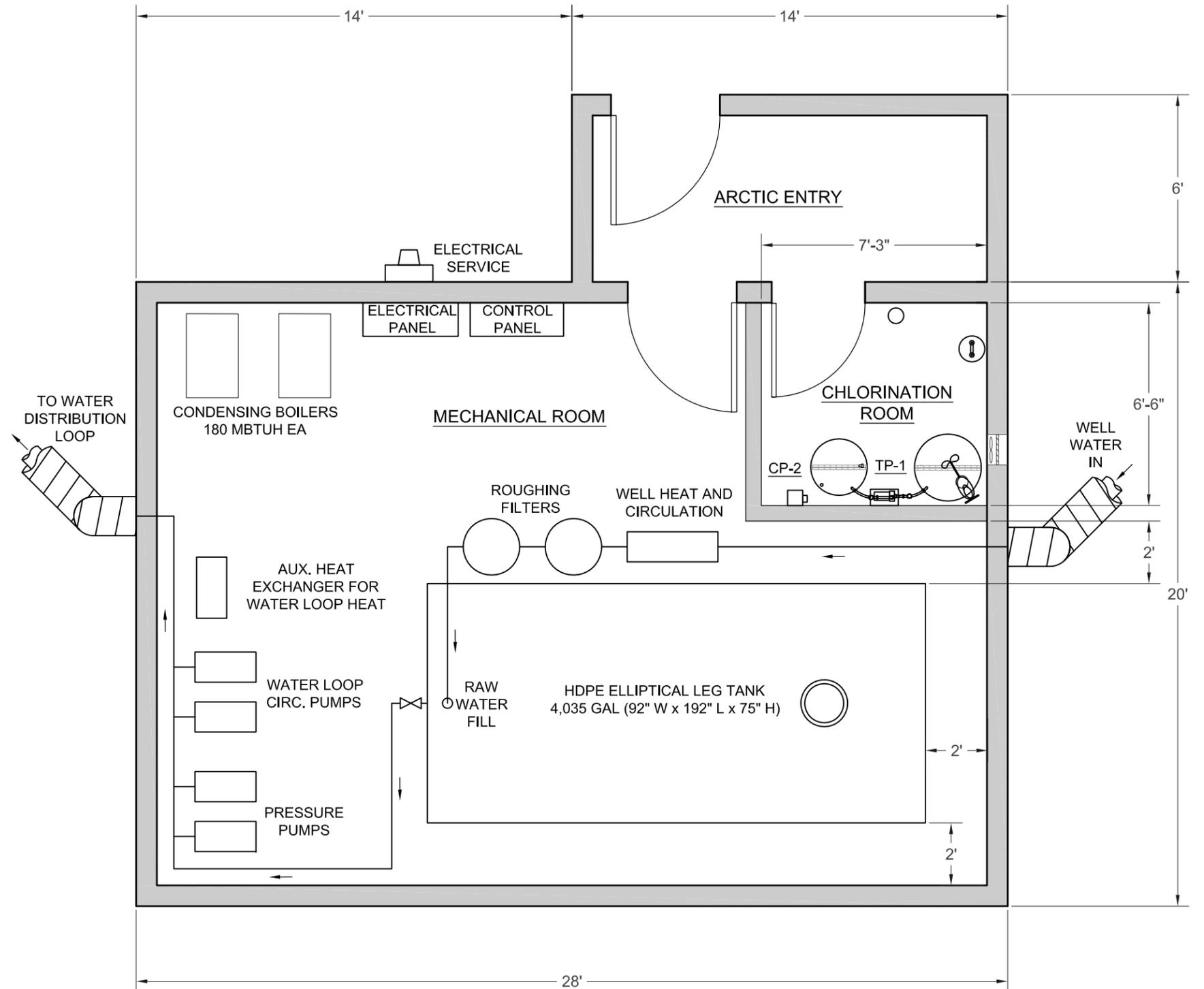


PROPOSED PUMP HOUSE DESCRIPTION

THE TWO PROPOSED PUMP HOUSES WOULD PROVIDE THE NECESSARY INFRASTRUCTURE THAT WOULD SUPPORT THE ORIGINAL PHS WELL IN THE NORTHEAST CORNER OF THE COMMUNITY, AS WELL AS THE TWO WELLS IN THE SOUTH PART OF THE COMMUNITY DRILLED IN 2002. FEATURES OF THE PROPOSED PUMP HOUSES INCLUDE THE FOLLOWING:

- THE BUILDING WOULD BE CONSTRUCTED OF STRUCTURAL INSULATED PANELS (SIP) FOR HIGH INSULATION VALUE, AS WELL AS RAPID ERECTION OF THE BUILDING SHELL.
- THE BUILDING FOUNDATION WOULD BE A TRIODETIC® SPACE FRAME ON THE TUNDRA. THIS SPACE FRAME WOULD EVENLY DISTRIBUTE THE BUILDING LOAD EVENLY OVER THE GROUND SURFACE WITHOUT THE EXPENSE OF DRILLING AND SETTING PILES.
- AN HDPE ELLIPTICAL HORIZONTAL LEG TANK OF 4,000 GALLONS CAPACITY WOULD PROVIDE A BUFFER BETWEEN THE WELLS AND THE WATER DISTRIBUTION SYSTEM. THIS TANK WAS SELECTED TO PROVIDE A LARGER FOOTPRINT FOR LOWER FLOOR LOADING, AS WELL AS A LOWER TANK HEIGHT TO ALLOW FOR A LOWER CEILING HEIGHT, WITH SUBSEQUENT BUILDING COST SAVINGS.
- WATER FROM WELLS WOULD ENTER THE BUILDING AND BE FILTERED, CHLORINATED, AND WOULD FLOW INTO THE WATER STORAGE TANK. A SEPARATE ROOM WOULD PROVIDE FOR CHLORINATION. LEVEL CONTROLS IN THE TANK WOULD CONTROL THE WELL PUMP, AND WOULD PROTECT PRESSURE PUMPS FROM DRY RUNNING.
- TWO PRESSURE PUMPS WOULD PROVIDE PRESSURIZATION OF THE COMMUNITY WATER DISTRIBUTION LOOP THAT FEEDS THE WATERING POINTS AND THE SCHOOL.
- TWO CIRCULATION PUMPS NEXT TO THE PRESSURE PUMPS PROVIDE CIRCULATION OF THE WATER DISTRIBUTION LOOPS, ALONG WITH OTHER CIRCULATION PUMPS IN THE OTHER PUMP HOUSE AND IN THE MECHANICAL AREA OF THE WASHETERIA.
- HEAT WOULD BE PROVIDED THROUGH TWO OIL-FIRED CONDENSING BOILERS FOR THE BUILDING SPACE, WELL HEAT, AND BACKUP HEAT OF THE WATER DISTRIBUTION LOOP. THERE IS ALSO THE POSSIBILITY OF USING WASTE HEAT FROM THE POWER PLANT FOR SOME LOW LEVEL HEATING OF WATER IN THE PUMP HOUSE. THIS WILL HAVE TO BE LATER INVESTIGATED.
- ELECTRIC POWER FOR THE PUMP HOUSE WOULD BE PROVIDED FROM THE VILLAGE POWER PLANT DISTRIBUTION SYSTEM.
- A SIMPLE CONTROL PANEL WOULD PROVIDE AUTOMATIC CONTROL OF THE PUMP HOUSE FUNCTIONS, MONITORING OF THE CRITICAL OPERATIONAL PARAMETERS OF THE PUMP HOUSE AND WELLS, WITH MANUAL OPERATING BACKUP.

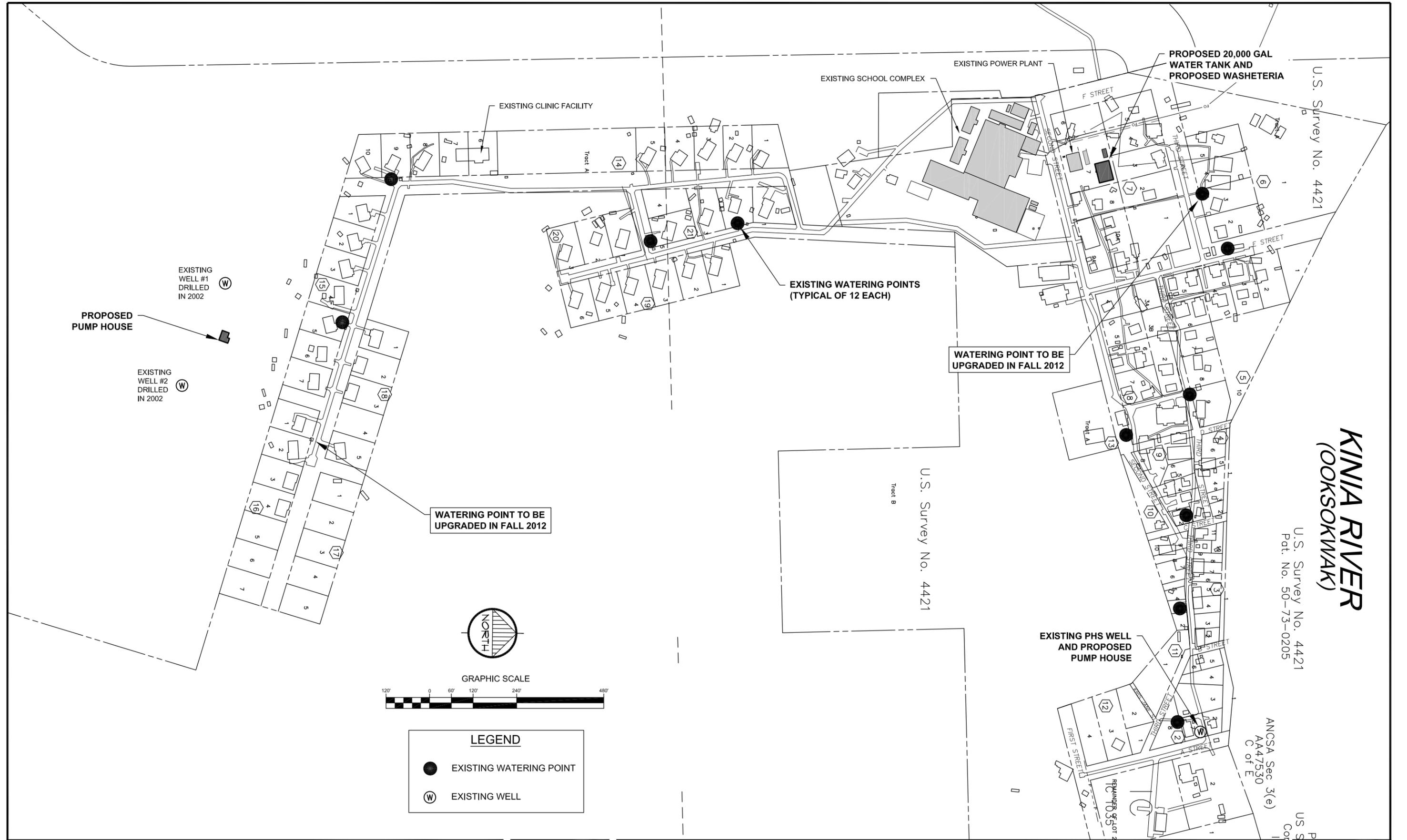


KINIA RIVER (OOKSOKWAK)

U.S. Survey No. 4421
Pat. No. 50-73-0205

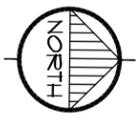
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LEGEND

- EXISTING WATERING POINT
- ⊙ EXISTING WELL



PO BOX 222946 ANCHORAGE, AK 99522 PH: 907-348-1010 FAX: 907-348-1015

Scale: AS SHOWN
Date: OCT. 2012
Drawn: CM

WATERING POINTS AND WELL LOCATIONS

CHEFORNAK, ALASKA

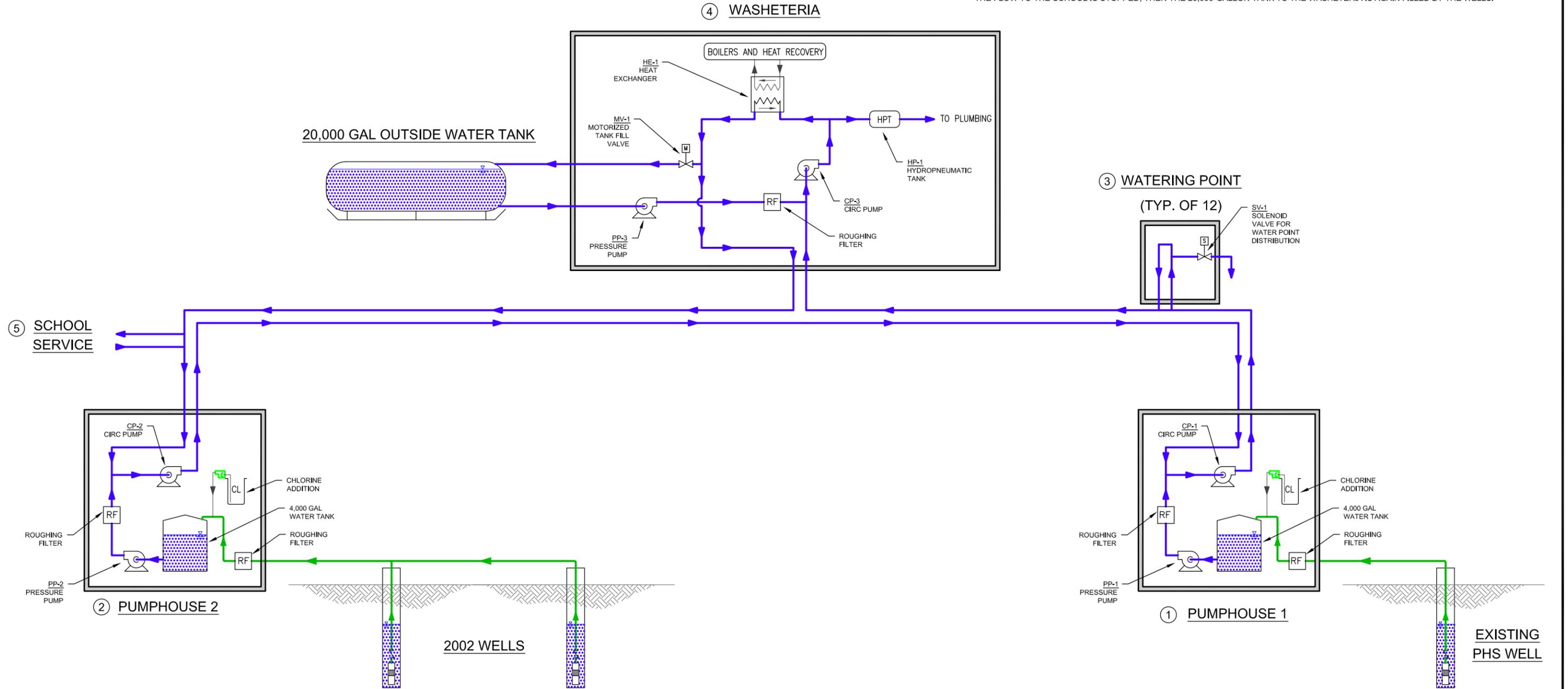
FIGURE 2

PROCESS DESCRIPTION

- 1 WATER SOURCE—PUMP HOUSE 1.** WATER IS PUMPED FROM THE EXISTING PHS WELL THROUGH A ROUGHING FILTER, THEN A HYPOCHLORITE SOLUTION IS ADDED JUST BEFORE THE WELL WATER ENTERS INTO A 4,000-GALLON WATER STORAGE TANK. THE TANK SERVES AS A BUFFER FOR WATER ENTERING THE EXISTING WATER DISTRIBUTION SYSTEM. PRESSURE PUMP PP-1 MAINTAINS A CONSTANT 50-PSI PRESSURE IN THE WATER DISTRIBUTION LOOP. PUMPING IS COORDINATED THROUGH A RADIO LINK BACK TO THE WASHETERIA TO MANAGE PUMPING INTO THE LOOP THROUGH PUMP HOUSES 1 AND 2 TO EQUALIZE WATER DRAW FROM THE THREE WELL SOURCES. CIRCULATING PUMP CP-1 PROVIDES PART OF THE CIRCULATION OF THE WATER DISTRIBUTION LOOP. THE FIRST PRIORITY OF THE WATER PUMPING IS TO KEEP THE 20,000-GALLON WATER STORAGE TANK FILLED FOR SUPPLYING THE SCHOOL ULTRAFILTRATION / REVERSE OSMOSIS (UF/RO) WATER TREATMENT SYSTEM. THE WELL IS KEPT THAWED BY A CIRCULATION LOOP DOWN THE CASING, HEATED BY THE WATER LOOP THROUGH A HEAT EXCHANGER, AND BACKED UP BY OIL HEAT.
- 2 WATER SOURCE—PUMP HOUSE 2.** THIS SYSTEM IS VIRTUALLY IDENTICAL TO PUMP HOUSE 1 EXCEPT THAT THERE ARE TWO WELLS SERVING THIS PUMP HOUSE. WATER IS PUMPED FROM THE EXISTING TWO WELLS DRILLED IN 2002 THROUGH A ROUGHING FILTER, THEN A HYPOCHLORITE SOLUTION IS ADDED JUST BEFORE THE WELL WATER ENTERS INTO A 4,000 GALLON WATER STORAGE TANK. THE TANK SERVES AS A BUFFER FOR WATER ENTERING THE EXISTING WATER DISTRIBUTION SYSTEM. PRESSURE PUMP PP-2 MAINTAINS A CONSTANT 50-PSI PRESSURE IN THE WATER DISTRIBUTION LOOP. PUMPING IS COORDINATED THROUGH A RADIO LINK BACK TO THE WASHETERIA TO MANAGE PUMPING INTO THE LOOP THROUGH PUMP HOUSES 1 AND 2 TO EQUALIZE WATER DRAW FROM THE THREE WELL SOURCES. CIRCULATING PUMP CP-2 PROVIDES PART OF THE CIRCULATION OF THE WATER DISTRIBUTION LOOP. THE FIRST PRIORITY OF THE WATER PUMPING IS TO KEEP THE 20,000-GALLON WATER STORAGE TANK FILLED FOR SUPPLYING THE SCHOOL ULTRAFILTRATION / REVERSE OSMOSIS (UF/RO) WATER TREATMENT SYSTEM. THE WELLS ARE KEPT THAWED BY A CIRCULATION LOOP DOWN THE CASING, HEATED BY THE WATER LOOP THROUGH A HEAT EXCHANGER, AND BACKED UP BY OIL HEAT.

PROCESS DESCRIPTION CONT'D

- 3 WATER DISTRIBUTION—TYPICAL WATERING POINT.** THERE ARE TWELVE WATERING POINTS THAT WILL BE UPGRADED TO MORE ENERGY EFFICIENT AND ROBUST WATER DISPENSING SYSTEMS FOR PUBLIC USE. WATER FROM THESE WATERING POINTS WILL BE USED FOR NON-POTABLE USES, SUCH AS LAUNDRY, WASHING AND BATHING, AND STEAM BATHS. THE UPGRADED WATERING POINT ENCLOSURES WILL BE CONSTRUCTED FROM ALUMINUM PLATE, WITH 4-IN OF RIGID STYROFOAM INSIDE THE ENCLOSURES. HEATING WILL BE DONE BY TWO SYSTEMS OF THERMOSTATICALLY CONTROLLED HEAT TRACE FOR SIMPLICITY OF OPERATION.
- 4 WATER DISTRIBUTION AND HEATING—WASHETERIA.** THE WATER DISTRIBUTION SYSTEM IS HEATED HERE BY RECOVERING WASTE HEAT FROM THE NEARBY DIESEL GENERATOR POWER PLANT, WITH OIL HEAT BACKUP FROM THE WASHETERIA MECHANICAL ROOM. AN OUTSIDE 20,000-GALLON WATER STORAGE TANK IS KEPT FILLED BY A CONTROL SYSTEM THAT OPENS MOTORIZED VALVE MV-1 TO LET IN APPROXIMATELY 10 GPM TO THIS TANK FROM THE WATER DISTRIBUTION SYSTEM. THE WELL PUMPS IN PUMP HOUSE 1 AND 2 ARE ULTIMATELY CONTROLLED FROM THE WASHETERIA TO LIMIT STRESS ON THE AQUIFERS, THUS MINIMIZING SALT INTRUSION. WHEN THE SCHOOL REQUIRES WATER FOR THEIR UF/RO TREATMENT SYSTEM, PRESSURE PUMP PP-3 SUPPLIES THE WATER FROM THIS TANK. THE 20,000-GALLON TANK PROVIDES A BUFFER FOR THE WELLS, AND ALSO SERVES AS A BACKUP IN CASE THE WELLS OR PUMP HOUSE ARE TAKEN DOWN FOR MAINTENANCE. HEATING FOR THE 20,000-GALLON INSULATED TANK IS ACCOMPLISHED BY UTILIZING RECOVERED WASTE HEAT FROM THE POWER PLANT, OR THE WASHETERIA BOILERS. WATER FROM THE DISTRIBUTION LOOP ALSO SUPPLIES WATER FOR THE WASHETERIA WASHERS, TOILETS, SHOWER, AND SINKS.
- 5 WATER DISTRIBUTION—SCHOOL WATER SERVICE.** THE SCHOOL UF/RO SYSTEM REQUIRES APPROXIMATELY 10 GPM WHEN IT IS TREATING WELL WATER TO POTABLE WATER STANDARDS. WHEN THIS SYSTEM IS OPERATING, A RADIO LINK TO THE WASHETERIA TELLS PRESSURE PUMP PP-3 TO SUPPLY WATER TO THE WATER DISTRIBUTION LOOP, THUS PREVENTING THE WELLS FROM BEING OVERSTRESSED. ONCE THE FLOW TO THE SCHOOL IS STOPPED, THEN THE 20,000-GALLON TANK TO THE WASHETERIA IS AGAIN FILLED BY THE WELLS.





TOKEN SLIDE AND
PUSH BUTTON

WATER DELIVERY HOSE

ELECTRICAL SERVICE



TOKEN SLIDE AND
PUSH BUTTON

1-1/2" HIGH
BOOST FLOW

WATER DELIVERY
SOLENOID VALVE

3" HDPE WATER LOOP
DISTRIBUTION PIPES
INSIDE WATERING POINT

G:\ACAD\CHEFORNAK\2012 Water Study\Fig 8-4 Existing Watering Point.dwg, 11/6/2012 4:24:03 PM, cmerz, Adobe PDF

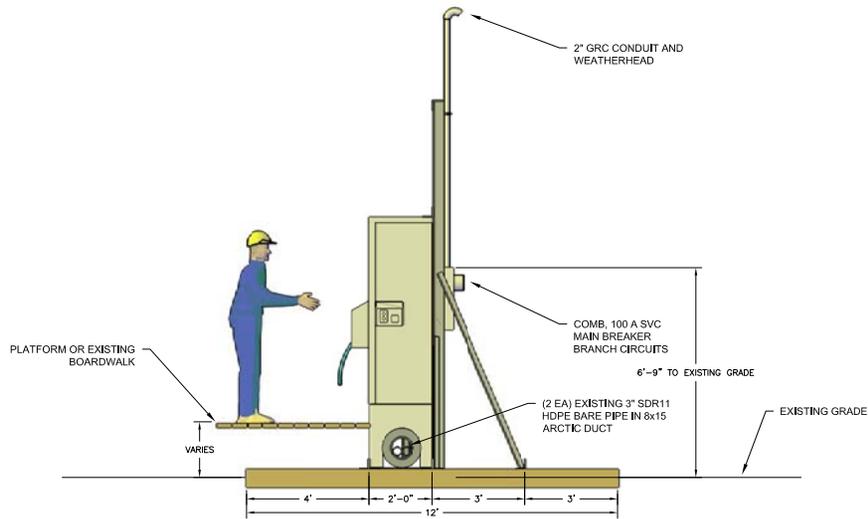


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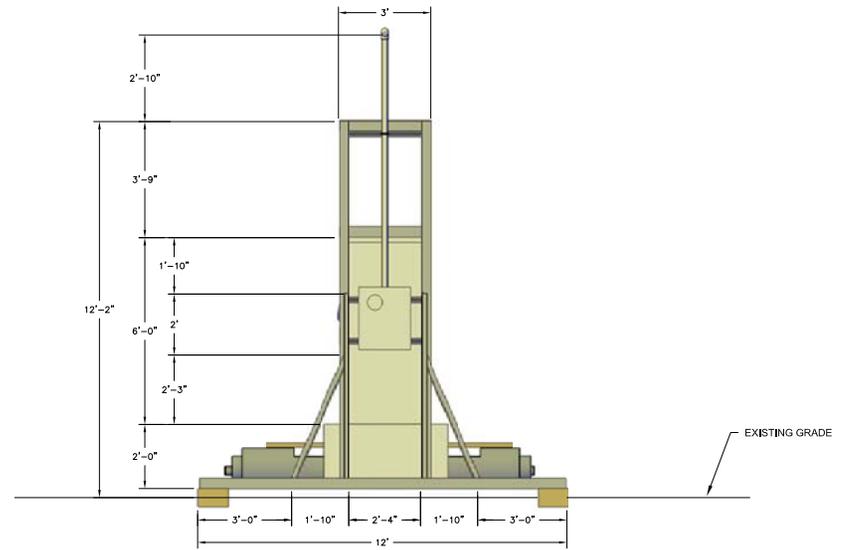
EXISTING WATERING POINT
CHEFORNAK, ALASKA

FIGURE 4

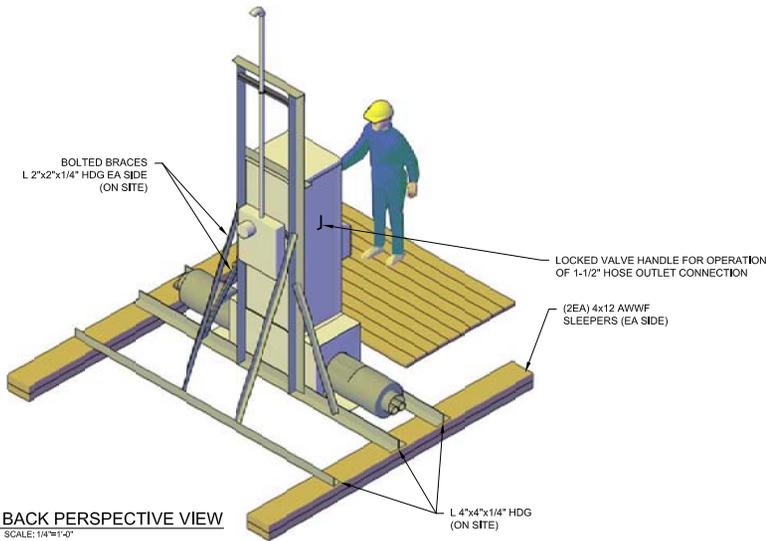
G:\ACAD\CHEFORNAK\2012 Water Study\Fig. B-5 Upgraded Watering Point.dwg, 11/07/2012 4:51:32 PM, cmezz, Adobe PDF



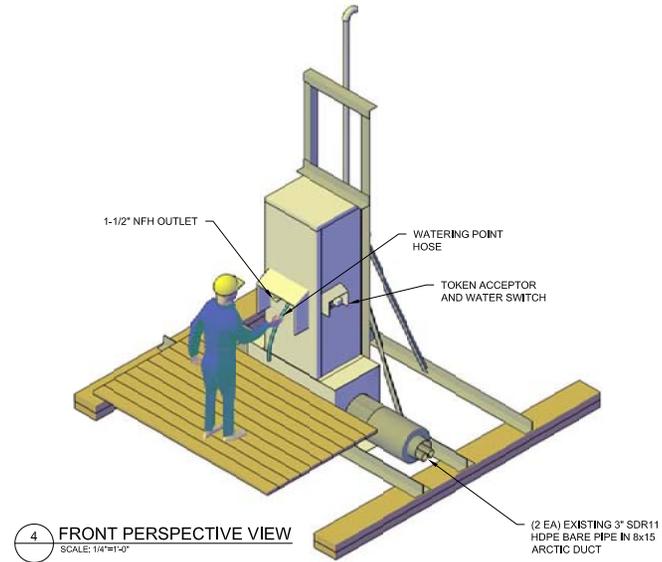
1 SIDE ELEVATION
SCALE: 1/4"=1'-0"



2 BACK ELEVATION
SCALE: 1/4"=1'-0"



3 BACK PERSPECTIVE VIEW
SCALE: 1/4"=1'-0"



4 FRONT PERSPECTIVE VIEW
SCALE: 1/4"=1'-0"

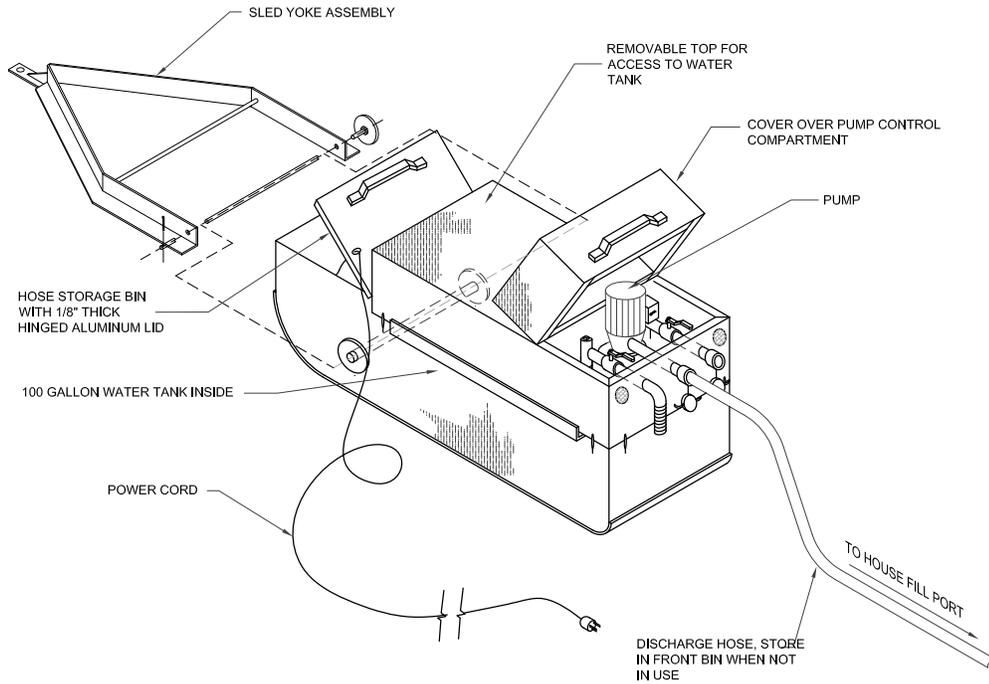


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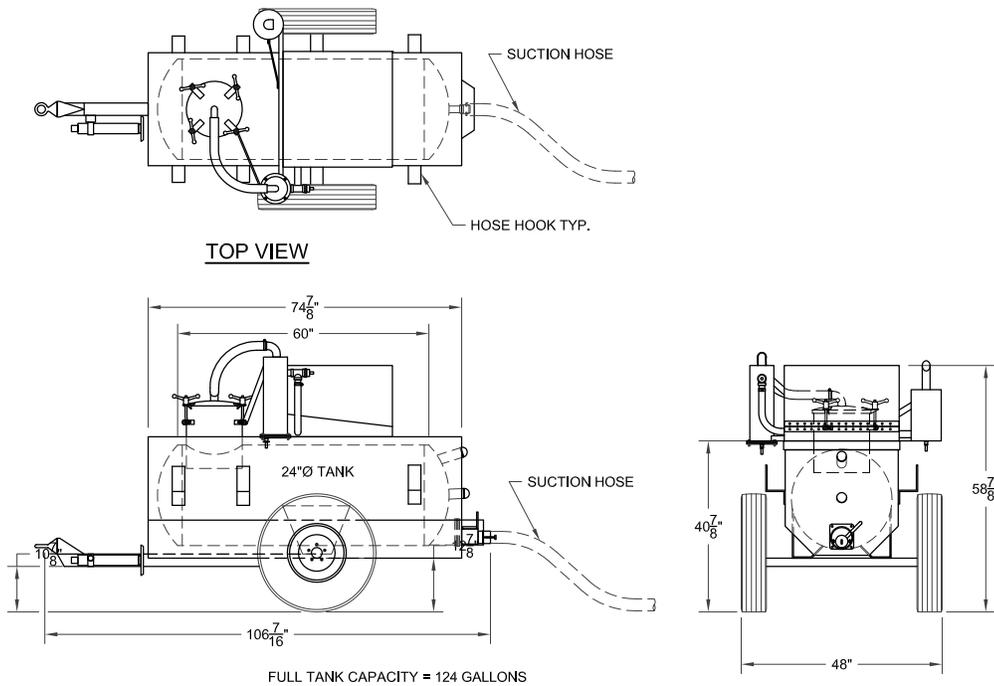
UPGRADED WATERING POINT

CHEFORNAK, ALASKA

FIGURE 5



1 **ALUMINUM WATER TANK ASSEMBLY IN SLED CONFIGURATION**



2 **WASTEWATER VACUUM TRAILER**



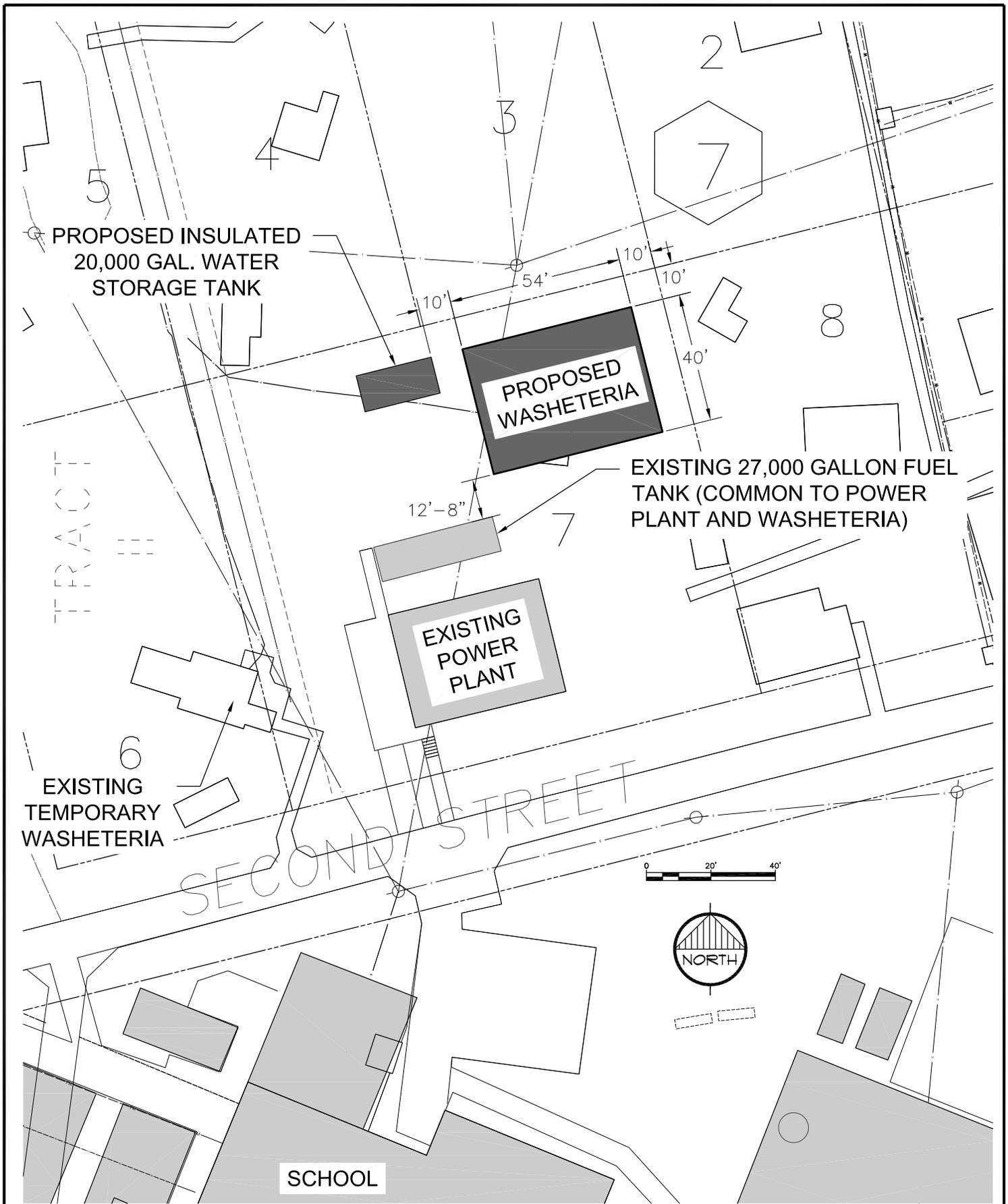
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**EXISTING FLUSH TANK
 AND HAUL COMPONENTS**

 CHEFORNAK, ALASKA

FIGURE 6

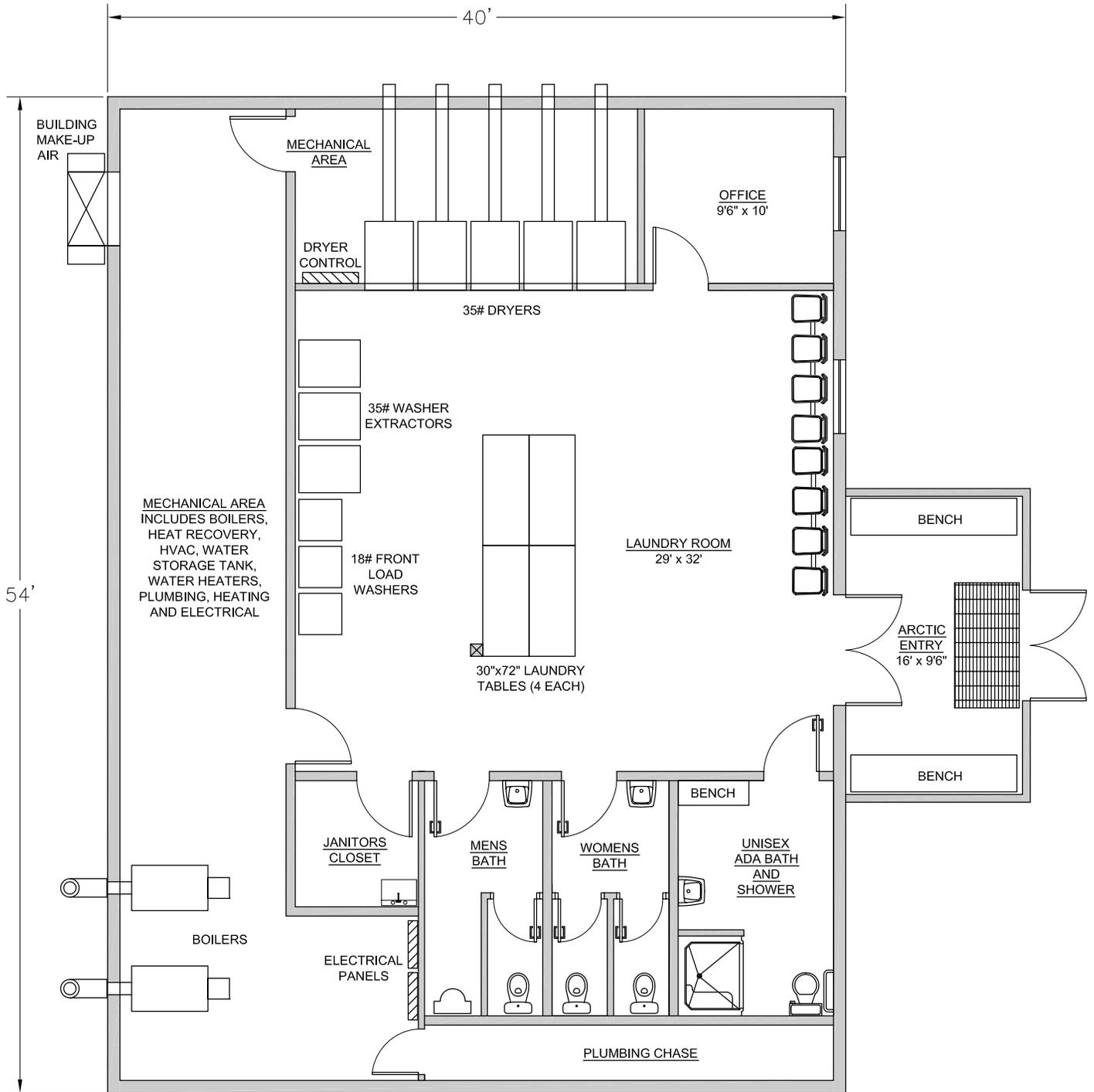
G:\ACAD\CHEFORNAK\2012 Water Study\Fig 8-7 Power Plant Site Plan.dwg, 11/16/2012 5:14:54 PM, cmerz, Adobe PDF



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 Date: OCT. 2012
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POWER PLANT SITE PLAN
 LOT 7, BLOCK 7
 CHEFORNAK, ALASKA

FIGURE 7



Scale: 1/8" = 1'-0"

Date: OCT. 2012

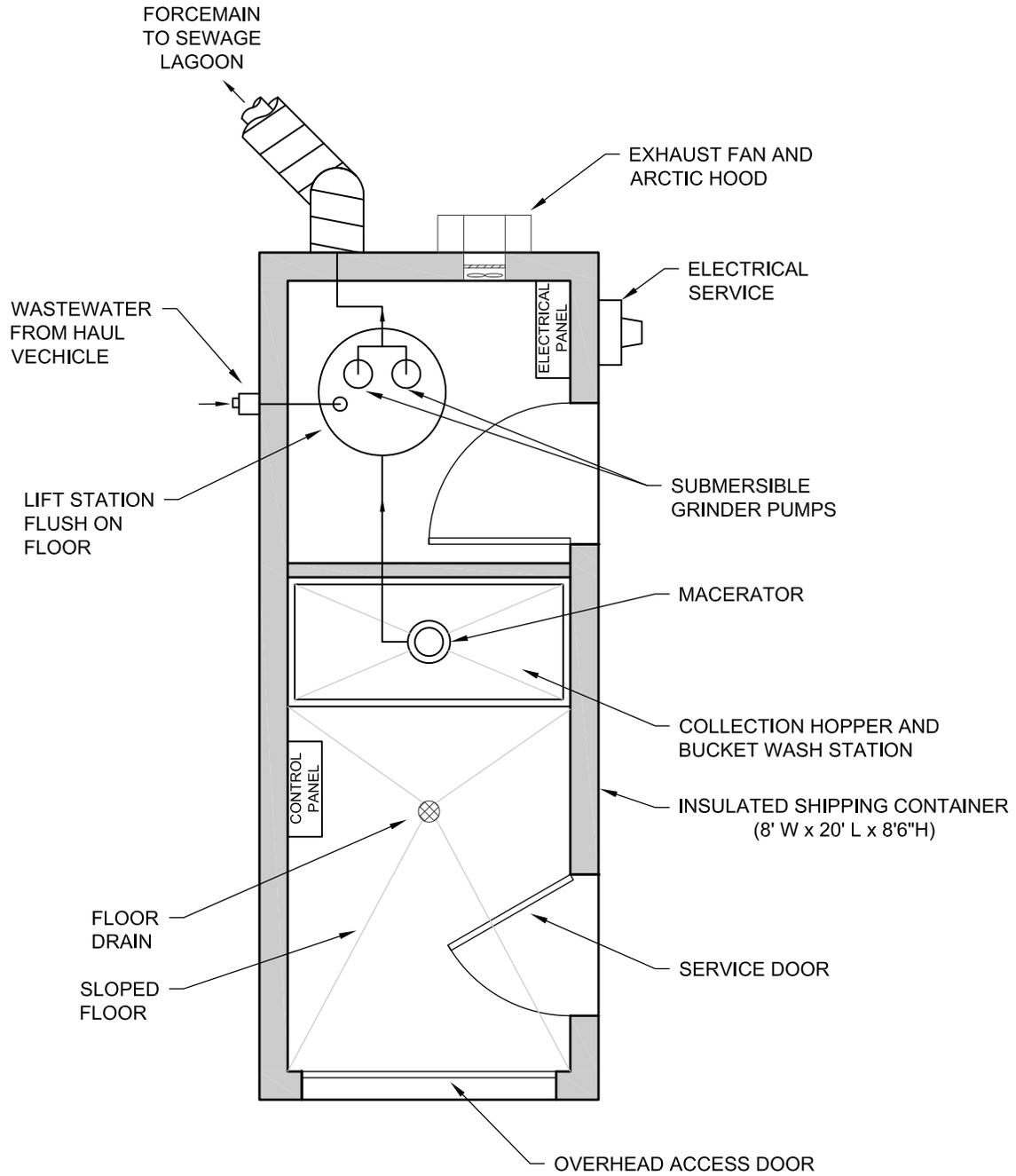
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PROPOSED WASHETERIA

CHEFORNAK, ALASKA

FIGURE 8

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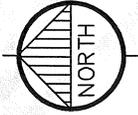
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PROPOSED COLLECTION STATION

CHEFORNAK, ALASKA

FIGURE 9



**KINIA RIVER
(OOKSOKWAK)**

PROPOSED HONEYBUCKET
DUMPING STATION (EXACT
LOCATION IS TO BE DETERMINED)

PROPOSED WATER TREATMENT
PLANT, WASHETERIA AND
WATER STORAGE TANKS

SCHOOL

EXISTING FUEL
TANK FARM

NEW SCHOOL FORCE MAIN

PROPOSED FORCEMAIN
EXTENSION

SCHOOL SEWAGE
LAGOON
(TO BE CLOSED)

SLUDGE
SETTLING CELL

PRIMARY
TREATMENT CELL

SECONDARY
TREATMENT CELL

PROPOSED SEWAGE
LAGOON SITE

CHEFORNAK CITY BOUNDARY

C:\Users\dbeiswenger\Desktop\CYF Sewage Lagoon.dwg, 11/9/2012 3:41:54 PM, \\CE2MAIN.ce2inc.local\LANIER MP C2050/LD520C PCL 6



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**PROPOSED
FACULTATIVE LAGOON**

CHEFORNAK, ALASKA

FIGURE 10