KOERS
& ASSOCIATES
ENGINEERING LTD.
Consulting Engineers

PO Box 790, 194 Memorial Ave.
Parksville, BC V9P 2V7
T:250-248-3151 F: 250-248-5362

CONTEMPLATED CHANGE ORDER NO. 1	
PROJECT: San Pareil UV Disinfection Upgrades	PROJECT NO.: 1683
OWNER: Regional District of Nanaimo	CCO NO.: 1 **REV2**
TO: Garth O'Neill	DATE: **May 2, 2018**
CONTRACTOR: Ridgeline Mechanical Ltd.	TOTAL NO. OF PAGES: 9
SUBJECT: Contemplated Change Order Request	
ATTACHED: RB Engineering Ltd Drawing SKE-1 (dated: Mar 9, 2018) & SKE-2 REV 1 (dated April 11, 2018) & **RB Engineering Ltd. San Pareil Water Treatment Upgrades – Scope Change (dated: May 2, 2018)**	

DESCRIPTION:

The Regional District of Nanaimo is requesting the following changes be made to the contract. In accordance with Article 39. CHANGES IN THE WORK, please provide pricing changes that reflect the addition of the following work. The prices below shall be included in the part with which it is most closely associated and include all the work shown on the attached documents:

Table 1: Schedule of Prices

Item	Description	Unit	Price ($)
1	**Well sensor Upgrades, Well No. 1 Upgrade, Nanoose Water Treatment Plant PC Upgrade and Upgrade Rockwell Software and Connection and Integration of San Pareil site into Nanoose WTP System**	LS	133,638.43
	Total Price (excluding GST)		133,638.43

PREPARED BY: KOERS & ASSOCIATES ENGINEERING LTD.

SIGNED: _____ DATE: **MAY 2, 2018**

Ken Doll, P.Eng.

Alternate to Factory talk sub UTSCADA
Deduct $14,400.00 from above quote.

San Pareil Water Treatment Upgrades – Scope Change

Last Modified: **May 2, 2018** by David Moss

Part A: Well Sensor Upgrade

1. Add terminal blocks and wiring in the control cabinets as per the control schematic.

2. Add Level Sensors for Well #1 and Sensor Extension for Well #4

    a. Add a 4-20mA well pressure transducer and signal isolator for well #1. Review existing well configuration and wiring to determine the most appropriate sensor for the well. Run 2C #18 shielded current loop cable from well pressure transducer through conduit system back to existing San Pariel SCADAPack controller in the reservoir building control panel. Terminate conductors on new terminal blocks as required. Calibrate, test, and commission the pressure transducer. Provide commissioning report and sensor installation depth to the Engineer.

    b. Well #4 already has a level sensor that provides feedback to the local VFD. Intercept the sensor signal wire and install a signal duplicator in Well #4 VFD cabinet complete with power supply and associated wiring as required. Run first signal to the local VFD controls and run second signal via a signal isolator and a 2C #18 shielded current loop cable from the signal duplicator through conduit system back to existing San Pariel SCADAPack controller in the reservoir building control panel. Terminate conductors on new terminal blocks as required. Confirm operation of the signal to both the local VFD and the Remote SCADAPack controller.

    c. Program SCADAPack to:
        i. Scale, store, and datalog the two well level sensors.
        ii. Halt operation of a given well pump if the water level in that well drops below a user specified set point.

    d. Program the HMI to:
        iii. Display the current water level in each well.
        iv. Display a user configurable lower operating limit of the water level complete with configuration interface.

Part B: Well #1 VFD Upgrade

1. Add Input/Output Card to Existing SCADAPack

    a. Add a 5305 analog output card to the existing SCADAPack Controller to enable expansion of sensor outputs.

    b. Update SCADAPack program to recognise addition of the card as required.

c. Add terminal blocks and wiring in the control cabinet to extend all new SCADAPack I/O points. All field terminations shall be to these intermediary terminal blocks.

2. Install a NEMA 3R kiosk complete with VFD for well pump at well #1 as follows:
    a. Kiosk to be fabricated from marine grade aluminum or stainless steel and include insulation, heat, ventilation, lighting and affiliated controls as required for the proposed equipment.
    b. Install 300mm deep concrete base and all conduit for power and control as required. Concrete base to be no closer than 1m from well to allow suitable clearance for maintenance. Contractor to confirm kiosk location with RDN.
    c. Intercept and extend existing well pump power feed such that the VFD is fed by the existing 208 V, 3 phase feeder and the pump power conductor connects to the VFD.
    d. VFD to be enclosed in separate enclosure within the kiosk, be manufactured by Franklin Electric or Rockwell Automation, and include the following:
        i. On the front of the enclosure:
            1. Hour meter
            2. Local Hand-Off-Auto switch
                a. Local switch shall operate as follows:
                    i. Hand – User can configure pump speed with local LCD controller.
                    ii. Off – VFD disabled
                    iii. Auto – VFD operation is controlled by SCADAPack as described below
            3. LCD interface capable of showing VFD operating information, VFD configuration/settings, manual speed control and fault log.
            4. External operator for internal power disconnect.
            5. Green LED status light for 'Pump Running'
            6. Red LED status light for "VFD Fault"
            7. Lamicoid labels for the above devices
        ii. Use existing starter enable for VFD enable input
        iii. 4-20mA speed control input
        iv. Form C contact for the following outputs:
            1. VFD fault
            2. Local VFD switch in HAND
            3. Local VFD switch in OFF
            4. Local VFD switch in AUTO
            5. Pump running

3. Undertake manufacturer testing and commissioning of the VFD including configuration of pump ramp up/down, soft start, soft stop, speed control, and operation in Hand, Off, and Auto modes. Provide commissioning report to the Engineer.

4. Run 12C #14 control cable from VFD through conduit system back to existing San Pariel SCADAPack controller in the reservoir building control panel for discreet I/O.

5. Run 2C #18 shielded current loop cable from VFD through conduit system back to existing San Pariel SCADAPack controller in the reservoir building control panel for pump speed control.

6. Program SCADAPack to:
    a. Store and control incoming VFD digital I/O.
    b. Operate the well pump VFD at 100% when the reservoir control cabinet HOA switch is in Hand.
    c. Disable the VFD when the reservoir control cabinet HOA switch is in Off.
    d. Operate the well pump VFD at an operator adjustable speed control setpoint when the reservoir control cabinet HOA switch is in Auto (Civil Engineer to provide default set point).

7. Program the HMI to:
    a. Display the current pump operating frequency.
    b. Display the status of the remote and local HOA switches.
    c. Display a user configurable operating set point of the water level complete with configuration interface.

Part C: Nanoose Water Treatment Plant PC Upgrade and Upgrade Rockwell Software

~~1. Replace existing PC at Nanoose Water Treatment Plant with a new PC with the following requirements:~~
    ~~a. Windows 10 Pro 64 bit operating system~~
    ~~b. Intel Core i7-7000 series quad core processor, 3.5GHz or better~~
    ~~c. 16GB 2400MHz DDR4 RAM~~
    ~~d. Dual 1TB hard drives in RAID 1 Configuration~~
    ~~e. Microsoft Office Professional~~
    ~~f. All other requirements to meet or exceed Rockwell software requirements and existing PC peripherals.~~

2. **Contractor to provide RDN IT with Windows Server 2016 required specifications to suit all software. RDN IT to supply and install server that suits Contractor requirements at Nanaoose Water Treatment Plant.**

3. Transfer Rockwell RS Logix software and licensing from existing PC to new ~~PC~~ **server** including all configuration to re-establish existing functionality and remote connections.

4. Supply and install Rockwell FactoryTalk View SE on the new ~~PC~~ **server**. Undertake all programming and configuration to provide similar views and controls as existing HMI for Parker Road well and local WTP control system on RSView 32. Contractor to provide RDN with views and controls for approval.

5. Supply and install Rockwell FactoryTalk Historian and undertake all configuration required to undertake long term data logging of all events at the Nanoose WTP and the Parker Road Well. ~~RDN to provide data logging details.~~ **Providing grouped datalogging/recording as follows:**
    a. **Well levels**
    b. **Reservoir levels**
    c. **Flows**
    d. **Pressures**
    e. **Chlorine levels**
    f. **UV disinfection data (UVT, turbidity, run times, intensity, etc.)**
    g. **Pump run times (hour meters)**
    h. **PRVs (flows and position)**
    i. **Alarms**
        i. **All alarms should be logged (low, medium, high priority)**
            1. **Low levels**
            2. **High levels**
            3. **Failures (well pumps, chlorine pumps, communication,etc.)**
            4. **Power fails**
            5. **Intrusion**
            6. **Fire**
            7. **Etc.**

6. Test and commission the overall system:
    a. Create detailed test sheets including all I/O on each controller at the Parker Road and Nanoose WTP sites.
    b. Test and confirm that all I/O points are accurate and functional on the FactoryTalk View SE interface.
    c. Test and confirm that all data logging is active and accurate.
    d. Commission the system in the presence of RDN staff.
    e. Provide 8 hours of training to RDN staff on site covering the overall FactoryTalk View system operation and data logging.

Part D: Connection and Integration of San Pariel site into Nanoose WTP System

1. Add of Telus Internet Connection at San Pareil:
    ~~a. An existing Telus line is already on site to monitor the Price's alarm system in the existing Chlorination and Reservoir Building.~~

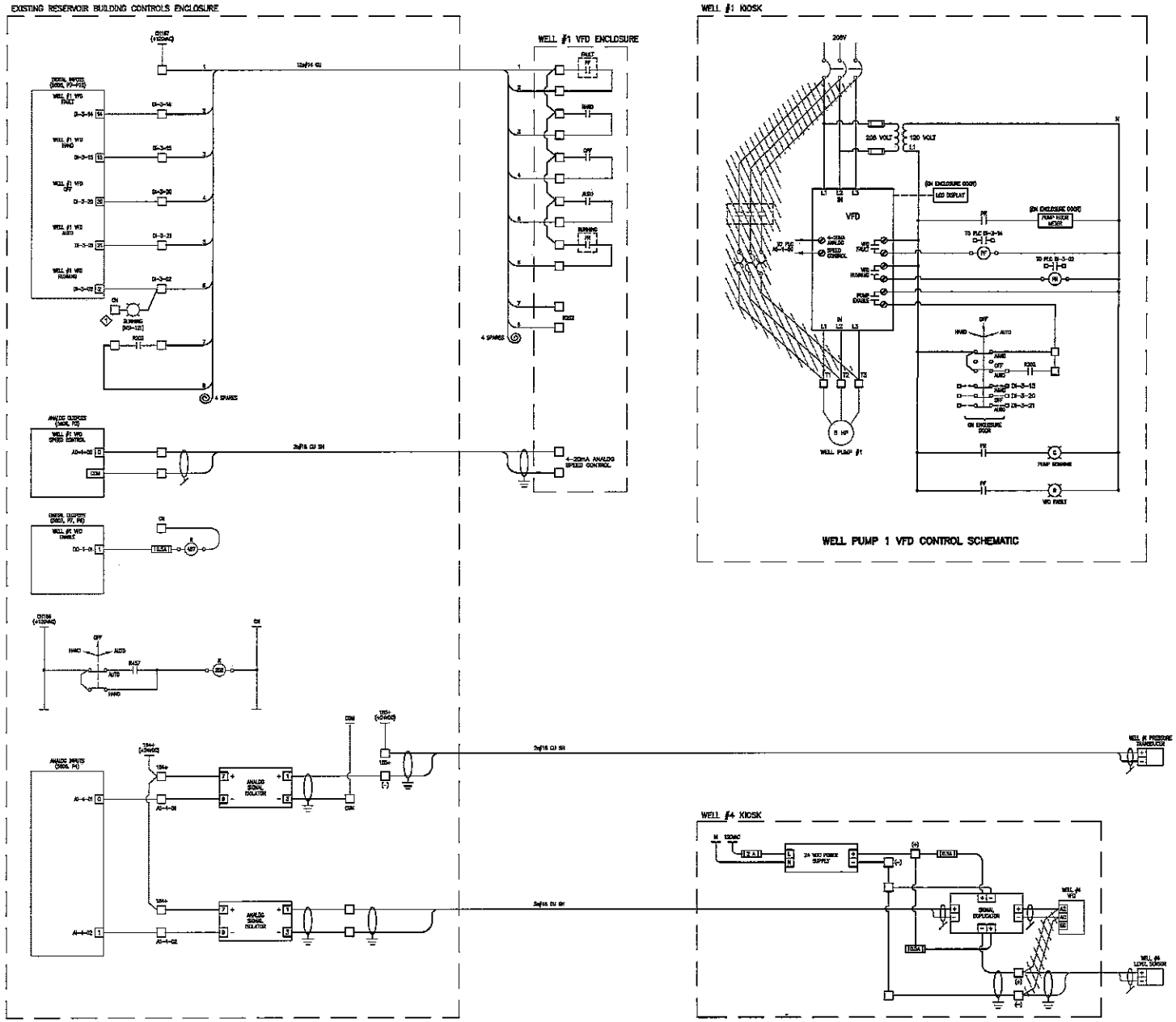
    ~~b. Coordinate with Telus and RDN IT Services to confirm requirements to add a fixed IP Internet service to the Existing Reservoir Building control room (not the existing Chlorination and Reservoir Building).~~
    ~~c. Run communication cabling as required between the two existing buildings.~~
    ~~d. Install Telus supplied router in control room control panel.~~
    e. **RDN IT to coordinate a new Shaw internet service to the San PAriel Site. Shaw installation to include coax cable run to the Reservoir Building control room and Shaw modem.**
    f. RDN IT Services to install IPSEC VPN router in Reservoir Building control room control panel.
    g. **Contractor to** install CAT 6 cabling to connect router to existing switch.
    h. **RDN IT to** configure router as required to provide the Nanoose WTP FactoryTalk View SE with IP connectivity to the San Pareil SCADApack and HMI.

2. Establish Nanoose WTP FactoryTalk connection, control, and data logging of San Pariel site:

    a. Configure software and networking hardware as required to establish connectivity to the San Pariel SCADAPack and HMI.
    b. Add HMI pages on FactoryTalk View SE to provide full remote control of the San Pariel station. These pages should mimic the complete set of controls and views that are available on the San Pariel HMI. Contractor to provide RDN with views and controls for approval.
    c. Configure FactoryTalk Historian as required to undertake long term data logging of all events at the San Pariel site.

3. Test and commission the added San Pariel system:
    a. Create detailed test sheets including all I/O on each controller at the San Pariel site.
    b. Test and confirm that all I/O points are accurate and functional on the FactoryTalk View SE interface.

c. Test and confirm that all data logging is active and accurate.
d. Commission the system in the presence of RDN staff.
e. Provide 3 hours of training to RDN staff on site covering the overall FactoryTalk View system operation and data logging.



NOTES:

1. ALL NEW EQUIPMENT IN BOLD.
2. HATCHED LINES INDICATE REMOVED.

KEY NOTES:

① RE-USE MSR-121 RUNNING LIGHT. CONTRACTOR TO RE-WIRE AS SHOWN.

REVISION					
NO.	DATE	COMMENT	NO.	DATE	COMMENT
1	FEB 19 2018	ISSUED FOR REVIEW			
2	MAR 09 2018	ISSUED FOR CONST			

KB ENGINEERING LTD
ELECTRICAL CONSULTING ENGINEERS
#1 - 101 NORTHFIELD ROAD
NANAIMO, BC V9S 3B3
TEL: 250.751.1441
E-MAIL: KBENG@KBENG.CA

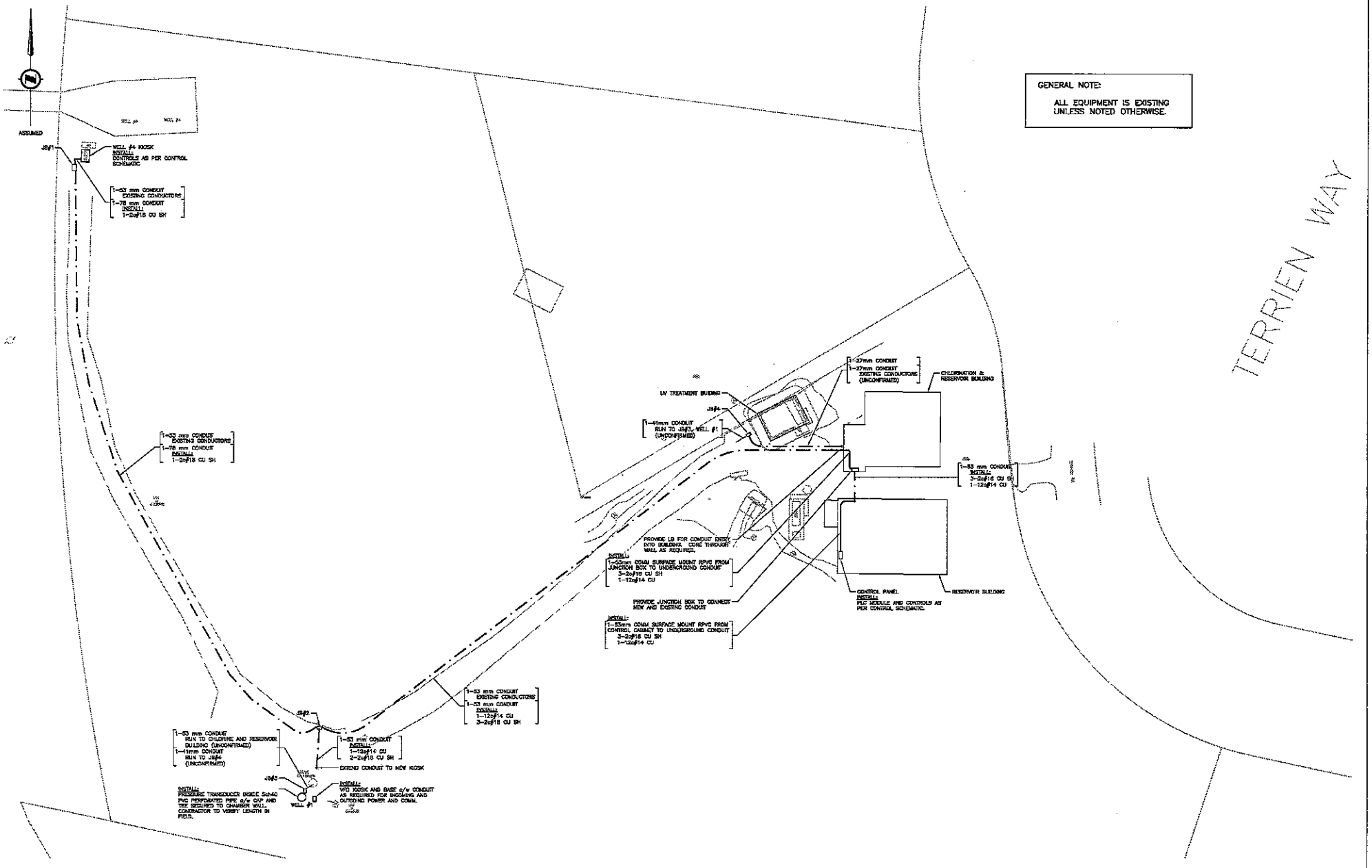
CLIENT: REGIONAL DISTRICT OF NANAIMO

PROJECT: SAN PARIEL UPGRADES

TITLE: RESERVOIR & KIOSK CONTROL SCHEMTIC

SCALE	DATE
N.T.S.	JANUARY, 2018
DESIGNED: DC	CHECKED: DM
PROJECT NO.: 16-2468	

DRAWING NO.: SKE-1



REVISION					
NO.	DATE	COMMENT	NO.	DATE	COMMENT
1	FEB 16 2018	ISSUED FOR REVIEW	3	APR 11 2018	ISSUED FOR CCD#1 REV 1
2	MAR 09 2018	ISSUED FOR CCD#1			

KB ENGINEERING LTD
ELECTRICAL CONSULTING ENGINEERS
44 TIMBERFIELD ROAD NANAIMO, BC V9S 3N3
TEL 250-754-4441
KBENG@KBENG.CA

CLIENT: REGIONAL DISTRICT OF NANAIMO

PROJECT: SAN PARIEL UPGRADES

TITLE: RESERVOIR & KIOSK SITE ELECTRICAL LAYOUT

SCALE	DATE
1:250	JANUARY, 2018
DESIGNED	CHECKED
DC	DM
PROJECT NO.	
16-2465	

DRAWING NO.
SKE-2