KERN COUNTY AIR POLLUTION CONTROL DISTRICT

2700 "M" STREET SUITE 302, BAKERSFIELD, CA 93301-2370
PHONE: (661) 862-5250 • FAX: (661) 862-5251 • www.kernair.org

APPLICATION FOR AUTHORITY TO CONSTRUCT, PERMIT TO OPERATE, EXEMPTION, AND BANKING CERTIFICATE

Operator Information

Business Name to Appear on Permit:	Owner's Name:		Phone No:
Sierra Sands Unified School District	same		(760) 499-1600
Mailing Address: 113 Felspar		Business E-mail Address: ejanson@ssusd.org	
City: Ridgecrest	State: CA	Zip: 93555	Fax No: (760) 375-4562

Equipment Location

Street Address:	City:	Zip:
500 E. French Ave.	Ridgecrest	93555
General Nature of Business: Burroughs High School (on China Lake Naval Air Weapons Station)		S.I.C. CODE(S) *If Known*:

Assessors' Parcel No: Gov Lease OR /4 SECTION 34 TOWNSHIP 26 S RANGE 40 E

Application Type *See ATC/PTO Instructions for appropriate filing fee*

☐ Authority To Construct (ATC)	☐ Permit To Operate (PTO)	☐ Exemption
☐ ATC – Modification	☐ PTO – Modification	☐ Exemption Renewal
☐ ATC – Renewal	☐ PTO – Transfer of Ownership	☐ Banking Certificate
☐ Transfer of Location	☐ Change of Business Name	

Description of Equipment or Modification for which application is made (*include Permit #'s if known*)

Electrically operated fire sprinkler booster pump with a backup diesel generator

Use Additional Sheets if Necessary

Check all that apply

Is this Facility within 1,000 feet of the outer boundary of a school? ☒ YES ☐ NO
Have all necessary land-use authorizations been obtained? ☒ YES ☐ NO *(If "NO" attach explanation)*
Is there any other equipment in the KCAPCD jurisdiction operated by the same operator? ☒ YES ☐ NO
Is this application being submitted as the result of a Notice of Violation or Notice to Comply? ☐ YES ☒ NO
If YES, NOV/NTC #:
Is this equipment portable AND will it be operated at different locations within KCAPCD jurisdiction? ☐ YES ☒ NO

Print Contact Name: Elaine Janson Consultant? ☐ YES ☒ NO If YES, please attach Assignment of Agent

Title: Asst Superintendent Phone: (760) 499-1612 E-Mail Address: ejanson@ssusd.org

Signature: Elaine Janson Date: 08/09/2011

RECEIVED
AUG 12 2011
EASTERN KERN AIR POLLUTION CONTROL DIST.

DATE RECEIVED

Validation (for KCAPCD use)

0449001

ATC No: ~~S22 002~~ **Filing Fee: $** 120.00

Equip Dscrpt: Emergency Fire Pump Engine Rated @ 175 HP **Receipt No:** 27974

Equip Code: ____ : ____ **Date:** 8/15/11

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SUPPLEMENTAL APPLICATION
PISTON ENGINE DATA FORM

Business Name to Appear on Permit:	Owner's Name:	Phone No:
Sierra Sands Unified School District	Same	(760) 499-1600

Engine Information

Engine Manufacturer:	Model:	Model Year:	Serial Number:
Clarke	JU4H-UFAD4G	2010	

EPA Certification: ☐ Tier 0 ☐ Tier 1 ☐ Tier 2 ☒ Tier 3 ☐ Tier 4 ☐ Two Cycle ☒ Four Cycle

Number of Cylinders: 4 | Average Load: % | Expected operating schedule: hrs/day 200 hrs/year

Fuel Consumption: 8.5 gl/hr or Cuft/hr | Engine Rating: BHP @ RPM

Fuel Type: ☐ Gasoline ☒ Diesel ☐ CNG ☐ LPG ☐ Landfill Gas ☐ Digester Gas ☐ Other (list):

Emissions Controls (check all that apply)

☒ Turbo Charged ☐ Fuel Injected ☐ Lean Burn ☐ Rich Burn ☐ Inter Cooler ☐ After Cooler ☐ Timing Retarded ☐ Naturally Aspired

☐ Oxidation Catalyst (OC) ☐ Diesel Particulate Filter (DPF) ☒ Positive Crankcase Ventilation (PCV) ☐ Exhaust Gas Recirculation ☐ Non-selective Catalytic Reduction

DPF/OC Manufacturer:	DPF/OC Model:	DPF/OC Efficiency:

Emissions data collected from: ☒ Manufacturer Guarantee ☐ Source Test | List any other Emissions Control Device:

PM-10: 0.09 g/bhp-hr	NMHC: 0.1 g/bhp-hr	NOx: 2.8 g/bhp-hr	NMHC+NOx: g/bhp-hr	CO: 1.0 g/bhp-hr

Exhaust Information

Stack Diameter: in | Height Above Grade or Building: ft | Exhaust Temp. @ Rated HP: °F

Does the Stack have a Weather Cap: ☐ Yes ☐ No | Direction of exhaust from engine: ☐ Vertical ☐ Horizontal

Stack Serves: ☒ Only This Equipment ☐ This Engine and Other Equipment | Exhaust Flow Rate: CFM

*If this stack serves additional equipment please list the type and rating of all other equipment on a separate sheet of paper and submit with this form.

Use (check all that apply)

☐ Pump Driver Rating: gpm | ☐ Electric Generator Rating: kw | ☐ Compressor Driver Rating: cfm

☐ Full Time ☐ Standby ☐ Emergency ☒ Other (list): Fire water pump

Check one if requesting emission limits exemption: ☐ Emergency Generator ☐ Remote Location (only valid in Indian Wells Valley)

Receptor Data

Is this engine located or to be located within ¼ mile of an off-site residential area (3 or more homes), school, or hospital? ☐ Yes ☐ No

If Yes, check one and complete the following: ☐ Residential ☐ School ☐ Hospital | Distance from Engine: Ft.

Name of School or Hospital:	Address of Receptor:	City:	Compass Direction to Engine: Deg.

Print Contact Name: _____ Consultant? ☐ YES ☐ NO If YES, please attach Assignment of Agent

Title: _____ Phone: _____ E-Mail Address: _____

Signature: _____ Date: _____

KERN COUNTY AIR POLLUTION CONTROL DISTRICT

ENVIRONMENTAL INFORMATION FORM AND INITIAL STUDY EVALUATION

Applicant: Sierra Sands Unified School District
Contact: Elaine Jamson
Title: Asst. Superintendent **Phone:** (760) 499-1612
Project Description: Fire Sprinkler Booster Pump Burroughs HS.

Environmental Information	**Yes**	**No**	**Maybe**
Will the proposed project with regard to the proposed location:			
a. Conflict with the adopted environmental plans and goals of the community?	[ ]	[X]	[ ]
b. Have a substantial, demonstrable negative aesthetic effect?	[ ]	[X]	[ ]
c. Substantially affect a rare or endangered species of animal or plant or the habitat of the species?	[ ]	[X]	[ ]
d. Interfere substantially with the movement of any resident or migratory fish or wildlife species?	[ ]	[X]	[ ]
e. Substantially diminish habitat for fish, wildlife or plants?	[ ]	[X]	[ ]
f. Breach published national, state, or local standards relating to solid waste or litter control?	[ ]	[X]	[ ]
g. Substantially degrade water quality or contaminate a public water supply?	[ ]	[X]	[ ]
h. Substantially degrade or deplete ground water resources or interfere substantially with ground water recharge?	[ ]	[X]	[ ]
i. Disrupt or adversely affect a prehistoric or historic archeological site or a property of historic or cultural significance to a community or ethnic or social group; or a paleontological site except as part of scientific study?	[ ]	[X]	[ ]
j. Induce substantial growth or concentration of population?	[ ]	[X]	[ ]
k. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system?	[ ]	[X]	[ ]
l. Displace a substantial number of people?	[ ]	[X]	[ ]
m. Encourage activities which result in the use of large amounts of fuel, water or energy?	[ ]	[X]	[ ]
n. Use fuel, water or energy inefficiently?	[ ]	[X]	[ ]

o. Increase substantially the ambient noise level for adjoining areas?	[ ]	[X]	[ ]
p. Cause substantial flooding, erosion or siltation?	[ ]	[X]	[ ]
q. Expose people or structures to major geologic hazards?	[ ]	[X]	[ ]
r. Extend a sewer trunk line with capacity to serve new development?	[ ]	[X]	[ ]
s. Disrupt or divide the physical arrangement of an established community?	[ ]	[X]	[ ]
t. Create a potential public health hazard or involve the use, production, or disposal of materials which pose a hazard to people or animal or plant populations in the area affected?	[ ]	[X]	[ ]
u. Conflict with established recreational, educational, religious or scientific uses?	[ ]	[X]	[ ]
v. Convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land?	[ ]	[X]	[ ]
w. Interfere with emergency response or evacuation plans?	[ ]	[X]	[ ]
x. Violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations?	[ ]	[X]	[ ]

NOTE: Please attach any pertinent explanatory information.

CERTIFICATION:

I hereby certify the statement furnished above and in attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Signature: _____ **Date:** 8/9/11

CLARKE®
FIRE PUMP ENGINES

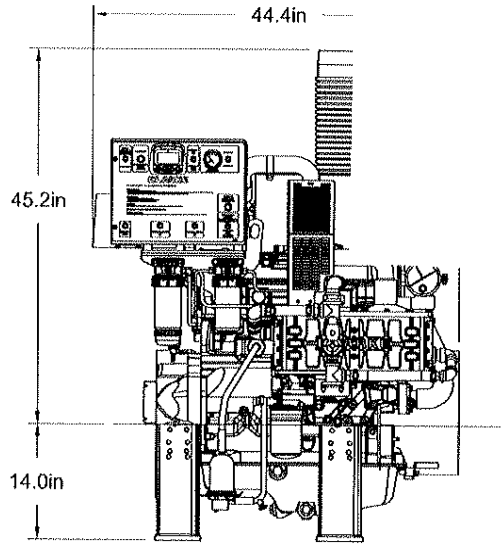
MODELS
JU4H-UFAD4G
JU4H-UFAD5G
JU4H-UFADP0
JU4H-UFADR0
JU4H-UFADW8

USA Purchased - EPA Tier 3 Emissions Certified[1]

FM-UL-cUL APPROVED RATINGS BHP/*KW*

JU4H MODEL	RATED SPEED 1760		2100		2350		2400	
UFAD4G	100	*74.5*	101	*75*	105	*78*	105	*78*
UFAD5G	110	*82*	113	*84*	118	*88*	118	*88*
UFADP0	121	*90*	125	*93*	130	*97*	130	*97*
UFADR0	113	*84*	136	*101*	140	*104*	140	*104*
UFADW8	144	*107*						
UFADY8	157	*117*						

[1]Engines are:
EPA Tier 3 Emissions Certified Off-Road (40 CFR Part 89) and NSPS Stationary (40 CFR Part 60 Sub Part IIII);
CARB Approved Off-Road (Title 13 CCR Section 2423) and ATCM Stationary (Title 17 CCR Section 93115.6 (a) (4)) for 2010 engines manufactured by John Deere Power Systems.



OVERALL WIDTH
36.6in

SPECIFICATIONS

ITEM	JU4H MODELS UFAD4G	UFAD5G	UFADP0	UFADR0	UFADW8	UFADY8
Number of Cylinders	4					
Aspiration	TRWA					
Rotation*	CW					
Weight – lb (kg)	1490 (676)					
Compression Ratio	19.0:1					
Displacement – cu. in. (l)	275 (4.5)					
Engine Type	4 Stroke Cycle – Inline Construction					
Bore & Stroke – in. (mm)	4.19 x 5.00 (106 x 127)					
Installation Drawing	D630					
Wiring Diagram AC	C07591					
Wiring Diagram DC	C071367, C071360, C071361					
Engine Series	John Deere 4045 Series Power Tech E					
Speed Interpolation	N/A					

Abbreviations: CW – Clockwise TRWA – Turbocharged with Raw Water Aftercooling N/A Not Available

*Rotation viewed from Heat Exchanger / Front of engine

CERTIFIED POWER RATING

- Each engine is factory tested to verify power and performance.
- FM-UL power ratings are shown at specific speeds, Clarke engines can be applied at a single rated RPM setting ± 50 RPM.

ENGINE RATINGS BASELINES

- Engines are to be used for stationary emergency standby fire pump service only. Engines are to be tested in accordance with NFPA 25.
- Engines are rated at standard SAE conditions of 29.61 in. (752.1 mm) Hg barometer and 77°F (25°C) inlet air temperature [approximates 300 ft. (91.4 m) above sea level] by the testing laboratory (see SAE Standard J 1349).
- A deduction of 3 percent from engine horsepower rating at standard SAE conditions shall be made for diesel engines for each 1000 ft. (305 m) altitude above 300 ft. (91.4 m)
- A deduction of 1 percent from engine horsepower rating as corrected to standard SAE conditions shall be made for diesel engines for every 10°F (5.6°C) above 77°F (25°C) ambient temperature.

c UL us

Meets NFPA 20 Requirements

FM C US APPROVED

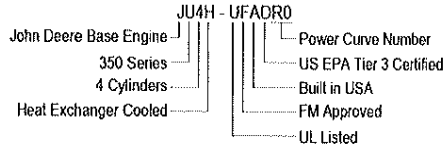
ENGINE EQUIPMENT

EQUIPMENT	STANDARD	OPTIONAL
Air Cleaner	Direct Mounted, Washable, Indoor Service with Drip Shield	Disposable, Drip Proof, Indoor Service Outdoor Type
Alternator	12V-DC, 42 Amps with Poly-Vee Belt and Guard	24V-DC, 40 Amps with Poly-Vee Belt and Guard
Exhaust Protection	Metal Guards on Manifolds and Turbocharger	
Coupling	Bare Flywheel	UL Listed Driveshaft and Guard, JU4H-UFAD4G-CDS20-SC, JU4H-UFAD5G, P0, R0, W8, Y8 – CDS30-S1
Electronic Control Module	12V-DC, Energized to Stop, Primary ECM always Powered on	24V-DC, Energized to Stop, Primary ECM always Powered on
Exhaust Flex Connection	Stainless Steel Flex, NPT(M) Connection, 4"	Stainless Steel Flex, 150# ANSI Flanged Connection, 5"
Flywheel Housing	SAE #3	
Flywheel Power Take Off	11.5" SAE Industrial Flywheel Connection	
Fuel Connections	Fire Resistant, Flexible, USA Coast Guard Approved Supply and Return Lines	Stainless Steel, Braided, cUL Listed, Supply and Return Lines
Fuel Filter	Primary Filter with Priming Pump	
Fuel Injection System	High Pressure Common Rail	
Engine Heater	120V-AC, 1500 Watt	240V-AC, 1500 Watt
Governor, Speed	Dual Electronic Control Modules	
Heat Exchanger	Tube and Shell Type, 60 PSI (4 BAR), NPT(F) Connections	
Instrument Panel	Multimeter to Display English and Metric, Tachometer, Hourmeter, Water Temperature, Oil Pressure and One (1) Voltmeter with Toggle Switch, Front Opening	
Junction Box	Integral with Instrument Panel; For DC Wiring Interconnection to Engine Controller	
Lube Oil Cooler	Engine Water Cooled, Plate Type	
Lube Oil Filter	Full Flow with By-Pass Valve	
Lube Oil Pump	Gear Driven, Gear Type	
Manual Start Control	On Instrument Panel with Control Position Warning Light	
Overspeed Control	Electronic, Factory Set, Not Field Adjustable	
Raw Water Solenoid Operation	Automatic from Fire Pump Controller and from Engine Instrument Panel	
Run – Stop Control	On Instrument Panel with Control Position Warning Light	
Starters	Two (2) 12V-DC	Two (2) 24V-DC
Throttle Control	Adjustable Speed Control by Increase/Decrease Button, Tamper Proof in Instrument Panel	
Water Pump	Centrifugal Type, Poly-Vee Belt Drive with Guard	

Abbreviations : DC – Direct Current, AC – Alternating Current, SAE – Society of Automotive Engineers, NPT(F) – National Pipe Tapered Thread (Female), NPT(M) – National Pipe Tapered Thread (Male), ANSI – American National Standards Institute

Note : Engine Controller needs two (2) additional signals: Injector Failure, Alternate ECM Selected

MODEL NOMENCLATURE: (10 Digit Models)



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CLARKE Fire Protection Products, Inc.
3133 E. Kemper Rd., Cincinnati, Ohio 45241
United States of America
Tel +1-513-475-FIRE(3473) Fax +1-513-771-0726
www.clarkefire.com

CLARKE UK, Ltd.
Grange Works, Lomond Rd., Coatbridge, ML5-2NN
United Kingdom
Tel +44-1236-429946 Fax +44-1236-427274
www.clarkefire.com

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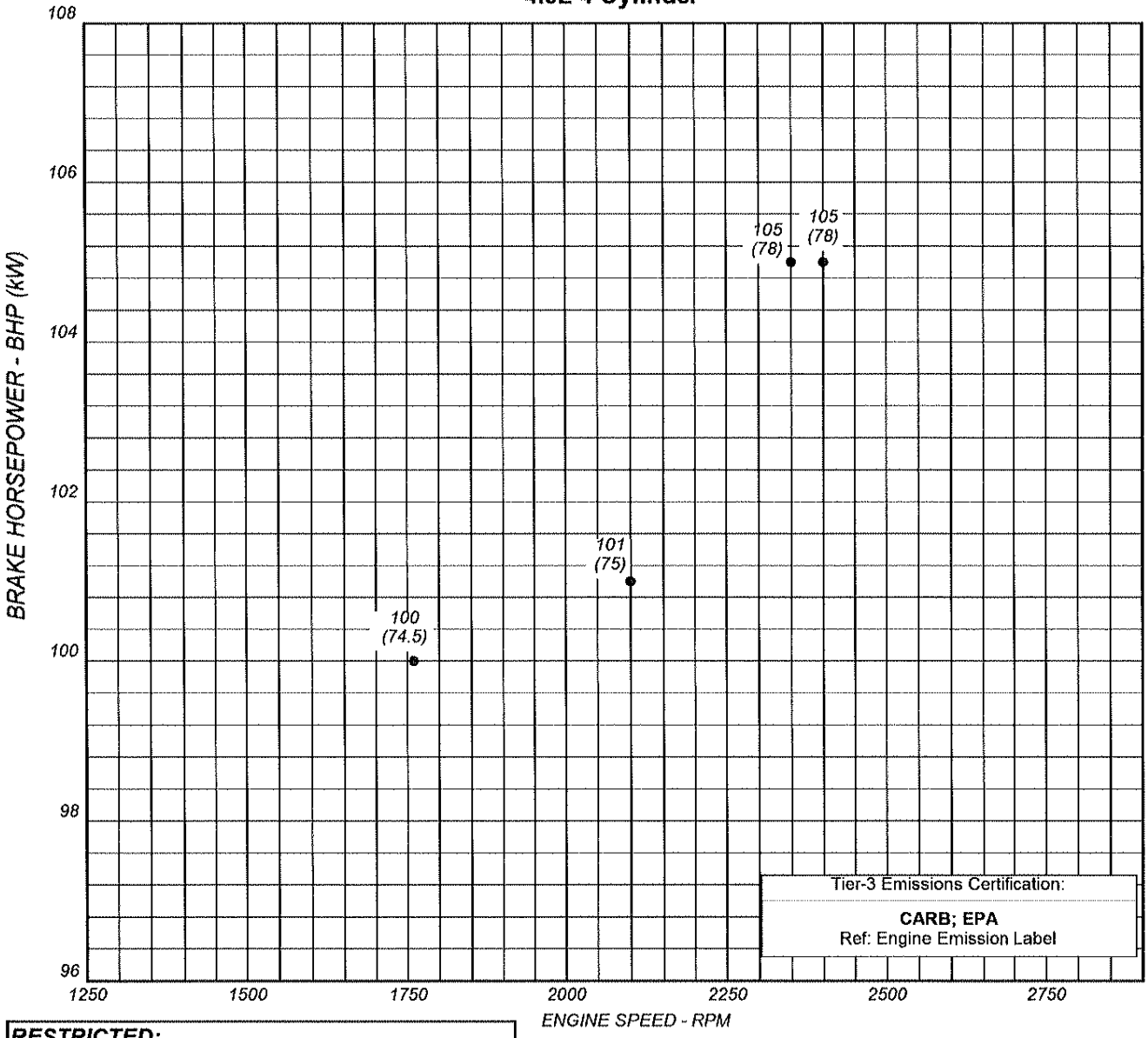
Fire Protection Products, Inc.

FIRE PUMP MODEL: JU4H-UFAD4G
Heat Exchanger Cooled
Turbocharged
4.5L 4 Cylinder



RESTRICTED:
USE ONLY FOR STAND-BY FIRE PUMP APPLICATIONS

ENGINE PERFORMANCE:
STANDARD CONDITIONS: (SAE J1349, ISO 3046)
77°F (25°C) AIR INLET TEMPERATURE
29.61 IN. (751.1MM) HG BAROMETRIC PRESSURE
#2 DIESEL FUEL (SEE C13940)

KEVIN KUNKLER 18DEC09

●——● *NAMEPLATE BHP (MAXIMUM PUMP LOAD)*

CREATED	DATE CREATED
KJE	09/14/09

ENGINE MODEL JU4H-UFAD4G

DRAWING NO.	REV
C133149	B

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Fire Protection Products, Inc.

JU4H-UFAD4G

INSTALLATION & OPERATION DATA (I&O Data)

USA Produced

Basic Engine Description

Engine Manufacturer	John Deere Co.
Ignition Type	Compression (Diesel)
Number of Cylinders	4
Bore and Stroke - in (mm)	4.19 (106) X 5 (127)
Displacement - in^3 (L)	275 (4.5)
Compression Ratio	19.0:1
Valves per cylinder	
Intake	1
Exhaust	1
Combustion System	Direct Injection
Engine Type	In-Line, 4 Stroke Cycle
Fuel Management Control	Electronic, High Pressure Common Rail
Firing Order (CW Rotation)	1-3-4-2
Aspiration	Turbocharged
Charge Air Cooling Type	None
Rotation, viewed from front of engine, Clockwise (CW)	Standard
Engine Crankcase Vent System	Open
Installation Drawing	D630
Weight - lb (kg)	1490 (676)

Power Rating	**1760**	**2100**	**2350**	**2400**
Nameplate Power - HP (kW)	100 (74.5)	101 (75)	105 (78)	105 (78)

Cooling System - [C051386]	**1760**	**2100**	**2350**	**2400**
Engine Coolant Heat - Btu/sec (kW)	36 (38)	49 (51.7)	50 (52.8)	50 (52.8)
Engine Radiated Heat - Btu/sec (kW)	23 (24.3)	23 (24.3)	24 (25.3)	24 (25.3)
Heat Exchanger Minimum Flow				
60°F (15°C) Raw H_20 - gal/min (L/min)	3.9 (14.8)	3.8 (14.4)	5.8 (22)	5.9 (22.3)
95°F (35°C) Raw H_20 - gal/min (L/min)	7.9 (29.9)	17.1 (64.7)	13.7 (51.9)	14 (53)

Heat Exchanger Maximum Cooling Raw Water	
Inlet Pressure - psi (bar)	60 (4.1)
Flow - gal/min (L/min)	40 (151)
Typical Engine H_20 Operating Temp - °F (°C)[1]	180 (82.2) - 195 (90.6)
Thermostat	
Start to Open - °F (°C)	180 (82.2)
Fully Opened - °F (°C)	203 (95)
Engine Coolant Capacity - qt (L)	15.3 (14.5)
Coolant Pressure Cap - lb/in^2 (kPa)	15 (103)
Maximum Engine Coolant Temperature - °F (°C)	230 (110)
Minimum Engine Coolant Temperature - °F (°C)	160 (71.1)
High Coolant Temp Alarm Switch - °F (°C)[2]	235 (113) - 241 (116)

Electric System - DC	**Standard**		**Optional**	
System Voltage (Nominal)	12		24	
Battery Capacity for Ambients Above 32°F (0°C)				
Voltage (Nominal)	12	[C07633]	24	[C07633]
Qty. Per Battery Bank	1		2	
SAE size per J537	8D		8D	
CCA @ 0°F (-18°C)	1400		1400	
Reserve Capacity - Minutes	430		430	
Battery Cable Circuit, Max Resistance - ohm	0.0012		0.0012	
Battery Cable Minimum Size				
0-120 in. Circuit Length[3]	00		00	
121-160 in. Circuit Length[3]	000		000	
161-200 in. Circuit Length[3]	0000		0000	
Charging Alternator Maximum Output - Amp,	40	[C071363]	55	[C071366]
Starter Cranking Amps, Rolling - @60°F (15°C)	345	[RE59595/RE59589]	250	[C07819/C07820]

NOTE: This engine is intended for indoor installation or in a weatherproof enclosure. [1]Engine H_2O temperature is dependent on raw water temperature and flow. [2]High Coolant Switch threshold varies with engine load. [3]Positive and Negative Cables Combined Length.

CLARKE

Fire Protection Products, Inc.

JU4H-UFAD4G

INSTALLATION & OPERATION DATA (I&O Data)

USA Produced

Exhaust System	**1760**	**2100**	**2350**	**2400**
Exhaust Flow - ft.³/min (m³/min)	530 (15)	645 (18.3)	677 (19.2)	691 (19.6)
Exhaust Temperature - °F (°C)	1000 (538)	855 (457)	815 (435)	800 (427)
Maximum Allowable Back Pressure - in H_20 (kPa)	30 (7.5)	30 (7.5)	30 (7.5)	30 (7.5)
Minimum Exhaust Pipe Dia. - in (mm)[4]	4 (102)	4 (102)	4 (102)	4 (102)

Fuel System	**1760**	**2100**	**2350**	**2400**
Fuel Consumption - gal/hr (L/hr)	8.5 (32.2)	8.1 (30.7)	10.1 (38.2)	10.3 (39)
Fuel Pressure - lb/in² (kPa)	3 (20.7) - 6 (41.4)			
Minimum Line Size - Supply - in.	.50 Schedule 40 Steel Pipe			
Pipe Outer Diameter - in (mm)	0.848 (21.5)			
Minimum Line Size - Return - in.	.375 Schedule 40 Steel Pipe			
Pipe Outer Diameter - in (mm)	0.675 (17.1)			
Maximum Allowable Fuel Pump Suction Lift with clean Filter - in H_20 (mH_20)	80 (2)			
Maximum Allowable Fuel Head above Fuel pump, Supply or Return - ft (m)	6.6 (2)			
Fuel Filter Micron Size	2 (Secondary)			

Heater System	**Standard**	**Optional**
Engine Coolant Heater		
Wattage (Nominal)	1500	1500
Voltage - AC, 1 Phase	120 (+5%, -10%)	240 (+5%, -10%)
Part Number	[C124948]	[C124949]

Air System	**1760**	**2100**	**2350**	**2400**
Combustion Air Flow - ft.³/min (m³/min)	186 (5.3)	266 (7.5)	300 (8.5)	306 (8.7)
Air Cleaner	**Standard**		**Optional**	
Part Number	[C03396]		[C03327]	
Type	Indoor Service Only, with Shield		Canister, Single-Stage	
Cleaning method	Washable		Disposable	
Air Intake Restriction Maximum Limit				
Dirty Air Cleaner - in H_20 (kPa)	12 (3)		10 (2.5)	
Clean Air Cleaner - in H_20 (kPa)	6 (1.5)		5 (1.2)	
Maximum Allowable Temperature (Air To Engine Inlet) - °F (°C)[5]	130 (54.4)			

Lubrication System	
Oil Pressure - normal - lb/in² (kPa)	40 (276) - 60 (414)
Low Oil Pressure Alarm Switch - lb/in² (kPa)[6]	30 (207) to 35 (241)
In Pan Oil Temperature - °F (°C)	220 (104) - 245 (118)
Total Oil Capacity with Filter - qt (L)	15.5 (14.7)

Lube Oil Heater	**Optional**	**Optional**
Wattage (Nominal)	150	150
Voltage	120V (+5%, -10%)	240V (+5%, -10%)
Part Number	C04430	C04431

Performance	**1760**	**2100**	**2350**	**2400**
BMEP - lb/in² (kPa)	164 (1130)	139 (958)	129 (889)	126 (869)
Piston Speed - ft/min (m/min)	1467 (447)	1750 (533)	1958 (597)	2000 (610)
Mechanical Noise - dB(A) @ 1m	C133359			
Power Curve	C133149			

[4]Based on Nominal System. Back pressure flow analysis must be done to assure maximum allowable back pressure is not exceeded. (Note: minimum exhaust Pipe diameter is based on: 15 feet of pipe, on 90° elbow, and a silencer pressure drop no greater than one half of the maximum allowable back pressure.) [5]Review for horsepower derate if ambient air entering engine exceeds 77°F (25°C). [6]Low Oil Pressure Switch threshold varies w/engine speed. [ ] indicates component reference part number.

JU4H & JU6H ENGINE MODELS
ENGINE MATERIALS AND CONSTRUCTION

Air Cleaner
Type..... Indoor Usage Only
Oiled Fabric Pleats
Material..... Surgical Cotton
Aluminum Mesh

Air Cleaner - Optional
Type..... Canister
Material..... Pleated Paper
Housing..... Enclosed

Camshaft
Material..... Cast Iron
Chill Hardened
Location..... In Block
Drive..... Gear, Spur
Type of Cam..... Ground

Charge Air Cooler (JU6H-60,62,68,74,84, ADK0, AD58, ADNG, ADN0, ADQ0, ADR0, AAQ8, AARG, ADP8, ADP0, ADT0, AD88, ADR8, AD98, ADS0, ADW8, ADX8, AD98 only)
Type.....Raw Water Cooled

Materials (in contact with raw water)
Tubes..... 90/10 CU/NI
Headers ..... 36500 Muntz
Covers ..... 83600 Red Brass
Plumbing ..... 316 Stainless Steel/ Brass
90/10 Silicone

Coolant Pump
Type..... Centrifugal
Drive..... Poly Vee Belt

Coolant Thermostat
Type..... Non Blocking
Qty..... 1

Connecting Rod
Type..... I-Beam Taper
Material..... Forged Steel Alloy

Crank Pin Bearings
Type..... Precision Half Shell
Number..... 1 Pair Per Cylinder
Material..... Wear-Guard

Crankshaft
Material..... Forged Steel
Type of Balance..... Dynamic

Cylinder Block
Type..... One Piece with
Non-Siamese Cylinders
Material..... Annealed Gray Iron

Cylinder Head
Type..... Slab 2 Valve
Material..... Annealed Gray Iron

Cylinder Liners
Type..... Centrifugal Cast, Wet Liner
Material..... Alloy Iron Plateau, Honed

Valves
Type..... Poppet
Arrangement..... Overhead Valve
Number/Cylinder..... 1 intake
1 exhaust
Operating Mechanism..... Mechanical Rocker Arm
Type of Lifter..... Large Head
Valve Seat Insert..... Replaceable

Fuel Pump
Type..... Diaphragm
Drive..... Cam Lobe

Heat Exchanger (USA)
Type..... Tube & Shell
Materials
Tube& Headers..... Copper
Shell..... Copper
Electrode..... Zinc

Heat Exchanger (UK)
Type..... Tube & Bundle
Materials
Tube& Headers..... Copper
Shell..... Aluminum

Injection Pump
Type..... Rotary
Drive..... Gear

Lubrication Cooler
Type..... Plate

Lubrication Pump
Type..... Gear
Drive..... Gear

Main Bearings
Type..... Precision Half Shells
Material..... Steel Backed-Aluminum Lined

Piston
Type and Material..... Aluminum Alloy with Reinforced
Top Ring Groove
Cooling..... Oil Jet Spray

Piston Pin
Type..... Full Floating - Offset

Piston Rings
Number/Piston..... 3
Top..... Keystone Barrel Faced -
Plasma Coated
Second..... Tapered Cast Iron
Third..... Double Rail Type
w/Expander Spring

DATUMS:

-A- - MOUNTING FACE OF FLYWHEEL

-B- - ENGINE CRANKSHAFT HORIZONTAL CENTERLINE

-C- - ENGINE CRANKSHAFT VERTICAL CENTERLINE

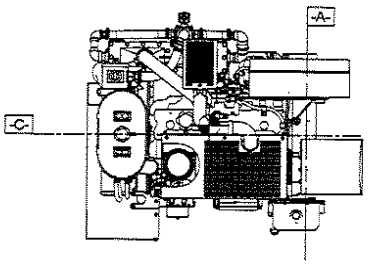
- CENTER OF GRAVITY OF ENGINE

- CLOCKWISE ROTATION WHEN VIEWED FROM FRONT OF ENGINE

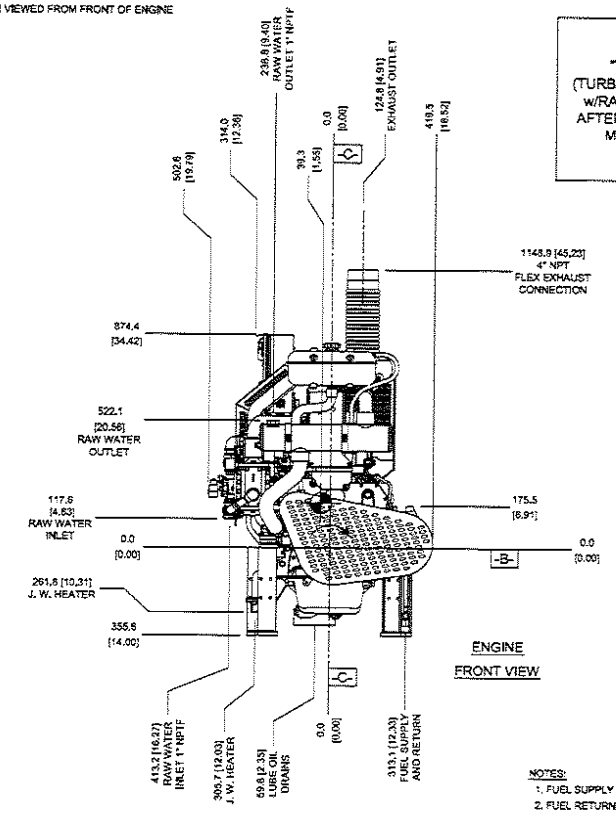
CAUTION:
ALL PLUMBING MUST BE SUPPOERTED AND/OR ISOLATED SO THAT NO WEIGHT OR STRESS IS APPLIED TO ANY ENGINE COMPONENT

ATTENTION:
REFER TO THE SPECIFIC MODEL 'INSTALLATION AND OPERATION DATA' FOR INSTALLATION GUIDELINES

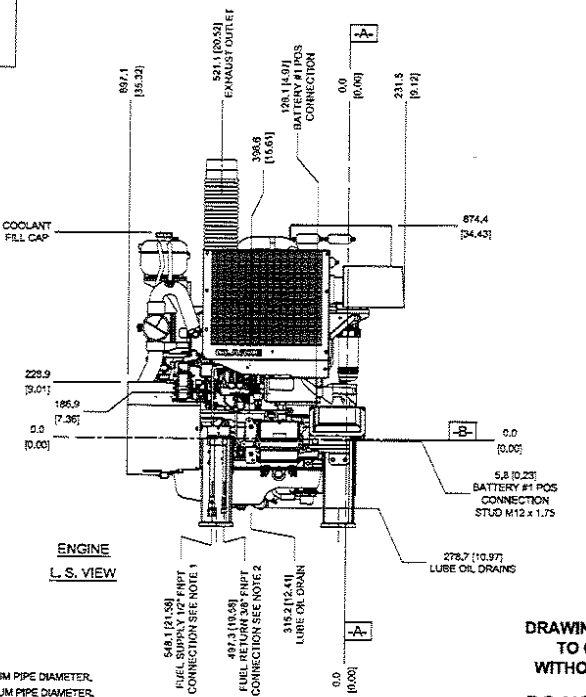
"TRWA" (TURBOCHARGED w/RAW WATER AFTERCOOLING) MODELS	JU4H-UFAD4G, JU4H-UFAD5G, JU4H-UFADJG, JU4H-UFADP0, JU4H-UFADRO, JU4H-UFADW8, JU4H-UFADY8 (MODELS SHOWN)



ENGINE
TOP VIEW



ENGINE
FRONT VIEW



ENGINE
L. S. VIEW

NOTES:
1. FUEL SUPPLY PIPING FROM TANK TO ENGINE SHOULD BE 1/2" MINIMUM PIPE DIAMETER.
2. FUEL RETURN PIPING FROM ENGINE TO TANK SHOULD BE 3/8" MINIMUM PIPE DIAMETER.

DRAWING SUBJECT TO CHANGE WITHOUT NOTICE

DO NOT SCALE

REV	DESCRIPTION	ECN#	DWN	APVD	DATE
A	ISSUED ENGINEERING DRAWING	1626	DMP	[illegible]	29OCT09
B	CHANGED 4" 150# FLANGED EXHAUST TO 4" NPT	1883	RJT	KRW	09FEB10
C	ENGINE MODEL JU4H-UFADY8 REPLACED ENGINE MODEL JU4H-UFAD98	1909	MAL	[illegible]	23FEB10
D	REVISED ENGINE FOOT MOUNTING HOLE LOCATIONS - PAGE 2	1901	JCA	[illegible]	28JUL10
E	ADDED ENGINE MODEL JU4H-UFAD98	2160	JCA	[illegible]	06DEC10
F	ADDED CENTER OF GRAVITY, REMOVED ENGINE MODEL JU4H-UFAD98	2241	DGP	KRW	21MAR11

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CONTROLLED DRAWING

CLARKE
Fire Protection Products, Inc.

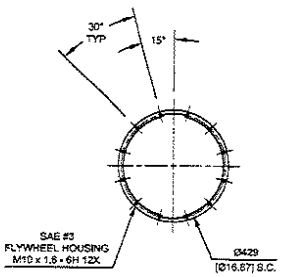
DRWN DPOTTER
DATE 11SEP09
ENGR KKUNKLER

INSTALLATION DRAWING
DIESEL FIRE PUMP DRIVER
MODEL JU4H T3 PTE

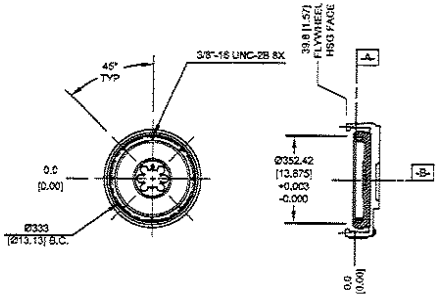
PART NO. D630 REV F

SCALE NTS UNITS MM [INCH] PAGE 1 OF 2

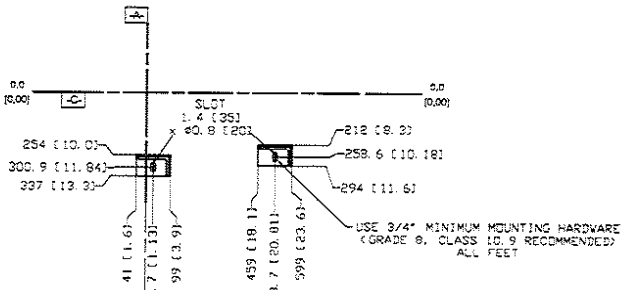
FLYWHEEL HSG FACE DETAIL



DETAIL DATUM -A- BARE FLYWHEEL

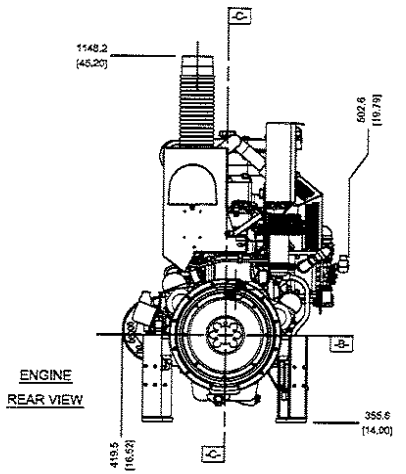


ENGINE MOUNTING FEET
SYMMETRICAL ABOUT CRANKSHAFT CENTERLINE: DATUM - C -

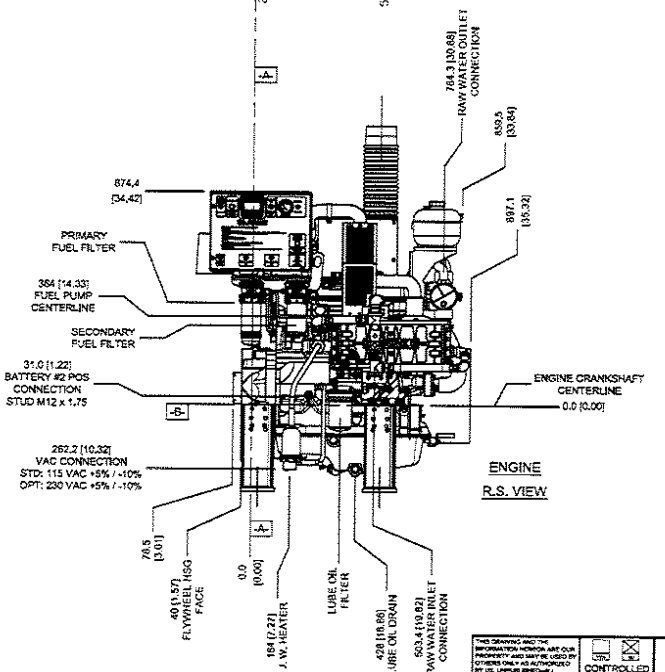


DRAWING SUBJECT TO CHANGE WITHOUT NOTICE

DO NOT SCALE



ENGINE REAR VIEW



ENGINE R.S. VIEW

FOR ENGINE SPECIFIC OPTIONS SEE www.CLARKEFIRE.com

CONTROLLED DRAWING

CLARKE
Fire Protection Products, Inc.

DRAWN: DPOTTER
DATE: 11SEP09
USER: KKUNKLER
MATERIAL:
REFERENCE: EC1625

INSTALLATION DRAWING
DIESEL FIRE PUMP DRIVER
MODEL JU4H T3 PTE

PART NO.: D630 REV: F
SCALE: NTS UNITS: MM [INCH] PAGE: 2 OF 2

Rating Specific Emissions Data - John Deere Power Systems

JOHN DEERE

Nameplate Rating Information

Clarke Model	JU4H-UFAD4G
Power Rating (BHP / kW)	100 / 74.5
Certified Speed (RPM)	1760

Rating Data

Rating	4045HFC28A
Certified Power (kW)	117
Rated Speed	1760
Vehicle Model Number	Clarke Fire Pump

Units	g/kW-hr	g/hp-hr
NOx	3.7	2.8
HC	0.1	0.1
NOx + HC	3.8	2.8
Pm	0.12	0.09
CO	1.3	1.0

Certificate Data

Engine Model Year	2010
EPA Family Name	AJDXL06.8105
EPA JD Name	350HAC
EPA Certificate Number	JDX-NRCI-10-10.1
CARB Executive Order	U-R-004-0383
Parent of Family	4045HF285A

Units	g/kW-hr
NOx	3.3
HC	0.1
NOx + HC	3.4
Pm	0.25
CO	1.5

* The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

JDPS 2/14/2010

Rating Specific Emissions Data - John Deere Power Systems

JOHN DEERE

Nameplate Rating Information

Clarke Model	JU4H-UFAD4G
Power Rating (BHP / kW)	101 / 75
Certified Speed (RPM)	2100

Rating Data

Rating	4045HFC28D
Certified Power (kW)	101
Rated Speed	2100
Vehicle Model Number	Clarke Fire Pump

Units	g/kW-hr	g/hp-hr
NOx	3.7	2.8
HC	0.2	0.1
NOx + HC	3.9	2.9
Pm	0.15	0.11
CO	0.7	0.5

Certificate Data

Engine Model Year	2010
EPA Family Name	AJDXL06.8105
EPA JD Name	350HAC
EPA Certificate Number	JDX-NRCI-10-10.1
CARB Executive Order	U-R-004-0383
Parent of Family	4045HF285A

Units	g/kW-hr
NOx	3.3
HC	0.1
NOx + HC	3.4
Pm	0.25
CO	1.5

* The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

JDPS 2/14/2010

Rating Specific Emissions Data - John Deere Power Systems

Nameplate Rating Information

Clarke Model	JU4H-UFAD4G
Power Rating (BHP / kW)	105 / 78
Certified Speed (RPM)	2350

Rating Data

Rating	4045HFC28C
Certified Power (kW)	104
Rated Speed	2350
Vehicle Model Number	Clarke Fire Pump

Units	g/kW-hr	g/hp-hr
NOx	3.2	2.4
HC	0.2	0.2
NOx + HC	3.4	2.6
Pm	0.20	0.15
CO	2.0	1.5

Certificate Data

Engine Model Year	2010
EPA Family Name	AJDXL06.8105
EPA JD Name	350HAC
EPA Certificate Number	JDX-NRCI-10-10.1
CARB Executive Order	U-R-004-0383
Parent of Family	4045HF285A

Units	g/kW-hr
NOx	3.3
HC	0.1
NOx + HC	3.4
Pm	0.25
CO	1.5

* The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

JDPS 2/14/2010

Rating Specific Emissions Data - John Deere Power Systems

JOHN DEERE

Nameplate Rating Information

Clarke Model	JU4H-UFAD4G
Power Rating (BHP / kW)	105 / 78
Certified Speed (RPM)	2400

Rating Data

Rating	4045HFC28B
Certified Power (kW)	104
Rated Speed	2400
Vehicle Model Number	Clarke Fire Pump

Units	g/kW-hr	g/hp-hr
NOx	3.4	2.5
HC	0.2	0.2
NOx + HC	3.6	2.7
Pm	0.19	0.14
CO	2.0	1.5

Certificate Data

Engine Model Year	2011
EPA Family Name	BJDXL06.8105
EPA JD Name	350HAC
EPA Certificate Number	JDX-NRCI-11-14
CARB Executive Order	U-R-004-0429
Parent of Family	4045HF285A

Units	g/kW-hr
NOx	3.3
HC	0.1
NOx + HC	3.4
Pm	0.25
CO	1.5

* The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

JDPS 2/24/2011

JU4H-UFAD4G

FIRE PUMP DRIVER

NOISE DATA

Mechanical Engine Noise *

RPM	BHP	OVERALL dB(A)	Octave Band 31.5 Hz dB(A)	63 Hz dB(A)	125 Hz dB(A)	250 Hz dB(A)	500 Hz dB(A)	1k Hz dB(A)	2k Hz dB(A)	4k Hz dB(A)	8k Hz dB(A)	16k Hz dB(A)
1760	100	103.1	65.0	69.1	70.9	86.7	95.9	95.8	97.8	97.5	93.1	79.8
2100	101	103.7	64.0	66.3	83.6	85.7	93.6	95.9	98.4	97.8	94.8	83.1
2350	105	105.3	64.9	67.7	80.3	84.4	94.1	97.1	99.9	98.5	96.3	85.8

Raw Exhaust Engine Noise **

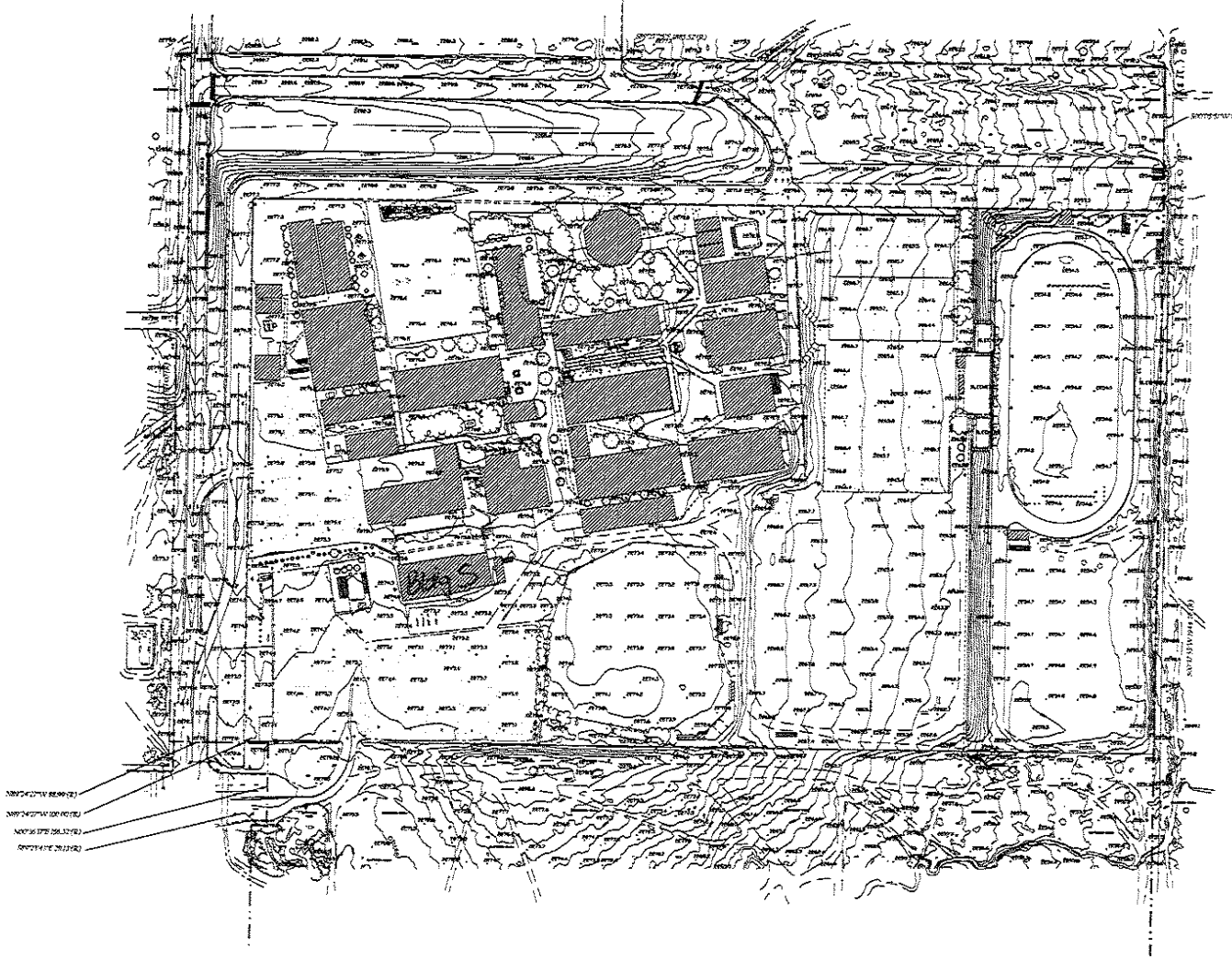
RPM	BHP	OVERALL dB(A)	Octave Band 31.5 Hz dB(A)	63 Hz dB(A)	125 Hz dB(A)	250 Hz dB(A)	500 Hz dB(A)	1k Hz dB(A)	2k Hz dB(A)	4k Hz dB(A)	8k Hz dB(A)	16k Hz dB(A)
1760 - 2350	100 - 105	106.4		96.2	100.6	95.3	97.5	97.1	99.8	96.0	86.7	80.3

** Values above are provided at 3.3ft (1m) from engine block and do **not** include the raw exhaust noise.*

*** Values above are provided at 23ft (7m), 90o horizontal, from a vertically directed engine exhaust outlet with a 24" straight pipe attachment and does not include mechanical engine noise.*

The above data reflects values for a typical engine of this model, speed and power in a free-field environment.

Installation specifics such as background noise level and amplification of noise levels from reflecting off of surrounding objects, will affect the overall noise levels observed. As a result of this, Clarke makes no guarantees to the above levels in an actual installation.



GRAPHIC SCALE

(IN FEET)

1 inch = 100 ft.

AERIAL TOPOGRAPHIC SURVEY

BURROUGHS HIGH SCHOOL

SOUTHEASTERN UNIFIED SCHOOL DISTRICT

VERTICAL MAPPING RESOURCES, INC.

7833 E. Gelding Drive, Suite 101
Scottsdale, Arizona 85260
Phone: 480.948.2566
Fax: 480.948.3521
www.verticalmapping.com

Map Scale: 1" = 40'
Contour Interval: 1'
Photo Date: June 6, 2007
Photo Scale: 1"=800'
Client: Eastern Sierra Land Surveys, Inc.
Project Name: Sierra Sands - Burroughs-Addition
Project Number: 07-079
Client References: Sierra Sands - Burroughs-ADD

NOTES:

Accuracy Standards: ASPRS Class 1 & NMAS

RECORD INFORMATION

(R) RECORD INFORMATION PER RSB5 31/31

LEGEND

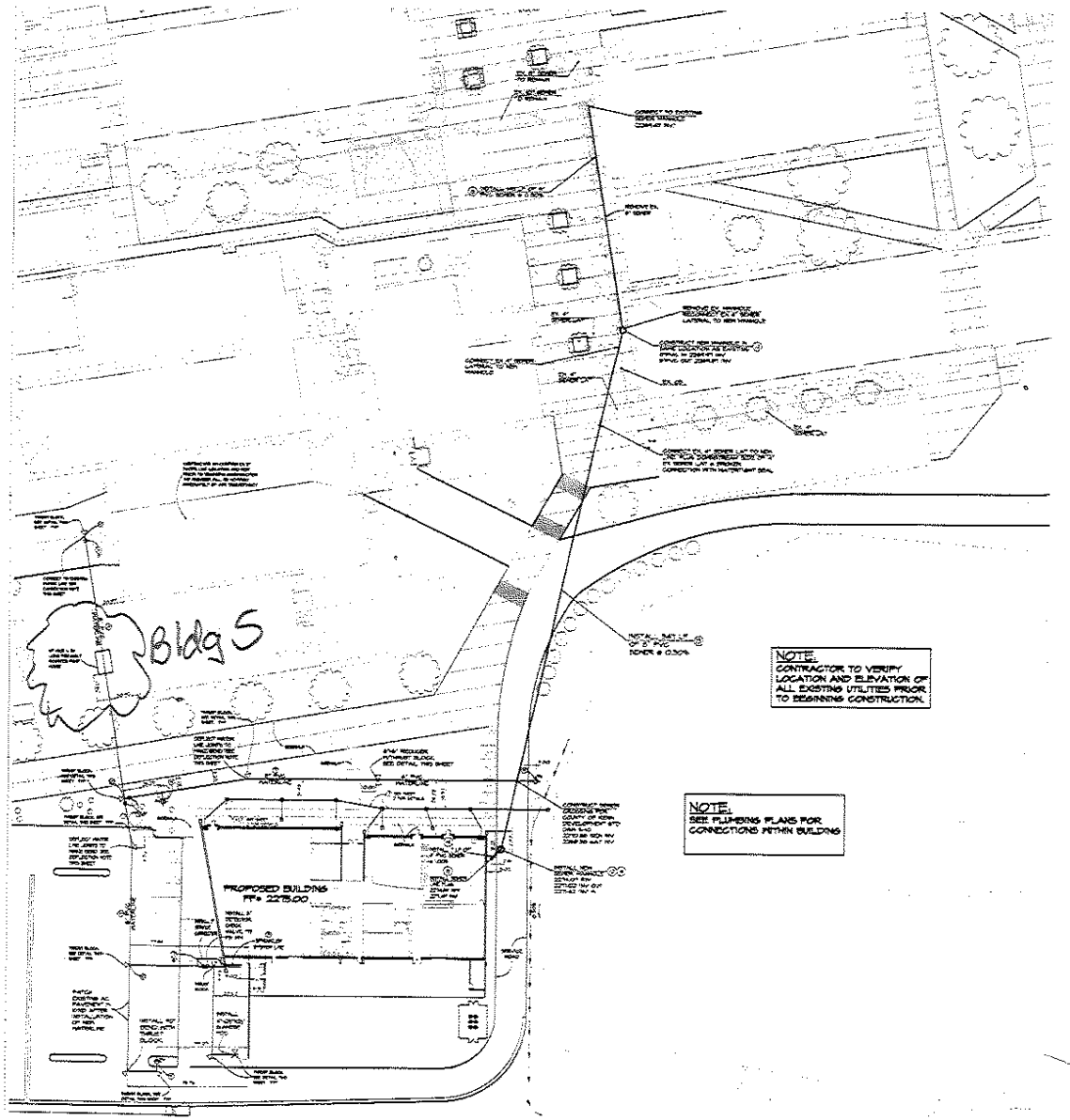
BOUNDARY

NOTE

THE BOUNDARY INFORMATION SHOWN HEREON HAS BEEN COMPILED FROM RECORDED DOCUMENTS LOCATED IN THE KERN COUNTY RECORDER'S OFFICE AND S.S.U.S.D. THEY ARE FOR REFERENCE PURPOSES ONLY. THIS MAP DOES NOT CONSTITUTE A BOUNDARY SURVEY NOR WAS A BOUNDARY SURVEY CONDUCTED BY THIS CORPORATION. NO EASEMENTS HAVE BEEN SHOWN.

Eastern Sierra Land Surveys, Inc.

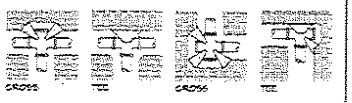
1

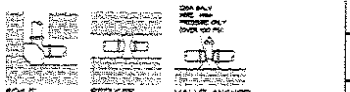


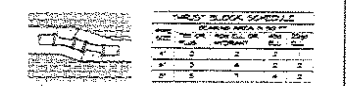
BURROUGHS HIGH SCHOOL SCALE: 1" = 30'-0"

PIPE NOTES

SCALE: NONE







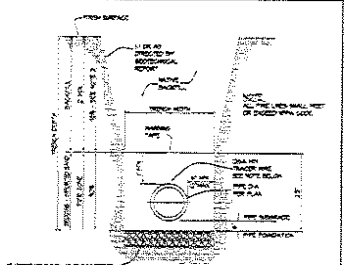
NOTES:
ALL THRUST BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL. CONCRETE SHALL BE PLACED BEHIND BELLS AND FITTINGS.

BEARING AREAS SHOWN IN TABLE ARE BASED ON ALLOWABLE SOIL PRESSURE OF 1500 PSF.

KEEP CONCRETE AWAY FROM BELLS.

THRUST BLOCK DETAIL

NTS 34



TRACER WIRE NOTES:
TRACER WIRE SHALL BE TAPED TO TOP OF ALL PVC WATERLINE AT INTERVALS NOT TO EXCEED 10'.
TRACER WIRE INSULATION SHALL BE BLUE IN COLOR.
TRACER WIRE SHALL BE "ENTOMBED" AT ALL FIRE HYDRANTS, BENDS AND BUILDING ZONES.
TRACER WIRE SHALL CONFORM TO ALL REQUIREMENTS OF APWA, CURRENT EDITION.

TRENCH DETAIL - FOR FIRE WATERLINE

NTS 35

PRIVATE HYDRANTS & SPRINKLERS NOTES:

1. PRIOR TO INSTALLATION, ALL PLANS AND SPECIFICATIONS SHALL BE APPROVED BY DSA.
2. INSPECTIONS ARE REQUIRED: 1 PRIOR TO HOLDING THRUST BLOCKS, 2) FOR HYDROSTATIC TESTING, AND 3) FOR FLOW.
3. INSTALLATION, INSPECTION, AND TESTING SHALL CONFORM TO 2002 NFPA 13 AND 2002 NFPA 24.
4. PRIVATE FIRE HYDRANTS SHALL BE APPROVED WET BARREL STYLE WITH A MINIMUM OF ONE 2-1/2 AND ONE 4" OUTLET. THE 4" OUTLET SHALL FACE THE FIRST DRIVE/PARKING AISLE/ROAD. ALL OUTLETS SHALL BE PROVIDED WITH NATIONAL STANDARD THREADS (NST).
5. FIRE HYDRANT SUPPLY PIPING SHALL BE A MINIMUM OF SIX INCHES IN DIAMETER. THE LOWEST OPERATING NUT SHALL BE A MINIMUM OF 18" ABOVE GRADE AND THE HYDRANT FLANGE SHALL BE A MINIMUM OF 3" ABOVE GRADE.
6. FIRE HYDRANTS SHALL BE A MINIMUM OF 40 FEET FROM ALL STRUCTURES. A VERIFIED GATE VALVE SHALL BE PROVIDED FOR EACH HYDRANT IN AN ACCESSIBLE LOCATION. VALVES SHALL NOT BE LOCATED IN PARKING STALLS.
7. ALL PIPES SHALL BE APPROVED FOR USE IN FIRE SERVICE SYSTEMS INCLUDING BS 1566, CLASS 200 PIPE SHALL BE USED WHERE THE PRESSURE MAY EXCEED 150 PSI.
8. ALL FERROUS PIPE AND FITTING SHALL BE PROTECTED WITH DOUBLE WRAP POLYETHYLENE TUBE OR SHEET CONFORMING TO ANSI A21.5 MADE FOR THAT USE. OTHER PIPING COMPONENTS SHALL BE SEALED WITH 2" TAPE APPROVED FOR UNDERGROUND USE. ALL BOLTED JOINTS SHALL BE CLEANED AND THOROUGHLY COATED WITH ASPHALT OR OTHER CORROSION RETARDING MATERIAL AFTER ASSEMBLY AND PRIOR TO POLY-TUBE INSTALLATION.
9. A 12" BED OF CLEAN FILL SAND SHALL BE PROVIDED BELOW AND ABOVE THE PIPE (TYPICAL 24").
10. ALL BOLTS USED FOR UNDERGROUND CONNECTIONS SHALL BE STAINLESS STEEL.
11. A MINIMUM OF 30" OF COVER, FROM FINISH GRADE TO THE TOP OF THE PIPE, SHALL BE PROVIDED. WHEN SURFACE LOADS ARE EXPECTED, A MINIMUM OF 36" COVER SHALL BE PROVIDED.
12. THRUST BLOCKS OR OTHER APPROVED METHOD OF THRUST RESTRAINT SHALL BE PROVIDED PER DISTRICT STANDARD DIRECTION. PROVIDE DETAILS AND CALCULATIONS FOR SIZING THRUST BLOCKS BASED ON ACTUAL SOIL CONDITIONS.
13. THE TRENCH SHALL BE EXCAVATED FOR THRUST BLOCKS AND INSPECTED PRIOR TO POUR. ALL CORROSION PROTECTION SHALL BE IN PLACE.
14. A HYDROSTATIC TEST (200 PSI FOR TWO HOURS OR 50 PSI OVER STATIC PRESSURE, WHICHEVER IS GREATER) SHALL BE CONDUCTED BETWEEN THE JOINTS TO PREVENT MOVEMENT OF THE PIPE.
15. THE SYSTEM SHALL BE THOROUGHLY FLUSHED BEFORE CONNECTION IS MADE TO OVERHEAD PIPING. FLOW SHALL BE THROUGH A HOSE OF AT LEAST THE DIAMETER APPROVED BY THE DEPUTY STATE FIRE MARSHALL. A DEPUTY STATE FIRE MARSHALL WITNESSES THE TEST.
16. PRIVATE HYDRANTS, SPRINKLER CONTROL VALVES, DETECTOR, CHECK ASSEMBLIES, POST INDICATING VALVES AND FIRE DEPARTMENT CONNECTIONS SHALL BE PAINTED DSA# RED.
17. ALL CONTROL VALVES SHALL BE LOCKED IN THE OPEN POSITION. VALVES SHALL BE MONITORED IF THEY SERVE 100 OR MORE SPRINKLER HEADS.

PRIVATE FIRE HYDRANT & SPRINKLER NOTES

SCALE: NONE

CONSTRUCTIONS NOTES

SCALE: NONE

1. INSTALL SIDEWALK PER DETAIL / SHEET C-0000
2. INSTALL 4" PVC DRAIN LINE
3. INSTALL 6" PVC DRAIN LINE
4. INSTALL 12" LANDSCAPE DRAIN BOX WITH GRATE CARSON 1712SO OR EQUIVALENT
5. CONSTRUCTED GRADED SWALE SLOPE AS NOTED. SEE DET. 2, SHEET C-0009
6. INSTALL 18" BUBBLER BOX PER DETAIL 6 SHEET C-0005
7. INSTALL 8" PVC WATER MAIN, AWWA C-900 CLASS 150
8. INSTALL 6" PVC SPRINKLER LINE, AWWA C-900 CLASS 150
9. INSTALL 6" FIRE HYDRANT ASSEMBLY PER COUNTY OF KERN DEVELOPMENT STD 206A (H)
10. INSTALL 8" TEE WITH THRUST BLOCK
11. INSTALL GATE VALVE SIZE AS NOTED
12. CONSTRUCT SEWER MANHOLE PER COUNTY OF KERN DEVELOPMENT STD 208A (H)
13. INSTALL 8" PVC SEWER
14. INSTALL 6" PVC SEWER LATERAL
15. INSTALL SEWER LINE PLUG IN BUILDING SEWER NOT COMPLETED AT TIME OF INSTALLATION
16. MATCH EXISTING GRADE
17. PART OF SEQUENTIAL CAMPUS MODERNIZATION WORK, L.C.
18. CONSTRUCT ACCESS RAMP PER DETAIL 18 SHEET C-0005
19. CONNECT TO ROOF DRAIN, INVERT AS NOTED
20. CONSTRUCT ACCESS RAMP, TYPE 5, PER DETAIL 5D SHEET C-0005
21. CONSTRUCT 3" AC OVER 4" AB PER DETAIL 2 SHEET C-0009
22. CONSTRUCT 6" CONCRETE CURB PER DETAIL 22 SHEET C-0006
23. CONSTRUCT 6" CONCRETE RETAINING CURB PER DETAIL 23 SHEET C-0005
24. CONSTRUCT 6" CONCRETE CURB AND GUTTER PER DETAIL 24 SHEET C-0006
25. CONSTRUCT CURB TAPER PER DETAIL 25 SHEET C-0006
26. CONSTRUCT 3' WIDE RIBBON GUTTER PER DETAIL 26 SHEET C-0005
27. CONSTRUCT 3' WIDE RIBBON GUTTER BETWEEN CURB PER DETAIL 27 SHEET C-0004
28. CONSTRUCT ACCESSIBLE RAMP PER DETAIL 28 SHEET C-0004
29. CONSTRUCT ACCESSIBLE RAMP PER APWA STD. 110-2 TYPE 3, X AND Y AS NOTED
30. PARKING STRIPING
31. REMOVE EXISTING PAVEMENT

WESTBERG+WHITE, INC.
ARCHITECTS
PLANNERS

CONSULTANT

ENGINEERING SOLUTIONS

PROJECT NAME

Eng. and Design CTE Facility
Burroughs High School
500 French Ave.
Ridgecrest, CA 93555

CLIENT

Sierra Sands Unified School District
113 Felspar St.
Ridgecrest, CA 93555

No	Rev Date	Description

JOB NO
DATE 07/25/2008
DRAWN DVN
CHECK TF
APPROVED
ENGINEER AS NOTED
ARCHITECT

CONSULTANT

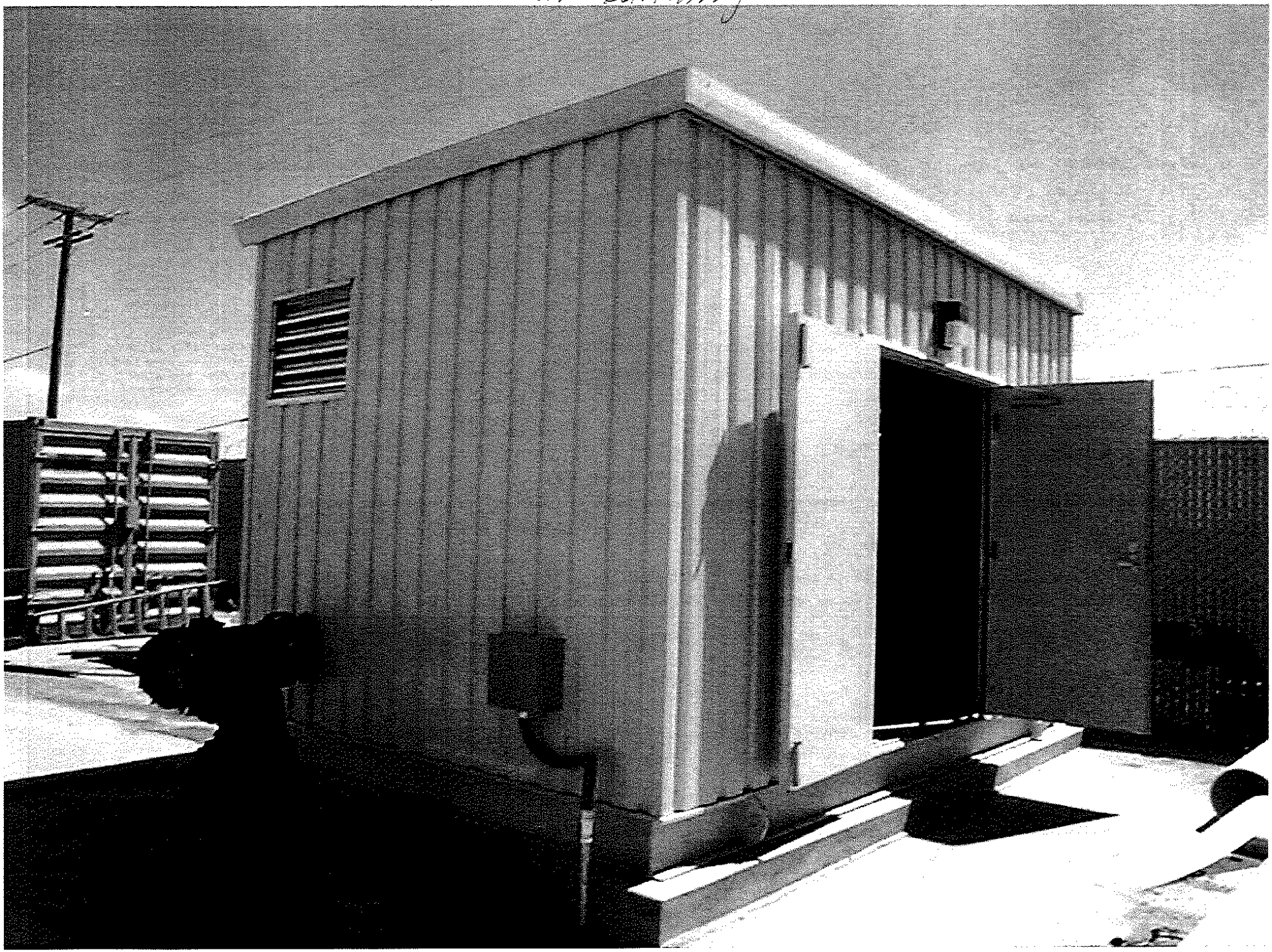
CONSULTANT

DSA SUBMITTAL

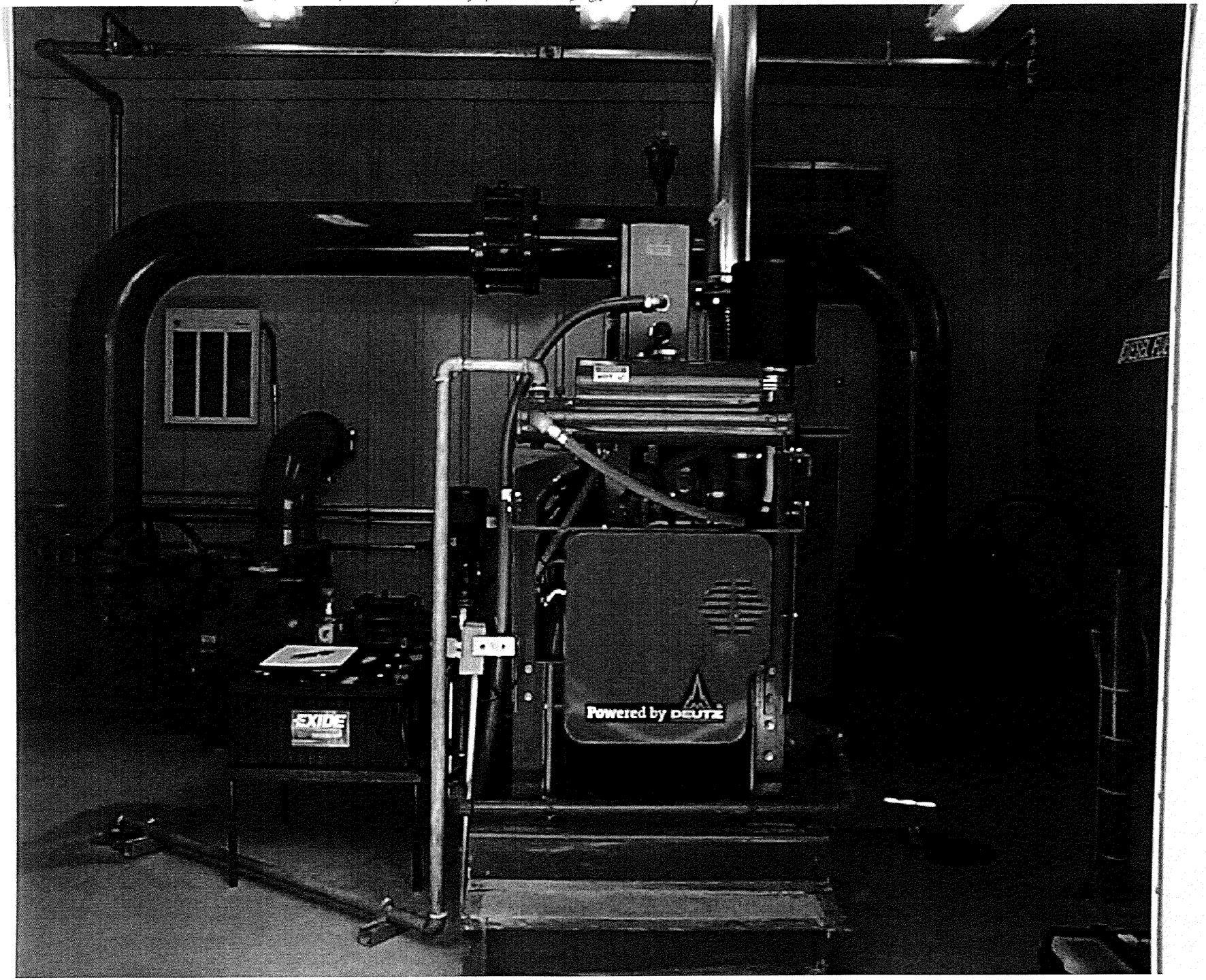
SHEET DESCRIPTION
CIVIL WATER AND SEWER PLANS

SHEET NO
C-004

Like but not our building



Similar to new building



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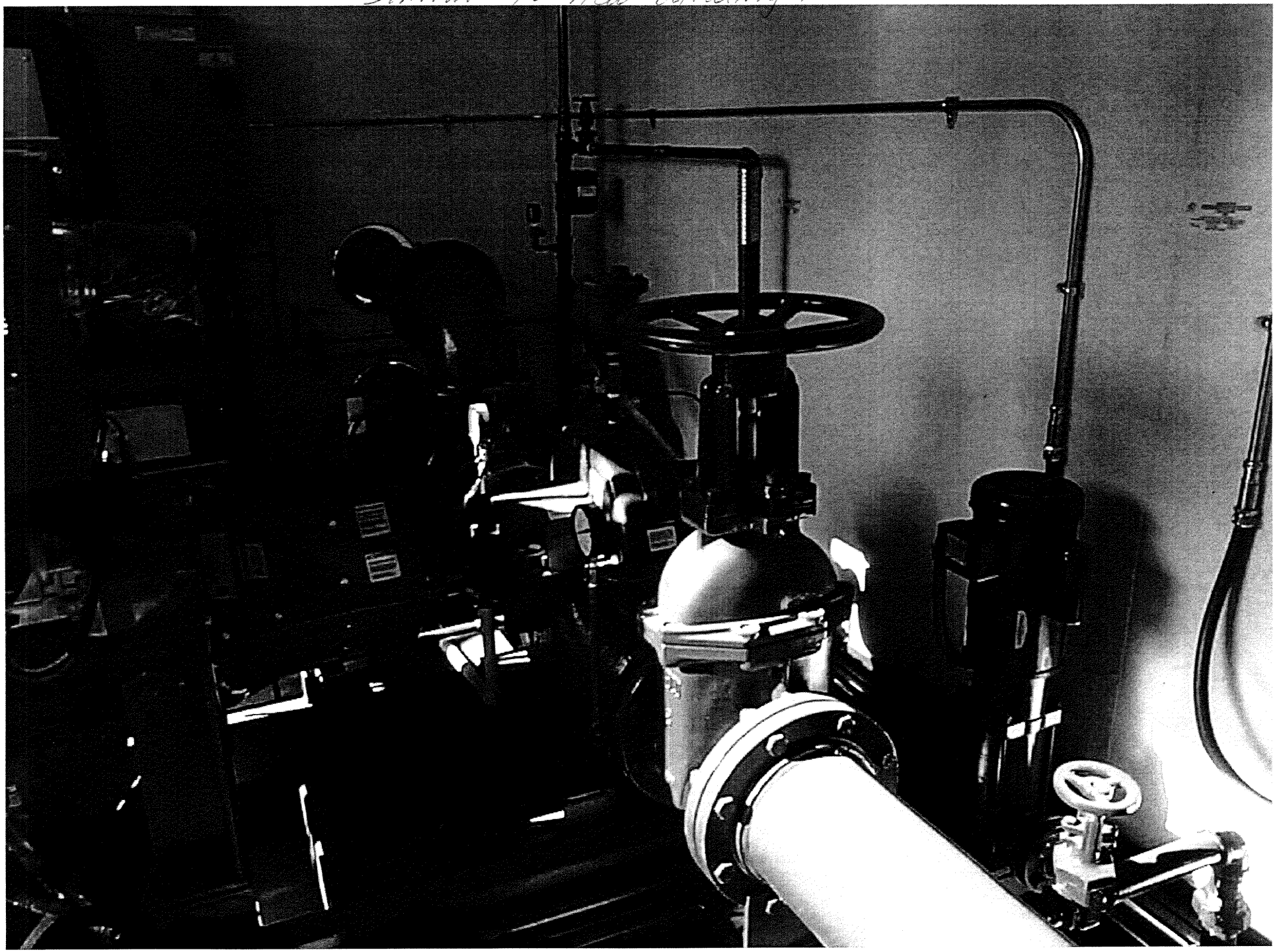

INSTRUCTION MANUAL

Model No.: FD4-J 12V NEG

Serial No.: FF-1147866-11

METRON, INC.
1505 WEST THIRD AVENUE
DENVER, COLORADO 80223

PHONE (303) 592-1903
TELEFAX (303) 534-1947

MANUAL FOR MODEL FD4 FIRE PUMP CONTROLLERS

Starting Serial No. "FF"

This manual provides General Information, Installation, Operation, Maintenance and System Set-Up Information for METRON Model FD-4 Engine Driven Fire Pump Controllers.

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METRON, INC.
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PART I: GENERAL INFORMATION

The basic function of the model FD4 Fire Pump Controller for diesel engine driven fire pumps is to automatically start the engine upon a drop in pressure in the water main, or from a number of other demand signals. This controller provides automatic cycled cranking, alarm and/or alarm shutdown protection for various engine failures. Stopping of the engine after the demand period is over may be either manual or automatic. This controller also includes an automatic weekly test starting feature.

PART II: FUNCTIONS

Equipment is provided in the Controller to provide the following functions:

A. Automatic Starting From:
   a. Drop in water line pressure
   b. Loss of battery charger output (if enabled)
   c. Operation of optional remote start switches, such as remote start switch, deluge valve switch, fire alarm switch, etc.
   d. Weekly test timer

B. OID – Operator Interface Device - Provided for display of alarm functions, system pressure, battery volts, battery charger amps, alarm conditions, etc. Includes a 4 line by 20 character LCD for display of system messages and programming.

C. Auto-Off-Manual selector switch.

D. Automatic Cranking - A microprocessor controlled crank cycle timer provides six (6) fixed crank periods separated by five (5) rest periods each of approximately 15 seconds duration.

E. Alarms and Signal Lights - Fourteen (14) Standard lights are provided to give visual signals for; **"System Fault", "Battery #1 Healthy", Battery #2 Healthy", "Charger #1 Failure", Charger #2 Failure", "AC Power Loss", "Engine Running", "Engine Failed to Start", "Engine Low Oil Pressure", "Engine High Water Temp", "Engine Overspeed", "Low Fuel", "Pump On Demand", "Contactor Coil Failure", "ECM Alternate",**and **"ECM Failure".** In addition the mode buttons have LED's on the button indicating **"Auto", Manual", "Test",** or **"Off"** mode. 8 additional lights, configurable by the factory, can be provided for **"Pump Room Alarms".** An audible alarm horn is mounted on the front of the cubicle for sounding in the event of failure. Terminals are provided for remote failure indication of the following:
   "Automatic Mode"
   "System Fault"
   "Engine Running (2 sets)"
   "Common Battery Fault"

F. A data logger is provided as standard to record system pressure along with numerous alarm conditions and system events. The data can be displayed on the OID or can be downloaded to a PC through the RS485 port provided on the main system board. Data is stored on an SD Memory card. This card contains individual pressure files with each file containing one days worth of pressure data. Each file is of the PressXXX.txt format. Each entry is stamped with the date and time and system pressure at that time. The Events.txt file contains all of the logged events with each event stamped with date and time. The SD memory card can be removed and files transferred directly to a PC using appropriate memory card reader. The controller will continue to operate normally with the SD card removed. There will, however, be a visual and audible alarm when the card is removed. Events and pressure data will continue to be logged while the card is missing. The memory cards should be replaced within 12 hours to ensure that no data is lost.

G. A weekly test timer is supplied to automatically start the engine any set day of the week, at a set time of day, and a preset run time. See Part IV below for more information and the System Config Screen 106.

H. **"Stop"** Pushbutton - A pushbutton is provided to stop the engine in Auto at any time provided all starting demands have cleared. This returns the controller to the automatic position. The Auto-Off-Manual selector switch can also be put in the "Off" mode to stop the engine. Any starting commands will not start the engine in the "Off" mode.

I. Integral Battery Chargers (Option J). There are two separate fully automatic, solid state chargers provided for maintaining full charge on the dual sets of engine batteries. An LED display is provided on each charger to indicate charger AC input voltage is present and DC output voltage is present.

   User Preferences Screen 218 and 219 are used to determine when the Charger Failure alarm will activate. When Screen 218 is set to No, the Charger Failure alarm will not be active while the engine is running. Should both chargers fail or switch off due to a high voltage output from the engine alternator, the AC Power Failure lamp may come on. This is normal. It will reset

automatically once the engine stops running and the charger failure alarms reset. When Screen 218 is set to Yes, the Charger Failure alarm will be active at all times when the Mode selector switch is in the Auto or Manual mode. Screen 219 is used to determine the time delay between the failure contacts on the charger closing and the Charger Failure lamp and audible alarm sounding on the controller.

J. Cabinet - A heavy gauge steel cubicle encloses the controller. The OID, the key operated Auto-Off-Manual (AOM) Selector Switch and manual start pushbuttons are mounted on the outer door. The battery circuit breakers are located inside the cabinet on the main back panel of the unit. A key for the AOM switch is stored in a break-glass housing on the door of the cabinet. An additional key is located inside the cabinet.

PART III: OPERATION OF THE CONTROLLER

A. When the controller is the **"Auto"** mode and both circuit breakers are in the **"On"** position, the controller is in standby condition ready to start the engine automatically. A green pilot light above the **"Auto"** button will illuminate in this mode. Also, Battery #1 Fault and Battery #2 Fault lights should be off indicating that battery power is available.

When the water pressure drops below a level which is set in System Config Screen 101, the Controller will actuate the starter motor and the cranking cycle will commence. In addition the **"Pump on Demand"** light will illuminate. If the engine starts and runs, cranking will cease and the protective circuits will be operative. If the engine fails to start after six (6) crank periods, cranking will cease, the **"Engine Failed to Start"** light will illuminate, and the alarm horn will sound. The fuel solenoid will stay on for one hour however. This is to allow the engine to continue to run in the event the failed to start condition was due to a faulty speed switch signal from the engine. The battery alternating circuit alternates batteries on each crank attempt unless one battery is in a discharged state and incapable of cranking the engine. In this instance, the control will lock onto the other battery for the remaining cranking attempts. Dry contacts for remote indication of **"Battery Failure"** are provided.

The panel is wired so that optional remote start switches may be used, such as Deluge Valve, Remote Start pushbutton, External Pressure , These start switches will also cause the **"Pump on Demand"** light to illuminate.etc. In addition, when "Power Failure Engine Startup" feature is enabled (System Config Screen 111), the Controller will automatically start the engine upon loss of Battery Charger output or AC Power loss, after an adjustable time delay (System Config Screen 112).

While the engine is running, all protective circuits are operative. If the engine stops while running, and there is still an auto start demand, the control will attempt to restart the engine. If the engine fails to start the **"Engine Failed to Start"** light will illuminate and the alarm will sound. If, while the engine is operating, the oil pressure drops below a safe limit, the **"Low Oil Pressure"** light will illuminate immediately. After approximately seven (7) seconds the alarm will sound. Should the engine temperature exceed a safe limit while running, the **"Engine High Water Temp."** light will illuminate after a seven (7) second time delay and the alarm will sound indicating engine overheating.

In case of Overspeed, the engine will be stopped and the **"Engine Overspeed"** light will illuminate and the alarm will sound. The light and alarm will stay on until the Engine Speed Switch and the Controller are manually reset. To manually reset the Controller, turn the controller selector switch to **Off**, then press the Reset button. Then turn the selector switch back to **"Auto"**.

The Controller may be configured as either **"Manual"** or **"Automatic"** stop as required (System Config Screen 104). **"Manual"** stop is set as standard. The current status of this setting is visible on the Main System Status Screen where the letter "A" will appear in the upper right hand corner of the screen when set to Automatic Stop and an "M" will appear when set for Manual stop. When Automatic stop is enabled the stop timer is preset at the factory to 30 minutes. Longer time settings can be set in System Config screen 105 with a maximum setting of 60 minutes possible. When "Automatic Stop" is disabled, the engine will continue to run even though the pressure switch or other remote starting switch returns to its normal position. The engine can be stopped immediately only by pressing the stop button or by turning the Auto-Off-Manual switch to the **Off** position. On engines that do not use the "energize to stop" method (i.e. Caterpillar), the engine may also be stopped by turning the circuit breakers BATT1 and BATT2 to OFF. If set up for **"Automatic"** stop, the engine will be stopped automatically upon restoration to normal of whatever demand switch started the engine providing it has run at least 30 minutes or longer as set in System Config screen 105. If the demand period was less than the time set on the auto stop timer, the engine will continue to run until the timer times out and then will stop.

B. When the **"Test"** mode button is pressed for two or more seconds, the engine will be started by causing a drop in water pressure. Failure alarm circuits will be operative in the **"Test"** mode. This method of starting provides a test of the Controller, thereby assuring proper operation when required. The engine will run for the time set in Auto Weekly Test Length Of Run Time (System Config Screen 109) or until the **"Stop"** push button is pressed or the selector switch is turned to **"OFF"**.

C. The **"Manual"** position of the Auto-Off-Manual switch is for manually starting the engine from either battery. The fuel and water solenoids are energized in this position, and the engine must be cranked by pushing one of the buttons located below the

OID. **"Manual Crank 1"** cranks from Battery 1, and **"Manual Crank 2"** cranks from Battery 2. Pressing both buttons will result in cranking from both batteries simultaneously.

D. When the engine is given a command to stop for any reason, terminal 12 will energize and will remain on for approximately 15 seconds. The controller will not start until terminal 12 is de-energized again.

E. Periodic Self Testing - The Test Run Timer can be set to give test runs on any day of the week and time of day desired. A timing element is incorporated in the control so that when the engine starts in this manner, it will run for a definite time before it shuts down. See System Config Screens 106 through 109 to set the starting time and length of engine running.

F. Provision for sequential starting is accomplished by the use of adjustable time delay on pressure drop starting or "Deluge Valve" starting. On Multiple Pump installations these timers are set sequentially and progressively longer in time to prevent more than one (1) pump from starting simultaneously with another pump. Failure of the lead pump to start will not prevent subsequent pumps from starting. The time delay on starting is set in System Config Screen 103.

G. The "Pump On Demand" alarm light is provided to indicate that there is a command to start and run the additive pump controller. This includes a low pressure condition, deluge valve start signal etc. The alarm light will clear when the start condition has been cleared such as the water pressure in the system rises above the high set point set in screen 102.

H. The "Contactor Coil Failure" alarm light is to annunciate a loss of continuity to the two engine starting contactors on the engine. There is a low level DC current that is applied to field terminals #9 and #10 to detect continuity in the contactor coils. Should the contactor coil open or fail, the "Contactor Coil Failure" LED will illuminate and the alarm horn will sound. In addition there will be an entry in the Event log to indicate which Contactor coil has failed.

I. The "Loss of DC Power" lamp is provided to indicate that both batteries have been disconnected or turned off but AC power is still available. The alarm horn will also sound upon the loss of DC Power and can not be silenced.

J. The "ECM Alternate" and "ECM Failure" alarms apply only to those engines that have electronic fuel control. Should the "Electronic Control Module" Fail the "ECM Failure LED will illuminate and sound the horn. In addition if the Alternate Electronic Control Module is switch over to control the engine, the "ECM Alternate" LED will illuminate and sound the horn.

PART IV: INSTALLATION AND TEST PROCEDURE

A. INSTALLATION

The Fire Pump Controller has been assembled and wired at the factory in accordance with the highest workmanship standards. All circuits and functions have been thoroughly tested to assure correct operation when properly installed. The installer should be completely familiar with the external hookup of the engine junction box to the terminal bar in the Controller. Various engine components must be wired to the proper terminal in the controller using the correct size of stranded wire. An appropriate size wire must be wired from the grounding lug in the controller to earth ground. In most cases, the engine manufacturer furnishes the engines with all accessories installed and wired to the connection box. Therefore, it is only necessary to wire from the engine connection box to like numbered terminals in the Controller. Note proper wire sizes. All wires must be stranded.

A drain valve is provided to relieve water pressure to the pressure switch, thus closing the pressure switch contacts and starting the engine. This test simulates an actual start demand. Since the Controller operates the drain valve only momentarily, a small amount of water is drained off. The water pressure sensing line to the Controller from the pump must be thoroughly flushed before connection to the Controller in order to remove chips, particles, or other matter, that could enter the plumbing components in the Controller.

Controllers configured with **"Automatic Stop"** enabled may be changed to **"Manual"** stop by disabling this feature in System Config Screen 104. If deluge valve switches are to be used for starting, enable the Deluge Valve Option in Config Screen 121 and connect the remote normally closed switch to terminals 31 and 111.

B. TEST PROCEDURE

All of the following tests should be made on each unit after installation. If each test is satisfactory, the operator may place the control switch in **"Auto"** mode and depend upon the panel operating properly when required. Also, any one or all of these tests may be carried out at any time after installation, if so desired. **NOTE: If 115 Volts A.C. is not connected to Controller, the "Charger Failure" lights and "AC Power Loss" light and alarm will be activated and if the Power Failure Start feature (System Config Screen 111) is enabled, the controller will start automatically. The 115VAC must be turned ON to prevent the engine from starting.**

ENGINE TERMINAL (terminals 1-12) STATUS INDICATOR LIGHTS

Light Emitting Diodes (L.E.D.) lights have been installed on the microprocessor module to indicate the status of each engine terminal. Status indication is given below:

Terminal Number (Microprocessor Func #)	L.E.D. (light) "ON" Indication
1 (Out 06)	Power available to fuel and water solenoids
2 (In 06)	Speed switch has operated into engine running mode
3 (In 07)	Speed switch has operated into overspeed mode
4 (In 08)	Oil Pressure switch contacts closed (Low Oil Pressure)
5 (In 09)	Water temperature switch contacts closed (High Engine Temp.)
6 (In 01)	Battery #1 voltage present
8 (In 02)	Battery #2 voltage present
9 (Out 02)	Crank #1 voltage present (while cranking on Battery #1)
10 (Out 03)	Crank #2 voltage present (while cranking on Battery #2)
12 (Out 07)	Energize to stop voltage present

a. **BATTERY LOCKOUT TEST:**

1. Turn on Battery #1 switch and Battery #2 switch.
2. Press the **"Reset"** button. Battery #1 and Battery #2 Healthy lights should be on.
3. Turn Battery #1 switch off for a couple of seconds and back on. Battery #1 light should go off and remain off.
4. Press **"Reset"** button. Battery #1 light should come on.
5. Repeat for Battery #2.

b. **CRANKING CYCLE TEST:** This test simulates a condition where the engine refuses to start.

1. Disconnect Terminal No.1 on Controller panel. **NOTE: Disconnecting Terminal No.1 is for the purpose of removing power from the fuel solenoid so engine will not start. On engines where the fuel solenoid is not used (Caterpillar), or is connected other than through Terminal #1 (Clarke-G.M.), other means must be used to stop fuel flow to the engine to prevent starting.**
2. Press the **"Test"** mode button to start cranking the engine. Time the crank and rest periods, and count the number of cranks. There should be six (6) crank periods separated by five (5) rest periods each of approximately 15-seconds duration. The **"Failed to Start"** light should come on and the alarm horn should sound. Status indicator light for Terminal #1 should come on as soon as the **"Test"** push button is pressed and the pressure drops below the low set point. Indicator lights for terminals 9 and 10 should come on alternately to indicate cranking cycle. (See above)
3. Press the **"Stop"** push button to stop the engine and properly reconnect all leads.

   NOTE: **In order to prevent discharging the starting batteries, this same test can be made without actually cranking the engine by disconnecting the starter cable and observing the action of the starter contactors and/or status indicator lights for terminals 9 and 10.**

c. **CHECKING STARTING MOTOR RELEASE**

1. Press the **"Test"** mode button. Engine should start promptly and starting motor should release at approximately 1/3 of engine speed. Status indicator light for terminal #2 should come on to indicate speed switch has operated to disconnect cranking and the Engine Running LED should illuminate.

   NOTE: A convenient method of determining the exact instant the starter releases is to connect a battery test light or voltmeter across the starter terminals and observe when power is disconnected.

2. Press the **"Stop"** push button to stop the engine.

d. **OIL PRESSURE FAILURE TEST:**

1. Press the **"Test"** mode button to start engine. When the engine is starting and oil pressure is not yet up to full pressure, the **"Engine Low Oil Pressure"** light will illuminate, but the horn will not sound. When pressure builds up, and the

switch opens, the light will go out. This feature provides indication that the oil pressure switch contacts are operating in a normal manner.

Note: On Electronic Engines with electronic oil pressure sensors, the oil pressure light may not illuminate while the engine is cranking. The low oil pressure test should be performed on these engines with the engine running as described below.

2. After the engine is running, connect a temporary jumper between terminal #4 and terminal #11.
3. Both the **"Engine Low Oil Pressure"** light and status indicator light for terminal #4 should come on immediately. Wait approximately seven (7) seconds. Alarm horn should sound.
4. Press the **"Stop"** push button to stop the engine and remove jumper between terminal #4 and terminal #11.
5. Wait at least 30 seconds for elements to reset before making any further tests.

e. **WATER TEMPERATURE FAILURE TEST:**

1. Press the **"Test"** push button to start engine.
2. Jumper contacts on water temperature switch on engine.
3. Alarm horn sounds and the **"High Water Temperature"** light on controller will illuminate after approximately 7 seconds. Status indicator light for terminal #5 should come on with **"High Water Temperature"** light.
4. Press the **"Stop"** push button to stop the engine and remove jumper on water switch.

f. **OVERSPEED FAILURE TEST:**

1. Press the **"Test" mode** button to start engine.
2. Momentarily short the contacts on the engine speed switch, or connect a temporary jumper between terminal #3 and #6 on the controller.
3. The alarm horn sounds and the **"Engine Overspeed"** light will illuminate immediately. Engine comes to a stop. Status indicator lights for terminals #3 and #12 should come on with the **"Engine Overspeed"** light.
4. Remove the jumper from terminals #3 and #6 then turn the selector switch to the **Off** position. Press the **"Reset"** button to reset the **"Overspeed"** alarm. Turn the selector switch back to the **Auto** position.

g. **CONTACTOR COIL FAILURE ALARM TEST:**

1. While the controller is in the **"Auto"** mode disconnect the field wire from terminal 9. Within a few seconds the **"Contactor Coil Failure"** lamp should illuminate and the alarm horn should sound. Reconnect the field wire to terminal 9. The **"Contactor Coil Failure"** lamp should go out and the alarm horn should silence. Repeat for terminal 10.

h. **AUTOMATIC STARTING TESTS:**

1. Place control in **"Auto"** position.
2. Bleed off pressure in system until pressure drops below the low set point. The **"Pump on Demand"** light should come on.
3. Engine should start automatically and continue to run after pressure rises above the high set point, if arranged for **"Manual"** stop. If arranged for **"Automatic"** stop, engine will continue to run for time set on Engine Run Timer and then stop.
4. Press the **"Stop"** push button to stop the engine.
5. Repeat tests for each demand switch such as deluge valve, remote start, etc.

i. **PERIODIC WEEKLY START TEST:**

1. Pressure must be up and all other demand switches de-activated.
2. 115 V.A.C. power must be turned on to the panel.
3. When the current day and time of day matches the settings in System Config screens 107 and 108, the solenoid drain valve will energize and the engine will begin cranking. It will continue to run for the amount of time set.

4. Should a remote manual start occur or a low pressure condition occur while the pump is running on Weekly Test, the pump will not stop until the Stop pushbutton is pressed or if set for Automatic Stop, the Minimum run timer times out.

5. The periodic Weekly Test function is factory set to No in Screen 106 due to Factory Mutual standard requirements. Contact the Metron Factory Service department for instructions to turn this function on if this is not a Factory Mutual insured facility.

j. **SETTING PROGRAM WEEKLY TEST TIME:** System Config screen 106 through 109.

k. **REMOTE START SWITCH CIRCUITS:** Field wiring terminals are provided on the controller so that optional remote start switches such as Remote Pushbutton Stations, Deluge Valve Switch, Fire Alarm Switches, etc., may be used to start the engine. Two (2) sets of terminals are provided. Terminals #112 and #31 are used for remote manual start push buttons (close to start). Terminals #111 and #31 are used for remote Deluge Valve Switch or other remote automatic start switches (open to start). Upon automatic start from this type of switch, the engine will be stopped either automatically (if set for automatic stop) after the demand switch de-activates and Engine Auto Stop Timer times out, or manually at the Controller. Terminals #111 and #31 must have a jumper installed if a remote Deluge switch is "Enabled" but not to be used. When the controller is shipped from the factory Deluge Valve start is Disabled (System Config screen 121).

l. **AC POWER FAILURE STARTING:** If this feature has been enabled it can be tested by disconnecting the normal 115 V.A.C. to the Controller. After the preset time delay (which is specified in System Config screen 112), the Controller will commence cranking the engine. The **"Charger #1 Failure", "Charger #2 Failure", and "AC Power Loss"** lamps will illuminate and the alarm will sound without delay.

m. **NORMAL OPERATION – AUTOMATIC:** Turn the selector switch to the **"Auto"** position. A green **"Automatic Mode"** light will illuminate and the engine will automatically start upon drop in pressure or operation of other start switches. If the Auto Stop Timer is disabled (Manual Stop) the engine must be turned off at the Controller. When the Auto Stop Timer is enabled, upon termination of the demand signal, the engine will run for the length of time left on the Auto Stop Timer and then will stop automatically.

n. **AN ADJUSTABLE SEQUENTIAL START TIMER IS SUPPLIED FOR MULTIPLE PUMP INSTALLATION:** Normally, the leading pump Controller will not have a delay timer and will commence cranking the engine immediately upon operation of a demand signal (other than Power Failure which is time delayed). The subsequent Controllers will have a time delay which is adjustable from 0 to 999 seconds. Each time delay should be set with progressively longer times on each subsequent pump. The recommended time interval is ten (10) to fifteen (15) seconds. This may be extended or shortened as required by the local authorities having jurisdiction.

o. **PUMP ROOM ALARMS:** Field terminals may be provided for various inputs from pump room alarms. These alarms include: Low Fuel, Low Pump Room Temperature, Reservoir Low, Reservoir Empty, Low Suction Pressure, Relief Valve Discharge and/or Flow Meter On etc. A maximum of ten (8) pump room alarms are available. The Controller is arranged so that the alarm horn will sound and the light will come on when the alarm sensor contacts close. These pump room alarms can be silenced with the "Silence" push button on the OID if they have been configured as silenceable.

p. **FOAM PUMP OPTION:** An optional feature to operate an external pressure dump valve can be provided for Foam Pump Service if required. Screen 318 is set to approximately 10-15 seconds to operate a dry contact which can be used to operate the Dump Valve solenoid. This contact will close when a demand for the pump to run is received such as low pressure, deluge valve, remote start, weekly test start etc. Once the engine is running, the timing circuit will start and keep the contact close for the length of time set in screen 318. Then it will open and de-energize the dump valve allowing the pump to develop full pressure. In addition, if the controller is not activated by a pressure start, the pressure transducer can be deactivated through screen 319. This will also remove the pressure display from the main status screen of the OID. The controller can only then be activated by a remote start such as deluge valve or remote start contacts. This a factory settable option only and must be ordered with the controller before it ships from the factory.

PART V: ADDITIONAL OPTIONAL FEATURES

A. **Battery Charger Operation:** The Battery Chargers are mounted in the engine controller, and are factory wired to the controller terminal block from which it obtains its 120 volt, 50-60 Hz. supply voltage, and through which it provides charging current to the batteries. The charging current to the two (2) batteries and the battery voltage is monitored by the controller and displayed on the OID. The charger output is current limited and provides full protection during the engine cranking cycle. The charger input and output are fused for protection in case of a failure of the control circuit or other internal component.

Each battery charger is fully automatic, and will charge the batteries at a rate of up to 10 amperes. As the batteries approach full charge, the current will taper off to a predetermined level at which time the charger automatically switches to the float mode of operation. In the float mode the charger maintains the batteries at the float potential (approximately 12.7 volts for a 12-volt battery or 25.4 volts for the 24-volt battery).

The charger provides a means of monitoring the charger output to sound an alarm in case of loss of charger output. This also provides a means of monitoring the A.C. power since a loss of A.C. power results in a loss of charger output.

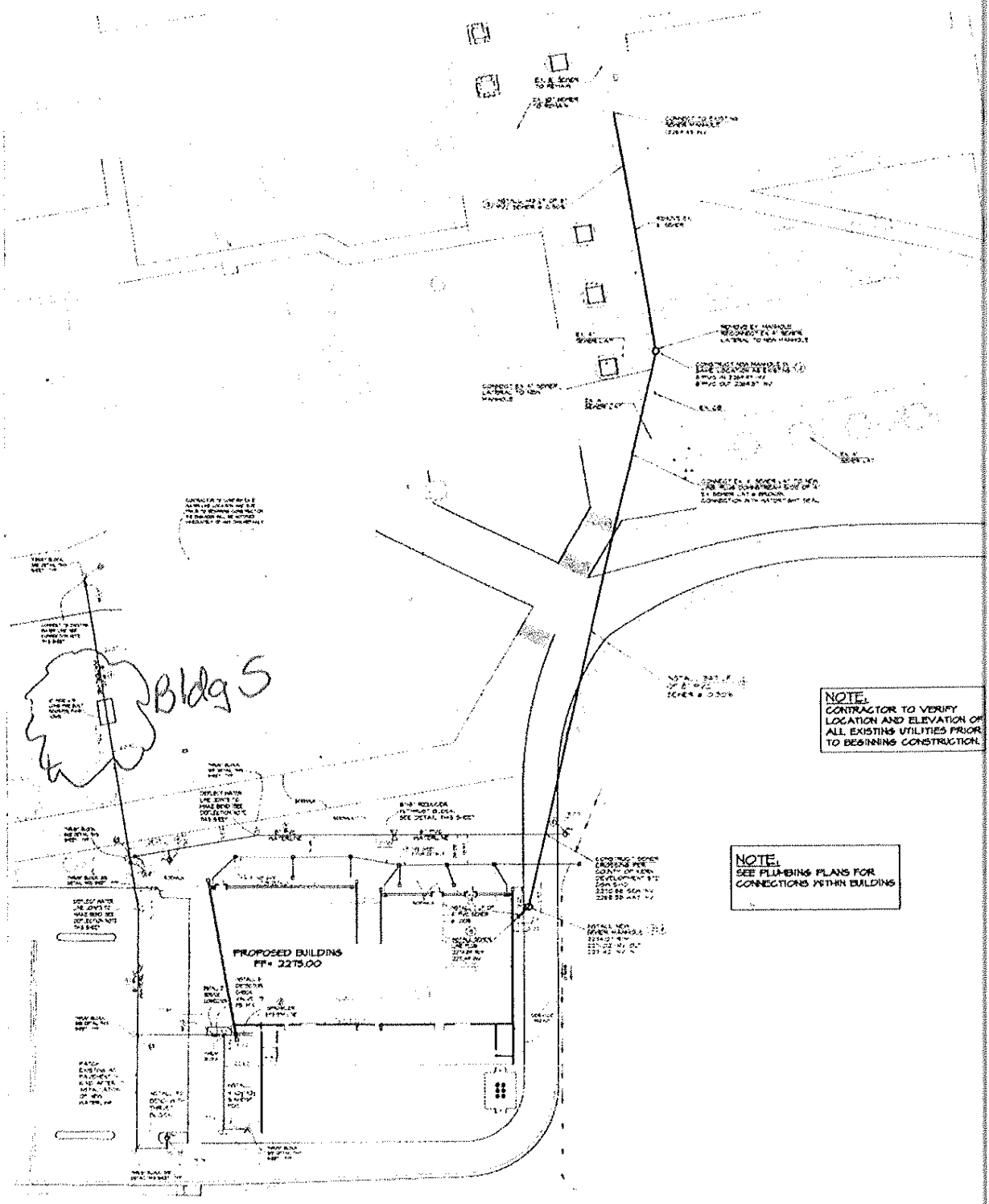
Never disconnect the batteries from the controller while the AC power is on to the controller as this may cause damage to the printed circuit boards.

In the event that a battery is lost or disconnected the output of the charger will stop (0 volts). This will allow the voltage sensing circuit of the fire pump controller microprocessor to detect a missing battery or open circuit from the battery. This will result in the respective Battery Fault light to illuminate and the alarm horn to sound. Before reconnecting the battery to the controller, turn the AC power off. Then reconnect the battery to the controller and turn the AC power back on.to reset the alarm.

Generally, when all conditions are normal, the batteries will come to a full charge prior to the 24 hour period. As batteries begin to charge, the controller OID will indicate a gradual decrease in current flow. When these ammeters indicate a current level of less than 0.5 amps the charger will be in a trickle mode.

Check batteries daily for a few days after initial installation has been made, and weekly thereafter. Batteries should be checked for overcharging (gassing), or undercharging (low voltage, or low specific gravity of the electrolyte or acid.

CAUTION: Under no circumstances should new electrolyte (acid) be added to a battery that has been previously filled. Only distilled water is recommended for maintenance purposes.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PROPOSED BUILDING
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NOTE
CONTRACTOR TO VERIFY
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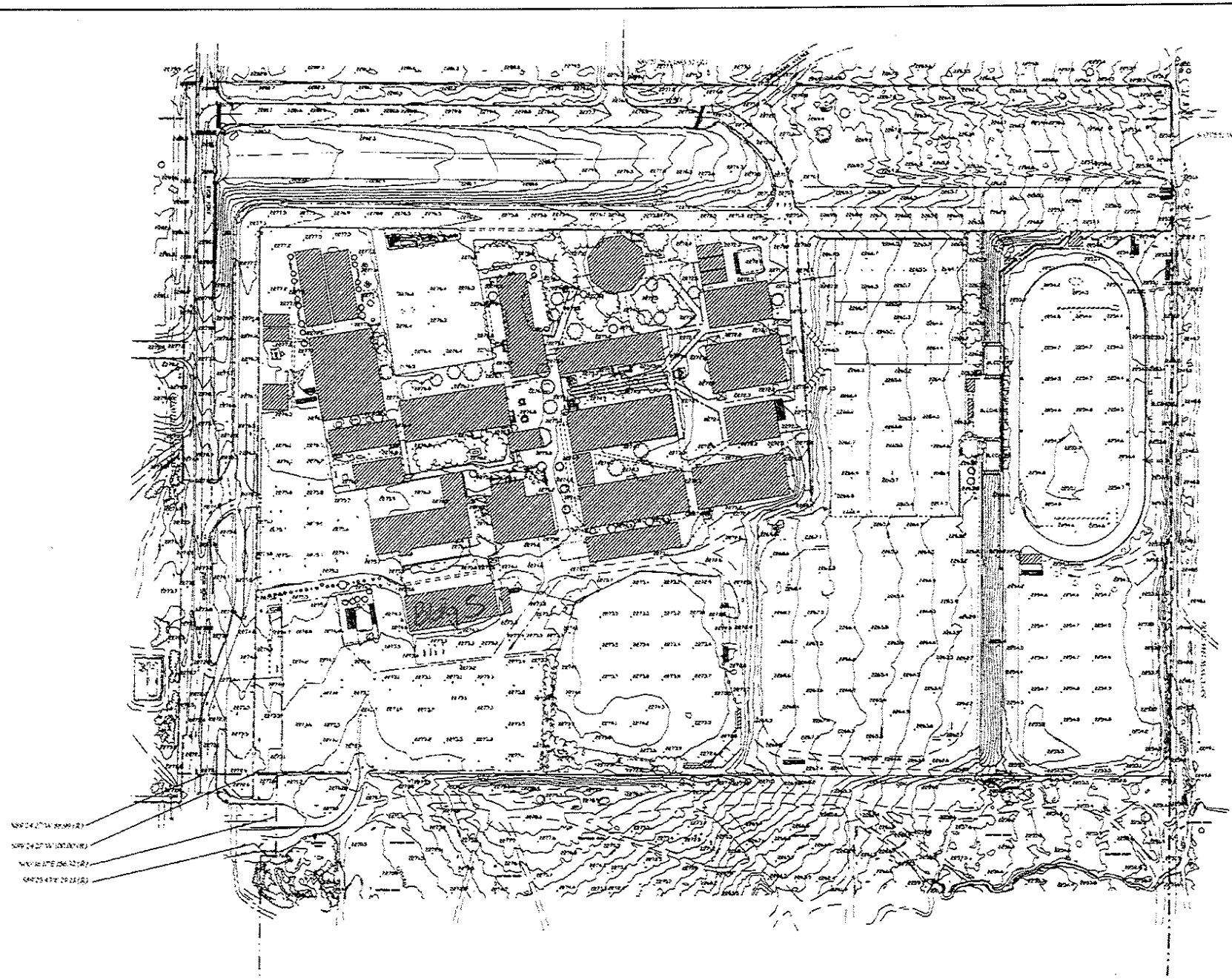
TO BEGINNING CONSTRUCTION.
NOTE
SEE PLUMBING PLANS FOR
CONNECTIONS WITHIN BUILDING



SIERRA SANDS
UNIFIED SCHOOL DISTRICT

Joanna Rummer
Superintendent

August 10, 2011

From: Tom McMahon
Construction Manager
760 301-2988

To: Julie Damo
Kern County Air Pollution Control District
2700 M Street Suite 302
Bakersfield, CA 93301-2370

Julie,

Please see the attached Application for Authority to Construct and Permit to Operate for the new modular fire flow booster pump with diesel backup engine enclosed in a pre-fabricated metal building to be located at Burroughs High School 500 E. French Ave. Ridgecrest, CA 93555.

From review of the attached partial Instruction Manual, operation of this engine will be a minimum of about thirty hours a year and a maximum of about seventy hours a year for test and maintenance purposes.

Please let me know if any additional information is needed from the school district.

Respectfully,

Tom McMahon