING WATER TEMPERATURE
		FPM	FEET PER MINUTE
1		GC	GENERAL CONTRACTOR
		GLY	GLYCOL
RUN)		GPM	GALLONS PER MINUTE
JN)		HP	HORSEPOWER
		HVAC	HEATING, VENTILATING & AIR CONDITIONING
		LAT	LEAVING AIR TEMPERATURE
		LWT	LEAVING WATER TEMPERATURE
		мвн	THOUSAND BTU'S PER HOUR
		МСА	MINIMUM CIRCUIT AMPACITY
		NC	NOISE CRITERIA
		OA	OUTSIDE AIR
		RA	RETURN AIR
		RPM	REVOLUTIONS PER MINUTE
		SA	SUPPLY AIR
		SP	STATIC PRESSURE (IN. WC.)
		TSP	TOTAL STATIC PRESSURE (IN. WC.)
		TYP	TYPICAL
		UNO	UNLESS NOTED OTHERWISE
		Ø	PHASE, ROUND
	1	STR	STRAINER
		Т	THERMOMETER
			FLEXIBLE INSULATED DUCT
		WTR	WATER
		ICWS/R	INDUCTION UNIT CHILLED WATER SUPPLY/RETURN
		IHWS/R	INDUCTION UNIT HOT WATER SUPPLY/RETURN
		DDC	DIRECT DIGITAL CONTROL
		BMS	BUILDING MANAGEMENT SYSTEM OR DDC
		REA	RELIEF AIR

C	'R(W	N
ENT	FERPI	RISES	INC
COPYRIGH	T		
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NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

RESET/CLEAR						FSDG CONCRETE PLANT				
AIR HANDLING UNIT TAG NUMBER (AHU-1, ETC.)	F	-1		DA TE: DESIGN OA	TEMP.:	28.04.22 0				
RECORD NUMBER >>>>	1	2	3	4	5	6	7			
ZONE NUMBER (EG: 1-1, 1-2)	RM-101	RM-201								
OCCUPANCY CATEGORY NUMBER (SEE TABLE 6-1)	37	37								
OCCUPANCY CATEGORY	Office space	Office space	0	0	0	0	0			
PEOPLE OUTDOOR AIR RATE (CFM/PERSON) (Rp)	5.0	5.0	0.0	0.0	0.0	0.0	0.0			
AREA OUTDOOR AIR RATE (CFM/SQ. FT.) (Ra)	0.06	0.06	0.00	0.00	0.00	0.00	0.00			
ZONE FLOOR AREA (SQ. FT.) (Az)	673	655								
NORMAL OCCUPANCY - IF KNOWN (EG. ONE PER OFFICE)										
(NUMBER OF PEOPLE) PEAK OCCUPANCY - IF KNOWN (EG. MEETING IN AN OFFICE) (NUMBER OF PEOPLE)										
IF SPACE IS INTERMITTENT USAGE (EG. CONFERENCE ROOM) (SPACE										
HEIGHT - FT.) CORRECTED OCCUPANCY FOR INTERMITTENT USAGE SPACES	0	0	0	0	0	0	0			
(NUMBER OF PEOPLE) CALCULATED OCCUPANCY (NUMBER OF PEOPLE) (Pz)	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
DEFAULT OCCUPANCY (NUMBER OF PEOPLE) (Pz)	3.4	3.3	0.0	0.0	0.0	0.0	0.0			
DESIGN OCCUPANCY (CALCULATED, IF KNOWN OR DEFAULT) (NUMBER OF PEOPLE) (Pz)	4	4	0	0	0	0	0			
PEOPLE OUTDOOR AIR (CFM) (Rp x Pz)	20	20	0	0	0	0	0			
AREA OUTDOOR AIR (CFM) (Ra x Az)	40	39	0	0	0	0	0			
BREATHING ZONE OUTDOOR AIRFLOW (CFM) (Vbz)	60	59	0	0	0	0	0			
AIR DISTRIB. CONFIG. NUMBER (SEE TABLE 6-2)	1	1								
ZONE AIR DISTRIBUTION EFFECTIVENESS (Ez)	1.0	1.0	0.0	0.0	0.0	0.0	0.0			
ZONE OUTDOOR AIRFLOW (CFM) (Voz)	60	59								
DESIGN PRIMARY AIRFLOW TO ZONE (INCL. PRIMARY OA & RA) (CFM) (Vpz)	640	800								
MINIMUM VAV AIRFLOW TO ZONE (INCL. PRIMARY OA & RA) (CFM) (Vdz)										
ZONE PRIMARY OUTDOOR AIR FRACTION (Zp)	0.09	0.07	0.00	0.00	0.00	0.00	0.00			
NORMAL ZONE OCCUPANCY (EI THER KNOWN OR DEFAULT) (NUMBER OF PEOPLE)	4	4	0	0	0	0	0			
SYSTEM POPULATION (SUM OF NORMAL OCCUPANCIES) (Ps)	8	8		E00.000	1641726		CALC.			
(LARGEST TYPICAL OCCUPANCY) (SUM (Pz))	8	8		AIRFLON	MIZA NON "MINIMUM W TO ZON	, ADD TO VAV E'' (CFM):	0			
OCCUPANT DIVERSITY (SYSTEM POPULATION / SUM OF DESIGN POPULATION) (D)	1.	00		OA QUAN WHEN I CHANG	NTITY IS O REQ'D. OA SE IS LESS	PTIMIZED INTAKE THAN:	0.0			
UNCORRECTED OUTDOOR AIR INTAKE (CFM) (Vou)	1:	20			D OA INTA CFM) (Vo	KE FLOW t)	121			
MAXIMUM ZONE PRIMARY OUTDOOR AIR FRACTION (Zp)	0.0)94		AUT	O-OPTIN	AIZE				
DEFAULT SYSTEM VENTILATION EFFICIENCY (Ev)	1.	00								
SYSTEM PRIMARY AIRFLOW (CFM) (Vps)	14	40								
AVERAGE OUTDOOR AIR FRACTION (Xs)	0.	08								
DISCHARGE OUTDOOR AIR FRACTION (Zd)	0.09	0.07	0.00	0.00	0.00	0.00	0.00			
ZONE VENTILATION EFFICIENCY (Evz)	0.99	1.01								
CALCULATED SYSTEM VENTILATION EFFICIENCY (APPENDIX A) (Ev) = MINIMUM (Evz)	0.	99								
REQUIRED OA INTAKE FLOW (CFM) (Vot)	1:	21								

ELECTRIC HEATER												
TAG	SERVES	ĸw	POWER	MANUF. (DESIGN BASIS)	MODEL	REMARKS						
EUH—1	ELECTRICAL ROOM	3.0	208V-1ø	MARKEL	SERIES 3320	1234						
1) BUILT-IN STARTER & DISCONNECT												
2	2 PROVIDE MOUNTING HARDWARE											
(3)	BUILT-IN THEF	RMOSTAT										

(4) VERIFY SEMI RECESSED/RECESSED UNITS FROM PLANS (BASED ON SITE CONDITION)

EXI	EXHAUST FAN SCHEDULE											
TAG	TYPE	SERVES	CFM	ESP	WATT/ HP	FAN RPM	DRIVE TYPE	ELEC. VLT./PH.	MANUFACTURER/ MODEL (DESIGN BASIS)	REMARKS		
EF-1	CENTI.	RESTROOM-102	100	0.25	8.4	904	DIRECT	120V 1ø	GREENHECK SP-110-VG	12345		
EF-2	CENTI.	JC	50	0.25	22.1	808	DIRECT	120V 1ø	GREENHECK SP-A50-90-VG	12345		
EF-3	CENTI.	RESTROOM-202	100	0.25	8.4	808	DIRECT	120V 1ø	GREENHECK SP-110-VG	12345		
EF-4	CENTI.	LOCKERS	50	0.25	22.1	808	DIRECT	120V 1ø	GREENHECK SP-A50-90-VG	12345		
EF-5	INDUSTRIAL PROCESS FAN	PLANT	12000	0.25	6.53 HP	688	BELT	480∨ 3ø	GREENHECK IP-21	123678		
EF-H-1	SIDEWALL	PLANT	1200	0.2	1/2 HP	1308	DIRECT	120V 1ø	GREENHECK SE1-14-436-VG	1237912		
EF-H-2	SIDEWALL	PLANT	1200	0.2	1/2 HP	1308	DIRECT	120V 1ø	GREENHECK SE1-14-436-VG	12371012		
EF-H-3	SIDEWALL	PLANT	1200	0.2	1/2 HP	1308	DIRECT	120V 1ø	GREENHECK SE1-14-436-VG	12371112		
(.	1) PROVIDE	STARTER AND DISC	ONNECT.				(7)	MOTORIZED DA	AMPER.			
	2) PROVIDE	ALL MOUNTING HAR	NDWARE, F	LEXIBLE	CONNECTO	R.	8	VFD.				
	3) VERIFY I	FAN LOCATION AT SI	TE.				9	FAN SHALL BE	E INTERLOCKED WITH	IRH-1, 2 & 3.		
	4) PROVIDE	TIMMER CONTROL W	VITH OVER	RRIDE WA	LL SWITCH.		(10)	(10) FAN SHALL BE INTERLOCKED WITH IRH-4, 5 & 6.				

	PROVIDE STARTER AND DISCONNECT.
2	PROVIDE ALL MOUNTING HARDWARE, FLEXIBLE CONNECT
3	VERIFY FAN LOCATION AT SITE.
4	PROVIDE TIMMER CONTROL WITH OVERRIDE WALL SWITC
5	BACKDRAFT DAMPER.
6	SWITCH CONTROL WITH TIMER CONTROL.

<u>GAS</u> F	GAS FURNACE SCHEDULE (GAS HEAT):														
					OUTSIDE		TONS	FSP	GAS H	GAS HTG. MBH		ELECTRICAL		REMARKS	
MARK	MANOF.	SERVES	MODEL NO.	CFM	AIR CFM		10110		INPUT	OUTPUT	HP	МСА	MOCP	VOLTAGE/PHASE/HZ	
F-1	CARRIER	CONTROL RM DRIVER RM	59SP5A080	1600	250	UP FLOW	4	0.5	80	78	1	14.7	20	120V/1ø/60	123456789
	F-1 CARRIER DRIVER RM 59SP5A080 1600 250 UP FLOW 4 0.5 (1) PROVIDE STARTER & DISCONNECT. (4) HIGH EFFICIENCY SEALED COMBUSTIO (2) SEVEN DAY PROGRAMMABLE T-STAT. (5) PROVIDE 1" PLEATED MEDIA T.A. FILT (3) CASED COOLING COIL. (6) VERIFY WITH MANUFACTURER FOR RE LOCATION BEFORE ORDERING.								BURNER. RS WITH FILTE IRN AIR CONI	ER RACK. NECTION		7 AUX SHI 8 HUI 9 2	X CONDENS/ JT OFF FUR MIDIFIER (OF STAGE HEATI	ATE DRAIN PAN OR FLOW S NACE IF PAN IS CLOGGED. PTIONAL). NG.	SWITCH IN DRAIN PAN TO

OUTDOOR CONDENSING UNIT SCHEDULE:											
TAG	INTERI OCK	LOCK MODEL	NOMINAL COOLING MBH	CAPACITY (TON)		ELECTRICAL		MANUF.	DIMENSION H X L X W	WEIGHT (Ibs)	
					POWER	MCA	MOCP	(DESIGN BASIS)			
ACCU-1	F-1	24ACC448	48	4	208V/1ø 60HZ	20.9 35		CARRIER	287⁄6"X31¾6"X31¾6"	182	
NOTES: 1	PROVIDE ST	ARTER & DISCONNECT.		PROVIDE PAD.				3 PROVIDE ALL F AND ACCESSOF CHARGED REFF	REFRIGERANT PIPING DEV RIES AS REQUIRED AND RIGERANT.	/ISES	

GAS FIRED INFRARED HEATER SCHEDULE						
TAG	AREA SERVED	MAKE/MODEL	HIGH-FIRE BTU/HR	LOW-FIRE BTU/HR	VOLT/PH	REMARKS
IRH—1 THRU IRH—6	PLANT	RE–VERBER–RAY DR 100 NFS–2	100,000	N/A	24V/1ø	12357
IRH-7	STAIR	RE–VERBER–RAY DR 30 NFS–2	30,000	N/A	24V/1ø	12357
IRH-8	CONTAINMENT AREA	RE–VERBER–RAY HL3–30–100N	100,000	65,000	120V/1ø	1234568
IRH-9	HOPPER/ CONVEYOR PLANT	RE–VERBER–RAY DR 100 NFS–2	100,000	N/A	24V/1ø	12357
IRH-10	DRUM HEATER PLANT	RE–VERBER–RAY DR 100 NFS–2	100,000	N/A	24V/1ø	12357
NOTES:						
(1) 5 YEAR WARRANTY ON HEAT EXCHANGER (5) PROVIDE FULL PARABOLIC REFLECTOR						
2 24 VOLT THERMOSTAT						
(3) CSA LISTED(7) 120V/24V TRANSFORMER.						
4 TWO-SATGE THERMOSTAT 8 COMBUSTION AIR/FLUE KIT.						

DIFFUSERS. GRILLES & REGISTER * USE AS SCHEDULED UNLESS NOTED OTHERWISE ON PLANS.						
TAG	TYPE	CFM RANGE	NECK	MANUFACTURER	MODEL	
А	SUPPLY	0-200	8X6	TITUS	300RL	
В	SUPPLY	0-200	12X6	TITUS	CT-480	
С	RETURN	0-350	24X4	TITUS	CT-TAF	
D	RETURN	0-700	18X12	TITUS	350RL	

(11) FAN SHALL BE INTERLOCKED WITH IRH-9 & 10.

(12) PROVIDE HOUSING, 45° OUTDOOR HOOD WITH BIRD SCREEN, MOTORIZED DAMPER, PROTECTION GRILL.

(1) ALL CEILING DIFFUSER ARE 4-WAY THROW UNLESS NOTED OTHERWISE.

2 COORDINATE DIFFUSER TYPE TO BE USED WITH CEILING LAYOUT.

(3) N.C. VALUE 25 OR LESS.

(4) PROVIDE ALL DUCT TRANSITION AT THE NECK AS REQUIRED.

5 PROVIDE ACCESS PANEL FOR MANUAL BALANCE DAMPER IN HARD CEILING & WALL.

(6) ANY SPECIAL GRILLE/DIFFUSER/REGISTER REQUIRED IS NOTED ON PLAN.

7 COLOR TO MATCH CEILING OR BY ARCHITECT.

8 PROVIDE 12X12 FACE (5"Ø NECK, TITUS-OMNI-AA) DIFFUSER

SHOWN ON PLANS.





KEY DRAWING NOTES:

- (1) PROVIDE FURNACE AS SHOWN ON PLAN. SEE SCHEDULE FOR DETAILS.
- 2 PROVIDE ELECTRIC UNIT HEATER AS SHOWN ON PLAN. SEE SCHEDULE FOR DETAILS.
- $\overline{(3)}$ OUTSIDE AIR INTAKE AIR INTAKE LOUVER WITH BACKDRAFT DAMPER. SEE SIZE ON PLAN. MAINTAIN MIN 10'-0" DISTANCE BETWEEN OUTSIDE AIR INTAKE AND ANY EXHAUST/FLUE.
- (4) PROVIDE CEILING MOUNTED EXHAUST FAN. SEE SCHEDULE FOR DETAILS. EXHAUST AIR DUCT RUN THROUGH WALL. PROVIDE WALL CAP WITH BIRD SCREEN. CAP COLOR BY ARCHITECT.
- $\langle 5 \rangle$ provide air cooled condensing unit for furnace. See SCHEDULE FOR DETAIL.
- (6) INTAKE AIR LOUVERS FOR PLANT VENTILATION. LOUVERS SHALL BE LOCATED ABOVE THE BARRIER THAT SEPARATES TRUCK DRIVE THRU AREA AND PLANT. PROVIDE MOTORIZED DAMPERS. DAMPERS SHALL BE INTERLOCKED WITH EF-5. WHEN FAN STARTS DAMPERS SHALL GO TO FULL OPEN POSITION.
- $\langle 7 \rangle$ PROVIDE GAS RADIANT HEATER. SEE SCHEDULE FOR DETAILS.
- $\langle 8 \rangle$ COMBUSTION AIR LOUVER FOR THE BOILER WITH MOTORIZED DAMPER. DAMPER SHALL BE INTERLOCKED WITH BOILER START. FREE AREA OF THE LOUVER SHALL BE VERIFIED WITH FINAL PURCHASED BOILER INPUT CAPACITY.
- (9) USE INSULATED BLADE DAMPER RUSKIN TED 50XT OR APPROVED EQUAL.
- (1) EXHAUST FAN EF-H-1 AND INTAKE LOUVER L-H-1 SHALL BE INTERLOCKED WITH IRH-1, 2 & 3.
- (1) EXHAUST FAN EF-H-2 AND INTAKE LOUVER L-H-2 SHALL BE INTERLOCKED WITH IRH-4, 5 & 6.
- (12) EXHAUST FAN EF-H-3 AND INTAKE LOUVER L-H-3 SHALL BE INTERLOCKED WITH IRH-9 & 10.

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GENERAL NOTES:

GN1.	ALL DUCT SUPPORT SHALL BE PER SMACNA WITH ADEQUATE SPACE FOR PIPING & CONDUIT ABOVE DUCTWORK.
GN2.	SEE M-100 & M-101 FOR SCHEDULES, NOTES & LEGENDS.
GN3.	ALL EXPOSED DUCTWORK SHALL BE FLAT ROUND OR SPIRAL ROUND.
GN4.	COORDINATE DUCTWORK WITH PIPING, STORM DRAIN, ETC. PRODUCE WORKING SHOP DRAWING.
GN5.	PROVIDE ACCESS DOOR FOR ALL FIRE DAMPERS & MANUAL BALANCE DAMPER IN GYP BOARD CEILING OR SOFFIT.
GN6.	COORDINATE FINAL THERMOSTAT LOCATION WITH OWNER/ ARCHITECT.
GN7.	COORDINATE WITH G.C. TO PROVIDE GYP BOARD CEILING & COORDINATE SOFFIT LOCATION.
GN8.	SEE ARCHITECTURAL DRAWING FOR LIFE SAFETY TO PROVIDE APPROPRIATE DAMPERS.

KEY DRAWING NOTES:

- (1) EXHAUST FAN ABOVE CONTROL ROOM. PROVIDE VIBRATION ISOLATION.
- $\langle 2 \rangle$ INTERLOCK INTAKE DAMPERS ON L-2 & L-3 AND EXHAUST MOTORIZED DAMPERS ON L-4 WITH EF-5.
- $\langle \overline{3} \rangle$ MAINTAIN 10 FT. DISTANCE TO OUTSIDE AIR INTAKE LOUVER FOR FURNACE.
- 4 PROVIDE CEILING MOUNTED EXHAUST FAN. SEE SCHEDULE FOR DETAILS. EXHAUST AIR DUCT RUN THROUGH WALL. PROVIDE WALL CAP WITH BIRD SCREEN. CAP COLOR BY ARCHITECT.
- 5 PROVIDE GAS RADIANT HEATER. SEE SCHEDULE FOR DETAILS. COORDINATE THERMOSTAT LOCATION WITH OWNER.
- 6 USE INSULATED BLADE DAMPER RUSKIN TED 50XT OR APPROVED EQUAL.

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MECHANICAL GENERAL

A. PROVIDE MATERIALS AND EQUIPMENT AND EXECUTE THE WORK. INCLUDING ALL TESTING AND INSPECTIONS, IN COMPLIANCE WITH THE APPLICABLE PROVISIONS OF FEDERAL, STATE AND LOCAL GOVERNMENT LAWS, ORDINANCES, REFERENCED CODES AND STANDARDS CURRENT AS OF THE ISSUE DATE OF THESE DRAWINGS INCLUDING THE GOVERNING LAWS, ORDINANCES, CODES AND STANDARDS CONSTITUTE MINIMUM REQUIREMENTS. ALL MORE STRINGENT REQUIREMENTS SHALL MODIFY, SUPPLEMENT AND SUPERCEDE APPLICABLE PORTIONS OF GOVERNING LAWS, ORDINANCES, CODES AND STANDARDS.

B. CONTRACTOR SHALL PRESENT CERTIFICATE TO THE OWNER'S REPRESENTATIVE THAT ALL APPLICABLE BUILDING PERMITS HAVE BEEN SECURED PRIOR TO STARTING ANY WORK AND PROVIDE THE OWNER WITH ALL REQUIRED CERTIFICATES OF FINAL APPROVAL FROM THE GOVERNING JURISDICTIONS AT COMPLETION OF THE WORK. PROVIDE ALL SHOP DRAWINGS AS REQUIRED IN FOLLOWING SECTIONS.

C. REFER TO ALL GENERAL NOTES ON DRAWING FOR ADDITIONAL REQUIREMENTS.

D. MECHANICAL EQUIPMENT SHALL HAVE DECALS AND TAGS TO INDICATE LIFTING AND RIGGING, SERVICE AREAS AND CAUTION IDENTIFICATION FOR SAFETY TO ASSIST SERVICE PERSONNEL. E. UNIT NAMEPLATE SHALL BE PROVIDED IN TWO LOCATIONS ON THE EQUIPMENT. AFFIX TO THE EXTERIOR OF THE EQUIPMENT AND TO THE INTERIOR OF THE CONTROL COMPARTMENT ACCESS DOOR.

SHOP DRAWINGS

A. NO APPARATUS OR EQUIPMENT SHALL BE SHIPPED FROM STOCK OR FABRICATED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND STAMPED "REVIEW COMPLETED", "APPROVED" OR "APPROVED AS NOTED".

B. PROVIDE DETAILED SHOP DRAWINGS (SEPIAS) OF ALL SHEET METAL DUCTWORK WITH NECESSARY FAN INDICATING IT'S OPERATING POINT, EFFICIENCY, STARTING TIME, DATA RELATIVE TO SOUND

LEVELS. ALL SHEET METAL SHOP DRAWINGS SHALL BEAR INDEPENDENT BALANCE AGENCY (AABC) APPROVAL STAMP BEFORE SHOP DRAWINGS ARE SUBMITTED TO THE ARCHITECT FOR APPROVAL.

C. SUBMIT FOR APPROVAL, SHOP DRAWINGS FOR ALL EQUIPMENT, INCLUDING MATERIALS, VALVES, HEATING SPECIALTIES, WIRING DIAGRAMS AND CONTROL DIAGRAMS INCLUDING, BUT NOT LIMITED TO THE ITEMS LISTED BELOW. WHERE ITEMS ARE REFERRED TO BY SYMBOL NUMBERS ON THE DRAWINGS AND SPECIFICATIONS, ALL SUBMITTALS SHALL BEAR THE SAME SYMBOL NUMBERS. ALL DRAWINGS SHALL CONTAIN THE PROJECT NAME AND PROJECT NUMBER. NO LOOSE SHEETS SHALL BE SUBMITTED UNLESS A COVER SHEET IS ATTACHED.

D. PROVIDE THE FOLLOWING EQUIPMENT SHOP DRAWINGS: VALVES, TEMPERATURE AND PRESSURE GAUGES, PACKAGED HVAC EQUIPMENT, EXHAUST FANS, UNIT HEATERS, GRILLES, REGISTERS, INSULATION, VIBRATION ISOLATORS, TEMPERATURE CONTROLS AND THERMOSTATS.

E. APPROVAL OF SHOP DRAWINGS DOES NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES TO CONFORM TO THE DESIGN INTENT OF THE CONTRACT DOCUMENTS. APPROVAL OF SHOP DRAWINGS IS INTENDED TO BE FOR GENERAL CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS ONLY. ANY INSTALLED EQUIPMENT WHICH REQUIRES WORK BY OTHER TRADES SHALL BE COORDINATED WITH THOSE TRADES. REFER TO OTHER TRADES BID DOCUMENTS.

CODES, PERMITS AND FEES

A. UNLESS OTHERWISE INDICATED, ALL REQUIRED PERMITS, LICENSES, INSPECTIONS, APPROVALS AND FEES FOR MECHANICAL WORK SHALL BE SECURED AND PAID FOR BY THIS CONTRACTOR. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES, RULES AND REGULATIONS.

B. RULES OF LOCAL UTILITY COMPANIES SHALL BE COMPLIED WITH.

IN LOCAL AND STATE CODES. WHERE THE DRAWINGS AND OR SPECIFICATIONS INDICATE MATERIALS OR CONSTRUCTION IN EXCESS OF CODE REQUIREMENTS. THE DRAWINGS ANDOOR SPECIFICATIONS SHALL GOVERN.

BASIC MATERIALS AND METHODS

A. PROVIDE ALL ITEMS, ARTICLES, MATERIALS, OPERATIONS AND METHODS LISTED. MENTIONED OR SCHEDULED ON DRAWINGS ANDTOR HEREIN, INCLUDING ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS NECESSARY AND REQUIRED FOR THEIR COMPLETION. THE WORK SHALL INCLUDE INSTALLATION, CLEANING AND TESTING OF COMPLETE AND OPERATING HVAC, TEMPERATURE CONTROL, AND OTHER SPECIAL SYSTEMS.

MECHANICAL SPECIFICATIONS

HEATING AND VENTILATING

A. GENERAL

REFER TO SCHEDULES FOR CAPACITIES, ACCESSORIES AND LEVEL OF QUALITY.

B. CONTROLS

UNITS SHALL BE ORDERED AND INSTALLED WITH MANUFACTURED STANDARD CONTROLS. SCOPE OF CONTROLS WORK SHALL BE COORDINATED WITH MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR AND GENERAL CONTRACTOR.

REFER TO SCHEDULES FOR EQUIPMENT REQUIREMENTS.

SYSTEM TESTING AND BALANCING

A. ALL HVAC SYSTEMS SHALL BE TESTED AND BALANCED TO DEMONSTRATE THAT SPECIFIED CAPACITIES AND PROPER CONTROL FUNCTIONING HAS BEEN ATTAINED. FAN SYSTEMS ARE NOT TO BE COMPLETED PRIOR TO RUNNING PERFORMANCE TESTS, AND PRIOR TO TRAINING AND INSTRUCTION OF THE OWNER'S PERSONNEL IN SYSTEM OPERATION.

B. ENGAGE THE SERVICES OF AN INDEPENDENT CERTIFIED TEST AND BALANCE AGENCY THAT SPECIALIZES IN AND WHOSE BUSINESS IS LIMITED TO THE TESTING AND BALANCING OF AIR CONDITIONING SYSTEMS AND IS NOT AFFILIATED IN ANY WAY WITH MANUFACTURER, SUPPLIER, OR INSTALLATION CONTRACTOR. THE AGENCY SELECTED SHALL BE CERTIFIED BY ASSOCIATED AIR BALANCE COUNCIL (AABC) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB).

C. TAKE CHARGE OF AND DIRECT THE PERFORMANCE TESTS AND SUBMIT A COMPLETE REPORT ON SAME TO THE ARCHITECT. REFER TO "PERFORMANCE TESTS" IN THIS SECTION OF THE SPECIFICATIONS.

D. EXAMINE THE AIR HANDLING SYSTEMS TO SEE THAT THEY ARE FREE FROM OBSTRUCTIONS. DETERMINE THAT ALL DAMPERS AND REGISTERS ARE OPEN, THAT MOVING EQUIPMENT IS LUBRICATED, THAT FILTERS ARE FUNCTIONING, AND PERFORM OTHER INSPECTION AND MAINTENANCE ACTIVITIES NECESSARY FOR PROPER OPERATION OF THE SYSTEMS.

E. DEMONSTRATE THAT THE AIR HANDLING EQUIPMENT PERFORMS AS SPECIFIED. ADJUST VARIABLE TYPE PULLEYS AND VOLUME DAMPERS, WHERE NECESSARY TO ACHIEVE DESIGN AIR VALUES.

G. TESTING AND BALANCING OF ALL AIR SYSTEMS SHALL BE PERFORMED BY A SINGLE AGENCY IN MOUNTING SLEEVE: FACTORY-INSTALLED, 0.052" THICK, GALVANIZED SHEET STEEL; LENGTH TO COMPLETE ACCORDANCE WITH THE AABC "STANDARDS AND INSTRUMENTATION'S FORM NUMBER SUIT WALL OR FLOOR APPLICATION. 81266 VOLUME NUMBER 1" AS PUBLISHED BY AABC, INCLUDING ALL CURRENT REVISIONS THERETO OR BY NATIONAL ENVIRONMENT AL BALANCING BUREAU (NEBB). DAMPER MOTORS: TWO-POSITION ACTION.

PERFORMANCE TESTS

A. A PERFORMANCE TEST SHALL BE RUN ON ALL MECHANICAL SYSTEMS IN THE PRESENCE OF THE ARCHITECT OR THE OWNER'S REPRESENTATIVE. THE OWNER'S OPERATIONS PERSONNEL, AND UNDER THE DIRECTION OF THE TESTING AND BALANCING TRADE. THE DURATION OF THE TEST SHALL BE A MINIMUM OF 8 HOURS OF CONTINUOUS SUCCESSFUL OPERATION (WITH NO DOWN TIME) IN WEATHER SUCH THAT A REASONABLE LOAD IS PLACED ON THE EQUIPMENT, AIR TEMPERATURES, VOLTAGES, AMPERAGES RPM'S, ETC., SHALL ALL BE TAKEN AND RECORDED HOURLY. AT THIS TIME, ANY ADJUSTMENTS TO AIRFLOW, ETC. SHALL BE MADE.

B. WHERE THE TIME OF YEAR PRECLUDES WEATHER TESTING OF EITHER SYSTEM, THEN SYSTEM OPERATION SHALL BE SIMULATED TO FACILITATE TESTING AT REQUIRED AIR TEMPERATURES. RESULTS RECORDED AND ANY ADJUSTMENTS SHALL BE PERFORMED AT THIS TIME.

SHEET METAL

A. ALL DUCTWORK SHALL BE GALVANIZED SHEET METAL AS INDICATED ON THE DRAWINGS OR AS DIRECTED HEREIN. ALL SHEET METAL WORK SHALL BE IN ACCORDANCE WITH LATEST EDITIONS OF SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE" MANUALS, NFPA 90A AND 96. AND THE LATEST EDITION OF THE ASHRAE GUIDE AND DATA BOOKS. ALL DUCTWORK SIZES INDICATED ON THE PLANS ARE THE INTERNAL DIMENSIONS.

B. ALL DUCTWORK SHALL BE SEALED AIR TIGHT AND SHALL NOT ALLOW MORE THAN 10M AIR LEAKAGE THROUGHOUT THE ENTIRE SYSTEM.

C. SHEET METAL DUCTWORK SHALL BE SMOOTH INSIDE AND TRUE TO SIZE.

D. DUCTWORK FITTINGS SHALL BE PER SMACNA STANDARDS. RADIUS TURNS ON SUPPLY AIR DUCTS SHALL BE 1 1 2 TIMES THE DUCT WIDTH, MINIMUM. WHERE SPACE OR CLEARANCES REQUIRES THE USE OF MITERED TURNS, PROVIDE HIGH PERFORMANCE DOUBLE THICKNESS TURNING VANES EQUAL TO AEROMDYNE "HEP".

PROVIDE FACTORY MANUFACTURED TEST HOLE UNITS IN DUCTWORK WHERE REQUIRED TO FACILITATE AIR BALANCE.

F. DUCT CONSTRUCTION AND SUPPORT DESIGN SHALL BE PER SMACNA. MINIMUM DUCT DESIGN IS PRESSURE CLASS 2" WG. ALL DUCTWORK FROM THE AIR HANDLING UNIT FAN AND OR STAND-ALONE FAN (EXHAUST) TO A MAIN DUCT DAMPER (CONTROL) SHALL BE DESIGNED FOR THE MAXIMUM TOTAL FAN OUTPUT PRESSURE. (THIS IS TO PREVENT DUCT FAILURE IN CASE WHERE A MAIN DUCT DAMPER CLOSES BY DESIGN OR MALFUNCTION). ALL OTHER DUCTWORK SHALL BE DESIGNED FOR THE MAXIMUM SYSTEM EXTERNAL FAN OUTPUT PRESSURE.

G. ALL RECTANGULAR DUCTWORK SHALL BE IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS WITH REGARD TO DUCT GAGE THICKNESS, REINFORCEMENT SPACING, BRACING, HANGERS, AND B. ALL CONNECTIONS TO DIFFUSERS ARE TO BE MADE WITH ADJUSTABLE CLAMPS AND SUPPORTS, ALL LONGITUDINAL SEAMS SHALL BE MADE WITH A PITTSBURGH LOCK (TYPE L-1). TRANSVERSE JOINTS SHALL BE MADE WITH A POCKET LOCK (TYPE T-17) FOR DUCTWORK UP TO 3" WG. TIGHTENED AIRTIGHT.

H. CONTRACTOR SHALL USE DEGREASER, CLEAN AND PREP ALL EXPOSED DUCTWORK TO HAVE PAINT APPLIED. COORDINATE WITH ARCHITECTURAL TRADES.

I. AT EACH POINT OF CONNECTION OF DUCTWORK TO FANS, PROVIDE A FLEXIBLE CONNECTION EQUAL TO VENTFABRICS, INC. "VENTGLAS L.A.", NOT LESS THAN 6" IN LENGTH AND MADE OF HEAVY GRADE FABRIC DOUBLE COATED WITH NEOPRENE AND PROVIDED WITH A SUITABLE FRAME AT EACH END, ARRANGED FOR BOLTING TO THE INLET OR OUTLET OF FAN AND DUCTWORK, RESPECTIVELY.

C. ALL WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE RULES AND REGULATIONS SET FORTH J. FLEXIBLE CONNECTORS ON DUCTWORK TO AIR HANDLING EQUIPMENT SHALL HAVE A MAXIMUM FLAMELSMOKE DEVELOPED RATING NOT TO EXCEED 25N50. K. PROVIDE VOLUME DAMPERS IN THE DUCT SYSTEMS WHERE SHOWN ON PLANS AND WHERE

> PROVIDE FACTORY FABRICATED VOLUME DAMPERS IN ALL SUPPLY AND EXHAUST BRANCH DUCTS AND OTHERS WHERE INDICATED ON DRAWINGS. VOLUME DAMPERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH APPLICABLE SMACNA STANDARDS.

M. MANUAL VOLUME DAMPERS SHALL BE MADE OF GALVANIZED STEEL 18 GAUGE OR HEAVIER. DAMPERS FOR DUCTWORK UP TO 12 INCHES DEEP SHALL BE ONE BLADE CARRIED ON A 3V8 INCH SQUARE STEEL ROD MOUNTED IN THE SIDE OF DUCT WITHOUT FRAME AND FITTED WITH A LOCKING TYPE QUADRANT. SINGLE BLADE HAND DAMPERS UP TO 12 INCHES WIDTH MAY BE USED. DAMPERS FOR DUCTS OF GREATER DEPTH SHALL BE MULTI-BLADE TYPE. MAXIMUM BLADE WIDTH 12 INCHES UP TO 30 INCHES BLADE LENGTH, 8 INCHES MAXIMUM WIDTH OVER 30 INCHES LENGTH. BLADES SHALL BE MOUNTED IN FRAME AND INTERCONNECTED FOR OPERATION FROM ONE LOCKING TYPE HAND QUADRANT.

FIRE DAMPERS AND FIRETSMOKE COMBINATION DAMPERS A. FIRE DAMPERS

FIRE DAMPERS SHALL BE LABELED ACCORDING TO UL 555. FIRE RATING: 1 1L2 HOURS (MINIMUM). COORDINATE WITH ARCHITECTURAL PLANS.

FRAME: CURTAIN TYPE WITH BLADES OUTSIDE AIRSTREAM; FABRICATED WITH ROLL-FORMED, 0.034" THICK GALVANIZED STEEL; WITH MITERED AND INTERLOCKING CORNERS. MOUNTING SLEEVE: FACTORY OR FIELD INSTALLED, GALVANIZED SHEET STEEL.

MINIMUM THICKNESS: 0.052 THICK AS INDICATED AND OF LENGTH TO SUIT APPLICATION.

EXCEPTIONS: OMIT SLEEVE WHERE DAMPER FRAME WIDTH PERMITS DIRECT ATTACHMENT OF PERIMETER MOUNTING ANGLES ON EACH SIDE OF WALL OR FLOOR, AND THICKNESS OF DAMPER FRAME COMPLIES WITH SLEEVE REQUIREMENTS.

MOUNTING ORIENTATION: VERTICAL OR HORIZONTAL AS INDICATED. BLADES: ROLL-FORMED, INTERLOCKING, 0.034" THICK, GALVANIZED SHEET STEEL. IN PLACE OF INTERLOCKING BLADES, USE FULL-LENGTH, 0.034" THICK, GALVANIZED-STEEL BLADE CONNECTORS. HORIZONTAL DAMPERS: INCLUDE BLADE LOCK AND STAINLESS-STEEL CLOSURE SPRING. FUSIBLE LINKS: REPLACEABLE, 165 DEG F RATED.

B. FIREUSMOKE COMBINATION DAMPERS

COMBINATION FIRE AND SMOKE DAMPERS SHALL BE LABELED ACCORDING TO UL 555. FIRE RATING: 1 1A2 HOURS (MINIMUM). COORDINATE WITH ARCHITECTURAL PLANS. FRAME AND BLADES: 0.064" THICK, GALVANIZED SHEET STEEL

REQUIRED TO INSURE PROPER SYSTEM BALANCING.

MOUNTING ORIENTATION: VERTICAL OR HORIZONTAL AS INDICATED.

HORIZONTAL DAMPERS: INCLUDE BLADE LOCK AND STAINLESS-STEEL CLOSURE SPRING. FUSIBLE LINKS: REPLACEABLE, 165 DEG F RATED.

MOTORS: OIL-IMMERSED AND SEALED GEAR TRAINS.

SPRING-RETURN MOTORS: EQUIP WITH AN INTEGRAL SPIRAL-SPRING MECHANISM WHERE INDICATED. ENCLOSE ENTIRE SPRING MECHANISM IN A REMOVABLE HOUSING DESIGNED FOR SERVICE OR ADJUSTMENTS. SIZE FOR RUNNING TORQUE RATING OF 150" E LB E FT AND BREAKAWAY TORQUE RATING OF 150" E LB FT.

ELECTRICAL CONNECTION: 115 V, SINGLE PHASE, 60 Hz. COORDINATE WITH CONTROLS AND ELECTRICAL CONTRACTORS.

C. DUCT-MOUNTING ACCESS DOORS

GENERAL DESCRIPTION: FABRICATE DOORS AIRTIGHT AND SUITABLE FOR DUCT PRESSURE CLASS.

DOOR: DOUBLE WALL, DUCT MOUNTING, AND RECTANGULAR; FABRICATED OF GALVANIZED SHEET METAL WITH INSULATION FILL AND THICKNESS AS INDICATED FOR DUCT PRESSURE CLASS. INCLUDE 1"x1" BUTT OR PIANO HINGE AND CAM LATCHES.

FRAME: GALVANIZED SHEET STEEL, WITH BEND-OVER TABLES AND FOAM GASKETS.

PROVIDE NUMBER OF HINGES AND LOCKS AS FOLLOWS:

LESS THAN 12" SQ.: SECURE WITH TWO SASH LOCKS.

UP TO 18" SQ .: TWO HINGES AND TWO SASH LOCKS. UP TO 24"x48": THREE HINGES AND TWO COMPRESSION LATCHES WITH OUTSIDE HANDLES. SIZES 24"x48" AND LARGER: ONE ADDITIONAL HINGE.

ACCESS POINTS SHALL BE PERMANENTLY IDENTIFIED ON THE EXTERIOR BY A LABEL HAVING LETTERS NOT LESS THAN 0.5" IN HEIGHT READING: FIREESMOKE DAMPER OR FIRE DAMPER.

FLEXIBLE AIR DUCTWORK

A. INSULATED FLEXIBLE AIR DUCTS SHALL BE U.L. 181 LISTED WITH TRILAMINATE OF ALUMINUM FOIL, FIBERGLASS AND POLYESTER INNER LINER ON GALVANIZED STEEL HELIX WITH R-5.0 RATING. FIBERGLASS INSULATION SHALL HAVE 25R50 FLAMENSMOKE FIRE RETARDANT VAPOR BARRIER JACKET.

C. MANUFACTURERS: CLEVAFLEX OR FLEXMASTER TYPE 5.

DUCTWORK CONSTRUCTION

A. LOW PRESSURE DUCTWORK:

LONGITUDINAL JOINTS SHALL BE PITTSBURGH TYPE AND SHALL BE SEALED WITH MINNESOTA MINING & MANUFACTURING COMPANY'S (3M) EC-800 OR AS APPROVED SEALING COMPOUND AS SHOWN ON DRAWING.

TRANSVERSE JOINTS SHALL BE STANDING "S" SLIP TYPE FOR HORIZONTAL JOINTS UP TO AND INCLUDING 40" WIDTH, AND REINFORCED BAR SLIP (CLEAT) JOINT FOR 41" TO 84" WIDTH; AND 1-1/2" ANGLE REINFORCED SLIP TYPE JOINT FOR DUCTS OVER 84".

DRIVE SLIP TYPE FOR VERTICAL JOINTS

ALL DUCTS WIDER THAN 48" SHALL BE PROVIDED WITH 1-1.2" x 1-102" x 1T8" ANGLE IRON STIFFENERS ON ALL SIDES ON MAXIMUM OF 48" CENTER.

B. HANGERS FOR DUCTWORK:

ALL SHEET METAL DUCTWORK SHALL BE SECURELY SUPPORTED ON APPROVED HANGERS OR SADDLES AS REQUIRED.

RECTANGULAR HORIZONTAL DUCTWORK SHALL BE SUPPORTED BY ROUND STEEL RODS, THREADED AT BOTH ENDS AND BOLTED THROUGH THE SUPPORTING STEEL ACROSS THE DUCT.

SUPPORTING STEEL SHALL BE AS FOLLOWS:

DUCT SIZE (MAXIMUM DIMENSION) SUPPORT STEEL SPACING

UP TO 26" 2" X 3 1'" STRAP 8'-0" 27" TO 48" (INCLUSIVE) L 1-1'2" X 1-12" X 158" 8'-0" 49" TO 59" (INCLUSIVE) L 2" X 2" X 118" OVER 60" L 2-1C2" X 2-1L2" X 3216" 5'-0"

ALL DUCTWORK AND PIPING INSIDE THE BUILDING SHALL BE SUSPENDED FROM THE TOP CHORD OF A. ALL WIRING SHALL COMPLY WITH LOCAL AND NATIONAL ELECTRIC CODES AND THE BAR JOIST AT PANEL POINTS ONLY. DO NOT CONNECT TO THE ROOF DECK. DUCTWORK AND PIPES MANUFACTURER'S PUBLISHED INSTALLATION MANUAL. LOCATED ON THE ROOF ARE TO BE MOUNTED ON "PATE" EQUIPMENT OR PIPE SUPPORTS. EQUIPMENT CURBS SHALL BE TYPE ES-1 OR ES-5 FOR INSULATED ROOFS. CONTRACTOR HAS THE B. PROVIDE LAMINATED COLOR CODED WIRING DIAGRAM TO MATCH FACTORY INSTALLED WIRING AND OPTION TO USE "MIRO INDUSTRIES" EQUIPMENT OR PIPE SUPPORTS.

ALL SHARP ENDS AND EDGES SHALL BE GROUND DOWN SMOOTH OR COVERED TO PREVENT INJURY TO PERSONNEL.

HANGER RODS, ANGLES AND STRAPS SHALL BE ATTACHED TO BEAM CLAMPS, CONCRETE INSERTS, AND APPROVED ANCHORS. ALL SUCH DEVICES SHALL BE UNDERWRITER'S LABORATORIES APPROVED. INSERTS AND ANCHORS SHALL BE SET IN COOPERATION WITH ALL TRADES INVOLVED.

C-CLAMPS SHALL NOT BE USED FOR ATTACHING HANGERS.

INSULATION - GENERAL

A. THE CONTRACTOR SHALL FURNISH ALL LABOR AND MATERIALS NECESSARY FOR THE INSTALLATION OF THERMAL INSULATION ON ALL HOT AND COLD SURFACES WHICH REQUIRE INSULATION FOR HEAT OR COLD CONSERVATION, COMFORT OF OCCUPANTS, EFFICIENCY OR EASE OF OPERATION OR TO PREVENT CONDENSATION OR DRIPPING. THE INSULATION SHALL BE COMPLETE AND EFFECTIVE THROUGHOUT THE BUILDING.

B. MANUFACTURERS: CERTAIN TEED SAINT GOBAIN, OWENS CORNING, JOHNS-MANSVILLE, ARMSTRONG CORK COMPANY.

DUCT INSULATION

A. ALL CONCEALED SUPPLY AND RETURN AIR DUCTS SHALL BE INSULATED PER ASHRAE STANDARD 90.1, GENERAL REQUIREMENTS.

B. CONCEALED DUCTWORK SHALL BE INSULATED WITH FACED DUCTWRAP 1" THICK, ONE (1) LB.DCU.FT. DENSITY WITH FACTORY-APPLIED "FRK" VAPOR BARRIER JACKET OR LAMINATED ALUMINUM FOIL, OPEN MESH GLASS FIBER REINFORCING MESH SCRIM AND FLAMEPROOF KRAFT PAPER. INSULATION SHALL BE EQUAL TO OWENS-CORNING FIBERGLASS COMMERCIAL GRADE TYPE 100.

ENSURE INSULATION IS CONTINUOUS THROUGH INSIDE WALLS, PACK AROUND DUCTS WITH FIRE PROOF SELF-SUPPORTING INSULATION MATERIAL, PROPERLY SEALED.

FINISH INSULATION NEATLY AT HANGERS, SUPPORTS AND OTHER PROTRUSIONS.

C. ALL SUPPLY AND RETURN AIR DUCTWORK SHALL BE INSULATED ACCORDING TO THE ASHRAE 90.1 ENERGY STANDARDS. GENERAL REQUIREMENTS FOR INSULATION SHALL BE R-6 FOR SUPPLY AND RETURN DUCTS IN AN UNCONDITIONED SPACE OR R-8 OUTSIDE THE BUILDING, R-8 INSULATION INSTALLED BETWEEN SUPPLY AND RETURN DUCTS AND BUILDING EXTERIOR WHEN DUCTS ARE PART OF THE BUILDING ASSEMBLY.

B. GRILLES AND REGISTERS PERFORMANCE SHALL BE BASED ON TESTS CONDUCTED IN ACCORDANCE WITH ADC STANDARDS 1062 A2, "AIR DIFFUSING EQUIPMENT TEST CODE" AND ASHRAE STANDARD 3368 "METHOD OF TESTING FOR RATING THE ACOUSTIC PERFORMANCE OF AIR CONTROL AND TERMINAL DEVICES AND SIMILAR EQUIPMENT."

C. GRILLES, REGISTERS AND DIFFUSERS SHALL BE MANUFACTURED BY PRICE, TITUS, CARNES, OR KRUEGER. PROVIDE DAMPERS AT EACH DIFFUSER AND REGISTER. PROVIDE OPTIONS PER SCHEDULE ON DRAWINGS.

EXHAUST AIR FANS

A. FANS SHALL BE AS SCHEDULED WITH ACCESSORIES ON DRAWINGS. FANS SHALL BEAR AMCA SEAL FOR RATED SOUND AND AIR PERFORMANCE. ALL UNITS TO BE VANDAL-PROOF AND COVERS TO BE BOLTED SECURE.

REPRESENTATIVE.

B. THE CONTRACTOR SHALL GUARANTEE THE ENTIRE INSTALLATION OF THE DUCT SYSTEMS TO FUNCTION SATISFACTORILY AGAINST THE SPECIFIED SYSTEM TOTAL STATIC PRESSURE. DEFECTS DUE TO IMPROPER MATERIALS, WORKMANSHIP, AND LEAKS SHALL BE CORRECTED WITHOUT ADDITIONAL COST TO THE OWNER. OTHER WORK AFFECTED AS A RESULT OF THE ABOVE MENTIONED DEFECTS SHALL ALSO BE MADE GOOD WITHOUT COST TO THE OWNER. THE ENTIRE SYSTEM SHALL BE LEFT IN PROPER OPERATING CONDITION, ACCEPTABLE TO THE ENGINEER'S FIELD REPRESENTATIVE. OIL CANNING OF DUCTS WILL NOT BE ACCEPTABLE.

SMOKE DETECTORS (SYSTEMS OVER 2000 CFM):

A. WHERE REQUIRED BY LOCAL CODE, FURNISH AND INSTALL IN THE RETURN AIR DUCT OF EACH AIR HANDLING UNIT, A SELF-CONTAINED, IONIZATION-TYPE DUCT SMOKE DETECTOR DESIGNED TO MOUNT TO A DUCT USING SAMPLING TUBES ACROSS THE DUCT TO SENSE THE AIR. UNIT SHALL BE MANUALLY RESET AND SHALL HAVE A SET OF CONTACTS FOR FAN SHUT DOWN AS WELL AS FOR REMOTE ALARMING. SMOKE DETECTORS SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED EDITIONS OF NFPA 90A AND THE INTERNATIONAL MECHANICAL CODE OF THE LOCAL AUTHORITY HAVING JURISDICTION.

B. SMOKE DETECTORS SHALL HAVE SAMPLING TUBES AND AUXILIARY CONTACTS FOR FAN SHUTDOWN. SMOKE DETECTORS SHALL BE CONNECTED TO THE BUILDING FIRE ALARM SYSTEM. C. SMOKE DETECTORS THAT ARE NOT VISABLE SHALL HAVE REMOTE INDICATION DEVICE (LIGHT

OPTION) FOR UNIT STATUS CONDITION.

WIRING

THERMOSTATS

A. IN GENERAL, ALL THERMOSTATS, INCLUDING SENSORS, ETC. SHALL BE PROVIDED BY THE HVAC EQUIPMENT MANUFACTURER PROVIDED. B. MECHANICAL TRADES SHALL FURNISH AND INSTALL ALL REQUIRED AUTOMATIC TEMPERATURE

INSULATION - MATERIALS

A. ALL INSULATION MATERIALS SHALL BE CLASS A BY UNDERWRITER'S LABORATORIES. STANDARD FIBERGLASS INSULATION SHALL BE MINIMUM 5 LB. DENSITY AND SHALL HAVE UL RATING NOT EXCEEDING 25 FLAME SPREAD, 35 FUEL CONTRIBUTED AND 50 SMOKE DEVELOPED. ACCESSORIES SUCH AS ADHESIVE, MASTICS, CEMENTS AND CLOTH FOR FITTINGS SHALL BE PERMANENTLY FIRE AND SMOKE RESISTANT. CHEMICALS USED FOR TREATING PAPER IN JACKET LAMINATES SHALL BE UNAFFECTED BY WATER OR HUMIDITY.

LOCATE COVER SEAMS IN LEAST VISIBLE LOCATIONS.

GRILLES, REGISTERS AND CEILING DIFFUSERS

A. REFER TO SCHEDULE ON DRAWINGS FOR CAPACITIES, SIZES AND TYPES.

AFTER THE VISUAL INSPECTION, ALL FANS SHALL BE TESTED AT FULL SYSTEM STATIC PRESSURES BY OPERATING THE SYSTEM FANS.

ALL TESTS SHALL BE CONDUCTED IN THE PRESENCE OF THE TESTING AND BALANCING TRADES. ALL REPAIRS MUST BE DONE IN A MANNER SATISFACTORY TO THE ENGINEERS FIELD

BE PROVIDED IN BOTH POINT TO POINT AND LADDER DIAGRAM FORMAT AND AFFIXED TO THE INTERIOR OF THE CONTROL COMPARTMENT ACCESS DOOR.

CONTROLS. INCLUDING WIRING, TRANSFORMERS, 7-DAY PROGRAMMABLE THERMOSTATS FOR PROPER OPERATION OF THE HVAC SYSTEM. WIRING SHALL BE IN ACCORDANCE WITH N.E.C. STANDARDS. COORDINATE WITH CONTROLS AND ELECTRICAL CONTRACTORS.

CONTROLS INSTALLATION

A. WALL MOUNTED 24X7 PROGRAMMABLE THERMOSTAT TO CONTROL FURNACE.

B. EXHAUST FAN (EF-1 TO 4) SHALL BE TIMER CONTROL WITH OVERRIDE WALL SWITCH.

C. ELECTRIC UNIT HEATER SHALL BE CONTROLLED BY BUILT-IN THERMOSTAT.

D. EF-5 SHALL BE SWITCH CONTROLLED WITH TIMER.

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ELECTRICA	ELECTRICAL LIGHTING LEGEND				
	2'x4' FLUORESCENT FIXTURE				
	1'x4' FLUORESCENT FIXTURE				
	2'x2' FLUORESCENT FIXTURE				
	1'x2' FLUORESCENT FIXTURE				
	2'x4' FLUORESCENT FIXTURE (EMERGENCY LIGHT)				
	1'x4' FLUORESCENT FIXTURE (EMERGENCY LIGHT)				
	2'x2' FLUORESCENT FIXTURE (EMERGENCY LIGHT)				
⊢ ⊸−	1'x8' INDUSTRIAL OR STRIP FIXTURE				
⊢⊶⊣	1'x4' INDUSTRIAL OR STRIP FIXTURE				
F	WALL MOUNT FOR STRIP FIXTURE				
0	ROUND SHAPE LIGHT FIXTURE				
Ø	ROUND SHAPE LIGHT EMERGENCY/NIGHT LIGHT FIXTURE				
♀	WALLWASHER FIXTURE				
<u>Q/</u>	WALL MOUNTED FIXTURE				
X	FIXTURE TYPE IDENTIFIER				
1	BATTERY OPERATED EMERGENCY LIGHT UNIT				
Ч	REMOTE HEAD – EMERGENCY LIGHT UNIT				
⊗∕യ	EXIT LIGHT – CEILING MOUNTED				
⊬⊗∕⊬Φ	EXIT LIGHT – WALL MOUNTED				
Sx	LIGHTING SWITCH (X DENOTES TYPE OF SWITCH)				
S ₃	THREE WAY LIGHTING SWITCH				
S4	FOUR WAY LIGHTING SWITCH				
S₀	DIMMER LIGHTING SWITCH				

ELECTRICA	L POWER LEGEND
Φ	DUPLEX RECEPTACLE
\$	DUPLEX RECEPTACLE - CEILING MOUNTE
φ	ISOLATED GROUND DUPLEX RECEPTACLE
\$	DOUBLE DUPLEX RECEPTACLE
P	GFCI RECEPTACLE
φ	SINGLE RECEPTACLE
Ø	SPECIAL RECEPTACLE
Sx	SWITCH (X DENOTES TYPE OF SWITCH)
o	PUSHBUTTON OR SELECTOR CONTROL S
Θ	SPECIAL POWER CONNECTION TO EQUIPM
0	JUNCTION BOX
Ø	3 PHASE MOTOR
¢	SINGLE PHASE MOTOR
다	NON-FUSED DISCONNECT SWITCH
۲	FUSED DISCONNECT SWITCH
⊠∽	COMBINATION MOTOR STARTER
	TRANSFORMER
▼	TELEPHONE RECEPTACLE
∇	DATA RECEPTACLE
V	TELEPHONE/DATA RECEPTACLE
	RECESSED LIGHTING/RECEPTACLE PANEL
	RECESSED LIGHTING/RECEPTACLE PANEL -
_	SURFACE LIGHTING/RECEPTACLE PANEL (
	SURFACE LIGHTING/RECEPTACLE PANEL (20"x
	MAIN DISTRIBUTION PANEL (38"x12")
CP	CONTROL PANEL
FACP	FIRE ALARM CONTROL PANEL
M	SEVEN DAY CONTROLLER
C	LIGHTING CONTACTOR
()	METER
o	CONDUIT UP
•	CONDUIT DOWN
s ()	LINE BREAK SYMBOL
	WIRE RUN
B-1	HOME RUN TO PANEL – CIRCUIT NO. N
	EXISTING CONSTRUCTION
<i>,+,+,+,+,+,+,+,+,</i> ,,	EXISTING CONSTRUCTION TO BE REMOVED
	NEW CONSTRUCTION



GENERAL ELECTRICAL NOTES: NOTED OTHERWISE AS BEING PROVIDED BY THE TENANT. LOCAL CODES. LAWS ORDINANCES AND REGULATIONS. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND CERTIFICATES OF INSPECTIONS FOR ALL WORK. ARTICLE 330. THE PLANS. WIRE SIZES LARGER THAN #12AWG SHALL BE STRANDED COPPER. THE PLANS, SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR. 8. ALL ELECTRICAL EQUIPMENT, INCLUDING CONDUIT AND WIRING SHALL BE NEW AND UNUSED UNLESS NOTED OTHERWISE. PARALLEL TO MECHANICAL PIPING. 14. PROVIDE CIRCUIT I.D. ON THE INSIDE OF ALL RECEPTACLES, CONSISTENT WITH EXISTING METHODS. 15. COORDINATE WITH ARCHITECTURAL PLANS FOR EXACT LOCATIONS OF LIGHTS, SWITCHES, RECEPTACLES, AND WIRING DEVICES. DEVIATE FROM THESE DESIGN CONTRACT DRAWINGS. WITH NEC TABLE 250.66. ELECTRICAL INSPECTOR FROM AUTHORITY HAVING JURISDICTION BEFORE AND AFTER PLACEMENT OF FIRE SEAL MATERIALS. 19. PROVIDE POWER TO ALL MOTORIZED DAMPERS. 20. REPAIR AREAS DAMAGED DURING CONSTRUCTION TO MATCH ADJACENT AREAS WITH RESPECT TO BOTH COLOR AND FINISH. EACH END OF THE CONDUIT RUN. BREAKERS, SAFETY SWITCHES AND MOTOR STARTERS BY MEANS OF NAMEPLATES AS INDICATED. 110.26 AND 110.34. CURRENT SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM OR EQUAL RATING AS ELECTRICAL PANEL. UNGROUNDED CONDUCTORS USING A COMMON NEUTRAL MUST ORIGINATE FROM DIFFERENT PHASES. FOR RECEPTACLE BRANCH CIRCUIT WIRING. HOME RUNS SHALL BE EMT CONDUIT & WIRE. 27. ALL CIRCUITS SHALL INCLUDE GROUND WIRES. 30. EXCEPT WHERE SHOWN OTHERWISE, INSTALL EQUIPMENT AND DEVICES AT THE FOLLOWING HEIGHTS: RECEPTACLES (WALL): 18" A.F.F. TO CENTER RECEPTACLES (ABOVE COUNTER): 44" A.F.F. TO CENTER RECEPTACLES (UNFINISHED AREA): 48" A.F.F. TO TOP SURFACE RACEWAY RECEPTACLE STRIPS: 42" A.F.F. TO BOTTOM LIGHT SWITCHES: 48" A.F.F. TO TOP TELEPHONE OUTLETS (WALL PHONE): 54" A.F.F. TO CENTER TELEPHONE/DATA OUTLETS: 18" A.F.F. TO CENTER 8. CLOCK OUTLETS: 88" A.F.F. TO CENTER 9. FIRE ALARM PULL STATIONS: 48" A.F.F. TO TOP 10. FIRE ALARM HORN/STROBES: 80" A.F.F. TO BOTTOM OR 6" BELOW CEILING (WHICHEVER IS LOWER) 11. CARD READERS: 48" A.F.F. TO CARD SLOT. 12. SECURITY SYSTEM CONTROLS: 48" A.F.F. TO TOP 13. THERMOSTATS/HVAC CONTROLS: 48" A.F.F. TO TOP 14. ELECTRICAL PANELS: 72" A.F.F. TO TOP 15. SAFETY SWITCHES/MOTOR STARTERS: 72" A.F.F. TO TOP (EXCEPT TOP OF HANDLE SHALL NOT EXCEED 78" A.F.F.) 16. MOTOR CONTROL PUSHBUTTONS: 60" A.F.F. TO CENTER 250.50: BE NOT USED AS A PART OF GROUNDING ELECTRODE SYSTEM)). NEC 250.52(A)(1) b. METAL FRAME OF THE BUILDING OR STRUCTURE (WHERE EFFECTIVELY GROUNDED) NEC 250.52(A)(2) c. CONCRETE ENCASED ELECTRODE (ENCASED AT LEAST 2" OF CONCRETE) NEC 250.52(A)(3) d. GROUND RING NEC 250.52(A)(4)e. GROUND ROD NEC 250.52(A)(5) BE INSTALLED AND USED. SIZED BASED ON NEC TABLE 250-66 USING THE UNGROUNDED SERVICE CONDUCTOR SIZE. 34. BOND HOT AND COLD WATER PIPING SYSTEMS.

- PRODUCT.
- 36. COORDINATE ALL CONSTRUCTION WORK WITH ARCHITECTURAL PHASING.

- REDUCE NOISE.







IAME IE	:
	:
LT CURRENT L-L-L (AMPS)	:
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- (1) (2)2" EMPTY UNDERGROUND PVC CONDUITS TO INCOMING TELEPHONE/DATA SERVICE. PROVIDE PULL STRING. FIELD

ELECTRICAL NOTES:

- ALL WORK SHALL BE IN ACCORDANCE WITH THE 1. REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE. GROUNDING SHALL BE ACCORDING TO N.E.C. ARTICLE 250.
- CONDUIT SHALL BE HOT-DIPPED GALVANIZED STEEL 2. CONDUITS FOR EXTERIOR OR RIGID PVC FOR UNDERGROUND CONDUITS, SCHEDULE 40, UL LISTED FOR DIRECT BURIAL UNDERGROUND.
- 3. WIRE SHALL BE SINGLE CONDUCTOR, STRANDED ANNEALED COPPER INSULATED FOR 600 VOLTS, TYPE XHHW OR THHN/THWN, MINIMUM SIZE NO. 12 AWG.
- 4. GROUND WIRES SHALL BE RUN IN ALL CONDUITS.
- CONDUIT AND WIRE ROUTING, ALONG WITH SIZING AND 5. DERATING SHALL BE BY THE ELECTRICAL CONTRACTOR IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
- 6. SEE BUILDING LIGHTING PLANS FOR ALL BUILDING MOUNTED LIGHTING FIXTURES.
- NEC: ALL WORK SHALL BE INSTALLED PER THE CURRENT 7. ADOPTED EDITION OF THE N.E.C. AND ALL STATE AND LOCAL CODES HAVING JURISDICTION.
- 8. ALL CONDUIT PENETRATION IN BUILDING EXTERIOR WALLS SHALL BE WATER TIGHT.
- 9. DATA CONDUIT SHALL HAVE MINIMUM 36" BENDING RADIUS.

EXTERIOR LIGHTING CONTROLS:

PROVIDE AND INSTALL LIGHTING PER ASHRAE 90.1-2013 9.4.1.4 EXTERIOR LIGHTING CONTROL. LIGHTING FOR EXTERIOR APPLICATIONS NOT EXEMPTED IN SECTION 9.1 SHALL MEET THE FOLLOWING

REQUIREMENTS: a. LIGHTING SHALL BE CONTROLLED BY A DEVICE THAT AUTOMATICALLY TURNS OFF THE LIGHTING WHEN SUFFICIENT DAYLIGHT IS

AVAILABLE. b. ALL BUILDING FAÇADE AND LANDSCAPE LIGHTING SHALL BE AUTOMATICALLY SHUT OFF BETWEEN MIDNIGHT OR BUSINESS CLOSING,

WHICHEVER IS LATER, AND 6 A.M. OR BUSINESS OPENING, WHICHEVER COMES FIRST, OR BETWEEN TIMES ESTABLISHED BY THE AUTHORITY HAVING JURISDICTION. c. LIGHTING NOT SPECIFIED IN SECTION 9.4.1.4(B) AND

LIGHTING FOR SIGNAGE SHALL BE CONTROLLED BY A DEVICE THAT AUTOMATICALLY

REDUCES THE CONNECTED LIGHTING POWER BY AT LEAST 30% FOR AT LEAST ONE OF THE FOLLOWING CONDITIONS: FROM 12 MIDNIGHT OR WITHIN ONE (1) HOUR OF THE FND OF BUSINESS OPERATIONS, WHICHEVER IS LATER, UNTIL 6 c.m. OR BUSINESS OPENING, WHICHEVER IS EARLIER

DURING ANY PERIOD WHEN NO ACTIVITY HAS BEEN DETECTED FOR A TIME OF NO LONGER THAN 15 MINUTES ALL TIME SWITCHES SHALL BE CAPABLE OF RETAINING PROGRAMMING

AND THE TIME SETTING DURING LOSS OF POWER FOR A PERIOD AT LEAST TEN HOURS.

EXCEPTIONS: LIGHTING FOR COVERED VEHICLE ENTRANCES OR EXITS FROM BUILDINGS OR PARKING STRUCTURES WHERE REQUIRED FOR SAFETY, SECURITY, OR EYE ADAPTATION 2. LIGHTING THAT IS INTEGRAL TO SIGNAGE AND INSTALLED IN THE SIGNAGE BY THE MANUFACTURER

SEQUENCE OF OPERATION EXTERIOR LIGHTING CONTROLS:

PROVIDE AND INSTALL LIGHTING PER ASHRAE 90.1-2013 9.4.1.4 EXTERIOR LIGHTING CONTROL. LIGHTING FOR EXTERIOR APPLICATIONS NOT EXEMPTED IN SECTION 9.1 SHALL MEET THE FOLLOWING **REQUIREMENTS:** LIGHTING SHALL BE CONTROLLED BY A DEVICE THAT AUTOMATICALLY TURNS OFF THE LIGHTING WHEN SUFFICIENT DAYLIGHT IS AVAILABLE. b. ALL BUILDING FAÇADE AND LANDSCAPE LIGHTING SHALL BE AUTOMATICALLY SHUT OFF BETWEEN MIDNIGHT OR BUSINESS CLOSING, WHICHEVER IS LATER, AND 6 A.M. OR BUSINESS OPENING,

WHICHEVER COMES FIRST, OR BETWEEN TIMES ESTABLISHED BY THE AUTHORITY HAVING JURISDICTION. c. LIGHTING NOT SPECIFIED IN SECTION 9.4.1.4(B) AND LIGHTING FOR SIGNAGE SHALL BE CONTROLLED BY A DEVICE THAT AUTOMATICALLY REDUCES THE CONNECTED LIGHTING POWER BY AT LEAST 30% FOR AT LEAST ONE OF THE FOLLOWING CONDITIONS: 1. FROM 12 MIDNIGHT OR WITHIN ONE (1) HOUR OF THE END OF BUSINESS OPERATIONS, WHICHEVER IS LATER, UNTIL 6 c.m. OR BUSINESS OPENING, WHICHEVER IS EARLIER 2. DURING ANY PERIOD WHEN NO ACTIVITY HAS BEEN DETECTED FOR A TIME OF NO LONGER THAN 15 MINUTES ALL TIME SWITCHES SHALL BE CAPABLE OF RETAINING PROGRAMMING

AND THE TIME SETTING DURING LOSS OF POWER FOR A PERIOD OF AT LEAST TEN HOURS. EXCEPTIONS: 1. LIGHTING FOR COVERED VEHICLE ENTRANCES OR EXITS FROM BUILDINGS OR PARKING STRUCTURES WHERE

REQUIRED FOR SAFETY, SECURITY, OR EYE ADAPTATION 2. LIGHTING THAT IS INTEGRAL TO SIGNAGE AND INSTALLED IN THE SIGNAGE BY THE MANUFACTURER

NOTE:

1. ALL EXTERIOR LIGHTING FIXTURES SHALL BE PROVIDED WITH OCCUPANCY SENSOR TO COMPLY WITH LATEST ADOPTED ENERGY CODE.

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LIG	HTING FIXTURE SCHEDULE:	
1. WHEI "OR AP CONSIDI	RE A SINGLE MANUFACTURER IS INDICATED FOR A LIGHTING FIXTURE, NO SUBSTITUTIONS WILL BE ALLOWED. WHERE PROVED EQUAL" IS INDICATED, EQUIVALENT FIXTURE BY OTHER MANUFACTURES WITH SAME PERFORMANCE WILL BE ERED.	
2. COO	RDINATE FIXTURE TRIM WITH CEILING TYPE.	
TYPE	DESCRIPTION	WATTAGE
FA	2'x4' LED LAY-IN TYPE T8 PREMIUM TROFFER LIGHTING FIXTURE, (1) 34.5 WATT LED LAMPS (3500K), HIGHLY TRANSMISSIVE PRISMATIC PATTERN (0.095" THICKNESS) LENS HELPS TO DIFFUSE THE LED SOURCE PIXILATION, LED DRIVER DELIVER DIMMING FROM 0-10V CONTROL SIGNAL.	39
FB	6" EVO, OPEN REFLECTOR, SOLID-STATE LED DOWNLIGHTS, SELF FLANGED SEMI SPECULAR, MATTE-DIFFUSER OR SPECULAR LOWER REFLECTOR, POLYCARBONATE LENS INTEGRAL TO LIGHT ENGINE, 70% LUMEN MAINTENANCE AT 60,000 HOURS, POWER SUPPLY WITH 0-10V DIMMING, OVERLOAD AND SHORT CIRCUIT PROTECTED. GOTHAM LIGHTING CATALOG #EVO-35/25-6AR-MVOLT OR APPROVED EQUAL.	30
FC	HIGH BAY IS AN AFFORDABLE LED LIGHTING FIXTURE WITH WHITE DIE—CAST ALUMINUM HOUSING. OPTIONAL CLEAR POLYCARBONATE OR DIFFUSE ALUMINUM REFLECTORS AVAILABLE SEPARATELY. CORROSION RESISTANT EXTERNAL HARDWARE STANDARD. HIGH—EFFICIENCY LEDS. 0—10V DIMMING STANDARD FOR A DIMMING. LITHONIA CATALOG #JEBL—30L—50K—80CRI OR APPROVED EQUAL.	218
FD	LOW-PROFILE Z STRIP LED WITH STANDARD DIFFUSE SNAP ON/SNAP OFF LENS ELIMINATES PIXELS, IMPROVES UNIFORMITY AND MINIMIZES GLARE. L/LENS OPTION AVAILABLE. PAINT OPTIONS INCLUDE HIGH-GLOSS, BAKED WHITE ENAMEL FINISHED. LITHONIA LIGHTING CAT. #ZL1N-L48-5000LM-FST-MVOLT-40K-80CRI SERIES OR APPROVED EQUAL	34
FE	WALL-MOUNTED LED LUMINAIRES PROVIDE BOTH ARCHITECTURAL STYLING AND VISUALLY COMFORTABLE ILLUMINATION. ARC2 DELIVERS UP TO 6,500 LUMENS WITH A SOFT, NON-PIXELATED LIGHT SOURCE. IT OFFERS INTEGRATED EMERGENCY BATTERY BACKUP OPTIONS, INCLUDING AN 8W COLD TEMPERATURE OPTION. FINISH BY ARCHITECT. WITH ACCESSORIES #WSBBW-DDBXD-U. LITHONIA LIGHTING CAT. #ARC2LED-P4-40K-MVOLT-E8WC SERIES OR APPROVED EQUAL	30
<pre> FF </pre>	4' LENGTH, NARROW HOUSING, LOW-PROFILE CURVED-BASKET, LED WRAPAROUND FIXTURE. PRISMATIC DIFFUSER IS 100% ACRYLIC WITH SONICALLY WELDED LUMINOUS ENDS. LONG-LIFE LEDS, COUPLED WITH HIGH-EFFICIENCY DRIVERS, PROVIDE SUPERIOR QUANTITY AND QUALITY OF ILLUMINATION FOR EXTENDED SERVICE LIFE. 90% LED LUMEN MAINTENANCE AT 50,000 HOURS. (1) 32.4 WATT LED LAMPS WITH 4000 LUMEN, 3500K, 80CRI, MINIMUM DIMMING LEVEL 10%. LITHONIA LIGHTING CATALOG #LBL4-4000LM-80CRI-35K-MIN10-GZT-MVOLT OR APPROVED EQUAL.	32.4
FH	LOW-PROFILE Z STRIP LED WITH STANDARD DIFFUSE SNAP ON/SNAP OFF LENS ELIMINATES PIXELS, IMPROVES UNIFORMITY AND MINIMIZES GLARE. L/LENS OPTION AVAILABLE. PAINT OPTIONS INCLUDE HIGH-GLOSS, MATTE BLACK FINISHED, CSA CERTIFIED TO US AND CANADIAN SAFETY STANDARDS. FOR USE IN DAMP LOCATIONS BETWEEN -40°F (-40°C) AND 86°F (30°C). LITHONIA LIGHITNG CAT. #TZL1N-L96-6000LM-FST-MVOLT-40K-80CRI SERIES OR APPROVED EQUAL	48
OA	WALL-MOUNTED LED LUMINAIRES PROVIDE BOTH ARCHITECTURAL STYLING AND VISUALLY COMFORTABLE ILLUMINATION. ARC2 DELIVERS UP TO 6,500 LUMENS WITH A SOFT, NON-PIXELATED LIGHT SOURCE. IT OFFERS INTEGRATED EMERGENCY BATTERY BACKUP OPTIONS, INCLUDING AN 8W COLD TEMPERATURE OPTION. FINISH BY ARCHITECT. WITH ACCESSORIES #WSBBW-DDBXD-U. LITHONIA LIGHTING CAT. #ARC2LED-P4-40K-MVOLT-E8WC SERIES OR APPROVED EQUAL	30
EM	BLACK COMPACT, LOW-PROFILE CONTEMPORARY DESIGN LED LIGHTING UNIT. ENGINEERING-GRADE THERMOPLASTIC HOUSING IS IMPACT-RESISTANT, SCRATCH-RESISTANT AND CORROSION-PROOF. TWO LED LAMP HEADS WITH 12 SERIES-PARALLEL WHITE LEDS EACH, PROVIDE REDUNDANT LIGHT SOURCES TO ENSURE EMERGENCY LIGHTING PERFORMANCE. TYPICAL LED LAMP LIFE IS 10 YEARS. LITHONIA LIGHTING CAT. #ELM-LED-B OR APPROVED EQUAL.	1.4
(EM1)	INDUSTRIAL BATTERY OPERATED EMERGENCY LIGHT IS GRAY THERMOPLASTIC, DESIGN TO PERFORM IN A WIDE VARITY OF INDUSTRAL APPLICATIONS. IT IS 5VA FLAME RATED, IMPACT-RESISTANT, SCRATCH-RESISTANT AND CORROSION PROOF. THE SP1100L FEATURES SIX HIGH-PERFORMANCE LEDS RATED AT 10.6 WATTS AND DELIVERS A TOTAL OF 1,100 LUMENS AT 5000K CCT IN A SPOT PATTERN. LITHONIA LIGHTING CAT. #INDL-SP1100L-UVOLT-LTP-SDRT OR APPROVED EQUAL.	10.6
(EXM)	COMBO EXIT AND EMERGENCY LED LIGHTING UNIT, TWIN LED LAMP HEADS OPERATE IN EMERGENCY (DC INPUT) MODE WITH 12 SERIES-PARALLEL WHITE LEDS IN EACH HEAD. PROVIDES REDUNDANT LIGHT SOURCES TO ENSURE EMERGENCY LIGHTING PERFORMANCE. THE TYPICAL LIFE OF THE EXIT LED LAMP IS 10 YEARS. CURRENT-LIMITING CHARGER MAXIMIZES BATTERY LIFE AND MINIMIZES ENERGY CONSUMPTION. 120V. LITHONIA LIGHTING CAT. #LHQM-LED-B-R OR APPROVED EQUAL.	4.3
EX	EXIT SIGN, RED LETTERS, L.E.D. LIGHT SOURCE, NICKEL–CADMIUM BATTERY, DIRECTIONAL CHEVRON ARROWS AS REQUIRED. LITHONIA CAT. #LQM–S–3–R–120/277 OR APPROVED EQUAL.	0.62W

EMERGENCY LIGHTING FIXTURES "EM/BL"

1. ALL EMERGENCY LIGHTING FIXTURES ARE SHOWN HALF SHADED ON FLOOR PLAN. ALL EMERGENCY LIGHTING FIXTURES SHALL BE SUPPLIED WITH FACTORY INSTALLED EMERGENCY BATTERY (EM/BL) TO PROVIDE MIN. 1,100 LUMENS FOR 90 MIN. COMPATIBLE WITH LIGHTING FIXTURES SHOWN ON THE FLOOR PLAN.

IF FACTORY INSTALLED BATTERY IS NOT AVAILABLE PROVIDE COMPATIBLE EMERGENCY BATTERY BY BODINE OR APPROVED EQUAL WITH REMOTE TEST SWITCH AND CHARGING INDICATOR TO PROVIDE MIN. 1,100 LUMENS FOR 90 MIN.

OCCUP/	ANCY SENS	OR AND SWITCH	<u>es schedui</u>	<u>_E:</u>					
SYMBOL	MANUF.	MODEL NO.	COLOR	MIN. LIGHT LEVEL SETTING	TIME DELAY SETTING	VOLTAGE LEVEL	POWER PACK	MOUNTED	REMARKS
S	SEE SPECS	_	AS DIRECTED BY ARCHITECT	N/A	N/A	120/277V	N/A	WALL	LINE VOLTAGE TOGGLE SWITCH
S₀	SEE SPECS	-	AS DIRECTED BY ARCHITECT	N/A	N/A	120/277V	N/A	WALL	LINE VOLTAGE DIMMER SWITCH, ARCHITECTURAL PRESET SLIDE DIMMER COMPATIBLE WITH LAMPS AS INDICATED ON DRAWINGS.
S20	ACUITY	WSXA PDT XX	AS DIRECTED BY ARCHITECT	30Fc	20 min.	120/277V	NO	WALL	NO CONTROL PANEL NEEDED. 0-800W, ONE LIGHTING LEVEL
S30	ACUITY	WSXA PDT 2P XX	AS DIRECTED BY ARCHITECT	30Fc	20 min.	120/277V	NO	WALL	NO CONTROL PANEL NEEDED. 0-800W, DUAL LIGHTING LEVEL
Swd	ACUITY	WSXA PDT D XX nWSXA PDT D XX	AS DIRECTED BY ARCHITECT	_	20 min.	120V 277V	NO	WALL	DIMMABLE AUTOMATIC WALL SWITCH, 10-500W, UP TO 300sf, 10% TO 100% DIMMING
Sts	ACUITY	PTS 60	AS DIRECTED BY ARCHITECT	_	20 min.	120/277V	NO	WALL	DIGITAL TIME SWITCH, 0-800W, LINE VOLTAGE
SNP1	ACUITY	nPODMA XX NOTE 9	AS DIRECTED BY ARCHITECT	_	_	LOW VOLTAGE	YES	WALL	WORKING WITH PANEL OR STANDALONE LOW VOLTAGE SWITCH. SEE FLOOR PLANS FOR DIMMING OPTION
SNP2	ACUITY	nPODMA 2P XX NOTE 9	AS DIRECTED BY ARCHITECT	_	_	LOW VOLTAGE	YES	WALL	WORKING WITH PANEL OR STANDALONE LOW VOLTAGE SWITCH. SEE FLOOR PLANS FOR DIMMING OPTION
SNP4	ACUITY	nPODMA 4P XX NOTE 9	AS DIRECTED BY ARCHITECT	_	_	LOW VOLTAGE	YES	WALL	WORKING WITH PANEL OR STANDALONE LOW VOLTAGE SWITCH. SEE FLOOR PLANS FOR DIMMING OPTION
SNPT	ACUITY	nPOD TOUCH	AS DIRECTED BY ARCHITECT	_	_	LOW VOLTAGE	YES	WALL	WORKING WITH PANEL OR STANDALONE LOW VOLTAGE CONTROLLER
-``@_`-	ACUITY	CM OR nCM	AS DIRECTED BY ARCHITECT	_	20 min.	LOW VOLTAGE	YES	CEILING	LOW VOLTAGE CEILING DUAL TECHNOLOGY (PIR/MICROPHONICS) SENSOR
-ऴ(- D	ACUITY	CM OR nCM	AS DIRECTED BY ARCHITECT	_	20 min.	LOW VOLTAGE	YES	CEILING	CEILING SENSOR WITH PHOTOCELL AND DIMMING FOR DAYLIGHT CONTROL. WILL BE USED CLOSE TO WINDOWS.
CX 100	ACUITY	WV PDT 16	AS DIRECTED BY ARCHITECT	20Fc	20 min.	24VDC	YES	CEILING/WALL	NO PANEL, LOW VOLTAGE CEILING DUAL TECHNOLOGY (PIR/MICROPHONICS) SENSOR
PP	ACUITY	nPP16	N/A	_	_	120/277V	N/A	SEE FLOOR PLANS	DUAL VOLTAGE RELAY PACK. 120/277V, 15VDC, 16A LOAD
\mathbb{PP}_{D}	ACUITY	nPP16 D EFP *NOTE 10	N/A	_	_	120/277V	N/A	SEE FLOOR PLANS	DUAL VOLTACE RELAY PACK WITH 0-10V DIMMING OUTPUT OR COMPATIBLE 120/277V, 15VDC, 16A, 1/2HP LOAD
(EP) _D	ACUITY	nPP16 D ER EFP *NOTE 10	N/A	_	_	120/277V	N/A	SEE FLOOR PLANS	DUAL VOLTAGE EMERGENCY RELAY PACK WITH O-10V DIMMING OUTPUT OR COMPATIBLE 120/277V, 15VDC, 16A, 1/2HP LOAD
PP _{DX}	ACUITY	nSP5 PCD XX *NOTE 10	N/A	-	_	120/277V	N/A	SEE FLOOR PLANS	DUAL VOLTAGE EMERGENCY RELAY PACK WITH 2 WIRE, MAGNETIC LOW VOLTAGE AND ELECTRONIC LOW VOLTAGE DIMMING OUTPUT 120/277V, 15VDC, 16A, 1/2HP LOAD
	•	•		•				•	•

nLIGHT NETWORKED DIGITAL LIGHTING CONTROL SYSTEM SHALL BE USING SENSORS STARTING WITH nXXX AS MENTIONED ABOVE.

DESIGN BASED ON ACUITY SENSORS.

. DEVICE FINISHES SHALL BE AS DETERMINED BY ARCHITECT.

2. IF ONE OF THE "OTHER ACCEPTABLE PRODUCT" SENSORS ARE USED, CONTRACTOR SHALL PROVIDE ADDITIONAL SENSORS AS NEEDED TO COMPLETELY COVER THE SPACE SERVED. QUANTITIES ON DRAWINGS ARE BASED ON THE COVERAGE OF THE BASIS-OF-DESIGN SENSORS. EXACT LOCATIONS OF ALL SENSORS SHALL BE AS RECOMMENDED BY MANUFACTURER.

3. ALL OCCUPANCY/VACANCY SENSOR TIME DELAYS SHALL BE 20 MINUTES, UNLESS NOTED OTHERWISE. 4. PROVIDE ALL LOW-VOLTAGE WIRING NEEDED FOR A FULLY OPERATIONAL SYSTEM (CAT 5E, 0-10V VIOLET-AND-GRAY, ANY OTHER MANUFACTURER-RECOMMENDED CABLING, PLENUM-RATED WHERE IN AIR HANDLING SPACES, IN DEDICATED CONDUIT SYSTEM WHERE NOT ABOVE ACCESSIBLE CEILINGS, IN DEDICATED SLEEVES WHERE PENETRATING PARTITIONS). 5. FOR CAT5E "PLUG-AND-PLAY" SYSTEMS, AT LEAST ONE WALL SWITCH IN EACH ROOM SHALL HAVE AN OPEN CAT5E PORT (SO THAT THERE IS AN EASILY ACCESSIBLE

OPEN PORT). 6. PROVIDE ALL PROGRAMMING NEEDED TO SET UP SENSORS, POWER PACKS AND LOW-VOLTAGE SWITCHES.

7. ALL MANUAL CONTROL MOUNTING HEIGHTS SHALL BE 48" AFF TO THE TOP. LOAD CONTROLLERS SHALL BE LOCATED ABOVE THE NEAREST ACCESSIBLE CEILING (PLENUM-RATED WHERE IN AIR HANDLING SPACES).

8. PROVIDE LOAD CONTROLLERS IN QUANTITIES NÉEDED TO SERVE THE NUMBER OF ZONES INDICATED ON THE DRAWINGS. ROOMS MAY SHARE LOAD CONTROLLERS IF THERE ARE SUFFICIENT OUTPUTS AND IF ROOMS CAN STILL OPERATE INDEPENDENTLY OF ONE ANOTHER. LOAD CONTROLLERS SHALL BE THE DIMMING TYPE WITH 0-10V WIRING IN ROOMS WHERE SWITCHES ARE THE DIMMING TYPE OR WHERE PHOTOSENSORS ARE PRESENT. OTHERWISE USE DIFFERENT DIMMING RELAYS COMPATIBLE WITH LIGHTING FIXTURES. 9. SEE FLOOR PLANS FOR DIMMING OPTIONS.

10. PROVIDE DIMMING POWER PACK COMPATIBLE WITH LIGHTING FIXTURES PROVIDED. VERIFY LIGHTING FIXTURE IS COMPATIBLE WITH DIMMING SYSTEM BEFORE INSTALLATION.

NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

NOTE:

1. ALL EXTERIOR LIGHTING FIXTURES SHALL BE PROVIDED WITH OCCUPANCY SENSOR TO COMPLY WITH LATEST ADOPTED ENERGY CODE.

2. FUNCTIONAL PERFORMANCE TEST WILL BE CONDUCTED PER C408.2.3 OF 2015 MICHIGAN ENERGY CODE / ASHRAE 90.1– 2013. 3. PRELIMINARY COMMISSIONING REPORT PER C408.2.4 OF 2015 MICHIGAN ENERGY CODE / ASHRAE 90.1 – 2013 SHALL BE PROVIDED BY DESIGN

PROFESSIONAL. 4. ACCEPTANCE OF REPORT SHALL BE PROVIDED PER C408.2.4.1 OF 2015 MICHIGAN ENERGY CODE / ASHRAE 90.1 – 2013 FOR BUILDING OR

PORTION.

CLIENT	
CROW ENTERPRISES	INC
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	5		G	11,085	L3 1,992	C C	H H	LIGHTING-PLANT#100	20A-1P 20A-1P	6
	9 60A-3P	OVERHEAD CRANE	G	11,085	L2 2,820	C	H	LIGHTING-SITE,OUTDOOR	20A-1P	10
	13			2,937	L3 1,000 L1 1,398	C	H	LIGHTING-PLANT#100	20A-1P	14
	15 25A-3P 17	XXX XXX		2,937 2,937	L2 1,600 L3 3,000	C C	н Н	LIGHTING-LOGO LIGHT LIGHTING-SITE	20A-1P 20A-1P	16 18
	19 21 25A-3P	XXX ARU-1		3,547 3,547	L1 3,000 L2	C G	Н	LIGHTING-SITE SPARE	20A-1P 20A-1P	20 22
	23 25	XXX XXX	N	3,547 3,000	L3 L1	G		SPARE SPARE	20A-1P 20A-1P	24 26
	27 30A-3P	TRUCK FILL PUMP	G	3,000	L2	G		SPARE SPARE	20A-1P	28
	31 20A-1P	SPARE	6	0,000	L1	G		SPARE SPARE	20A-1P	32
	35 20A-1P	SPARE	6		L3	G			20A-1F	36
	37 20A-1P 39 20A-1P	SPARE SPARE	6	·	L1 L2	G				38 40
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	45 47		- G	i l	L2 L3	G G				46 48
	49 51		G		L1	G				50 52
	53				L3	G				54
	57				L2	G				58
	59 61				L3 L1	G G				60 62
	63 65		- G		L2 L3 500	G G		LTG CONTRL PANEL LCP-AA	A 20A-1P	64 66 *
CONNEC	CTED LOAD: 1	14.61 KVA						FED FROM: SEE ON	IE LINE DIA	AGRAM
DEMAND	D LOAD: 122.0	07 KVA DEMAND AM	1P: 146.8	39 AMP				FEEDER SIZE: SEE	ONE LINE	DIAGRAM
IGHTINC	G CONTRC)L PANEL: LCP-	-AA	POW	ER SUP	PLY:	277	7V. N	MANUFACTU	Jrer: Acuity
LIGHTING 10UNTING: 10CATION:	G CONTRC : surface elect. rm.)L PANEL: LCP— #104	-AA	POW NUM ENC	ER SUF IBER OF LOSURE	PLY: REI : NE I	277 Lay: Ma	7V. N 16 T 1 L	MANUFACTU TYPE: nLIGH LIGHTING F	JRER: Acuity HT Panel: LP-AA
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_IGHTING MOUNTING: LOCATION:	G CONTRO SURFACE ELECT. RM.)L PANEL: LCP- #104 LOAD <u>CONTROLLED</u> 3-OUTDOOR 3-PLANT#100	-AA	POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC	ER SUF IBER OF LOSURE	PLY: REI NEI	277 LAY: MA	7V. N 16 T 1 LOAD CONTROLI LIGHTING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE	Manufactu IYPE: nLIGF Lighting f	JRER: ACUITY HT PANEL: LP-AA LIGHTIN CIRCUI AA-10 AA-10
_IGHTING MOUNTING: _OCATION: _AY LIGH 	CONTRC SURFACE ELECT. RM. UIT 10 LIGHTING 14 LIGHTING 4 LIGHTING)L PANEL: LCP – #104 CONTROLLED 3-OUTDOOR 3-PLANT#100 3-PLANT#100 3-PLANT#100	-AA	POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC	ER SUF IBER OF LOSURE 7 SI 0 TC/ 1 TC/ 1 TC/ 1 TC/ 1 TC/	PLY: REI NSO PHOT PHOT PHOT PHOT	277 LAY: MA	7V. N 16 T 1 LOAD CONTROLI LIGHTING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE	Manufactu Type: nligh Lighting f	JRER: ACUITY HT PANEL: LP-AA LIGHTIN <u>CIRCUI</u> AA-16 AA-10 AA-20 AA-20
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LIGHTING MOUNTING: OCATION: AY LIGH CIRC AA-4 AA-4 AA-4 AA-4 AA-4 AA-4 AA-4 AA-	G CONTRO SURFACE ELECT. RM. TING SUIT 10 LIGHTING 4 LIGHTING 4 LIGHTING 6 LIGHTING 6 LIGHTING 18 LIGHTING 10 LIGHTING 10 LIGHTING 11 LIGHTING 12 MONUMB 14 LIGHTING)L PANEL: LCP- #104 LOAD CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE	-AA	POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO	ER SUF IBER OF LOSURE 7 SI 0 TC/ 1 T	PLY: REI NEI VITCF NSO PHOT PHOT PHOT	277 LAY: MA	7V. N 16 T 1 LOAD CONTROLI LIGHTING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE SPARE SPARE SPARE SPARE SPARE	MANUFACTU TYPE: nLIGH LIGHTING F	JRER: ACUITY IT PANEL: LP-AA DANEL: LIGHTIN CIRCUI DANEL: LP-AA DANEL: LIGHTIN CIRCUI DANEL: LP-AA DANEL: LIGHTIN CIRCUI DANEL: LIGHTIN CIRCUI DANEL: LIGHTIN CIRCUI
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LIGHTING: AOUNTING: OCATION: AY LIGH CIRC AA-7 A	CONTRO SURFACE ELECT. RM. TING CUIT 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 18 LIGHTING 18 LIGHTING 10 LIGHTING 10 LIGHTING 114 LIGHTING 12 MONUME 14 LIGHTING 12 MONUME 14 LIGHTING 12 MONUME 14 LIGHTING 12 MONUME 14 LIGHTING 12 MONUME 14 LIGHTING 12 MONUME 14 LIGHTING 15 MONUME 14 LIGHTING 15 MONUME 14 LIGHTING)L PANEL: LCP- #104 LOAD CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE G-SITE S-SITE S-SITE S-SITE S-PLANT#100 CIRCUIT DESCRIPTION		POW NUM ENC SWITCH, SENSOF TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO	ER SUF IBER OF LOSURE 7 SV 1 TC/ 1 T	PLY: REI NEI PHOT PHOT PHOT	277 LAY: MA	7V. N 16 T 1 LOAD CONTROLI LIGHTING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE SPARE <td>MANUFACTU TYPE: nLIGH LIGHTING F</td> <td>JRER: ACUITY -T PANEL: LP-AA DANEL: LP-AA CIRCUI AA-10 AA-10 AA-2</td>	MANUFACTU TYPE: nLIGH LIGHTING F	JRER: ACUITY -T PANEL: LP-AA DANEL: LP-AA CIRCUI AA-10 AA-10 AA-2
LIGHTING AOUNTING: OCATION: AY LIGH CIRC AA-7 AA	CONTRO SURFACE ELECT. RM. TING UIT 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 13 LIGHTING 12 MONUME 14 LIGHTING 14 LIGH)L PANEL: LCP- #104 LOAD CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE G-SITE G-SITE S-SITE ENT SIGN G-PLANT#100 CIRCUIT DESCRIPTION CIRCUIT DESCRIPTION		POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO	ER SUF IBER OF LOSURE 7 SI 0 TC/ 1 T	PLY: REI NEI PHOT PHOT PHOT	277 LAY: MA 1/ R 00 10 10 10 10 10 10 10 10 10 10 10 10	7V. N 16 T 1 LOAD CONTROLI LIGHTING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE CIRCUIT DESCRIPTION CIRCUIT DESCRIPTION	MANUFACTU TYPE: nLIGH LIGHTING F LED	JRER: ACUITY TT PANEL: LP-AA LIGHTIN CIRCUI AA-10 AA-10 AA-20 AA
LIGHTING AOUNTING: OCATION: AY LIGH CIRC AA-7 AA	CONTRO SURFACE ELECT. RM. TING UIT 10 LIGHTING 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 13 LIGHTING 12 MONUME 14 LIGHTING 14 LIGHTING)L PANEL: LCP- #104 LOAD CONTROLLED G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE G-SITE C-RCUIT DESCRIPTION CIRCUIT DESCRIPTION		POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO	ER SUF IBER OF LOSURE 7 SI 0 TC/ 1 T	PLY: REI NITCH PHOT	277 LAY: MA 1/ R 00 10 10 10 10 10 10 10 10 10 10 10 10	7V. N 16 T 1 LOAD CONTROLI LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE CIRCUIT DESCRIPTION CIRCUIT DESCRIPTION	MANUFACTU TYPE: nLIGH LIGHTING F	JRER: ACUITY TT PANEL: LP-AA DANEL: LP-AA CIRCUI AA-10 AA-10 AA-2
LIGHTING AOUNTING: OCATION: AY LIGH CIRC AA-7 AA	CONTRO SURFACE ELECT. RM. TING UIT 10 LIGHTING 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 18 LIGHTING 18 LIGHTING 18 LIGHTING 10 LIGHTING 10 LIGHTING 11 LIGHTING 12 MONUME 14 LIGHTING 12 MONUME 14 LIGHTING 15 T 7 9 11	DL PANEL: LCP- #104 LOAD CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE G-SITE ENT SIGN G-PLANT#100 NATION: LP-BE (NEW) CIRCUIT DESCRIPTION		POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO	ER SUF IBER OF LOSURE 1 TC/ 1 TC/	PLY: REI NSO PHOT PHOT PHOT PHOT	277 LAY: MA 1/ R 00 00 10 10 10 10 10 10 10 10 10 10 10	7V. N 16 T 1 LOAD CONTROLI LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE SPARE CIRCUIT DESCRIPTION CIRCUIT DESCRIPTION	MANUFACTU TYPE: nLIGH LIGHTING F	JRER: ACUITY TT PANEL: LP-AA DANEL: LP-AA LIGHTIN CIRCUI AA-10 AA-20 AA
LIGHTING AOUNTING: OCATION: AY LIGH CIRC AA-7 AA	CONTRO SURFACE ELECT. RM. TING UIT 10 LIGHTING 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 13 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 15 MONUME 14 LIGHTING 14 LIGHTING 15 MONUME 14 LIGHTING 14 LIGHTING 15 MONUME 11 III 13 IIII 13 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII)L PANEL: LCP- #104 LOAD CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE G-SITE S-SITE ENT SIGN G-PLANT#100 NATION: LP-BE (NEW)		POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO TC/	ER SUF IBER OF LOSURE 1 TC/ 1 TC/	PLY: REI NSO PHOT PHOT PHOT PHOT	277 LAY: MA 1/ R 00 00 00 00 00 00 00 00 00 00 00 00 0	7V. N 16 T 1 LOAD CONTROLI LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE SPARE SPARE	MANUFACTU TYPE: nLIGH LIGHTING F	JRER: ACUITY T PANEL: LP-AA DANEL: LP-AA LIGHTIN CIRCUI AA-10 AA-20 AA-
LIGHTING AOUNTING: OCATION: AY LIGH CIRC AA-7 AA	CONTRO SURFACE ELECT. RM. TING CUIT 10 LIGHTING 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 13 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 15 T 10 STE # BKR 1 3 5 7 9 11 11 13 15 17 16)L PANEL: LCP- #104 LOAD CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE S-SITE ENT SIGN G-PLANT#100 NATION: LP-BE (NEW) CIRCUIT DESCRIPTION		POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO TC/	ER SUF IBER OF LOSURE 7 SI 0 TC/ 1 T	PLY: REI NSO PHOT PHOT PHOT PHOT PHOT	277 LAY: MA 1/ R 00 00 00 00 00 00 00 00 00 00 00 00 0	7V. N 16 T 1 LOAD CONTROLI LIGATING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE SPARE SPARE <td></td> <td>JRER: ACUITY T PANEL: LP-AA DANEL: LP-AA LIGHTIN CIRCUI AA-10 AA-20 AA-</td>		JRER: ACUITY T PANEL: LP-AA DANEL: LP-AA LIGHTIN CIRCUI AA-10 AA-20 AA-
LIGHTING AOUNTING: OCATION: AY LIGH CIRC AA-7 AA	CONTRO SURFACE ELECT. RM. TING CUIT 10 LIGHTING 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 18 LIGHTING 10 LIGHTING 18 LIGHTING 10 LIGHTING 11 LIGHTING 12 MONUME 14 LIGHTING 14 LIGHTING 15 7 9 11 15 17 9 11 13 15 17 19 21)L PANEL: LCP- #104 CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE S-SITE ENT SIGN G-PLANT#100 NATION: LP-BE (NEW) CIRCUIT DESCRIPTION		POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO TC/	ER SUF IBER OF LOSURE 7 SV 1 TC/ 1 T	PLY: REI NSO PHOT PHOT PHOT PHOT	277 LAY: MA 1/ R 00 00 00 00 00 00 00 00 00 00 00 00 0	7V. N 16 T 1 LOAD CONTROLI LIGATING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE SPARE SPARE <td></td> <td>JRER: ACUITY T PANEL: LP-AA DANEL: LP-AA LIGHTIN CIRCUI AA-10 AA-20 AA-</td>		JRER: ACUITY T PANEL: LP-AA DANEL: LP-AA LIGHTIN CIRCUI AA-10 AA-20 AA-
LIGHTING AOUNTING: OCATION: AY LIGH CIRC AA-7 AA	CONTRO SURFACE ELECT. RM. TING CUIT 10 LIGHTING 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 18 LIGHTING 18 LIGHTING 18 LIGHTING 10 LIGHTING 11 LIGHTING 12 MONUME 14 LIGHTING 12 MONUME 14 LIGHTING 15 T 17 T 19 T 11 T 13 T 15 T 17 T 19 T 21 T 23 T 25 T 10 T 11 T 12 T 11 T 13 T 15 T 17 T 19 T 21 T 23 T 25 T 10)L PANEL: LCP- #104 LOAD CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE G-SITE ENT SIGN G-PLANT#100 CIRCUIT DESCRIPTION CIRCUIT DESCRIPTION		POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO	ER SUF IBER OF LOSURE 7 SV 1 TC/ 1 T	PLY: REI NE PHOT PHOT PHOT PHOT PHOT PHOT PHOT PHOT	277 LAY: MA 1/ R 10 00 00 00 00 00 00 00 00 00 00 00 00	7V. N 16 T 1 LOAD CONTROLI LIGHTING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE SPARE SPARE <		JRER: ACUITY -T PANEL: LP-AA DANEL: LP-AA CIRCUI AA-10 AA-10 AA-2
LIGHTING AOUNTING: OCATION: AY LIGH CIRC AA-7 AA	CONTRO SURFACE ELECT. RM. TING CUIT 10 LIGHTING 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 18 LIGHTING 18 LIGHTING 10 LIGHTING 18 LIGHTING 10 LIGHTING 11 LIGHTING 12 MONUME 14 LIGHTING 14 LIGHTING 15 T 17 9 11 13 15 17 19 1 21 23 25 27 29 1)L PANEL: LCP- #104 LOAD CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE G-SITE G-SITE IN SIGN G-PLANT#100 NATION: LP-BE (NEW) CIRCUIT DESCRIPTION		POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO	ER SUF IBER OF LOSURE 7 SV 1 TC/ 1 T		277 LAY: MA 1/ R 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	TV. N 16 T 1 LOAD CONTROLI LIGHTING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE SPARE <td></td> <td>JRER: ACUITY -T PANEL: LP-AA DANEL: LP-AA CIRCUI AA-10 AA-10 AA-2</td>		JRER: ACUITY -T PANEL: LP-AA DANEL: LP-AA CIRCUI AA-10 AA-10 AA-2
LIGHTING AOUNTING: OCATION: AY LIGH CIRC AA-7 AA	CONTRO SURFACE ELECT. RM. TING CUIT 10 LIGHTING 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 18 LIGHTING 10 LIGHTING 18 LIGHTING 10 LIGHTING 11 LIGHTING 12 MONUME 14 LIGHTING 14 LIGHTING 15 T 17 9 11 13 15 T 17 9 11 13 15 T 17 9 11 13 15 T 17 9 11 13 15 T 17 19 19 21 23 25 27 29 31 30)L PANEL: LCP- #104 LOAD CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE G-SITE S-SITE S-SITE S-SITE CNT SIGN G-PLANT#100 NATION: LP-BE (NEW) CIRCUIT DESCRIPTION		POW NUM ENC SWITCH, SENSOR TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO	ER SUF IBER OF LOSURE 7 SV 10 TC/ 1		277 LAY: MA 1/ R 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7V. N 16 T 1 LOAD CONTROLI LIGHTING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE SPARE SPARE <td></td> <td>JRER: ACUITY -T PANEL: LP-AA DANEL: LP-AA CIRCUI AA-10 AA-10 AA-2</td>		JRER: ACUITY -T PANEL: LP-AA DANEL: LP-AA CIRCUI AA-10 AA-10 AA-2
LIGHTING AOUNTING: OCATION: AY LIGH CIRC AA-7 AA	CONTRO SURFACE ELECT. RM. TING CUIT 10 LIGHTING 10 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 14 LIGHTING 18 LIGHTING 18 LIGHTING 18 LIGHTING 18 LIGHTING 10 LIGHTING 11 LIGHTING 12 MONUME 14 LIGHTING 12 MONUME 14 LIGHTING 15 T 7 9 11 3 15 T 17 19 21 23 25 27 29 31 33 35 37)L PANEL: LCP- #104 CONTROLLED G-OUTDOOR G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-PLANT#100 G-SITE G-SITE G-SITE SITE SITE S-SITE NATION: LP-BE (NEW) CIRCUIT DESCRIPTION		POW NUM ENC SWITCH, SENSOF TC/PHOTO LV SWITC LV SWITC LV SWITC LV SWITC LV SWITC TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO TC/PHOTO	ER SUF IBER OF LOSURE 7 SV 10 TC/ 1	PLY: REI TREI PHOT PHOT PHOT PHOT PHOT PHOT PHOT PHOT	277 LAY: MA 1/ R 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7V. N 16 T 1 LOAD CONTROLL LIGHTING-LOGO LIGHT LIGHTING-SITE LIGHTING-SITE LIGHTING-SITE SPARE LIGHTING-SITE RATING: Z LIGHT SPARE SP		JRER: ACUITY -T PANEL: LP-AA DANEL: LP-AA CIRCUI AA-10 AA-10 AA-2

NEMA On: E	A 1 LECT. RI	(NEW) 1. #104	MAIN	: 400/	A. M	I.C.B.		RATING: 10,0 0	00 A.I.C.		
#	BKR	CIRCUIT DESCRIPTION	нт	VA	1 1	VA	П	CIRCUIT DESCRIPTION	BKR	#	
1	20A-1P	RECEPTACLE-PLANT #100	D	600	L1	791	СН	LTG-RM#101-104. EF-1	20A-1P	2	
3	20A-1P	(10)MD-1	M	500	L2	280	СН	LIGHTINGRM.#201.202.EF-3	20A-1P	4	
5	20A-2P	OVER HEAD DOOR	G	1,400	L3	600	M	IRH-1, IRH-2, IRH-3	20A-1P	6	
7		XXX	G	1,400	L1	200	M	IRH-8	20A-1P	8	
9	20A-2P	OVER HEAD DOOR	G	1,400	L2	600	M	IRH-7, IRH-9, IRH-10	20A-1P	10	
11		XXX	G	1,400	L3	1.000	D	RECDRIVER#101.MECH RM.	20A-1P	12	
13	20A-2P	COILING DOOR	G	1.400	L1	1,500	D	GFI RECEPVM	20A-1P	14	277/480V/ 3DH 4W/
15		XXX	G	1.400	L2	1,500	D	GFI RECEPVM	20A-1P	16	2111400 V 31 11, 4VV
17	20A-1P	GFI RECEPSTOR	D	600	L3	1.500	D	GFI RECEPVM	20A-1P	18	LOAD SUMMARY
19	20A-1P	RECEPTACLE-RM#100.104	D	1.200	L1	1.500	D	GFI RECEPEWC	20A-1P	20	
21	20A-2P	EUH-1	M	1.500	L2	50	M	EF-2, EF-4	20A-1P	22	
23		XXX	M	1.500	L3	800	D	GFI RECEP REST RM #102	20A-1P	24	
25	20A-2P	OVER HEAD DOOR	G	1.400	L1	1.000	G	ELECTRIC FAUCET	20A-1P	26	
27		XXX	G	1.400	L2	1,411	M	F-1	20A-1P	28	
29	20A-2P	OVER HEAD DOOR	G	1,400	L3	500	M	WH-1 IGNITION	20A-1P	30	
31		XXX	G	1.400	L1	1,740	M	ACCU-1	35A-2P	32	
33	20A-2P	OVER HEAD DOOR	G	1 400	12	1 740	M	XXX		34	
35		XXX	G	1 400	13	600	M	IRH-4 IRH-5 IRH-6	20A-1P	36	MCC
37	20A-2P	OVER HEAD DOOR	G	1,100	11	1,200	D	RECEP - CTRL RM #201	20A-1P	38	
39	20/12	XXX	G	1 400	12	1,200	D	RECEP - CTRL RM #201	20A-1P	40	
41	20A-1P	GFI RECEPOUT DOOR	D	600	L3	1.000	D	RECEP CTRL RM.#201	20A-1P	42	
43	20A-1P	GEL RECEP-OUT DOOR		1 000	11	1,000	G		20A-1P	44	
45	20A-2P	SLIDE GATE	G	250	L2	800	D	GFI RECEP REST RM #202	20A-1P	46	
47		XXX	G	250	L3	1.000	G	ELECTRIC FAUCET	20A-1P	48	GENERAL LU
49	20A-2P	SLIDE GATE	G	250	L1	1,176	M	EF-H-1	25A-1P	50	
51		XXX	G	250	L2	1,176	M	EF-H-2	25A-1P	52	
53	20A-1P	RECTELE BACBOARD #104	D	800	L3	1,176	M	EF-H-3	25A-1P	54	
* 55	20A-1P	HEAT TRACE SY STEM	G	1.500	L1	800	G	BULKER DRIVER SYSTEM	20A-1P	56	RECEPTA
* 57	20A-1P	HEAT TRACE SY STEM	G	1.500	L2	6.900	G	JUNCTION BOX-HVAC UNIT	60A-2P	58	
59	20A-1P	GFI RECEP-CO2 MA CHINE	D	800	L3	6.900	G	XXX	Decision of the second se	60	
61	20A-1P	GFI RECEPTACLE-FLOOR	D	800	L1	,	G	SPARE	20A-1P	62	LIGHTIN
63	20A-1P	GFI RECEPTACLE-FLOOR	D	800	L2		G	SPARE	20A-1P	64	LIGHTING
65	20A-1P	GFI RECEPTACLE-FLOOR	D	800	L3		G	SPARE	20A-1P	66	
67	20A-1P	RECEPTACLE-DRY ER	D	1,500	L1		G	SPARE	20A-1P	68	
69	20A-1P	RECEPTACLE-DRY ER	D	1,500	L2		G	SPARE	20A-1P	70	MOTORS/I
71	20A-1P	SPARE	G		L3		G	SPARE	20A-1P	72	
73	20A-1P	SPARE	G		L1		G	SPARE	20A-1P	74	
75	20A-1P	SPARE	G		L2		G			76	KITCHE
77	20A-1P	SPARE	G		L3		G			78	
79	20A-1P	SPARE	G		L1		G			80	
81			G		L2		G			82	
83			G		13		G			84	AIOI I

10N: S	ITE		MAI	N: 125	A. N	I.C.B.			RATING: 10,0	00 A.I.C.	
#	BKR	CIRCUIT DESCRIPTION	H I	VA		VA	IH	CIRCUI	T DESCRIPTION	BKR	#
1	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L1	1,500	G	GFI REC	CEPT BLOCK HEATER	20A-1P	2
3	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L2	1,500	G	GFI REC	CEPT BLOCK HEATER	20A-1P	4
5	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L3	1,500	G	GFI REC	CEPT BLOCK HEATER	20A-1P	6
7	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L1	1,500	G	GFI REC	CEPT BLOCK HEATER	20A-1P	8
9	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L2	1,500	G	GFI REC	CEPT BLOCK HEATER	20A-1P	10
11	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L3	1,500	G	GFI REC	CEPT BLOCK HEATER	20A-1P	12
13	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L1	1,500	G	GFI REC	CEPT BLOCK HEATER	20A-1P	14
15	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L2	1,500	G	GFI REC	CEPT BLOCK HEATER	20A-1P	16
17	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L3	1,500	G	GFI REC	CEPT BLOCK HEATER	20A-1P	18
19	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L1		G	SPARE		20A-1P	20
21	20A-1P	SPARE	G		L2		G	SPARE		20A-1P	22
23	20A-1P	SPARE	G		L3		G	SPARE		20A-1P	24
25	20A-1P	SPARE	G		L1		G	SPARE		20A-1P	26
27	20A-1P	SPARE	G		L2		G	SPARE		20A-1P	28
29			G		L3		G				30
31			G		L1		G				32
33			G		L2		G				34
35			G		L3		G				36
37			G		L1		G				38
39			G		L2		G				40
41			G		13		G				42

CATION: SI	JR TE		MAIN	l: 125 /	4. M	I.C.B.		RATING: 10,000 A.I.C.
#	BKR	CIRCUIT DESCRIPTION	HI	VA		VA	IH	CIRCUIT DESCRIPTION BKR #
1	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L1	1,500	G	GFI RECEPT BLOCK HEATER 20A-1P 2
3	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L2	1,500	G	GFI RECEPT BLOCK HEATER 20A-1P 4
5	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L3	1,500	G	GFI RECEPT BLOCK HEATER 20A-1P 6
7	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L1	1,500	G	GFI RECEPT BLOCK HEATER 20A-1P 8
9	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L2	1,500	G	GFI RECEPT BLOCK HEATER 20A-1P 10
11	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L3	1,500	G	GFI RECEPT BLOCK HEATER 20A-1P 12
13	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L1	1,500	G	GFI RECEPT BLOCK HEATER 20A-1P 14
15	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L2	1,500	G	GFI RECEPT BLOCK HEATER 20A-1P 16
17	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L3	1,500	G	GFI RECEPT BLOCK HEATER 20A-1P 18
19	20A-1P	GFI RECEPT BLOCK HEATER	G	1,500	L1		O	SPARE 20A-1P 20
21	20A-1P	SPARE	G		L2		G	SPARE 20A-1P 22
23	20A-1P	SPARE	G		L3		G	SPARE 20A-1P 24
25	20A-1P	SPARE	G		L1		G	SPARE 20A-1P 26
27	20A-1P	SPARE	G		L2		G	SPARE 20A-1P 28
29			G		L3		G	30
31			G		L1		G	32
33			G		L2		G	34
35			G		L3		G	36
37			G		L1		G	38
39			G		L2		G	40
41			G		L3		G	42

277/480V 3PH, 4W					
LOAD SUMMARY					
SWG					
GENERAL LOAD (MIS					
RECEPTACLES					
LIGHTING					
MOTORS/MECH					
KITCHEN					
TOTAL					

	CONNECTED KVA	DEMAND FACTOR	DEMAND KVA	DEMAND AMPS	CONN AMPS
SC)	0.0	1.00	0.0	0.0	0.0
	0.0	#DIV/0!	0.0	0.0	0.0
	0.0	1.25	0.0	0.0	0.0
	450.4	1.00	450.4	542.0	542.0
	0.0	0.65	0.0	0.0	0.0
	450.4		450.4	542.0	542.0

	CONNECTED KVA	DEMAND FACTOR	DEMAND KVA	DEMAND AMPS	CONN AMPS
SC)	700.8	1.00	700.8	843.4	843.4
	23.0	0.72	16.5	19.9	27.7
	20.2	1.25	25.3	30.4	24.3
	584.1	1.00	584.1	702.9	702.9
	0.0	0.65	0.0	0.0	0.0
	1328.1		1326.7	1596.5	1598.2













GENERAL DRAWING NOTES:

- GN1. SEE LEGEND AND LIGHTING FIXTURE SCHEDULE.
- GN2. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OWNER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
- GN3. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WITH REQUIRE SERVICE ACCESS.
- GN4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
- GN5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
- GN6. INSTALL NO FIXTURE FINISHED TRIMS, REFLECTORS, LAMPS, ETC. BEFORE ALL GYPSUM BOARD INSTALLATIONS HAVE BEEN COMPLETED AND PAINTED AND ALL OTHER CONSTRUCTION WORK THAT GENERATES DUST OR AIRBORN DEBRIS HAS BEEN COMPLETED. ANY FIXTURES REQUIRING FINAL CLEANING SHALL BE CLEANED USING ONLY THE FIXTURE MANUFACTURER'S RECOMMENDED METHOD(S).
- GN7. FIXTURES DAMAGED BY INSTALLATION PRIOR TO THE SIGNIFICANT COMPLETION OF OTHER WORK IN THE PROJECT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE.
- GN8. PROVIDE AND INSTALL CONDUITS, JUNCTION BOXES AND ALL DEVICES CONCEALED IN WALLS OR ABOVE CEILINGS FOR ALL FINISHED AREAS. ALL DEVICES INSTALLED IN UNFINISHED AREAS AND MECHANICAL/ELECTRICAL ROOMS SHALL BE SURFACE MOUNTED.
- GN9. ALL PENETRATION THROUGH ALL WALLS SHALL BE SEALED WITH HILTI FIRE STOP.
- GN10. PROVIDE AND INSTALL FIRE STOP MATERIAL FOR ALL SLEEVES PASSING THROUGH FLOORS AND FIRE RATED WALLS. PACK SLEEVES WITH FIRE STOP MATERIAL AFTER CABLES ARE INSTALLED. COORDINATE AND VERIFY WITH ARCHITECTURAL DRAWINGS.
- GN11. WIRE: ALL 20 AMP 277V,1PH CIRCUITS ARE 1/2"C, 2#12 & #12G WITH DEDICATED NEUTRAL. HOMERUNS OVER 70 FEET ARE #10 AWG. USE OF MC CABLES PER NEC ARTICLE 330 IS PERMITTED ONLY IN AREA WHERE IS NOT VISIBLE (DRYWALL OR CEILING TILES).

KEY DRAWING NOTES:

(1) LIGHTING FIXTURE FOR LOGO ILLUMINATION ON SILO. FIELD VERIFY EXACT LOCATION. SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-102.

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NORTH





CLIENT **GENERAL DRAWING NOTES:** GN1. BOX DEPTH: COORDINATE WALL BOX DEPTH WITH OTHER TRADES FOR PROPER PLACEMENT DUE TO WALL COVERING THICKNESS WIRE: ALL 20 AMP 120V,1PH AND 208V,1PH CIRCUITS ARE 1/2"C, 2#12 & #12G GN2. WITH DEDICATED NEUTRAL. HOMERUNS OVER 70 FEET ARE #10 AWG. USE OF MC ENTERPRISES CABLES PER NEC ARTICLE 330 IS PERMITTED ONLY IN AREA WHERE IS NOT VISIBLE (DRYWALL OR CEILING TILES). CONDUIT ROUTING: CONCEAL CONDUITS IN WALLS, FLOORS OR ABOVE CEILINGS FOR GN3. COPYRIGHT NEW FINISHED AREAS. This drawing has been prepared solely for the intended use, thus any reproduction or distribution for any purpose other than authorized by FormSurfaces Design Grou GN4. PANEL SCHEDULES: PROVIDE NEATLY TYPED PANEL DIRECTORIES FOR ALL is forbidden. Written dimensions shall have precedence over scaled dimensions. PANELBOARDS. DESIGNATE LOAD SERVED BY EACH CIRCUIT. REQUIRED INFORMATION actors shall verify and be responsible for all dimensions and conditions on the job, a intractor's share very and be exponential to an unremainer and conducts on the Do, a ormSurfaces Design Group shall be informed of any variations from the dimensions ar conditions shown on the drawing. Shop drawings shall be submitted to FormSurfaces SHALL BE COMPLETED FOR EACH CIRCUIT IN PANEL. Design Group for general conformance before proceeding with fabrication. ELECTRICAL CONTRACTOR SHALL COORDINATE AND VERIFY WITH THE EQUIPMENT EXACT GN5. LOCATION OF ALL ELECTRICAL AND DATA OUTLETS INDICATED TO BE MOUNTED ON SSUES INDIVIDUAL PIECES OF EQUIPMENT. MATCH AND MATE EQUIPMENT PLUG. No. DESCRIPTION DATE Permit 06/09/22 GN6. THE ELECTRICAL CONTRACTOR SHALL COORDINATE LOCATION AND HEIGHT OF ALL OUTLETS W/ ARCHITECTURAL ELEVATION DRAWINGS AND TECHNOLOGY DRAWINGS PRIOR TO PROCEEDING WITH WORK. NOTIFY ARCHITECT AND ENGINEER OF ANY DISCREPANCIES PRIOR TO PROCEEDING WITH WORK. GN7. EACH BRANCH CIRCUIT HOMERUN SHALL HAVE NO MORE THAN THREE CIRCUITS. PROVIDE 3P BREAKER IF SHARING NEUTRAL. EACH BRANCH CIRCUIT HOMERUN SHALL HAVE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR. GN8. SEE LEGEND AND PANELBOARD SCHEDULES. GN9. AT THE END OF THE CONSTRUCTION BALANCE ALL PANEL PHASES AND RECIRCUIT THEM IN PANELS IF PHASE BALANCE IS MORE THAN 20%. COORDINATE MECHANICAL EQUIPMENT LOCATIONS WITH MECHANICAL TRADES. REFER TO GN10. MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT. PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPACITY. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS GN11. SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS. CONSULTANTS ALL PENETRATION THROUGH ALL WALLS SHALL BE SEALED WITH HILTI FIRE STOP. GN12. FormSurfaces GN13. PROVIDE AND INSTALL FIRE STOP MATERIAL FOR ALL SLEEVES PASSING THROUGH **Design Group** FLOORS AND FIRE RATED WALLS. PACK SLEEVES WITH FIRE STOP MATERIAL AFTER 10913 Marcello Lane CABLES ARE INSTALLED. COORDINATE AND VERIFY WALLS AND FLOOR RATINGS WITH Whitmore Lake, MI 48189 ARCHITECTURAL DRAWINGS. www.fsdgllc.com GN14. REFER TO ARCHITECTURAL ELEVATIONS AND TECHNOLOGY DRAWINGS PRIOR TO ROUGHING-IN OUTLETS, CEILING MOUNTED DEVICES ETC. COORDINATE ALL MOUNTING HEIGHTS AND LOCATIONS WITH ARCHITECTURAL AND TECHNOLOGY DRAWINGS. COORDINATE THE MOUNTING HEIGHTS OF OUTLETS ABOVE COUNTER TOP, SINKS, ETC. WITH SYSTEMS SOLUTION ARCHITECTURAL ELEVATIONS AND THE TRADES INSTALLING THE WORK. ENGINEERING PROVIDE AND INSTALL CONDUITS, JUNCTION BOXES AND ALL DEVICES RECESSED IN NEW GN15. 3250 W BIG BEAVER RD Phone/Fax 248.247.1193 BLOCK WALLS IN ALL FINISHED AREAS. ALL DEVICES INSTALLED IN UNFINISHED AREAS www.sse-mep.com sse@sse-mep.com SUITE **#**305 TROY, MI 48084 AND MECHANICAL/ELECTRICAL ROOMS SHALL BE SURFACE MOUNTED. 224700 GN16. NEC: ALL WORK SHALL BE INSTALLED PER THE CURRENT ADOPTED EDITION OF THE N.E.C. AND ALL STATE AND LOCAL CODES HAVING JURISDICTION. Angle Design & Engineering 22417 Cranbrooke Drive. Novi, Michigan. 48375 GN17. ALL WIRING INSTALLED IN OPEN CEILING AREAS OR OTHERWISE VISIBLE FROM ANY POINT Phone: (313) 258-2036 . Email: Fadi@AngledesignLLC.com ON FLOOR (POWER WIRING) SHALL BE INSTALLED IN CONDUITS. PAINT CONDUITS TO MATCH WALL/CEILING COLOR. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS. GN18. conn engineering BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OWNER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY consultants, inc. COMPONENTS, FITTINGS, AND OFFSETS. +industrial+institutional+residenti structural engineering INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS GN19. 107 n. bridge PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY linden, mi 48451 COMPONENTS WITH REQUIRE SERVICE ACCESS p. 810.458.4350 www.connengineering.com COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND GN20. CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO SEAL ARCHITECTURAL DRAWINGS FOR CEILING TYPES. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL GN21. SYSTEMS. MASIC ENGINEER CONCRETE, LLC

EP-201

ELECTRICAL POWER

FIRST FLOOR PLAN

NOVI BATCH PLANT

46844 WEST 12 MILE ROAD

NOVI, MI

FSDG PROJECT NO:

20220204 N

CHECKED BY:

APPROVED BY:

PROJECT

PROJECT NO:

PROJECT MGR:

SHEET TITLE

SHEET NUMBER

80-0007

DRAWN BY

ISSUE



<u>GENERAL</u>	DRAWING	NOTES:

- GN1. BOX DEPTH: COORDINATE WALL BOX DEPTH WITH OTHER TRADES FOR PROPER PLACEMENT DUE TO WALL COVERING THICKNESS
- GN2. WIRE: ALL 20 AMP 120V,1PH AND 208V,1PH CIRCUITS ARE 1/2"C, 2#12 & #12G WITH DEDICATED NEUTRAL. HOMERUNS OVER 70 FEET ARE #10 AWG. USE OF MC CABLES PER NEC ARTICLE 330 IS PERMITTED ONLY IN AREA WHERE IS NOT VISIBLE (DRYWALL OR CEILING TILES).
- GN3. CONDUIT ROUTING: CONCEAL CONDUITS IN WALLS, FLOORS OR ABOVE CEILINGS FOR NEW FINISHED AREAS.
- GN4. PANEL SCHEDULES: PROVIDE NEATLY TYPED PANEL DIRECTORIES FOR ALL PANELBOARDS. DESIGNATE LOAD SERVED BY EACH CIRCUIT. REQUIRED INFORMATION SHALL BE COMPLETED FOR EACH CIRCUIT IN PANEL.
- GN5. ELECTRICAL CONTRACTOR SHALL COORDINATE AND VERIFY WITH THE EQUIPMENT EXACT LOCATION OF ALL ELECTRICAL AND DATA OUTLETS INDICATED TO BE MOUNTED ON INDIVIDUAL PIECES OF EQUIPMENT. MATCH AND MATE EQUIPMENT PLUG.
- GN6. THE ELECTRICAL CONTRACTOR SHALL COORDINATE LOCATION AND HEIGHT OF ALL OUTLETS W/ ARCHITECTURAL ELEVATION DRAWINGS AND TECHNOLOGY DRAWINGS PRIOR TO PROCEEDING WITH WORK. NOTIFY ARCHITECT AND ENGINEER OF ANY DISCREPANCIES PRIOR TO PROCEEDING WITH WORK.
- GN7. EACH BRANCH CIRCUIT HOMERUN SHALL HAVE NO MORE THAN THREE CIRCUITS. PROVIDE 3P BREAKER IF SHARING NEUTRAL. EACH BRANCH CIRCUIT HOMERUN SHALL HAVE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR.
- GN8. SEE LEGEND AND PANELBOARD SCHEDULES.
- GN9. AT THE END OF THE CONSTRUCTION BALANCE ALL PANEL PHASES AND RECIRCUIT THEM IN PANELS IF PHASE BALANCE IS MORE THAN 20%.
- GN10. COORDINATE MECHANICAL EQUIPMENT LOCATIONS WITH MECHANICAL TRADES. REFER TO MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT. PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPACITY.
- GN11. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS.
- GN12. ALL PENETRATION THROUGH ALL WALLS SHALL BE SEALED WITH HILTI FIRE STOP.
- GN13. PROVIDE AND INSTALL FIRE STOP MATERIAL FOR ALL SLEEVES PASSING THROUGH FLOORS AND FIRE RATED WALLS. PACK SLEEVES WITH FIRE STOP MATERIAL AFTER CABLES ARE INSTALLED. COORDINATE AND VERIFY WALLS AND FLOOR RATINGS WITH ARCHITECTURAL DRAWINGS.
- GN14. REFER TO ARCHITECTURAL ELEVATIONS AND TECHNOLOGY DRAWINGS PRIOR TO ROUGHING—IN OUTLETS, CEILING MOUNTED DEVICES ETC. COORDINATE ALL MOUNTING HEIGHTS AND LOCATIONS WITH ARCHITECTURAL AND TECHNOLOGY DRAWINGS. COORDINATE THE MOUNTING HEIGHTS OF OUTLETS ABOVE COUNTER TOP, SINKS, ETC. WITH ARCHITECTURAL ELEVATIONS AND THE TRADES INSTALLING THE WORK.
- GN15. PROVIDE AND INSTALL CONDUITS, JUNCTION BOXES AND ALL DEVICES RECESSED IN NEW BLOCK WALLS IN ALL FINISHED AREAS. ALL DEVICES INSTALLED IN UNFINISHED AREAS AND MECHANICAL/ELECTRICAL ROOMS SHALL BE SURFACE MOUNTED.
- GN16. NEC: ALL WORK SHALL BE INSTALLED PER THE CURRENT ADOPTED EDITION OF THE N.E.C. AND ALL STATE AND LOCAL CODES HAVING JURISDICTION.
- GN17. ALL WIRING INSTALLED IN OPEN CEILING AREAS OR OTHERWISE VISIBLE FROM ANY POINT ON FLOOR (POWER WIRING) SHALL BE INSTALLED IN CONDUITS. PAINT CONDUITS TO MATCH WALL/CEILING COLOR.
- GN18. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OWNER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
- GN19. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WITH REQUIRE SERVICE ACCESS.
- GN20. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
- GN21. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.

KEY DRAWING NOTES:

- $\langle 1 \rangle$ RECEPTACLE PROVIDED WITH USB CHARGER.
- (2) GFI RECEPTACLE UNDER SINK FOR ELECTRONIC FAUCET. FIELD VERIFY EXACT LOCATION.
- 3 PROVIDE JUNCTION BOX FOR ELECTRONIC FLUSH VALVE.
- $\langle 4 \rangle$ EF-5 Controller by others, wired by electrician.
- 5 PROVIDE AND INSTALL JUNCTION BOX FOR INFRARED HEATER POWER. LOW VOLTAGE TRANSFORMER 120/240V PROVIDED BY OTHERS, WIRED BY ELECTRICIAN. LOW VOLTAGE WIRING TO IRH-9 AND IRH-10 BY OTHERS.
- 6 PROVIDE AND INSTALL JUNCTION BOX FOR INFRARED HEATER POWER. LOW VOLTAGE TRANSFORMER 120/240V PROVIDED BY OTHERS, WIRED BY ELECTRICIAN. LOW VOLTAGE WIRING TO IRH-7 BY OTHERS.

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SEAL	Consultants, inc. commercial+industrial+institutional+residential structural engineering 107 n. bridge linden, mi 48451 p. 810.458.4350 www.connengineering.com
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1. Permit	06/09/22	
CONSULTANTS FormSurface Design Grou 10913 Marcello Lane Whitmore Lake, MI 481 www.fsdgllc.com	es ip ⁸⁹	
Suite #305 Phone/Fax 248.247.1193 WW.sse-mep.com sse@sse-mep.com TROY, MI 480B4 sse@sse-mep.com 2247004 Angle Design & Engineering 22417 Cranbrooke Drive. Novi, Michigan. 48375 Phone: (313) 258-2036 Email: Fadi@AngledesignLLC.com		
consultants consultants consultants consultants structural engines 107 n. bridge linden, mi 484 p. 810.458.43 www.connengines	eering s, inc. ional+residential aring e 451 50 ring.com	
SEAL		
CONCRETE, LLC		
PROJECT NOVI BATCH PLANT 46844 WEST 12 MILE ROAD NOVI, MI		
PROJECT NO: FSDG PROJE	CT NO:	
80-0007 20220204 N	۱ :	
SSE MS	- 	
AI APPROVED B	θY:	
SHEET TITLE ELECTRICAL DETAILS		
SHEET NUMBER	ISSUE	
E-300		





102 SCALE: NONE











GENERAL NOTES:

- 1. THIS PAD IS SHOWN FOR REFERENCE ONLY, TO INDICATE THE LEVEL OF QUALITY EXPECTED IN PAD CONSTRUCTION. DISREGARD ALL DIMENSIONAL DATA. ACTUAL PAD CONSTRUCTION SHALL BE REQUESTED BY UTILITY CO. COORDINATE PAD DETAILS AND GROUNDING WITH UTILITY CO. SERVICE PLANER.
- 2. PRIMARY CONDUIT MUST BE POSITIONED AT THE FRONT OF THE PRIMARY WINDOW AS SHOWN.
- 3. NUMBER OF CONDUITS IS TO BE APPROVED BY THE ELECTRICAL SERVICE PLANNER. 4. IF CONDUCTORS ARE NOT PULLED IN ALL SECONDARY SERVICE CONDUITS, THE UNUSED CONDUIT SHOULD BE AT THE FRONT POSITION.
- 5. SWEEPS MUST BE 4" CONDUIT WITH A MINIMUM 36" RADIUS BEND.
- 6. CONCRETE MIX, 6 BAGS OF CEMENT PER YARD.
- 7. MAINTAIN CONCRETE COVER CLEARANCES BETWEEN REINFORCEMENT RODS AND SURFACES AS SHOWN.
- 8. TRANSFORMER AND PAD SELECTION ON SECONDARY METERED INSTALLATIONS WILL BE DETERMINED BY THE UTILITY CO. SERVICE PLANER.



CLIENT		
CROV	VN s inc	
COPYRIGHT This drawing has been prepared solely for the intende or distribution for any purpose other than authorized is forbidden. Written dimensions shall have preceden Contractors shall verify and be responsible for all dimension FormSurfaces Design Group shall be informed of any ve conditions shown on the drawing. Shop drawings sha Design Group for general conformance before proceed	d use, thus any reproduction by FormSurfaces Design Group ce over scaled dimensions. ons and conditions on the job, and ariations from the dimensions and II be submitted to FormSurfaces ding with fabrication.	
ISSUES No. DESCRIPTION	DATE	
1. Permit	06/09/22	
CONSULTANTS FormSurfaces Design Group 10913 Marcello Lane Whitmore Lake, MI 48189 www.fsdgllc.com		
SYSTEMS SOLUTION SUITE #305 TROY, MI 48084 SUITE #305 SUITE #305 TROY, MI 48084 SUITE #305 SUITE #305 S		
Angle Design & Engineering 22417 Cranbrooke Drive. Novi, Michigan. 48375 Phone: (313) 258-2036 Email: Fadi@AngledesignLLC.com		
Conne consu commercial+indus structu 107 linde p. 8 www.conr	Itants, inc. Itants, inc. strial+institutional+residential oral engineering 7 n. bridge en, mi 48451 10.458.4350 hengineering.com	
SEAL	OIVEER + K	
CONCRETE, LLC		
PROJECT NOVI BATCH PLANT 46844 WEST 12 MILE ROAD NOVI, MI		
PROJECT NO: FSDG 80-0007 2022	PROJECT NO: 0204 N	
DRAWN BY: SSE MS	KED BY:	
PROJECT MGR: APPRO	OVED BY:	
SHEET TITLE ELECTRICAL DETAILS		
SHEET NUMBER	ISSUE	
E-301		







ELECTRICAL SPECIFICATIONS 16000 – GENERAL ELECTRICAL REQUIREMENTS A. The contract form, the general conditions, the supplementary general conditions, the special conditions, the instructions to bidders shall form an integral part of this section of the specifications.

16010 - WORK INCLUDED

- A. Electrical contractor shall provide all items, articles, materials, operations or methods mentioned, listed, or scheduled on drawings or in these specifications including all labor, materials, equipment, and incidentals necessarily required for the complete and proper operation of all systems installed under this contract.
- B. The installation of all products, systems, components shall be made so that all parts function together as a workable system, complete with all accessories necessary for proper operation. When installation is complete, all equipment shall be operative and in proper adjustment.
- C. All work shall be performed in conformity with the acceptable trade practices so as to contribute to efficiency of operations, minimum maintenance, maximum accessibility and sightliness.
- D. To accomplish these results, the electrical contractor shall consult the architect and engineer's plans covering the various other trades work, the field layouts of the contractors for these other trades, and their approved shop drawing. Coordinate the installation of electrical equipment with the work of other trades to avoid interferences and to insure proper operation and proper clearance about installed equipment.
- E. Contractor shall examine the site prior to submittal of bids to familiarize himself with field conditions which may impact his conformance to the contract documents work to be performed. Submittal of bids attest to this contractor's knowledge of site conditions and his ability to perform his work as called for in these contract documents. This contractor shall assume full and complete responsibility for conclusions drawn from site examination. Requests for additional fees to complete required electrical work due to lack of knowledge of existing field conditions will not be accepted.
- F. Where active electric or other services are encountered during the performance of this contract, the electrical contractor shall protect, brace, and support them as required to maintain their proper operation. Do not prevent, interrupt, or disturb operation of existing services that are to remain. Relocate existing services as required, with owner's approval.
- G. These specifications and accompanying drawings are intended to describe and provide for finished work. They are intended to be cooperative, and what is called for by either shall be as binding as if called for by both. The Contractor shall understand that the work herein described shall be complete in every detail.
- H. The Drawings are not intended to be scaled for rough-in measurements nor to serve as shop drawings. Field measurements necessary for ordering materials and fitting the installation to the building construction and arrangement shall be taken by the Contractor. Electrical Contractor shall check latest Architectural drawings and locate light switches where door swings are different from electrical drawings.
- I. Where job conditions require reasonable changes in equipment locations and arrangement, such changes shall be made without extra cost to the Owner, if requested before work is installed.
- J. Electrical Contractor shall cooperate with all other Contractors and Subcontractors performing work on this project as necessary to achieve a complete, neatly fitted installation for each condition. To that end, Contractor shall consult the Drawinas and Specifications for all trades involved to determine nature and extent of work specified in other Sections which adjoins or attaches to his work. Cost of repairs of alterations of work in place made necessary by failure to observe said requirements shall be paid for by Contractor so failing. (See also Articles above and provisions of GENERAL CONDITIONS concerning jurisdictions.)
- K. Electrical Contractor shall confer with other Contractors and Subcontractors at the site to coordinate his work with theirs in view of job conditions to the extent that interferences may be eliminated and that maximum head room and clearance may be obtained. In the event that interferences develop, the Owner's Engineer's decision will be final as to which trade shall relocate its work, and no additiona compensation will be allowed for the moving of conduit or equipment to clear such interferences.
- L. Where bulky equipment cannot be delivered or installed without unduly delaying concrete or masonry work. Contractor shall arrange for leaving openings in floors. walls or roofs, as necessary for installation. He also shall arrange for the subsequent closing of the openings. Arrangements for and closures of the openings shall be subject to Owner's representative's approval and all costs therefore shall be paid by Contractor requiring such provisions.
- M. Electrical Contractor shall "build in" his work and shall be responsible for holding his work in place while concrete is being poured and while walls are being laid. He shall have competent men available at all times to see that his work is well in advance of the Mason Contractor and that his work is coordinated with other trades.
- N. Any and all cutting of the building made necessary by the improper location of this work, or by the failure to build such work into the structure, shall be done at the expense of the Electrical Contractor.
- 0. No cutting or burning of holes through beams or other structural members shall be done without the specific permission of the Architect and the Owner's Engineer.
- P. All openings in walls, ceilings, or floors made by the Electrical Contractor shall be neatly patched by him to comply with the rating of the wall, after other work is done. At the discretion of the Architect, cutting and patching of work in place shall be done by the Contractor whose work is impaired, but the cost of such work shall be paid by the Electrical Contractor.
- Q. All measurements necessary for the proper installation of materials or apparatus shall be taken in the field. The Contractor will be held responsible for the correct fit of work installed.
- R. Electrical Contractor will be held responsible for all damage to the work installed by others that may be caused by his work or by anyone employed by him. Patching and replacing of damaged work will be done by the trade whose work was damaged and as directed by the Owner's representative, but the cost of same shall be paid by the Electrical Contractor.
- S. Electrical Contractor shall expedite his work in order to conform to the dates outlined in the General Contractor's progress schedule and where necessary shall work overtime at his own expense so that all work may be completed within the time originally outlined. See TIME OF COMPLETION AND GENERAL CONDITIONS for additional scheduling requirements.
- T. Responsibility for care and protection of electrical work rests with the Electrical Contractor until it has been tested and accepted. After delivery, before and after installation, protect equipment and materials against theft, injury or damage from all causes.
- U. For extra electrical work which may be proposed, this Contractor shall furnish to the Engineer an itemized breakdown of the estimated cost of materials and labor required to complete said work. The Electrical Contractor shall proceed only after receiving a written order from the Engineer establishing the agreed price and describing the work to be done.
- V. All electrical circuits shall be tested as soon as conductors are installed, and final tests shall be made in presence of Owner's Engineers when all work is complete. If required circuits are not properly controlled and insulated, Electrical Contractor shall make necessary changes and repairs at no expense to the Owner. All electric motors shall be checked for proper rotation and phasing.
- W. Electrical contractor shall provide 3" high concrete housekeeping pad for mounting of all free-standing electrical equipment, I.E. distribution panels, motor control centers, transformers, etc.

16030 - RULES, CODES, AND STANDARDS

- A. All work shall be performed in strict conformance with all applicable rules, codes and regulations of local, state, and federal government, and other authorities having lawful jurisdiction.
- B. All electrical work and equipment shall conform to the following regulations and codes:
- 1. The National Electrical Code, latest adopted edition. 2. All Michigan State code amendments
- C. All installed equipment shall bear the UL seal of approval for its intended purpose.
- D. Where jurisdictional rules require the assistance of workers of the electrical trade. in the handling of equipment furnished by others or in the work of other trades. this Contractor shall provide such required assistance.
- E. Where the requirements of these contract documents are in conflict with the codes and regulations of governing agencies, the most stringent shall apply.

16040 - EQUIPMENT SUBSTITUTIONS

- A. Where the Contractor proposes to use an item of eauipment other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layouts, all such redesign and all new drawings and detailing required thereof shall be prepared by the Contractor at his own expense and only with approval of the Architects/Engineer. The contractor shall also pay any additional costs of the work resulting from the redesign.
- B. Where such approved deviation requires a different quantity and arrangement of ductwork, piping, wiring conduit, and equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring, conduit, etc., and any other additional equipment required by the system, at no additional cost to the Owner.
- C. The name or make of any article, device, material, form of construction, fixture, etc., named in this specification, or on drawings whether or not the words, "or Owner approved equal" are used shall be known as a "standard".
- D. Where two or more standards are named together, bidder shall base his proposal upon any of the standards and shall list this standard in the space provided on his proposal form. If the bidder fails to name a selected standard, it shall be assumed he is consenting to have the Owner make a selection.
- E. Bidders may submit for consideration, substitutions for the standards specified, provided:
- 1. Name the substitute bid on, and the addition or deductions they will make to
- 2. Complete specifications and descriptions of the substitutes bid upon shall be
- furnished to the Owner's Engineer prior to the award of the Contract.
- F. If the bidder names no substitute, the standards specified shall be used. No substitutes will be allowed after the award of the Contract, except with the approval of the Owner's Engineer.
- G. In all cases where the choice of more than one make or style of article or material is specified, the final selection of the make or style rests with the Owner. Where the Contractor will require an adjustment in his bid due to such selection by Owner, he shall be required to state in his bid the make or style of the article or material specified upon which his bid is based, and the amount to be added or deducted from his bid if other styles or materials specified are selected by owner. In the absence of such statement in the bid form, the Owner may select any make or style without incurring any price change.

16050 - MINOR DEVIATIONS

- A. Dimensions and ratings of equipment herein specified or indicated on the Drawings are intended to establish the desired outlines and characteristics of such equipment. Minor deviations will be permitted to allow manufacturers specified to bid on their nearest stock equipment.
- B. Manufacturers catalog or model number mentioned in the Specifications or indicated on the Drawings are intended to be used as guides and shall not be interpreted as taking precedence over specific ratings or duties called for or shown, which modify stipulations in such catalogs. In all cases, the manufacturer shall verify the duties specified with the particular characteristics of the equipment he intends to offer for approval, and shall offer only items which comply with Specification requirements.

16060 - SHOP DRAWINGS

- A. Complete shop drawings for all electrical manufactured items shall be submitted to the owner's representative for approval before fabrication of the items. Shop drawings shall indicate name of project and name of Contractor.
- B. Contractor shall thoroughly check all shop drawings with regards to measurements. sizes of equipment, materials and details to satisfy himself that they conform with the intent of Engineer's drawings and specifications. Drawings found to be inaccurate or otherwise in error are to be returned to the Subcontractors for correction before submitting same to the Engineers.
- C. The checking and approving of shop drawings by the Engineers shall be construed as assisting, but not relieving, the Contractor from the responsibility for errors and/or omissions which may exist thereon. Where errors or omissions are discovered at a later date, they must accordingly be made good by the Contractor at no additional cost to owner.
- D. It is the responsibility of the Contractor to submit shop drawings which are in conformance with the design drawings. This Contractor shall coordinate equipment specified or called for under Division 15 sections as to required supply voltages (i.e., motors). Where conflict arises at later date due to inconsistencies in electrical/mechanical drawings concerning the installation of equipment covered by approved shop drawings, it shall be the responsibility of this Contractor to provide all necessary equipment, materials, and labor to supply the necessary electrical service for proper operation of supplied equipment at no additional cost to Owner.

16080 – PACKAGE EQUIPMENT

- A. "Package Equipment" shall be defined as Mechanical, Architectural, Civil, or other Trades equipment and which is specified in other Divisions of this Specification and which shall be furnished and installed complete with all associated electrical components by those trades.
- B. Package Equipment shall include control wiring, control device, fused switch type or circuit breaker disconnecting device, starters, control transformers with secondaries as specified by this Division, interlocks, relays, conduit, wire, terminal blocks, wiring and device identification, etc., for integral as well as remotely located devices to leave ready for operation except for a single incoming power service.
- C. Any special work to be provided under this Division of the Specifications outside the definition of package equipment shall be noted on the Contract Drawings accompanying these Specifications or in the Package Equipment listed hereinafter.
- D. Package Equipment as specified herein shall include but not be limited to the following:
- 1. Mechanical equipment 2. Security equipment

or from their bid, provided such substitute is approved by the Owner's Engineer

<u>16110 – CONDUIT</u>

- A. All conduit shall conform to the following regulatory requirements:
- 1. Rigid steel conduit ANSI C80.1
- 2. Intermediate metal conduit ANSI C80.6
- 3. Electrical metallic tubing ANSI C80.3
- 4. Rigid nonmetallic conduit NEMA TC2. Schedule 40
- B. Minimum conduit size shall be 1/2".
- C. Conduit Uses Shall Be As Follows:
- 1 Outdoor exposed: Use rigid aglygnized steel conduit or intermediate metal conduit.
- 2. Indoor office or finished area: use electrical metallic tubing. Flexible metallic tubing may be used in ceiling spaces for lighting fixture final connection (maximum 6' length). EMT, MC cable may be used - 15' max. length - use EMT for home runs to room area.
- 3. Indoor work areas: Use rigid galvanized steel conduit.
- 4. Conduit in slab or below floor slab: use rigid nonmetallic conduit.
- 5. Final connections to vibrating equipment shall be made using flexible steel conduit (maximum 3 ft. length), use liquid - tight flexible metal ("sealtite") or non metallic conduit in wet or damp locations.
- 6. All home runs shall be in conduit. No flexible conduit of any type allowed for home runs.
- D. Indoors Wiring Methods As Follows:
- 1. Connection to vibrating equipment (including transformers and hydraulic, pneumatic, electric solenoid or motor driven equipment): Flexible metal conduit, except in wet or damp locations use liquid tight flexible metal conduit.
- 2. Use MC cable and Electrical Non-metallic Tubing (ENT) in applications allowed by NFPA 70.
- 3. Damp or Wet Locations: PVC conduit.
- 4. Exposed: Rigid metallic conduit to 8'-0" A.F.F., EMT above 8'-0" A.F.F.
- 5. Concealed: Electrical metallic tubina.
- 6. Boxes and Enclosures: NEMA 250, Type 1, except in damp or wet locations use NEMA 250, Type 4, cast aluminum.
- 7. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.
- 8. Conceal conduit and electrical metallic tubing, unless otherwise indicated, within finished walls, ceilings, and floors.
- E. Use raceway fittings compatible with raceway and suitable for use and location. Use threaded rigid steel conduit fittings, unless otherwise indicated. For EMT use set screw type, steel only.
- F. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.
- G. Join raceways with fittings designed and approved for the purpose and make joints right. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight. Use insulating bushings to protect conductors.
- H. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line having not less than 200-lb (90-kg) tensile strength. Leave not less than 24 inches of slack pull wire at each end of the conduit.
- I. Stub-up Connections: Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used 6 inches above the floor (Maximum 6' length).
- J. Bond all conduit installations per N.E.C., install separate grounding conductor in all PVC and flexible metal conduit runs.
- K. Where conduits are run below grade, electrical contractor shall place a detectable warning tape above the entire length of the conduit run. Tape shall be run at 6" below finish grade. Detectable warning tape shall be acid — and alkali — resistant polyethylene film warning tape manufactured for marking and identifying underground utilities. minimum 6" (150mm) wide, 4 mils (0.1mm) thick, continuously inscribed with a description of utility with metallic core encased with a protective jacket for corrosion protection, detectable by a metal detector when tape is buried up to 30 inches (750mm) deep, colored as follows:
- RED Electric YELLOW - Gas, oil, steam, and danaerous materials
- ORANGE Telephone and other communications
- M. Acceptable manufacturers of conduit and conduit fittings shall be as follows: 1. Steel Conduit, Rigid and Intermediate:
 - Allied Midwest Republic Triangle
- 2. Steel Conduit, Electrical Metal Tubing:
- Allied Midwest Republic
- Triangle 3. Flexible Metal Conduit, Liquid Tight:
- Electri-Flex
- Sealtite-Anaconda
- 4. Flexible Metal Conduit: Acme American Metal Moulding
- Trianale
- 5. Conduit Fittings Conduit Manufacturers listed for conduits heretofore are acceptable for fittings, in addition to the following:
- For EMT use set screw type Steel Only Crouse-Hinds Hubbell
- 0.Z./Gedney/Electric Co. Thomas & Betts
- 6. Conduit and Outlet Boxes:
- Arrow-Hart Bryant Crouse-Hinds Hubbell
- Thomas & Betts Appleton
- N. Size of Bends: Bends of rigid conduit shall be made so that the conduit will not be damaged and the internal diameter of the conduit will not be effectively reduced. The radius of the curve of the inner edge of any field bend shall not be less than shown in Table below:

O. Number of Bend

four quarter bend

<u>16120 – WIRE</u>

- A. Building wire and control circuits n
- B. Use wire rated 6
- 1. Power and ligh 2. Control – THI 3. Control Panels
- C. Acceptable Manuf
- 1. Okonite
- 2. Pirelli 3. Rome 4. Triangle
- D. Acceptable Manuf
- 1. Brady 2. Westline
- E. Acceptable Manut
- 1. 3-M
- F. Acceptable Manu
- 1. Buchanen 2. Burndy
- 3. 0.Z./Gedney 4. Thomas & Be
- G. Connectors and application and f
- H. Twisted-Pair Plen overall aluminum/ in air-handling s
- I. Install wires and
- J. Wiring at Outlets:
- K. Where multiple co cable pulling lubri to insulation.
- L. Control wiring: All control wiring All wires from ot All DC wiring sho

0. Run separate gro <u> 16150 – SAFE</u>

- A. Provide and insta switches shall be enclosure, when cover interlock.
- B. Acceptable Manuf

Conduit Radius of Size Conduit Bends Inches Inches	
3/4" 5 1 6	CROWN
1 1/4" 8 1 1/2" 10	ENTERPRISES INC
2 12 2 1/2" 15	
3 1/2" 18 4" 24	COPYRIGHT This drawing has been prepared solely for the intended use, thus any reproduction
0. Number of Bends: A run of conduit shall not contain more than the equivalent of four quarter bends (360 degree total).	or distribution for any purpose other than authorized by FormSurfaces Design Group is forbidden. Written dimensions shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job, and FormSurfaces Design Group shall be informed of any variations from the dimensions and conditions shown on the drawing. Shop drawings shall be submitted to FormSurfaces
A. Building wire and cable shall be minimum No. 12 AWG copper conductor for power and lighting circuits,	Design Group for general conformance before proceeding with fabrication.
control circuits minimum No. 14 AWG.	ISSUES No. DESCRIPTION DATE
 Ose whe rated boov insulation type for use as follows: Power and lighting – THHN/THWN 	1. Permit 06/09/22
2. Control – THHN/THWN 3. Control Panels – THHN/THWN/MTW	
C. Acceptable Manufacturers, building wire and cable:	
1. Okonite 2. Pirelli 3. Rome	
4. Triangle D. Acceptable Manufacturers, Wire Label:	
1. Brady	
Z. westineE. Acceptable Manufacturer, Tape:	
1. 3-M	
F. Acceptable Manufacturers, Lug and Wire Connectors:	
1. Buchanen 2. Burndy 3. 0.7 (Codney, Electric, Co	FormSurfaces
 G. C.Z./Geaney Electric Co. 4. Thomas & Betts G. Connectors and Splices: Wiring connectors of size, ampacity rating, material, and type and class for application and for service indicated 	Design Group 10913 Marcello Lane
H. Twisted—Pair Plenum: 7—strand, tinned—copper conductors (size per plan drawings); Teflon insulation; overall aluminum/polyester shield and No. 22 AWG tinned—copper drain wire; Teflon jacket; suitable for use	Whitmore Lake, MI 48189 www.fsdgllc.com
in air-handling spaces.	
J. Wiring at Outlets: Install with at least 12 inches of slack conductor at each outlet.	
K. Where multiple conductors are installed in common conduit they shall be installed in a single pull. Use cable pulling lubricants as necessary and do not exceed manufacturer's pulling tension to avoid damage to insulation	SUITE #305 TROY, MI 48084 2247004
L. Control wiring: All control wiring shall be red	Angle Design & Engineering 22417 Cranbrooke Drive. Novi, Michigan. 48375
All wires from other power sources shall be yellow All DC wiring shall be blue O. Run separate arounding conductor with all circuits	Phone: (313) 258-2036 . Email: Fadi@AngledesignLLC.com
<u>16150 – SAFETY DISCONNECT SWITCHES</u>	conn engineering
A. Provide and install all required fusible or non-fusible disconnect switches shown on the drawings. All switches shall be heavy duty type in a NEMA 1 enclosure when mounted indoors, or a NEMA 3R enclosure, when mounted outdoors. Switches shall be quick-make, quick-break with a mechanical dual cover interlock.	consultants, inc. commercial+industrial+institutional+residential structural engineering 107 n. bridge
B. Acceptable Manufacturers of Safety Disconnect Switches Shall Be as Follows:	linden, mi 48451 p. 810.458.4350 www.connengineering.com
1. Square D 2. Siemens — I.T.E.	SEAL
<u>16170 – MOTORS</u>	NE OF MICHIER
A. All motors shall be provided by other trades unless otherwise noted. <u>16210 — PANELBOARDS</u>	* MIODRAG
A. Panelboards shall conform to the latest NEMA, UL and NEC standards and the following ratings and data.	
Shall be dead front type with surface mounted galvanized steel cabinet, prime coated, with an internal B. assembly of circuit breakers. Trims shall have hinged and locked doors with glass or heavy plastic covered circuit directories to also indicate voltage, phase, and capacity as indicated on drawing. All locks shall be keyed alike. Boxes shall be galvanized, and front assembly shall be painted with a prime and finish coat of manufacturer's standard finish. Panels shall have main lugs or main circuit breaker as indicated on drawings.	A HOFESSIONAL ENGLAN
C. Circuit breakers shall be molded plastic case type, AC rated, bolt on, quick—make, quick—break, with trip free common operating handle, position indication, and common trip for 2 and 3 pole circuit breakers from thermal—magnetic trip device. Trip ratings and number of poles shall be as indicated on the drawings	CONCRETE, LLC
D. Panelboards shall be UL listed. Main bus bars shall extend the full height of the enclosure being provided regardless of branch circuit positions being called for on the schedules.	
E. Panelboard directories shall designate the lighting fixtures, etc. controlled by each branch circuit in the panel. The required information shall be neatly typewritten on directories in each panel circuit.	N
Acceptable manufacturers of panelboards are as follows: F. 1. Square D	ACCA
2. Siemens – I.T.E. 3. GE	
<u>16400 — DRY TYPE TRANSFORMERS</u> A. Dry Type Transformers: ANSI/NEMA ST 20; factory-assembled, air cooled dry type transformers: ratinas as	46844 WEST 12 MILE ROAD
shown on the Drawings.	NOVI, MI
Rating Class Rise (degree C)	PROJECT NO: FSDG PROJECT NO: 20220204 N
1–15 185 80 [115] 16–500 220 80 [115] (150)	DRAWN BY: SSE
C. Mounting: Transformers 75 KVA and less shall be suitable for wall, floor, or trapeze mounting; transformers larger than 75 KVA shall be suitable for floor or trapeze mounting.	PROJECT MGR: APPROVED BY:
D. Winding Taps, Transformers 15 KVA and Larger: ANSI/NEMA ST 20.	SHEET TITLE
E. Enclosure: ANSI/NEMA ST 20; Type 1. Provide lifting eyes or brackets.	
F. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.	SPECIFICATIONS
G. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise. H. Acceptable manufacturers of dry type transformers will be as follows:	
1. Square D 2. Heavy-Duty	SHEET NUMBER ISSUE
 Install transformer on 3" high concrete housekeeping pad. Coordinate housekeeping pad installation with architectural trades. 	E-400

CLIENT
l	PLUN		G PIPE AND FITTING SPECIFICATIONS	
۱.	SOIL,	WAS	TE, VENTS, STORM AND CONDENSATE DRAINS:	
	1.	IN B NEO- CINC GRAD BEAR	UILDING ABOVE GRADE, USE SERVICE WEIGHT. NO-HUB OR -LOCK PVC PIPE AND FITTINGS WITH STAINLESS STEEL H BANDS CONFORMING TO CISPI 301. IN BUILDING BELOW DE, USE PVC SANITARY PIPING. PIPE AND FITTINGS SHALL	r Wi
1	DOME	STIC.	WATER PIPING (ABOVE GRADE).	
•	1.	HOT.	COLD AND HOT WATER RETURN:	
		a)	TYPE "L" HARD COPPER TUBE CONFORMING TO ASTM B88	UF
		-,	AND BEAR MADE IN USA LABEL.	S
		b)	FITTINGS: WROUGHT COPPER, SOLDER-SWEAT TYPE CONFORMING TO ANSI B16.21&22. USE DIELECTRIC ADAPTERS WHERE COPPER TUBE CONNECTS TO FERROUS PIPE.	F
		c)	JOINING: SOLDER CONNECTION, COMPLYING WITH COPPER DEVELOPMENT ASSOCIATION, INC; COPPER TUBE HANDBOOK, TABLE 11. 95–5 Sb LEAD–FREE SOLDER OR SILFOS.	F
		d)	USE PEX TUBING FOR BRANCHES AND COPPER FOR MAIN LINES. INSTALL PER MANUFACTURER RECOMMENDATIONS AND ALL APPLICABLE CODES.	F
	NATU	RAL (GAS PIPING:	
	1.	IN B A-53 LESS	UILDING, ABOVE AND BELOW GRADE; ASTM A–120 OR 3 SCHEDULE 40 BLACK STEEL THREADED PIPE 2" AND WITH BLACK MALLEABLE IRON SCREWED FITTINGS	
		CONF WRAF BE V	FORMING TO ANSI—B16.3. PROVIDE 5 MIL POLYETHYLENE P WHEN APPLIED BELOW GRADE. 2½"AND LARGER SHALL VELDED.	r
	2.	OUTS BUTT OF 1	SIDE BUILDING, BELOW GRADE: USE HDPE GAS PIPE WITH FUSION JOINTS CONFORMING TO ASTM 3408 WITH SDR 3.0, RATED FOR GAS SERVICE.	w
	3.	USE CHAS ALL	CSST FLEXIBLE GAS PIPING SYSTEM ONLY INSIDE BUILDING SES. INSTALL PER MANUFACTURER RECOMMENDATIONS AND APPLICABLE CODES.	M
	4.	ALL CEILI	NATURAL GAS PIPE UP IN SHAFT AND ABOVE HARD NG SHOULD BE WELDED STEEL.	EW
	5.	GAS COLC	PIPE COLOR PER FACILITY STANDARD. COORDINATE FINAL OR SELECTION AND/OR LABELS WITH THE BUILDING OWNER.	
F	PLUM	BING	G FIXTURE SPECIFICATIONS]
	<u>—1</u> :Р ИМ	ROVID DEI	E KOHLER ANGLESEY COMFORT HEIGHT HIGH EFFICIENCY	PR
ELC			WL HAS $1-1/2$ " TOP SPUD. IT HAS ROUGH-IN DIMENSION	-1/2
		NS 3	1-1/2"X14-7/8"X17". PROVIDE STRONGHOLD ELONGATED	
K-4 MOI	4731– DEL K	-C-0. -135	PROVIDE KOHLER MANUAL TOILET FLUSHOMETER VALVE 17–CP OF 1.28 GPF.	- C - N - F
<u>L</u>	L: PRO SINK SINK SING CONS ILER E	OVIDE IS M/ GLE CE SEALEE LECTR	KOHLER SOHO WALL MOUNT BATH ROOM SINK MODEL K-2084. ADE VITREOUS CHINA WITH OVER FLOW. THE RECTANGULAR BASIN ENTER HOLE HAS DIMENSIONS 20"X18". BASIN TO BE DRILLED O ARM CARRIER. PROVIDE KOHLER P-TRAP K-8998. PROVIDE CONIC BRASS CONSTRUCTION FAUCET MODEL K-7514.	-A -II INS
UR- K WIT CON TOU MOI	<u>-1</u> : P 4904- H 3/4 MPLIAN JCHLE DEL K	ROVID -ET. T 4"TO NT WH SS D(-109	E KOHLER BARDON HIGH EFFICIENCY URINAL MODEL THE URINAL IS MADE VITREOUS CHINA, HAS WASH OUT P SPUD AND 14" EXTENDED RIM. IT HAS WATERSENSE IEN USED WITH WATERSENSE FLUSHOMETER. PROVIDE C URINAL FLUSHOMETER WITH TRIPOINT TECHNOLOGY 49 WITH 0.125 GPF.	

<u>SS-1</u>: FIAT TERRAZZO MOP SERVICE BASIN 12" DEPTH WITH 6" DROP FRONT MODEL TSBC1610. IT HAS NOMINAL DIMENSION 24"X24"X12". PROVIDE FIAT FAUCET MODEL 830-AA.

E	PLUMBING FIXTURE SCHEDULE							
TAG	TAG FIXTURE		V	Т	cw	НW	REMARKS	
WC-1	WATER CLOSET	3"	2"	3"	1 1/2"	_	ADA; FLOOR MOUNT; FLUSH VALVE	
L-1	LAVATORY	1 1/2"	1 1/4"	1 1/2"	1/2"	1/2"	WALL MOUNT, PROVIDE MX-1 MIXING VALVE	
UR-1	URINAL	2"	1 1/2"	INT	3/4"	_	WALL MOUNT	
SS-1	SERVICE SINK	3"	2"	3"	3/4"	3/4"	PROVIDE MX-1 MIXING VALVE	
FD-1	FLOOR DRAIN	3"	-	3"	—	_	ZURN Z-415-3NH-6B-VP. TYPE "B" STRAINER, VANDAL PROOF GRATE PROVIDE TRAP PRIMER-TRAP PRIMER INFO ON THIS SHEET	
FD-2	FLOOR DRAIN	4"	_	4"	_	_	ZURN Z-1901-4NH-1-33, FULL GRATE PROVIDE TRAP PRIMER-TRAP PRIMER INFO ON THIS SHEET	
FS-1	FLOOR SINK	3"	_	3"	—	—	ZURN MODEL Z-1900-2 SANI-FLOR RECEPTOR 12X12X6	
WCO WALL CLEANOUT		FULL SIZE, SEE PLANS					ZURN Z-1446-A-VP-4NL, ROUND SMOOTH S.S. COVER W/ SCREW	
FCO FLOOR CLEANOUT		FULL SIZE, SEE PLANS					ZURN Z-1400 ADJUSTABLE FLOOR CLEANOUT	

PLUMBING FOUIPMENT SCHEDULE

TAG	EQUIPMENT	SIZE	RECO. AT 90°F GPH	NAT. GAS INPUT MBH	ELEC.	REMARKS
WH-1	WATER HEATER	48 GAL	62	60	120V 1ø	BRADFORD WHITE LIGHT DUTY COMMERCIAL POWER DIRECT VENT GAS WATER HEATER MODEL LG2PDV50H603N; WITH DRAIN PAN
MX-1	3/4" MIXING VALVE	0.25-4 GPM	-	-		LEONARD MOD. 170A-LF-BP WATER MIXING VALVE
BFP-1	BACKFLOW PREVENTER	6"	_	_	_	ZURN/WILKINS MODEL 350 OR EQUAL
EWC-1	COOLER ELECTRIC WATER	1/2"CW	_	-	120V 1ø	ELKAY EZH2O BOTTLE FILLING STATION WITH SINGLE ADA COOLER MODEL LZS8WSLK

TRAP PRIMER INFORMATION:

ROVIDE ZURN GREEN DRAIN 6D SERIES Z SHIELD MODEL Z1072 TRAP SEAL DEVICE (OR APPROVED EQUAL).

½"CW NPT INLET/OUTLET

ADJUSTABLE TO LINE PRESSURE FOR EVERY 20 FEET OF FLOOR DRAIN TRAP MAKE-UP WATER LINE THE PRIMER MUST BE AT MINIMUM 12" ELEVATION FROM THE FINISH FLOOR. OPERATING RANGE 35 TO 75 PSIG

MACHINED FROM CORROSION RESISTANT BRASS PISTON OPERATED

ADJUSTABLE PRESSURE INCLUDES INTEGRAL VACUUM BREAKER PORTS

NSTALL ON COLD FRESH WATER LINES 1½" OR LESS.

*ALL FLOOR DRAINS SHALL HAVE TRAP PRIMER UNLESS NOTED OTHERWISE

<u>GAS LOAD (ESTIMATE)</u>					
TAG	CUBIC FEET /HOUR				
F-1	FLOOR	80			
WH-1	FLOOR	60			
BIG WATER HEATER	FLOOR	4,500			
FUTURE	FLOOR	12,000			
IRH-1	PLANT	100			
IRH-2	PLANT	100			
IRH-3	PLANT	100			
IRH-4	IRH-4 PLANT				
IRH-5	PLANT	100			
IRH-6	PLANT	100			
IRH-7	101F	30			
IRH-8	CONTAINMENT AREA	100			
IRH-9	IRH-9 HOPPER/CONVEYOR				
IRH-10	100				
SUB TOTAL: 17,570					
+10% SAFETY FACTOR: 1757					
TOTAL CUBIC FEET/HOUR: 19,327 EQUIVALENT PIPE LENGTH: ±356'-0"					
1. SYSTEM SIZED FOR 0.6 SPECIFIC GRAVITY					

- GAS AND DELIVERY OF 2.0 PSI WITH A PRESSURE DROP OF 1.0 INCH WATER COLUMN.
- SYSTEM DESIGN AND INSTALLATION IS FOR NATURAL GAS.
- MBH RATING FOR EQUIPMENT IS DETERMINED BY THE MANUFACTURER.
- CONTRACTOR SHOULD PROVIDE PRESSURE REGULATOR FOR EACH EQUIPMENT. VENT REGULATOR FOR INDOOR EQUIPMENT INDIVIDUALLY FROM REGULATOR TO OUTSIDE THE BUILDING. COORDINATE WITH HVAC CONTRACTOR.

GENERAL PLUMBING NOTES

1.

- SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF ALL PLUMBING FIXTURES.
- 2. COORDINATE ALL LOCATION, SIZE AND ELEVATIONS OF ALL SLEEVE THROUGH WALLS AND SLABS WITH STRUCTURAL AND ARCHITECTUR DRAWINGS.
- PROVIDE SHUT OFF VALVE TO ALL FIXTURES, SILL COCK, APPLIAN 3. OR MECHANICAL EQUIPMENT UNLESS NOTED OTHERWISE.
- 4. VERIFY DEPTHS, SIZES, LOCATIONS, ETC., OF EXISTING UTILITIES THE FIELD INCLUDING POINTS OF CONNECTIONS BEFORE STARTING WORK.
- 5. ALL WORK AND MATERIALS WILL CONFORM TO THE LATEST EDITION THE INTERNATIONAL PLUMBING AND BUILDING CODES AND ALL O AUTHORITIES HAVING JURISDICTION. DESIGN TO COMPLY WITH MICH PLUMBING CODE 2006.
- 6. COORDINATE INSTALLATION OF PLUMBING WORK SO AS TO AVOID UNNECESSARY JOB DELAYS OR INTERFERENCE WITH ALL OTHER TRADES.
- 7. OBTAIN ALL FIELD APPROVALS ON PLUMBING WORK FROM REGUL AGENCIES WHERE REQUIRED. CONTRACTOR TO PAY ALL RELATED
- 8. ALL VALVES CONCEALED IN CEILING OR WALLS SHALL BE PROVIDI WITH 12"x12" ACCESS PANELS.
- 9. WATER SUPPLY AND DRAIN LINES UNDER LAVATORIES AND SINK BE INSULATED AND JACKETED WITH ADA APPROVED PROCESS. CONTRACTOR TO VERIFY AND REMOVE ALL SHARP OR ABRASIVE SURFACES UNDER SINKS AND LAVATORIES.
- 10. ALL OPENINGS FOR PIPING THROUGH FIRE-RATED ENCLOSURES BE CAULKED AS REQUIRED BY CODE TO MAINTAIN FIRE RATING. INCLUDING OPENINGS IN EXISTING BUILDING.
- 11. PLUMBING CONTRACTOR SHALL PROVIDE FULL SIZE CONDENSATE FROM ALL AIR CONDITIONING EQUIPMENT (WITH DEEP SEAL TRAP UNION) AND DISCHARGE TO THE NEAREST APPROVED RECEPTOR, COORDINATE FOR TRAP HEIGHT.
- 12. HOT AND COLD WATER PIPE INSULATION SHALL HAVE A SMOKE/FI SPREAD RATINGS OF 25/50 AS DEFINED BY NFPA.
- 13. FAUCETS AND PLUMBING FIXTURES SHALL BE OF THE WATER CONSERVATION TYPE AND COMPLY WITH THE STATE APPLIANCE EI STANDARDS.
- 14. RUN ALL SANITARY PIPING AT 1% MINIMUM SLOPE.
- 15. ALL HORIZONTAL PIPING LINES EXTENDED AND CONNECTED TO EQUIPMENT ARE TO BE RUN AT HIGHEST POSSIBLE ELEVATION AN NOT LESS THAN 6" ABOVE FINISHED FLOOR, TO ALLOW CLEARANCE FOR CLEANING. PIPING IS TO BE CONCEALED WHEREVER IS POSS
- 16. PLUMBING CONTRACTOR SHALL PROVIDE, ALL PIPING MATERIALS, INCLUDING VALVES, PRESSURE REGULATORS, TRAPS, STRAINERS I FROM ROUGH IN LOCATION TO EQUIPMENT AND MAKE FINAL CONNECTION. SUPPLY LINES TO EACH INDIVIDUAL PIECE OF EQUIF SHALL BE PROVIDED WITH PERMANENT NAME TAGS IDENTIFYING S
- GUARANTEE ALL LABOR AND MATERIALS ONE YEAR FROM DATE OF 17. SUBSTANTIAL COMPLETION.
- CONTRACTOR SHALL RECORD ON AS-BUILT DRAWINGS ALL SIZES, 18. MATERIALS, ELEVATIONS, AND LOCATIONS OF ALL PIPES THAT DEV FROM THE DESIGN CONTRACT DRAWINGS AND SUBMIT TO THE ENGINEER FOR REVIEW.
- 19. REFER TO ARCHITECTURAL DRAWINGS AND COORDINATE WITH OWN FOR PHASING LIMITATIONS ON SEQUENCE OF CONSTRUCTION. IF
- 20. ALL CORES REQUIRED THROUGH CONCRETE FLOOR SHALL BE COF JACK-HAMMERING WILL NOT BE ALLOWED.
- 21. PATCH & REPAIR ALL DAMAGED FINISHES RESULTING FROM WORK WITHIN BUILDING.
- 22. CONTRACTOR TO PROVIDE POINT OF USE MIXING VALVE FOR ALL LAVATORIES & HAND SINKS ..
- 23. ALL PLUMBING WORK TO BE PERMITTED, INSPECTED AND TESTED PRIOR TO COVERING (BY WALL, PARTITION, HARD CEILING ETC.). CONTRACTOR TO COORDINATE WITH INSPECTORS.
- 24. ALL EXPOSED PIPING TO BE PARALLEL TO BUILDING BEAMS.
- 25. CONTRACTOR IS RESPONSIBLE TO LIST ALL MODIFICATION TO ORIG DOCUMENT DURING SHOP DRAWING PROCESS. IT SHOULD CLEARLY MENTION THE CHANGES BEING MADE TO THE PARTS, OPTIONS, MATERIAL, CAPACITY, ETC. THAT IS DIFFERENT THAN WHAT IS SHOW ON DOCUMENT. CONTRACTOR WILL REMAIN RESPONSIBLE FOR THE PERFORMANCE, OPERATION, WARRANTY, ETC. FOR THE PRODUCT.
- 26. PROVIDE BALANCING VALVE IN ALL MAIN BRANCH LINE IN DOMEST HOT WATER RETURN LOOPS.
- 27. INSULATE ALL METAL DOMESTIC COLD WATER PIPES, METAL STORM DRAIN HORIZONTAL PIPING AND METAL CONDENSATE DRAIN PIPES CLOSED-CELL ELASTOMERIC MATERIAL.
- 28. RUN ALL UNDERGROUND SANITARY AND STORM PIPING 2-1/2" OF LESS AT 1/4" PER FOOT MINIMUM PITCH UNLESS NOTED OTHERW SANITARY PIPING LESS 3" OR LARGER SHALL BE PITCHED AT 1/8 PER FOOT MINIMUM, UNLESS NOTED OTHERWISE.

PLUMBING:

COMMERCIAL: MPC 2018 (MICHIGAN PLUMBING CODE 2018) EFFECTIVE SEPTEMBER 15, 2021

FUEL GAS: IFGC 2018 (INTERNATIONAL FUEL GAS CODE 2018) EFFECTIVE SEPTEMBER 21, 2021

ENERGY CODE:

COMMERCIAL: MBC 2015 (MICHIGAN BUILDING CODE 2015) - CHAPTER 13& MEC 2015 (MICHIGAN ENERGY CODE 2015) - CHAPTERS 1 THROUGH 6 & MICHIGAN ENERGY CODE, PART 10A. RULES (ANSI/ASHRAE/IES STANDARD 90.1-2013) EFFECTIVE SEPTEMBER 20, 2017

\vdash	SYMBOL	ABBR.	DESCRIPTION
_		SAN/S	SANITARY BELOW F.F. OR GROUND
_		SAN/S	SANITARY ABOVE F.F. OR GROUND
	- ST	ST/STORM	STORM DRAIN BELOW F.F. OR GROUND
		ST/STORM	STORM DRAIN ABOVE F.F. OR GROUND
_		CW	
			LIOT WATER SUPPLY
			HOT WATER RETURN
	GAS ——	GAS	NAURAL GAS PIPE
_		• · · · · ·	SANITARY VENT ABOVE F.F.
		V	SANITARY VENT BELOW F.F.
	Ю		RISE IN PIPE
	ci		DROP IN PIPE
			TEE UP
			TEE DOWN
			DIRECTION OF FLOW
_			DIRECTION OF SLOPE DOWN
_		U	UNION (DIELECTRIC IF CALLED FOR)
	—⋈—		BALL VALVE
	∼∼	CV	CHECK VALVE
			PRESSURE REDUCING VALVE
			BALLANCE VALVE
	_}~	BV	BALANCING VALVE
×	<u> </u>	COTG	CLEANOUT TO GRADE
φ		FCO	FLOOR CLEANOUT
ŀ		WCO	WALL CLEANOUT
	₿	FD	FLOOR DRAIN
	•	POC	POINT OF CONNECTION
	 М		GAS OR WATER METER
		w/	мітн
		A.F.F.	ABOVE FINISHED FLOOR
		F.F.	FINISHED FLOOR
		CPD	CRADE
		(F)	EXISTING
		N=7	
		<u>Α</u> ΚΟΠ.	
		VA	
		ABV	
		BEL	REFOM
		SHT	SHEET
		I.E.	INVERT ELEVATION
		CONN.	CONNECTION
		U.N.O.	UNLESS NOTED OTHERWISE
		V.T.R.	VENT THOUGH ROOF
		B.G.	BELOW GRADE
		TYP.	TYPICAL
		NC	NORMALLY CLOSED



NOTE . SUME STMDULS & ADDREVIATIONS SHOWN MAY NOT APPLY TO PROJECT



GENERAL NOTES:

- GN1. ROUTING OF UNDER FLOOR PIPING TO BE CAREFULLY COORDINATED WITH STRUCTURAL DRAWINGS FOUNDATION PLAN.
- GN2. ALL INFORMATION PROVIDED ON PLUMBING SCHEDULE SHEETS APPLIES.
- GN3. MAXIMUM DISTANCE BETWEEN FLOOR CLEANOUTS SHALL NOT EXCEED 50'-0". MAINTAIN 18" CLEARANCE AROUND CLEANOUT AS DICTATED BY CODE.
- GN4. ALL PIPING INSTALLED IN CEILING SPACE SHALL BE COORDINATED WITH DUCTWORK AND ALL OTHER TRADES AS REQUIRED.
- GN5. PLUMBING CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR A.D.A. PLUMBING FIXTURE AND STANDARD MOUNTING HEIGHTS.
- GN6. AT ALL DISSIMILAR METAL CONNECTIONS PROVIDE AND INSTALL DIELECTRIC UNIONS IMMEDIATELY TO MINIMIZE USE OF GALVANIZED PIPE MATERIAL.
- GN7. DO NOT INSTALL PLUMBING VENTS WITHIN 10'-0" OF ANY ROOF TOP UNITS OR FRESH AIR UNITS/INTAKE. COORDINATE WITH MECHANICAL CONTRACTOR.
- GN8. ALL PIPING PENETRATIONS THROUGH FIRE RATED WALLS TO BE SEALED "AIR TIGHT" WITH APPROVED SEALANT APPLIED ALL AROUND PENETRATION.
- GN9. ALL PIPING SHALL BE COORDINATED WITH CEILING AND HIDDEN AS MUCH AS POSSIBLE.

- 1 PROVIDE NEW SANITARY AND VENT CONNECTIONS FOR NEW PLUMBING FIXTURES.
- (2) CONNECT NEW SANITARY LINE TO NEAREST LARGER EXISTING SANITARY LINE. VERIFY EXACT LOCATION AT SITE.
- 3 PROVIDE CONDENSATE DRAIN FOR HVAC UNIT. CONNECT CONDENSATE DRAIN TO NEAREST FLOOR DRAIN AS INDIRECT.

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- GN5. PLUMBING CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR A.D.A. PLUMBING FIXTURE AND STANDARD MOUNTING HEIGHTS.
- GN6. AT ALL DISSIMILAR METAL CONNECTIONS PROVIDE AND INSTALL DIELECTRIC UNIONS IMMEDIATELY TO MINIMIZE USE OF GALVANIZED PIPE MATERIAL.
- GN7. DO NOT INSTALL PLUMBING VENTS WITHIN 10'-0" OF ANY ROOF TOP UNITS OR FRESH AIR UNITS/INTAKE. COORDINATE WITH MECHANICAL CONTRACTOR.
- GN8. ALL PIPING PENETRATIONS THROUGH FIRE RATED WALLS TO BE SEALED "AIR TIGHT" WITH APPROVED SEALANT APPLIED ALL AROUND PENETRATION.
- GN9. ALL PIPING SHALL BE COORDINATED WITH CEILING AND HIDDEN AS MUCH AS POSSIBLE.

- $\langle 1 \rangle$ PROVIDE NEW SANITARY AND VENT CONNECTIONS FOR NEW PLUMBING FIXTURES.
- $\langle 2 \rangle$ VENT UP THROUGH WALL AND PASSES OUT THROUGH ROOF. COORDINATE EXACT LOCATION WITH WALLS IN SPACE ABOVE.

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PROJECT NO: 80-0007FSDG PROJECT NO: 20220204 NDRAWN BY: SSECHECKED BY: MSPROJECT MGR: AIAPPROVED BY: MM
SHEET TITLE PLUMBING SANITARY SECOND FLOOR PLAN
PS-202



<u>GENERAL NOTES:</u>

- GN1. ALL INFORMATION PROVIDED ON PLUMBING SCHEDULE SHEETS APPLIES.
- GN2. AT ALL DISSIMILAR METAL CONNECTIONS PROVIDE AND INSTALL DIELECTRIC UNIONS IMMEDIATELY TO MINIMIZE USE OF GALVANIZED PIPE MATERIAL.
- GN3. DO NOT INSTALL PLUMBING VENTS WITHIN 10'-0" OF ANY ROOF TOP UNITS OR FRESH AIR UNITS/INTAKE. COORDINATE WITH MECHANICAL CONTRACTOR.
- GN4. GENERAL CONTRACTOR IS RESPONSIBLE FOR TESTING OF SANITARY AND VENTING.









GENERAL NOTES:

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- GN6. ALL PIPING PENETRATIONS THROUGH FIRE RATED WALLS TO BE SEALED "AIR TIGHT" WITH APPROVED SEALANT APPLIED ALL AROUND PENETRATION.
- GN7. ALL PIPING SHALL BE COORDINATED WITH CEILING AND HIDDEN AS MUCH AS POSSIBLE.
- GN8. ALL FIXTURES SHALL BE PROVIDED WITH DEDICATED SHUT-OFF VALVES WHETHER SHOWN OR NOT ON PLAN, UNLESS NOTED OTHERWISE.

- 1 PROVIDE NEW WATER METER WITH BACKFLOW PREVENTER FOR NEW COLD WATER MAIN. SEE SIZE ON PLAN.
- 2 PROVIDE NEW HOT WATER & COLD WATER CONNECTIONS FOR NEW PLUMBING FIXTURES.
- (3) PROVIDE NEW GAS WATER HEATER FOR NEW PLUMBING FIXTURES. SEE SIZE ON PLAN. SEE SCHEDULE FOR DETAILS.
- (4) PROVIDE NEW GAS METER WITH SHUT OFF VALVE FOR NEW GAS MAIN. SEE SIZE ON PLAN. VERIFY EXACT LOCATION AT SITE.
- (5) PROVIDE NEW GAS CONNECTION FOR NEW HVAC UNITS. SEE SIZE ON PLAN.
- (6) RUN FLUE AND COMBUSTION AIR OUT OF BUILDING THROUGH WALL FROM GAS WATER HEATER. KEEP 10' DISTANCE MINIMUM FROM ANY FRESH AIR INTAKE. PROVIDE BIRD/INSECT SCREEN. SEE SIZE ON PLAN.
- PROVIDE SHUT OFF VALVE AND PRESSURE REGULATOR FOR HIGH PRESSURE(2 PSI) GAS CONNECTIONS OF GAS FIRED EQUIPMENT.







PW-202

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- 2 PROVIDE SHUT OFF VALVE AND PRESSURE REGULATOR FOR HIGH PRESSURE(2 PSI) GAS CONNECTIONS OF GAS FIRED EQUIPMENT.
- $\langle \overline{3} \rangle$ PROVIDE NEW GAS CONNECTION FOR NEW HVAC UNIT. SEE SIZE ON PLAN.



PLUMBING GENERAL

A. PROVIDE MATERIALS AND EQUIPMENT AND EXECUTE THE WORK, INCLUDING ALL TESTING AND INSPECTIONS, IN COMPLIANCE WITH THE APPLICABLE PROVISIONS OF FEDERAL, STATE AND LOCAL GOVERNMENT LAWS, ORDINANCES, REFERENCED CODES AND STANDARDS CURRENT AS OF THE ISSUE DATE OF THESE DRAWINGS INCLUDING THE GOVERNING LAWS, ORDINANCES, CODES AND STANDARDS CONSTITUTE MINIMUM REQUIREMENTS. ALL MORE STRINGENT REQUIREMENTS OF THE CONTRACT DOCUMENTS SHALL MODIFY, SUPPLEMENT AND SUPERCEDE APPLICABLE PORTIONS OF GOVERNING LAWS, ORDINANCES, CODES AND STANDARDS.

B. CONTRACTOR SHALL PRESENT CERTIFICATE TO THE OWNER THAT ALL APPLICABLE BUILDING PERMITS HAVE BEEN SECURED PRIOR TO STARTING ANY WORK AND PROVIDE THE OWNER WITH ALL REQUIRED CERTIFICATES OF FINAL APPROVAL FROM THE GOVERNING JURISDICTIONS AT COMPLETION OF THE WORK. PROVIDE ALL SHOP DRAWINGS AS REQUIRED IN FOLLOWING SECTIONS.

C. MAKE ALL CONNECTIONS TO EXISTING SYSTEMS DURING DESIGNATED PERIODS UPON APPROVAL OF THE OWNER AND AT NO INCREASE IN CONTRACT SUM.

D. COORDINATE EXACT LOCATION OF NEW CONSTRUCTION TO AVOID ANY INTERFERENCE BETWEEN PIPING, WIRING, LIGHTING FIXTURES, DUCTWORK, BUILDING EQUIPMENT AND STRUCTURAL CONSTRUCTION.

E. PROVIDE LABOR, INCLUDING FIELD ERECTION AND SUPERVISION, MATERIALS, EQUIPMENT AND ANCILLARIES AND COORDINATE, PROCURE, FABRICATE, DELIVER, ERECT OR INSTALL, INTERFACE WITH EXISTING WORK, START, DEBUG AND TEST ALL SYSTEMS AS NECESSARY TO PROVIDE THE OWNER WITH A COMPLETE, OPERATING FACILITY IN CONFORMANCE WITH THE CONSTRUCTION BID DOCUMENTS.

F. ALL CUTTING AND PATCHING THAT MAY BE NECESSARY FOR THE INSTALLATION OF THE PLUMBING CONTRACTOR'S WORK SHALL BE PERFORMED AND REPAIRED BY THE TRADE WHOM NORMALLY PERFORMS THAT WORK AND PAID FOR BY THE PLUMBING CONTRACTOR. NO CUTTING OF THE BUILDING STRUCTURAL SYSTEM SHALL BE PERFORMED WITHOUT THE WRITTEN CONSENT OF THE ARCHITECT BEING PREVIOUSLY OBTAINED.

G. SHOP DRAWINGS

NO APPARATUS OR EQUIPMENT SHALL BE SHIPPED FROM STOCK OR FABRICATED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND STAMPED "REVIEW COMPLETED ' "APPROVED" OR "NOT APPROVED"

SUBMIT FOR APPROVAL, SHOP DRAWINGS FOR ALL EQUIPMENT AND SYSTEM LAYOUT (PIPING) INCLUDING MATERIALS, VALVES, PLUMBING SPECIALTIES, PIPE HANGERS, WIRING DIAGRAMS AND CONTROL DIAGRAMS INCLUDING, BUT NOT LIMITED TO THE ITEMS LISTED BELOW. WHERE ITEMS ARE REFERRED TO BY SYMBOL NUMBERS ON THE DRAWINGS AND SPECIFICATIONS, ALL SUBMITTALS SHALL BEAR THE SAME SYMBOL NUMBERS. ALL DRAWINGS SHALL CONTAIN THE PROJECT NAME. AND PROJECT NUMBER. NO LOOSE SHEETS SHALL BE SUBMITTED UNLESS A COVER SHEET IS ATTACHED.

PROVIDE THE FOLLOWING EQUIPMENT SHOP DRAWINGS:

VALVES, TEMPERATURE AND PRESSURE GAUGES, PUMPS AND CONTROLS, WATER HEATERS, MIXING VALVES, PLUMBING FIXTURES, PROPRESS COPPER FITTINGS, PLUMBING SPECIALTIES, PIPE INSULATION, VIBRATION ISOLATORS, CAST IRON SANITARY AND VENT PIPE. WATER CONDITIONING PRODUCTS, RELATED PRV'S AND UNDERGROUND GAS PIPING.

APPROVAL OF SHOP DRAWINGS DOES NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES TO CONFORM TO THE DESIGN INTENT OF THE CONTRACT DOCUMENTS. APPROVAL OF SHOP DRAWINGS IS INTENDED TO BE FOR GENERAL CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS ONLY. ANY INSTALLED EQUIPMENT WHICH REQUIRES WORK BY OTHER TRADES, SHALL BE COORDINATED WITH THOSE TRADES. REFER TO OTHER TRADES BID DOCUMENTS.

H. CODES, PERMITS AND FEES

UNLESS OTHERWISE INDICATED, ALL REQUIRED PERMITS, LICENSES, INSPECTIONS, APPROVALS AND FEES FOR PLUMBING WORK SHALL BE SECURED AND PAID FOR BY THIS CONTRACTOR. ALL WORK SHALL CONFORM TO ALL LOCAL APPLICABLE CODES, RULES AND REGULATIONS.

RULES OF LOCAL UTILITY COMPANIES SHALL ALSO BE COMPLIED WITH. BEFORE SUBMITTING HIS BID, THE PLUMBING CONTRACTOR SHALL VERIFY WITH EACH UTILITY COMPANY SUPPLYING SERVICE TO THIS PROJECT. THAT ALL SPECIALTY VALVES AND METERS REQUIRED WILL BE PROVIDED. THE PLUMBING CONTRACTOR SHALL INCLUDE THESE COSTS IN HIS BID. (NO ADDITIONAL PAYMENTS WILL BE MADE FOR INSTALLATION OF SUCH ITEMS, EXCEPT IN CASES WHERE THE REQUIREMENTS OF THE UTILITIES COMPANIES MAY CHANGE AFTER THE BID HAS BEEN SUBMITTED.)

ALL WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE RULES AND REGULATIONS SET FORTH IN LOCAL AND STATE CODES. (THE CONTRACTOR SHALL PREPARE ANY DETAILED DRAWINGS OR DIAGRAMS WHICH MAY BE REQUIRED BY THE GOVERNING AUTHORITIES.) WHERE THE DRAWINGS ANDAOR SPECIFICATIONS INDICATE MATERIALS OR CONSTRUCTION IN EXCESS OF CODE REQUIREMENTS, THE DRAWINGS AND OR SPECIFICATIONS SHALL GOVERN.

I. ACCESS DOORS

ACCESS DOORS SHALL BE PROVIDED TO MAKE ALL SHUT OFF VALVES. BALANCING VALVES OR THERMOSTATIC WATER MIXING VALVES LOCATED ABOVE HARD CEILINGS ACCESSIBLE FOR CLEANING, SERVICE AND MAINTENANCE. ACCESS DOORS SHALL BE FURNISHED BY PLUMBING TRADES AND INSTALLED BY ARCHITECTURAL TRADES. PLUMBING TRADES SHALL INCLUDE THE FULL COST OF THE WORK TO BE DONE BY OTHERS. TIMELY DELIVERY TO THE ARCHITECTURAL TRADES IS ESSENTIAL, SO AS NOT TO INTERRUPT THE SEQUENCE OF CONSTRUCTION. WHERE VALVES OR OTHER PLUMBING DEVICES ARE WITHIN EASY REACH OF THE OPERATOR, PROVIDE 12" X 12" ACCESS DOOR. WHERE OPERATOR MUST PASS THROUGH OPENING TO REACH THE DEVICE, PROVIDE 24" X 24" ACCESS DOOR.

ACCESS DOORS FOR NON-FIRE RATED CONSTRUCTION: UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR SPECIFIED, PROVIDE HINGED FLUSH TYPE STEEL FRAMED ACCESS DOORS WITH CONCEALED HINGES, SCREWDRIVER-OPERATED FLUSH LOCK. FACTORY-APPLIED RUST-INHIBITIVE PRIMER PAINT FINISH AND FLANGE OR CASING HEAD TRIM AS REQUIRED TO SUIT WALL OR CEILING CONSTRUCTION. FOR MASONRY CONSTRUCTION, USE MILCOR STYLE M STANDARD, OR APPROVED EQUIVALENT. FOR GYPSUM BOARD OR OTHER DRYWALL CONSTRUCTION USE MILCOR STYLE DW, OR APPROVED EQUIVALENT. FOR ACOUSTICAL TILE CEILINGS, USE RECESS PANEL TYPE, SUCH AS MILCOR STYLE AT, OR APPROVED EQUIVALENT.

FIRE RATED ACCESS DOORS: WHEN ACCESS DOORS ARE LOCATED IN FIRE RATED WALLS OR CEILINGS, THEY MUST BEAR THE UNDERWRITERS' LABORATORIES, INC. LABEL WITH TIME DESIGN RATING EQUAL TO OR EXCEEDING THAT OF THE WALL OR CEILING.

LOCATION: ALL ACCESS DOOR LOCATIONS MUST BE APPROVED BY THE ARCHITECT. APPROVED MANUFACTURES SHALL BE: MILCOR, MEADOWCRAFT, KARP ASSOCIATES.

PLUMBING SPECIFICATIONS

BASIC MATERIALS AND METHODS:

A. PROVIDE ALL ITEMS, ARTICLES, MATERIALS, OPERATIONS AND METHODS LISTED, MENTIONED OR SCHEDULED ON DRAWINGS ANDIOR HEREIN, INCLUDING ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS NECESSARY AND REQUIRED FOR THEIR COMPLETION. THE WORK SHALL INCLUDE INSTALLATION, CLEANING AND TESTING OF COMPLETE AND OPERATING, PLUMBING-PIPING, TEMPERATURE CONTROL AND OTHER SPECIAL SYSTEMS.

B. GRAVITY-FLOW SANITARY AND RELATED VENT (ABOVE GROUND) PIPING SHALL BE NO-HUB SERVICE WEIGHT CAST IRON PIPE. JOINTS SHALL BE STAINLESS STEEL SHIELD AND RUBBER SLEEVE.

CONNECTIONS TO UNDERGROUND SYSTEM SHALL BE MADE WITH PUSH-ON JOINTS, WHERE AVAILABLE.

JOINTS SHALL BE NEOPRENE COMPRESSION GASKET.

INSTRUCTIONS.

D. DOMESTIC WATER PIPING (ABOVE GROUND) PIPING SHALL BE TYPE "K" OR "L" HARD DRAWN SEAMLESS COPPER TUBE. MUELLER "STREAMLINE" OR EQUAL.

TUBING JOINTS SHALL BE SOLDER TYPE, WITH 95-5 TIN-ANTIMONY SOLDER, OR SILVABRITE 100, OR "VIEGA" PROPRESS SOLDERLESS PRESS CONNECTION USING "RIDGID" POWER TOOLS AND SPECIFIC TOOL JAWS TO COMPLETE THE CONNECTION.

FITTINGS SHALL BE WROUGHT COPPER SOLDER JOINT, OR SOLDERLESS PRESS TYPE WITH "SMART CONNECT" FEATURE AND EPDM SEALING ELEMENT RATED FOR THIS APPLICATION WITH NSF APPROVAL STAMP ON FITTINGS.

CONSTRUCTION WITH BLOW-OUT PROOF STEM.

CHECK VALVES SHALL BE 400 PSIG WOG, BRONZE BODY. DIELECTRIC COUPLINGS SIMILAR TO EPCO SHALL BE USED AT JOINTS OF DISSIMILAR METALS.

PROVIDE ALL NECESSARY SPECIALTY TRANSITION FITTING WHERE A CHANGE IN MATERIAL OCCURS (COPPER CPVC) COPPER SWEAT, INCLUDING ALL NECESSARY BUSHINGS.

E. DOMESTIC WATER PIPING (BELOW GROUND) DISTRIBUTION TUBING SHALL BE EITHER TYPE "L" SOFT COPPER OR PEX MATERIAL AS APPROVED IN THE CURRENT MICHIGAN PLUMBING CODE. THERE SHALL BE NO JOINTS BELOW OR LOCATED IN THE CONCRETE FLOOR SLAB. TUBING SHALL BE INSTALLED IN CONTINUOUS LENGTHS FROM THE POINTS OF SLAB PENETRATION SHOWN ON PLANS.

TRANSITION FITTINGS SHALL BE USED TO CONNECT DISSIMILAR MATERIALS. SUCH AS. COPPER TO PEX. PEX FITTING JOINING MAY BE DONE BY EITHER OF TWO METHODS. ASTM F-1807 BRASS BARBED FITTINGS AND COPPER PRESS BANDS OR STAINLESS STEEL SLEEVE AND BRONZE BARBED FITTINGS, SIMILAR TO "VIEGA NORTH AMERICA".

F. NATURAL GAS PIPING (ABOVE GROUND)

INSTALLATION SHALL BE IN ACCORDANCE WITH THE METHODS AS DESCRIBED IN THE INTERNATIONAL FUEL GAS CODE NFPA 58 AND THEIR RELATED SECTIONS.

GAS PIPING MATERIAL SHALL COMPLY WITH ONE OF THE STANDARDS LISTED IN THE INTERNATIONAL FUEL GAS CODE.

CORROSION PROTECTION, PROTECTIVE COATING AND WRAPPING SHALL BE IN ACCORDANCE WITH THE INTERNATIONAL FUEL GAS CODE AND NFPA 58.

VALVES SHALL NOT BE LOCATED IN ANY AIR PLENUM. PORTIONS OF A GAS PIPING SYSTEM INSTALLED IN CONCEALED LOCATIONS SHALL NOT HAVE UNIONS, TUBE FITTINGS, OR RUNNING THREADS. PROVIDE SHUT-OFF COCKS ON ALL BRANCH PIPING TO REGULATORS AND EQUIPMENT.

COORDINATE WITH LOCAL AUTHORITIES FOR OTHER REQUIREMENTS.

G. NATURAL GAS PIPING (UNDERGROUND)

INSTALLATION SHALL BE IN ACCORDANCE WITH THE METHODS AS DESCRIBED IN THE INTERNATIONAL FUEL GAS CODE. NFPA 58 AND THEIR RELATED SECTIONS.

GAS PIPING MATERIAL SHALL BE IN ACCORDANCE WITH THE SECTIONS RELATED TO PLASTIC PIPE, TUBING AND FITTINGS. PLASTIC PIPE SHALL BE LABELED FOR "GAS" WITH "ASTM D 2513" MARKINGS FOR OUTSIDE UNDERGROUND ONLY.

GAS PIPING JOINING SHALL BE IN ACCORDANCE WITH APPLICABLE CODE REQUIREMENTS. PLASTIC PIPE, TUBING AND FITTINGS SHALL BE JOINED PER MANUFACTURERS RECOMMENDATIONS. HEAT FUSION JOINTS SHALL BE MADE IN ACCORDANCE WITH QUALIFIED PROCEDURES. HEAT FUSION FITTINGS SHALL BE MARKED "ASTM D 2513". PLASTIC PIPING JOINTS AND FITTINGS FOR LIQUIFIED PETROLEUM GAS PIPING SYSTEMS IN ACCORDANCE WITH NFPA 58.

H. PIPE HANGERS AND SUPPORTS

NO VALVES SHALL BE ALLOWED IN UNDERGROUND DISTRIBUTION PIPING.

THE PLUMBING CONTRACTOR SHALL PROVIDE PIPE HANGERS AND SUPPORTS AS REQUIRED. APPROVED MANUFACTURERS SHALL BE: GRINNELL CARPENTER-PATTERSON, FEE-MASON OR MICHIGAN HANGER CO.

GENERALLY ALL SUPPORT COMPONENTS SHALL CONFORM TO MANUFACTURERS' STANDARDIZATION SOCIETY SPECIFICATION SP-69.

HANGERS SHALL ADEQUATELY SUPPORT THE PIPING SYSTEM. THEY SHALL BE LOCATED NEAR OR AT CHANGES IN PIPING DIRECTION, WITHIN 1"-0" OF EVERY FITTING AND CONCENTRATED LOAD. THEY SHALL PROVIDE VERTICAL ADJUSTMENT TO MAINTAIN PITCH REQUIRED FOR PROPER DRAINAGE ANDIOR VENTING. THEY SHALL ALLOW FOR EXPANSION AND CONTRACTION OF THE PIPING. HANGERS SHALL BE FASTENED TO BUILDING STEEL MEMBERS WHEREVER PRACTICAL AND HUNG FROM TRUSS OR JOIST PANEL POINTS ONLY.

C. GRAVITY FLOW SANITARY AND RELATED VENT (BELOW GROUND)

BELOW GROUND SOIL AND WASTE PIPING SHALL BE STANDARD WEIGHT HUB AND SPIGOT CAST IRON SOIL PIPE, TAR COATED INSIDE AND OUTSIDE OR PVC DWV.

TRANSITIONS FROM CAST IRON SOIL PIPE TO ANOTHER PIPE MATERIAL SHALL BE MADE WITH JOINT ADAPTERS, APPLICABLE FOR SUCH INSTALLATION PER MANUFACTURERS

BALL VALVES SHALL BE 600 PSIG WOG, BRONZE BODY, FULL PORT, 2 PIECE

NO CORROSION PROTECTION REQUIRED FOR PLASTIC PIPE. CONTRACTOR SHALL PROVIDE AND INSTALL A TRACER WIRE ON ALL UNDERGROUND GAS PIPING.

I. JOINING OF PIPE

THREADED JOINTS SHALL HAVE AMERICAN NATIONAL STANDARD TAPER PIPE THREADS. REAM PIPE ENDS AND REMOVE BURRS AFTER THREADING. MAKE UP JOINTS USING ON APPROVED COMPOUND APPLIED TO THE MALE THREADS ONLY.

SOLDER JOINTS: TUBING OR PIPE SHALL BE CUT SQUARE AND BURRS REMOVED. BOTH INSIDE OF FITTINGS AND OUTSIDE OF TUBING OR PIPE SHALL BE WELL CLEANED WITH STEEL WOOL BEFORE SWEATING. CARE SHALL BE TAKEN TO PREVENT ANNEALING OF FITTINGS AND HARD DRAWN TUBING WHEN MAKING CONNECTIONS. JOINTS SHALL BE MADE WITH 95 5 TIN-ANTIMONY SOLDER.

J. WELDING OF PIPE

SURFACE OF ALL PARTS TO BE WELDED SHALL BE THOROUGHLY CLEANED AND SHALL BE FREE FROM ALL PAINT, OIL, RUST OR SCALE BEFORE BEING WELDED.

FLANGES SHALL BE WELDED TO PIPE BY MEANS OF WELDING NECK FLANGES. BLIND FLANGES SHALL BE MADE WITH WELDING NECK FLANGES AND BLIND FLANGES. CAPS ON SMALLER LINES SHALL BE SCREWED ON FOR EASY REMOVAL.

WELDING SHALL BE DONE IN ACCORDANCE WITH THE WELDING PROCEDURES OF THE NATIONAL CERTIFIED PIPE WELDING BUREAU OR OTHER APPROVED PROCEDURE CONFORMING TO THE REQUIREMENTS OF THE A.S.M.E. BOILER AND PRESSURE VESSEL CODE OR THE A.S.A. CODE FOR THE PRESSURE PIPING. NO WELDER SHALL BE EMPLOYED ON THE WORK THAT HAS NOT FULLY QUALIFIED UNDER THE ABOVE-SPECIFIED PROCEDURE AND SO CERTIFIED BY A MEMBER OF A LOCAL CHAPTER OF THE NATIONAL CERTIFIED PIPE WELDING BUREAU OR SIMILAR LOCALLY

ALL FITTINGS SHALL BE SEAMLESS STEEL WELDING TYPE OF WEIGHT REQUIRED FOR THE SERVICE OR AS HEREIN SPECIFIED.

TURNS IN PIPING SHALL BE MADE WITH LONG RADIUS ELBOWS.

BRANCH TAKE-OFFS SHALL BE MADE WITH FACTORY MADE STRAIGHT OR REDUCING TEES, OR WELDOLETS OF BUTT, SOCKET OR THREADED TYPE SIMILAR THOSE MANUFACTURED BY BONNEY FORGE. WELDOLETS SHALL PROVIDE 100R PIPE STRENGTH FOR ALL SIZES, WEIGHTS AND SCHEDULES.

MITERING, NOTCHING OR DIRECT WELDING OF PIPE TO THE MAIN TO FORM TEES AND ELBOWS OR OTHER SIMILAR TYPE CONSTRUCTION WILL NOT BE PERMITTED.

VALVES AND EQUIPMENT SHALL NOT BE WELDED INTO THE PIPING SYSTEM. SCREWED TYPE UNIONS OR COMPANION FLANGES SHALL BE USED TO ALLOW FOR REMOVAL WITHOUT CUTTING OF PIPE.

PROVIDE A FIRE RESISTANT MAT OR BLANKET TO PROTECT THE STRUCTURE AND ADEQUATE FIRE PROTECTION EQUIPMENT AT ALL LOCATIONS WHERE WELDING IS DONE.

K. CHARACTER OF PIPE WORK

RECOGNIZED TESTING AUTHORITY.

PIPING SHALL BE LOCATED OR OFFSET AS REQUIRED TO CLEAR OTHER TRADES WORK. TO AVOID INTERFERENCE WITH OTHER PIPING HAVING PRECEDENCE, TO CONCEAL THEM MORE READILY OR TO ALLOW FOR MAXIMUM HEADROOM. PIPING AND CONDUIT IN FINISHED AREAS SHALL BE CONCEALED (WHEREVER POSSIBLE).

ALL CUT ENDS SHALL HAVE BURRS REMOVED AND ENDS REAMED.

INTERIOR OF ALL SERVICE PIPING SUCH AS WATER, AIR, ETC. SHALL BE CLEANED FREE OF DIRT AND IMPURITIES BEFORE PIPES ARE PUT IN PLACE. PIPING SHALL BE FLUSHED CLEAN AT COMPLETION.

NO PIPING SHALL BE RUN ABOVE ANY ELECTRICAL DEVICE, PANEL, SWITCHGEAR, ETC. PIPING SHALL BE OFFSET TO CONFORM TO THIS REQUIREMENT WHETHER INDICATED ON THE DRAWINGS OR NOT.

ALL PIPING SHALL BE PROPERLY PITCHED FOR DRAINING AND VENTING AS REQUIRED. UNDERGROUND LINES SHALL BE LAID ON SOLID EARTH WITH PIPE EVENLY SUPPORTED

THROUGHOUT LENGTH OF PIPE. CAP ALL OPENINGS WITH SUITABLE PLUGS OR CAPS DURING CONSTRUCTION.

KEEP HOT AND COLD LINES AT LEAST SIX (6) INCHES APART.

EACH TRADE IS WARNED TO MAKE CERTAIN THAT ALL PIPING, FITTINGS, VALVES, THREADS AND JOINTS ARE FREE FROM DEFECTS AND ARE TIGHTLY FITTED. WHERE LEAKS OCCUR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING DEFECTIVE PORTIONS OF THE SYSTEM, AS WELL AS REPAIRING DAMAGES TO FINISH PORTIONS OF THE BUILDING OR ITS CONTENTS AT NO EXTRA COST.

L. VALVES

VALVES SHALL BE AS MANUFACTURED BY NIBCO, OR APOLLOSCONBRACO.

AS FAR AS POSSIBLE. VALVES SHALL BE BY ONE MANUFACTURER.

VALVES SHALL BE DESIGNED FOR EACH SPECIFIC PRESSURE, TEMPERATURE AND APPLICATION.

FLANGED VALVES SHALL HAVE FLANGE DRILLING TO SUIT JOINING PIPE FLANGES.

ALL BALL VALVES SHALL BE TWO-PIECE, FULL PORT DESIGN WITH CHROME PLATED OR STAINLESS STEEL BALL AND BRONZE BODY.

DO NOT USE GATE VALVES FOR THROTTLING FLOW.

PROVIDE CHECK VALVES WHERE NECESSARY IN THE SYSTEM TO PREVENT BACKFLOW.

ALL MAINS, BRANCH MAINS AND BRANCHES SHALL BE VALVED SO AS TO PROVIDE MEANS OF SHUTTING DOWN THE COMPLETE SYSTEM OR SO THAT BRANCH LINES OR BRANCH MAINS MAY BE SHUT DOWN WITHOUT REQUIRING SHUTDOWN OF MAIN. (THESE VALVES SHALL BE INSTALLED WHETHER SHOWN ON DRAWINGS OR NOT.)

PROVIDE BALL VALVES FOR SHUTTING OFF EACH GROUP OF FIXTURES OR EQUIPMENT TO PERMIT REPAIRS WITHOUT INTERFERING WITH THE REMAINDER OF THE SYSTEM.

PROVIDE VACUUM BREAKERS AND ANTI-SIPHON FITTINGS ON WATER PIPING SYSTEMS BEFORE ALL REQUIRED EQUIPMENT CONNECTIONS, ALL HOSE END SPIGOTS AND HOSE CONNECTIONS, ETC. INSTALL BACKFLOW DEVICE ON ALL WATER LINES TO EQUIPMENT WHERE LOCAL CODE REQUIRES THE INSTALLATION IN STRICT ACCORDANCE WITH LOCAL CODES AND OR AUTHORITIES HAVING JURISDICTION.

CONTRACTOR SHALL COMPLETELY TAG AND LABEL ALL VALVES AND PROVIDE A COMPLETE VALVE CHART INDICATING LOCATION, FUNCTION AND EQUIPMENT SERVED. M. INSULATION - GENERAL

THE CONTRACTOR SHALL FURNISH ALL LABOR AND MATERIALS NECESSARY FOR THE INSTALLATION OF THERMAL INSULATION ON ALL HOT AND COLD SURFACES WHICH REQUIRE INSULATION FOR HEAT OR COLD CONSERVATION, COMFORT OF OCCUPANTS, EFFICIENCY OR EASE OF OPERATION OR TO PREVENT CONDENSATION OR DRIPPING. THE INSULATION SHALL BE COMPLETE AND EFFECTIVE THROUGHOUT THE BUILDING.

ALL INSULATION MATERIALS SHALL BE CLASS A BY UNDERWRITER'S LABORATORIES. STANDARD PIPING FIBERGLASS INSULATION SHALL BE MINIMUM 5 LB. DENSITY AND SHALL HAVE U.L. RATING NOT EXCEEDING 25 FLAME SPREAD, 35 FUEL CONTRIBUTED AND 50 SMOKE DEVELOPED. ACCESSORIES SUCH AS ADHESIVE, MASTICS, CEMENTS, AND CLOTH FOR FITTINGS SHALL BE PERMANENTLY FIRE AND SMOKE RESISTANT. CHEMICALS USED FOR TREATING PAPER IN JACKET LAMINATES SHALL BE UNAFFECTED BY WATER OR HUMIDITY.

APPROVED MANUFACTURERS: CERTAIN TEEDJSAINT GOBAIN, OWENS CORNING, JOHNS-MANSVILLE OR ARMSTRONG CORK COMPANY.

THERMAL INSULATION SHALL BE APPLIED TO THE FOLLOWING PIPING:

1. DOMESTIC WATER PIPING AND RELATED VALVES.

INSULATE FITTINGS AND VALVES. DO NOT INSULATE FLEXIBLE CONNECTIONS AND EXPANSION JOINTS. TERMINATE INSULATION NEATLY WITH PLASTIC MATERIAL TROWELLED ON BEVEL.

INSULATION SHALL BE APPLIED TO PIPE LINES AND EQUIPMENT ONLY AFTER THEY HAVE BEEN INSPECTED, TESTED, CLEANED AND DRIED BY THE CONTRACTOR AND SO APPROVED BY THE OWNER'S FIELD REPRESENTATIVE. INSULATION SHALL BE DRY BEFORE AND DURING APPLICATION. FINISHING SHALL BE DONE AT OPERATING CONDITIONS.

THE INSULATION ON PIPING SHALL BE NEATLY AND TIGHTLY APPLIED WITH UNBROKEN LENGTHS AND WITH THE ENDS OF THE SECTIONS FIRMLY BUTTED TOGETHER.

THE INSULATION ON PIPING SHALL BE EXTENDED THROUGH ALL SLEEVES IN ORDER TO PRODUCE A CONTINUOUS APPLICATION. INSULATE ALL PIPING PASSING THROUGH SLEEVES.

ALL DOMESTIC WATER MAINS AND BRANCHES TO RECEIVE 1" THICK FIBERGLASS INSULATION. ALL IN-WALL DOMESTIC WATER PIPING TO RECEIVE 112" THICK FIBERGLASS INSULATION WITH PVC COVERS.

N. EXCAVATION AND BACKFILL

DO ALL EXCAVATING AND BACKFILLING REQUIRED FOR ALL UNDERGROUND WORK AND EQUIPMENT PROVIDED UNDER THIS CONTRACT. AFTER PIPE IS INSTALLED, TESTED AND INSPECTED, BACKFILL TRENCHES TO GRADE OR UNDERSIDE OF FLOOR SLABS BACKFILL UNDER BUILDINGS SHALL BE CLEAN SAND. BACKFILL FOR OTHER LOCATIONS MAY BE EXCAVATED DIRT, IF APPROVED BY THE ARCHITECT'S FIELD REPRESENTATIVE. APPLY BACKFILL IN LAYERS NOT OVER 8 INCHES THICK, THEN COMPACTED. COMPACT ALL BACKFILL TO AT LEAST 95T OR MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT.

WALLS OF TRENCHES SHALL NOT BE CAVED IN FOR BACKFILLING. WHERE EARTH IS UNSTABLE, PROVIDE SHORING AND SHEET PILING, AS MAY BE NECESSARY TO SUPPORT THE BANKS AND PREVENT MOVEMENT OF EARTH INTO THE TRENCH. NO TRENCH SHALL BE EXCAVATED BELOW THE SAFE ANGLE OF REPOSE FOR THE SOIL ADJACENT TO ANY FOOTING, AS DETERMINED BY THE ARCHITECT, NOR SHALL ANY TRENCHING BE DONE IN SUCH A MANNER AS TO ENDANGER THE STABILITY OF ANY WORK IN PLACE.

REMOVE WATER, WHICH MAY ACCUMULATE OR BE FOUND IN THE TRENCH EXCAVATIONS AND KEEP ALL TRENCHES CLEAR OF WATER DURING THE LAYING OF SEWERS AND PIPING.

WHENEVER THE BOTTOM OF THE TRENCH IS SOFT, THE EXCAVATIONS SHALL BE CARRIED TO AT LEAST 8 INCHES BELOW THE BOTTOM OF THE PIPE AND REFILLED WITH GRAVEL OR CRUSHED STONE. GRAVEL FILL USED FOR THIS PURPOSE SHALL BE THE SAME SIZE AND QUALITY AS USED FOR COARSE AGGREGATE FOR CONCRETE.

ALL EXCAVATED MATERIAL IN EXCESS OF THE QUANTITY REQUIRED FOR BACKFILLNG SHALL BE HAULED AWAY FROM THE PREMISES OR DISPOSED OF BY DUMPING IN THE AREAS DESIGNATED BY THE ARCHITECT.

PIPING INSTALLED ON BACKFILL SHALL BE PLACED ON A GRILLAGE OF CONCRETE. PIPING SHALL NOT BE BURIED IN ASHES, CINDERS, OR STONE.

O. MATERIALS TESTS

PERFORM ALL TESTS REQUIRED BY STATE. CITY. COUNTY ANDEOR OTHER AGENCIES HAVING JURISDICTION, AND AS INDICATED HEREIN.

PROVIDE ALL MATERIALS, EQUIPMENT, WATER, COMPRESSED AIR, ETC. AND LABOR REQUIRED FOR THE TESTS.

PIPING UNDER HYDROSTATIC PRESSURE TEST SHALL NOT LOSE MORE THAN 2 PSI FOR A PERIOD OF 5 HOURS UNDER TEST PRESSURE. EXAMINE PIPING FOR LEAKAGE.

PIPING UNDER AIR PRESSURE TEST SHALL NOT LOSE MORE THAN 2F OF TEST PRESSURE FOR A PERIOD OF 1 HOUR. TEST SHALL BE PERFORMED WITH AMBIENT TEMPERATURE APPROXIMATELY CONSTANT.

TESTS SHALL BE AS REQUIRED BY AGENCIES HAVING JURISDICTION. WHERE NO TESTING REQUIREMENTS EXIST, OR WHERE SUCH REQUIREMENTS ARE LESS STRINGENT THAN THOSE LISTED BELOW, TESTS SHALL BE AS LISTED BELOW. VALVE OFF OR REMOVE ALL GAUGES, EQUIPMENT, ETC., WHICH MAY BE DAMAGED BY TESTS.

1. DOMESTIC WATER PIPING, COMPRESSED AIR PIPING SHALL BE TESTED AT 150-PSI HYDROSTATIC PRESSURE.

2. RAIN CONDUCTORS SHALL BE TESTED AT MINIMUM 5-PSI AIR PRESSURE OR HYDROSTATIC.

3. SANITARY PIPING SHALL BE TESTED AT MINIMUM 5-PSI AIR PRESSURE OR HYDROSTATIC.

P. PERFORMANCE TESTS

THE PLUMBING SYSTEM SHALL BE TESTED AND BALANCED TO DEMONSTRATE THAT SPECIFIED CAPACITIES AND PROPER CONTROL FUNCTIONING HAS BEEN ATTAINED. ALL TESTING AND BALANCING IS TO BE COMPLETED PRIOR TO RUNNING PERFORMANCE TESTS, AND PRIOR TO TRAINING AND INSTRUCTION OF THE OWNER'S PERSONNEL IN SYSTEM OPERATION.

Q. DISINFECTION OF POTABLE WATER SYSTEM

PLUMBING CONTRACTOR SHALL REVIEW APPLICABLE STATE AND LOCAL CODE REQUIREMENTS FOR CLEANING PROCEDURES ON DRINKING WATER SYSTEMS.

PLUMBING CONTRACTOR SHALL PURGE ALL POTABLE WATER SYSTEM OF DELETERIOUS MATER AND DISINFECT PRIOR TO UTILIZATION AS PRESCRIBED BY THE LOCAL HEALTH AUTHORITY OR WATER PURVEYOR HAVING JURISDICTION. IN THE ABSENCE OF A PRESCRIBED METHOD, THE PROCEDURE DESCRIBED IN EITHER AWWA C651 OR AWWA C652.

