REQUEST FOR PROPOSAL

FOR

CITY OF SEDONA

WASTEWATER DEPARTMENT

CENTRIFUGE NO. 1 CONTROL PANEL UPGRADE PROJECT CONTRACT

APRIL 2016

REQUEST FOR PROPOSALS

CITY OF SEDONA
WASTEWATER DEPARTMENT

CENTRIFUGE NO. 1 CONTROL PANEL UPGRADE CONTRACT

PROPOSAL DUE DATE: Tuesday, April 19, 2016 3:00 PM
PROPOSAL OPENING TIME AND DATE: After 4 PM Tuesday, April 19, 2016

The City of Sedona Wastewater Department is soliciting proposals from licensed contractors for the Upgrade of the control panel for Centrifuge No. 1

The Request for Proposals is available on the City of Sedona website at www.SedonaAz.gov. Addendums will be posted on the City of Sedona's website at www.SedonaAz.gov under the Bid/RFP Opportunities. The City retains the right to reject any proposal not acknowledging all issued addendums. Addendums may be posted to within 24 hours of the time of bid opening.

Contract Documents with completed Bid Proposals must be enclosed in a sealed envelope addressed to:

HAND DELIVERED: City of Sedona
Charles Mosley, PE
Wastewater Department
7500 W SR 89A
Sedona, AZ 86336

U.S. MAIL: City of Sedona
Charles Mosley, PE
Wastewater Department
102 Roadrunner Dive
Sedona, AZ 86336

AND CLEARLY MARKED: Proposal for Centrifuge No. 1 Control Panel Upgrade Contract

AND RECEIVED: **At the Wastewater Department until 3:00 p.m. local time, Tuesday, April 19, 2016, (as determined by reference to the official time.)**

MANDATORY PREBID MEETING: Thursday April 14, 2016. 2:30 PM; 7500 W SR89A Sedona, Arizona (Wastewater Reclamation Plant) Bidders not having a representative in attendance at this meeting and not signing the sign-in sheet will be considered unresponsive.

Proposals will be opened in the Wastewater Department at 7500 W SR 89A, Sedona after 4:00 PM on April 19, 2016. One or more proposals may be accepted by the City at its sole discretion. The City of Sedona reserves the right to reject any, or all proposals and withhold award if deemed in the best interest of the city.

A proposal guarantee shall be provided with each bid. The guarantee shall be in the form of a bid bond, certified check or cashier's check payable to the City.

By: _____
Charles Mosley, Director of Wastewater/City Engineer

First Advertisement: Wednesday, April 8, 2016
Second Advertisement: Friday, April 13, 2016
RED ROCK NEWS

INSTRUCTIONS TO PROPOSERS

1. Each proposal shall be submitted on the Proposal Form provided, to the locations specified in these request, at or prior to the date and time specified. All sections of the form must be completed. If information does not apply state "Not applicable". Mailing and location addresses must be provided.

2. Proposal prices submitted shall be considered to have included all local, state and federal taxes, and no additional allowance will be allowed for such. The City reserves the right to consider the value to it of warranties exceeding the minimum requirements in determining which if any proposal will be accepted. The scope of the work to be accomplished for the proposal is described in Exhibit A to these instructions.

3. No Proposer may withdraw his proposal for forty-five (45) days after the time established for receiving Proposals or before the accepted proposers have returned the Letter of Award signed, unless a period exceeding forty-five (45) calendar days after the time established for receiving Proposals has passed. The sending of the Letter of Award by the City of Sedona to one party does not constitute a waiver of this condition.

4. Each proposal must be accompanied by either a certified check made payable to the City of Sedona, a cashier's check made payable to the City of Sedona or a bid bond, duly executed by the Proposer as principal and having as surety thereon a surety company licensed to do business in Arizona. The City may retain such checks or bid bonds, of up to three (3) highest ranked Proposers, for a period of forty-five (45) days after the bid opening.

5. In the event a successful proposer fails to deliver to the City of Sedona all items, training and services, as proposed and awarded, within the time frames specified to the satisfaction of the City, the proposer may be deeded non-performing, and the proposal deposit or bond for the non-preforming proposer shall be forfeited to the City.

6. Each bidder acknowledges and agrees award of the contract shall require issuance of a Letter of Award by the City to the successful bidder and issuance of a Purchase Order. The City reserves the right to award the Base Proposal only, or the Base Proposal plus the Additive Alternate Proposal, or to reject all proposals, at its sole discretion.

7. City may conduct such investigation as it deems necessary to assist in the evaluation of any Proposal and to establish the responsibility, qualifications and financial ability of the Proposers, proposed Subcontractors and other persons and organizations to do the work in accordance with the Contract Documents. City reserves the right to reject the Proposal of any Proposer who does not pass any such evaluation to City's satisfaction.

8. Modification of a Proposal already received will be considered only if the modification is received prior to the time established for receiving Proposals. Modifications shall be made in writing, executed, and submitted in the same form and manner as the original Proposal. The communication should not reveal the Proposal Price, but should provide the addition or subtraction or other modifications so that the final price or terms will not be shown until the sealed Proposals are opened.

9. Each Proposal shall state its Arizona State Contractor's License number and category, in the proposal. The numbers for Subcontractors shall also be stated.

STATUTORY BID BOND

PURSUANT TO TITLE 34, CHAPTER 2, ARTICLE 1
OF THE ARIZONA REVISED STATUTES

(This bond must not be less than ten percent (10%) of the bid amount)

KNOW ALL MEN BY THESE PRESENTS:

That we, the undersigned _____, (hereinafter "Principal"), as Principal, and _____, a corporation organized and existing under the laws of the State of _____, with its principal offices in the City of _____, (hereinafter "Surety"), as Surety, are held and firmly bound unto the City of Sedona, the State of Arizona, (hereinafter "Obligee"), in the amount of _____ _____(Dollars) ($_____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

CITY OF SEDONA

Centrifuge No. 1 Control Panel UpgradeProject

NOW, THEREFORE, if the Obligee accepts the proposal of the Principal and the Principal enters into a contract with the Obligee in accordance with the terms of the proposal and gives the bonds and certificates of insurance as specified in the Contract Documents with good and sufficient surety for the faithful performance of the contract and for the prompt payment of labor and materials furnished in the prosecution of the contract, or in the event of the failure of the Principal to enter into the contract and give the bonds and certificates of insurance, if the Principal pays to the Obligee the difference not to exceed the penalty of the bond between the amount specified in the proposal and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by the proposal then this obligation is void. Otherwise, it remains in full force and effect provided, however, that this bond is executed pursuant to the provisions of Section 34-201, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions of the section to the extent as if it were copied at length herein.

Witness our hands this _____ day of _____, 2016.

_____

PRINCIPAL Seal

By:_____

Title:_____

_____

AGENCY OF RECORD

_____

SURETY Seal

_____

AGENCY ADDRESS

(Attach Power of Attorney form)

STATUTORY BID BOND

(Check to accompany bid)

(Note: The following form shall be used when a check accompanies bid)

Accompanying this proposal is a Cashiers check payable to the order of the City of Sedona hereinafter referred to as "City," for

CITY OF SEDONA

Centrifuge No. 1 Control Panel UpgradeProject

in the amount of _____Dollars ($_____), this amount being ten percent (10%) of the total amount of the Bid. The proceeds of this check shall become the property of said City provided this proposal shall be accepted by said City through action of its legally constituted contracting authorities and the undersigned shall fail to execute a contract and furnish the required Performance and Payment Bonds and proof of insurance coverage within the stipulated time; otherwise, the check shall be returned to the undersigned. The proceeds of this check shall also become the property of the City if the undersigned shall withdraw his bid within the period of forty-five (45) days after the date set for the opening thereof, unless otherwise required by law, and notwithstanding the award of the Contract to another Bidder.

_____

_____

_____

Bidder

(NOTE: If the Bidder desires to use a bond instead of a check, the Bid Bond Form on the previous two pages shall be executed -- the sum of this bond shall not be less than ten percent (10%) of the total amount of this Bid.)

STATUTORY PERFORMANCE BOND
PURSUANT TO TITLE 34, CHAPTER 2, ARTICLE 2,
OF THE ARIZONA REVISED STATUTES

(This Bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS:

That,_____ (hereinafter "Principal"), as Principal, and _____ _____, a corporation organized and existing under the laws of the State of _____with its principal office in the City of _____, (hereinafter "Surety"), as Surety, are held and firmly bound unto the City of Sedona, State of Arizona, (hereinafter "Obligee") in the amount of _____ _____ (Dollars) ($_____) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the _____, dated the _____ day of _____, 2016 to _____ _____ _____ _____ which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal faithfully performs and fulfills all of the undertakings, covenants, terms conditions and agreements of the Contract during the original term of the Contract and any extension of the Contract, with or without notice to the Surety, and during the life of any guaranty required under the Contract, and also performs and fulfills all of the undertakings, covenants, terms conditions and agreements of all duly authorized modifications of the Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, the above obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the extent as if it were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the Court.

Witness our hands this _____ day of _____, 2016.

_____

PRINCIPAL Seal

By:_____

Title:_____

AGENCY OF RECORD

_____

_____

AGENCY ADDRESS

_____

SURETY Seal

By:_____

(Attach Power of Attorney form)

STATUTORY PAYMENT BOND
PURSUANT TO
TITLE 34, CHAPTER 2, ARTICLE 2,
OF THE ARIZONA REVISED STATUTES

(This Bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS:

That, _____ (hereinafter "Principal"), as Principal, and _____, a corporation organized and existing under the laws of the State of _____ with its principal office in the City of_____, (hereinafter "Surety"), as Surety, are held and firmly bound unto the City of Sedona, State of Arizona (hereinafter "Obligee") in the amount of _____(Dollars) ($_____) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee dated the _____ day of _____, 2016, _____
_____
_____
_____
_____
which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal promptly pays all monies due to all persons supplying labor or materials to the Principal or the Principal's subcontractors in the prosecution of the work provided for in contract, this obligation is void. Otherwise it remains in full force and effect.

PROVIDED HOWEVER, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, of the Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the same extent as if it were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the Court.

Witness our hands this _____ day of _____, 2016.

_____
PRINCIPAL Seal

By:_____

Title:_____

AGENCY OF RECORD

_____

_____

AGENCY ADDRESS

_____

SURETY Seal

By:_____

(Attach Power of Attorney form)

DO NOT DETACH AND SUBMIT SEPARATE FROM OTHER CONTRACT DOCUMENTS

BID PROPOSAL

City of Sedona:

The undersigned Bidder, having examined the specifications, drawings and all other documents contained in the Contract Documents, attended all mandatory pre-bid meetings, and having examined the site where the work is being performed, and having familiarized himself with any local conditions affecting the work and having knowledge of the cost of work at the place where the work is to be done, hereby proposes to execute and perform the formal Contract set forth in these Contract Documents, of which this Proposal forms a part, and will do the work therein described on the terms and conditions therein set forth; and furnish all required labor, materials, tools, equipment, transportation and services for said work, and pay all taxes and other incidental costs, all in strict conformity with the drawings and specifications forming a part of the Contract Documents for the Unit Prices entered based on the Bidding Schedule included herein, said prices to only be amended or altered in accordance with the Contract Documents.

It is understood that any listed quantities of work to be done at unit prices are **approximate** only, and are intended to serve as a guide in evaluating bids.

It is further agreed that any quantities of work to be done at unit prices and material to be furnished may be increased or decreased as may be considered necessary, in the opinion of the City, to complete the work fully as planned and contemplated and that all quantities of work, whether increased or decreased, are to be performed at the unit prices set forth in the Bid Schedule, except as otherwise provided for in the Contract Documents.

It is further agreed that payments may be increased to cover additional work ordered by the City, but not shown on the Plans or required by the Specifications. Similarly, payments may decrease if work is deleted or changed.

By submitting a bid, the Bidder acknowledges the understanding that the bid process is solely intended to serve the public interest in achieving the highest quality of services and goods at the lowest price, and that no right, interest, or expectation shall vest or inure to the benefit of Bidders as a result of any reliance or participation in the process.

In submitting this Proposal, it is understood that the right is reserved by the City to reject any or all Proposals and waive informalities or irregularities in Proposals. The City also reserves the right to delay the award of a contract for a period not to exceed forty-five (45) days from the date of the opening of bids.

The undersigned Bidder further agrees, if awarded the contract for the work included in this Proposal, to begin and to complete and deliver the work contemplated in accordance with all the conditions set forth in the Contract Documents.

The undersigned Bidder has carefully checked the figures inserted by him and understands that they are the Bidder's sole responsibility, and the City will not be responsible for any errors or omissions on the part of the undersigned Bidder in preparing this Proposal although City may check and correct mathematical accuracy in evaluation of the bids.

The undersigned Bidder certifies that this Proposal is genuine, not collusive, or made in the interest or behalf of any person not named as provided in the Information for and Instructions to Bidders, and that the undersigned has not, directly, or indirectly, induced or solicited any other Bidder, or induced any other person, firm, or corporation to refrain from submitting a proposal, and the undersigned has not in any manner sought by collusion to secure for himself an advantage over any other Bidder.

Attached is a certified check without endorsement and with conditions payable to the City of Sedona in the sum of ten percent (10%) of the total bid drawn on a bank which is a member of Federal Reserve System or which is a member of the Federal Deposit Insurance Corporation, or a cashier's check for ten percent (10%) of the total bid or a Bid Bond written by an approved surety company for ten percent (10%) of the total bid.

The undersigned submits a bid bond pursuant to Section 34-201, Arizona Revised Statutes, payable to the City, equal to ten percent (10%) of the total amount of this proposal, and agrees that said bid bond shall be given as a guarantee that the Bidder will enter into the Contract within the time herein stated if the award is made to him by the City. In case of the Bidder's refusal or failure to do so within ten (10) days of Notice of the Award of Contract, or within five (5) days after receiving notice from the City of the rejection of any objections to the Notice of Award, the bond will be forfeited.

The Bidder grants the City the right to hold the lowest three (3) Proposals received, together with the accompanying bid securities, for a period of forty-five (45) days after the date of opening of said Proposals.

The undersigned Bidder further grants the City the right to award this Contract on the basis of any possible combinations of Base Bid and add/deduct alternate(s) (if any) that best suits the City's needs.

Bidder agrees that the City has determined that a reasonable time for the **Centrifuge No. 1 Control Panel Upgrade Project** is the contract time stated in the Advertisement for Bids and issued addendum. The Bidder agrees that this proposal is submitted on this basis, subject to provisions contained in the Contract Documents relating to extensions of time, and agrees to plan and prosecute the work with such diligence that the work shall be completed within the

time specified.

Bidder agrees that the bid includes the following items which have been completed in full by the Bidder:

(a) Bid or Proposal
(b) Bid Schedule
(c) Bid Guaranty Bond

(d) Certification of the Bidder's experience and qualifications and statement of Bidder's Qualifications
(e) List of all proposed Subcontractors
(f) Schedule of manufacturers and suppliers, major equipment and material items
(g) Non-collusion Affidavit
(h) Certificate of Insurability
(i) Signed Addenda

Bidder agrees that the City assumes no responsibility for any understanding or representation made by any of its Council members, officers or agents during or prior to the bidding and execution of the Contract, unless (1) such understanding or representations are expressly stated in the Contract or Addenda thereto, or (2) the Contract expressly provides that responsibility therefore is assumed by the City, or (3) said understanding or representation is contained in the information supplied to Bidders by the City or the City Engineer, or as information distributed pursuant to the Information for and Instructions to Bidders. The Bidder further understands that only the Mayor and Council of the City through action taken at a properly noticed meeting can waive any term or condition or requirement of this Contract or of the bid.

Bidder agrees that all terms set forth in all Contract Documents shall be binding upon the Bidder if a Notice of Award is issued in favor of said Bidder by the City.

Bidder agrees that all major equipment and suppliers shall be set forth herein on the attached "Schedule of Manufacturers and Suppliers, Major Equipment and Material Items",

Bidder understands that this project is to be constructed in compliance with all City, State and Federal laws, rules and regulations, which are applicable to the project and the Contractor and all work performed hereunder.

In making this proposal, the undersigned incorporates and acknowledges all definitions set forth in the Contract Documents.

The undersigned hereby submits this proposal and the accompanying Bid Schedule as its proposal to construct the improvements described in the Contract Documents.

The name and location of the place of business of each Subcontractor who will perform work or labor or render service to the general Contractor in or about the construction of the work or improvements in an amount in excess of one and one-half percent (1.5%) of the general Contractor's total Bid, and the portion of the work which will be done by each Subcontractor is set forth in the Proposed Subcontractor list attached hereto.

Bidder has received all Addenda before submission of Bid, and has examined the same and has included them in the Contract Documents prior to submitting the Bid and has submitted the Bid based upon them.

The Bonding company which will supply the required Performance and Payment bond is:

_____

BID SCHEDULE

PROJECT NAME: CITY OF SEDONA CENTRIFUGE NO. 1 CONTROL PANEL LCP-1180 UPGRADE
CITY OF SEDONA PROJECT NO.: 2016-WW-004

ITEM NO.	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE	EXTENDED TOTAL
1	Scope of Work Items Specified in 1.01, B.1 and 12	1	LS		
2	Scope of Work Items Specified in 1.01, B.2	1	LS		
3	Scope of Work Items Specified in 1.01, B.3	1	LS		
4	Scope of Work Items Specified in 1.01, B.4	1	LS		
5	Scope of Work Items Specified in 1.01, B.5	1	LS		
6	Scope of Work Items Specified in 1.01, B.6	1	LS		
7	Scope of Work Items Specified in 1.01, B.7, 8, 9 and 10	1	LS		
8	Scope of Work Items Specified in 1.01, B.11	1	LS		
9	Allowance for wire and conduit provision and installation (Paid per LF based on unit prices per Specification Section 1.02)	1	Allowance	$5,000.00	
	Note: Lump Sum prices paid per percentage of work performed as agreed to by owner. If work is not done completely, portions of the lump sum will not be paid.				
				TOTAL BID	

CIP: COMPLETE IN PLACE

Owner reserves the right to vary the quantities shown at their discretion. The contractor will accept the quantities if no corrections are made at the conclusion of the pre-bid meeting. All facilities incidental to the item are included in the unit price estimate. Bid Prices submitted include all local, state and federal taxes.

UNIT PRICES SHALL BE USED WHEN EXTENSION OF UNIT PRICES AND TOTAL AMOUNT CONFLICT. WRITTEN UNIT PRICES SHALL BE USED WHEN WRITTEN AND NUMBERICAL UNIT PRICES CONFLICT. BID PRICES SUBMITTED INCLUDE ALL LOCAL, STATE AND FEDERAL TAXES.

The City of Sedona reserves the right to reject all bids, or to award only the base bid, or to award a bid based upon the total of the Base Bid plus additive alternate(s) as selected for award from the additive alternate bid schedule, if additive alternate bid schedule is applicable. The City reserves the right to consider the Unit Prices provided for wire in determining the lowest, responsible, responsive bid.

DEPARTMENTAL CONTRACT FOR SERVICES
FOR THE CITY OF SEDONA

This contract is made and entered into on this _____ day of _____ 201__, by and between the City of Sedona ("CITY") and _____ ("CONTRACTOR")

Services. The CONTRACTOR promises and agrees to and with the CITY that it shall perform everything required to be performed and shall provide and furnish all the labor, materials, necessary tools, expendable equipment, and all utility and transportation services required to perform and complete in a workmanlike manner all of the work required in connection with _____ all in strict accordance with MAG Specifications, if applicable, and in strict compliance with the CONTRACTOR'S Proposal set forth in **Exhibit "A"** (attached), for a contract price not to exceed $ _____ ("Project"). Contractor shall diligently and continuously prosecute and complete all work under this Contract within the time frame specified by the Proposal.

1. *Contract Documents.* The CONTRACTOR and the CITY agree that the terms, conditions, and covenants of his contract may be supplemented by specific conditions, drawings, and materials lists, if any, which are attached hereto as additional exhibits, and made a part hereof as if fully set forth herein.

2. *Confidential Information.* All correspondence, reports and other documentation of CONTRACTOR'S work shall be considered confidential information and will be distributed only to those persons, organizations or agencies specifically designated by CITY or its authorized representative, or as specifically required for completion of CONTRACTOR'S task.

3. *Billing and Payment.* Billing and payment will be in accordance with an attached payment schedule or as set out in **Exhibit A.** Invoices are due and payable upon receipt and are delinquent only thirty (30) days after the date received by CITY. Each invoice shall set forth a general description of the work performed, in accordance with the scope of work, for the items billed.

4. *Conflicts.* In the event any term or provision of this contract is held to be illegal or in conflict with any law of the United States or Arizona or any local law, the validity of the remaining provisions shall not be affected, and this contract shall be construed and enforced as if it did not contain the particular term or provision.

5. *Certification.* CONTRACTOR hereby warrants that it is qualified by experience, necessary work force, and materials to assume the responsibilities and render the services described herein. CONTRACTOR shall execute the required affidavit of lawful presence as set forth in ARS 1-502/8 USC § 1621 [Exhibit B]

6. *Compliance with Local Rules and Regulations.* It is contemplated that the work and services to be performed by CONTRACTOR hereunder shall be done in compliance with applicable laws, ordinances, rules and regulations that are in effect on the date of this contract. Any subsequent changes in applicable laws, ordinances, rules or regulations that necessitate additional work shall constitute a change in the scope of work.

7. *Indemnification.* To the fullest extent permitted by law, CONTRACTOR shall indemnify and hold harmless CITY, and each council member, officer, employee or agent thereof (CITY and any such person being herein called an "Indemnified Party"), for, from and

against any and all losses, claims, damages, liabilities, costs and expenses (including, but not limited to, reasonable attorneys' fees, court costs and the costs of appellate proceedings) to which any such Indemnified Party may become subject, under any theory of liability whatsoever ("Claims") to the extent that such Claims (or actions in respect thereof) are caused by the negligent acts, recklessness or intentional misconduct of the CONTRACTOR, its officers, employees, agents or any tier of subcontractor in connection with CONTRACTOR's work or services in the performance of this contract. The amount and type of insurance coverage requirements set forth below will in no way be construed as limiting the scope of the indemnity in this paragraph.

8. *Insurance.* The CONTRACTOR agrees to procure and maintain in force during the term of this contract, at its own cost, the following coverage, as may be requested by the CITY, either in the initial bid, or prior to commencement of particular tasks. The policies shall name the CITY and its agents and employees as ***additional insured***, and contain a ***waiver of subrogation*** endorsement.

   a. Worker's Compensation Insurance as required by the Title 23, Chapter 6, of the Arizona Revised Statutes.

   b. Commercial General or Business Liability Insurance (Occurrence Form) with minimum combined single limits of ONE MILLION DOLLARS ($1,000,000.00) each occurrence and TWO MILLION DOLLARS ($2,000,000.00) general aggregate.

   c. Automobile Liability Insurance with minimum combined single limits for bodily injury and property damage of not less than ONE MILLION DOLLARS ($1,000,000.00) for any one occurrence, ***if*** CONTRACTOR'S owned or hired vehicles will be assigned to or used in performance of the services.

   d. Professional Liability coverage with minimum limits of FIVE HUNDRED THOUSAND DOLLARS ($500,000.00) each claim and ONE MILLION DOLLARS ($1,000,000.00) general aggregate, ***if*** professional services are utilized by the CONTRACTOR for design and performance of the Project. If approved by CITY, evidence of qualified self-insured status may be substituted for one or more of the foregoing insurance coverages. In the event the policy is written on a "***claims made***" basis, the CONTRACTOR warrants that any ***retroactive date*** shall precede any work on the Project.

9. *Non-Assignability.* Neither this contract, nor any of the rights or obligations of the parties hereto, shall be assigned by either party without the written consent of the other.

10. *Termination.* This contract shall terminate at such time as the work in the scope of work is completed or upon CITY providing CONTRACTOR with seven (7) days advance written notice, whichever occurs first. In the event the contract is terminated by CITY's issuance of said written notice of intent to terminate, CITY shall pay CONTRACTOR for all work previously authorized, performed and accepted prior to the date of termination. If, however, CONTRACTOR has substantially or materially breached the standards and terms of this contract, CITY shall have any remedy or right of set-off available at law and equity. CITY shall owe no other payments, including any payment for lost profit or business opportunity, and no penalty, to CONTRACTOR in the event of termination upon notice.

11. *Venue.* The laws of the State of Arizona shall govern this contract, and any legal action concerning the provisions hereof shall be brought in the County of Coconino, State of Arizona.

12. *Independent Contractor.* CONTRACTOR is an independent contractor. Notwithstanding any provision appearing in this contract, and any exhibits and/or addenda, all personnel assigned by CONTRACTOR to perform work under the terms of this contract shall be, and remain at all times, employees or agents of CONTRACTOR for all purposes. CONTRACTOR shall make no representation that it is the employee of CITY for any purpose.

13. *Performance Standards.* CONTRACTOR shall perform the services in **Exhibit A** in a good and workmanlike manner and in conformity with the best standards of its industry. The CITY in its sole discretion may cancel this agreement if the CONTRACTOR fails to meet the specifications for the materials and timely complete assigned tasks.

14. *Entire Agreement.* This contract, together with the attached exhibits," is the entire agreement between CONTRACTOR and CITY, superseding all prior oral or written communications. None of the provisions of this contract may be amended, modified or changed except by written amendment executed by both parties.

15. *Non-Discrimination.* Contractor, its agents, employees, and subcontractors, shall not discriminate in any employment policy or practice. "Discrimination" means to exclude individuals from an opportunity or participation in any activity or to accord different or unequal treatment in the context of a similar situation to similarly situated individuals because of race, color, gender, gender identity, sexual orientation, religion, national origin or ancestry, marital status, familial status, age, disability, or veteran status. (Ordinance 2015-10 (2015).

16. *Compliance with State and Federal Laws:*

CONTRACTOR understands and acknowledges the applicability to it of the Americans with Disabilities Act, the Immigration Reform and Control Act of 1986 and the Drug Free Workplace Act of 1989. The following is only applicable to construction contracts: CONTRACTOR must also comply with A.R.S. § 34-301, "Employment of Aliens on Public Works Prohibited," and A.R.S. § 34-302, as amended, "Residence Requirements for Employees."

a. Under the provisions of A.R.S. § 41-4401, CONTRACTOR hereby warrants to CITY that CONTRACTOR and each of its subcontractors will comply with, and are contractually obligated to comply with, all Federal Immigration laws and regulations that relate to their employees and A.R.S. § 23-214(A) (hereinafter "Contractor Immigration Warranty").

b. A breach of the Contractor Immigration Warranty shall constitute a material breach of this contract and shall subject CONTRACTOR to penalties up to and including termination of this contract at the sole discretion of CITY.

c. CITY retains the legal right to inspect the papers of any contractor or subcontractor employee who works on this contract to ensure that the contractor or subcontractor is complying with the Contractor Immigration Warranty.

CONTRACTOR agrees to assist CITY in regard to any such inspections.

d. CITY may, at its sole discretion, conduct random verification of the employment records of CONTRACTOR and any subcontractors to ensure compliance with Contractor's Immigration Warranty. CONTRACTOR agrees to assist CITY in regard to any random verification performed.

e. Neither CONTRACTOR nor any subcontractor shall be deemed to have materially breached the Contractor Immigration Warranty if CONTRACTOR or any subcontractor establishes that it has complied with the employment verification provisions prescribed by sections 274A and 274B of the Federal Immigration and Nationality Act and the E-Verify requirements prescribed by A.R.S. § 23-214, Subsection A.

f. The provisions of this article must be included in any contract that CONTRACTOR enters into with any and all of its subcontractors who provide services under this contract or any subcontract. "Services" are defined as furnishing labor, time or effort in the State of Arizona by a contractor or subcontractor. Services include construction or maintenance of any structure, building or transportation facility or improvement to real property.

17. *Dispute Resolution.* The parties shall follow the dispute resolution procedures of Chapter 3.10 of the Sedona City Code.

18. *Delays.* CONTRACTOR shall not be responsible for delays that are due to causes beyond CONTRACTOR'S reasonable control. In case of any such delay, any deadline established as part of the scope of work shall be extended accordingly as may be agreed by the CITY.

19. *Attorneys' Fees and Costs.* Should any legal action, including arbitration, be necessary to enforce any term of provision of this contract or to collect any portion of the amount payable hereunder, then all expenses of such legal action or collection, including witness fees, costs of the proceedings and attorneys' fees, shall be awarded to the substantially prevailing party.

20. *Conflict of Interest.* From the date of this contract through the termination of its service to Sedona, CONTRACTOR shall not accept, negotiate or enter into any contract or agreements for services with any other party that may create a substantial interest, or the appearance of a substantial interest in conflict with the timely performance of the work or ultimate outcome of this contract and/or adversely impact the quality of the work under this contract without the express approval of the City Manager and the City Attorney. Whether such approval is granted shall be in the sole discretion of the City Manager and the City Attorney. The parties hereto acknowledge that this Contract is subject to cancellation pursuant to the provisions of ARS § 38-511.

21. *Notice.* Any notice or communication between CONTRACTOR and CITY that may be required, or that may be given, under the terms of this contract shall be in writing, and shall be deemed to have been sufficiently given when directly presented or sent pre-paid, first class United States Mail, addressed as follows:

CITY: City of Sedona
Attention: _____
102 Roadrunner Drive
Sedona, AZ 86336

CONTRACTOR: _____
_____
_____
_____

22. *Offsets.* During the performance of this Agreement, CONTRACTOR may also be under contract with the CITY for performance of work on other projects. A breach in the performance of any of CONTRACTOR'S obligations under this Agreement shall constitute a breach of CONTRACTOR'S obligations under any other agreement with the CITY and the breach by CONTRACTOR under other agreement with the CITY shall also constitute a breach of CONTRACTOR'S obligations under this Agreement. The CITY may offset any amounts owed by CONTRACTOR under any such other agreement from any amounts owed to CONTRACTOR under this Agreement, or any delinquent wastewater fees or transaction privilege taxes owed to the City.

23. *Notice to Proceed.* Unless otherwise noted by CITY, acceptance of this contract is official notice to proceed with the work.

24. *Licensing.* CONTRACTOR shall maintain a valid license through the Arizona Registrar of Contractors for all types of work or services for the project as set forth in ARS 32-1122 and related provisions, and shall also obtain a business license for the City of Sedona.

CITY OF SEDONA, ARIZONA

_____
[Department head/designee if under $50,000 – City Manager otherwise]

ATTEST:

_____
City Clerk

APPROVED AS TO LEGAL FORM:

_____
City Attorney

[Contractor]

By:_____
Title:_____

I hereby affirm that I am authorized to enter into and sign this contract on behalf of CONTRACTOR

EXHIBIT/S

Exhibit A

X **Quote Response Form Including Project Phases, Costs, and Payment Schedules**

Exhibit B

X **Affidavit of Lawful Presence if required**

General Conditions

1. CONTENTS

The following Contract Provisions are general in scope and may refer to conditions, which will not be encountered in the performance of the work, included in this Contract and which are not applicable thereto. Any requirements, provisions or other stipulation of these General Conditions, which pertain to a non-applicable condition, shall be excluded from the scope of the Contract. Where conflict appears, "Special Condition" shall take precedence over "General Conditions". Full compensation for compliance with these General Conditions shall be considered as included in the total and various bid items of the contract and the contract time.

2. CONTROL OF WORK

This work shall be conducted in accordance with the attached Technical Specifications, the Sedona City Code, and the Maricopa Association of Governments *Uniform Standard Specifications and Details for Public Works Construction—2015 Edition* as may be modified by these General Conditions and Technical Specifications. The Contract Document consist of the following component parts, all of which are a part of this Contract whether herein set out verbatim, or attached hereto:

1. Change Orders
2. Contract For Services, including addenda
3. Payment and Performance Bonds
4. Advertisement for Bids
5. Information for and Instructions to Bidders
6. Notice of Award
7. Notice to Proceed
8. Special Conditions
9. Bid Proposal
10. Technical Specifications
11. Plans and Drawings
12. General Conditions
13. Bid Guaranty Bond
14. Standard Specifications

In the event there is a conflict between any of the above listed documents, the provision of the document with the lower numerical value shall govern those

documents with a higher numerical value. Within a category, the last in time is first in precedence.

The Contractor shall not take advantage of any apparent error or omission in the Plans or Specifications. In the event the Contractor discovers such an error or omission, he shall immediately notify the Owner. The City will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the Plans and Specifications.

The Contractor shall abide by all the laws of the United States of America, State of Arizona, Coconino/Yavapai Counties, and the City of Sedona.

It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, equipment rental, water, heat, light, fuel, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the Work in a workman like manner within specified time.

Equipment shall be properly equipped with safety devices including but not limited to spark arrestors, back up alarms, reflectors, signage, labeling, and lights.

At least one set of all appropriate Material Safety Data Sheets shall be maintained in a common location on the project site at an identified location during all working hours.

3. DEFINITIONS AND TERMS

When the Contract indicates that work shall be "accepted, acceptable, approve, authorized, condemned, considered necessary, contemplated, deemed necessary, designated, determined, directed, disapproved, established, given, indicated, insufficient interpreted, ordered, permitted, rejected, required, reserved, satisfactory, specified sufficient, suitable, suspended, unacceptable, unsatisfactory," it shall be understood that these expressions are followed by the words "by the City of Sedona".

Wherever the following abbreviations, terms, or pronouns are used in the specifications, plans, or other Contract Documents, the intent and meaning shall be interpreted as follows:

ABBREVIATIONS

AAN	American Association of Nurserymen
AAR	Association of American Railroads

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADOT	Arizona Department of Transportation
AGC	Associated General Contractors of America
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ANSI	American National Standards Institute, Inc.
ARA	American Railway Association
AREA	American Railway Engineering Association
ARTBA	American Road and Transportation Builders Association
ASCE	American Society of Civil Engineers
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATSSA	American Traffic Safety Services Association
A WG	American Wire Gauge
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
CRSI	Concrete Reinforcing Steel Institute
EIA	Electric Industries Association
FHWA	Federal Highway Administration, Department of Transportation
FSS	Federal Specifications and Standards
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IMSA	International Municipal Signal Association
IPCEA	Insulated Power Cable Engineers Association
ITE	Institute of Transportation Engineers
MAG	Maricopa Association of Governments
MIL	Military Specifications
MUTCD	Manual on Uniform Traffic Control Devices
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NIST	National Institute of Standards and Technology
NSF	National Sanitation Foundation (NSF)
SAE	Society of Automotive Engineers
UL	Underwriters Laboratories, Inc.

ADVERTISEMENT - A public announcement inviting proposals for work to be performed or materials to be furnished.

AWARD - The acceptance by the City of a proposal.

BASIS OF PAYMENT - The terms under which "work" is paid, as a designated pay item in accordance with the quantity measured and the pay unit.

BIDDER - Any individual, partnership, joint venture, firm or corporation submitting a proposal for the advertised work, acting directly or through a duly authorized representative.

CALENDAR DAY - Each and every day shown on the calendar, beginning and ending at midnight.

CERTIFIED INVOICE - An invoice from a supplier which has been reliably endorsed by the Contractor guaranteeing that the material was purchased and received for the project and establishing the value of the material.

CLAIM - A written demand or request for additional compensation or additional time submitted to the Engineer that:
Contains the words "This is a claim…", within its Subject line or the first paragraph
Cites the contractual basis for the demand or request
Relates the Contractual basis cited to factual events occurring or that have occurred within the project.

COMPLETION DATE - The date on which the contract work is specified to be completed

CONTRACT ITEM (PAY ITEM) - A specifically named unit of work for which a price is provided in the Contract. The description, whether general or detailed, the content of the named unit of work shall be as per the project plans and specifications.

CONTRACT CHANGE ORDER - A written order issued to the Contractor by the City covering extra work, additions or alterations to the plans and specifications, and establishing the basis of payment and time adjustment for the work affected by the changes. The Contract Change Order is the only method authorized for changing the Contract.

CONTRACT DOCUMENTS - The following comprise the Contract Documents: Advertisement for Bids, Information for and Instructions to Bidders, Bid Proposal and Bid Guarantee Bond, Construction Contract, Change Orders, Addenda, Performance Bond, Labor and Material Payment Bond, Special Conditions, General Conditions, Technical Specifications, Notice of Award, Notice to Proceed, Drawings, Plans, Standard Specifications and Certificate of insurability. All of these documents together constitute the **CONTRACT.**

CONTRACT TIME - The number of calendar days allowed for the entire completion of the Contract, including authorized time extensions and work required to be complete after substantial completion. Where a calendar date of completion is specified, the Contract shall be completed on or before that date.

CONTRACTOR - Party contracting directly with the City to furnish and perform all work and services in accordance with the Contract Documents.

COUNTY - The County in which the work is to be done.

DAY - Unless otherwise defined shall mean "calendar" day.

ENGINEER - The Director of Wastewater; or his designated representative.

EXTRA WORK - Work not provided for in the Contract as awarded but determined by the City to be essential to the satisfactory completion of the Contract within its intended scope.

FINAL ACCEPTANCE - The acknowledgment by the City that the project or the work has been completed in accordance with the Contract Documents and provides the date at which the warranty or guarantee period begins.

GENDER AND NUMBER - References are made as if masculine in gender and singular in number unless neuter gender is appropriate in the context; however, the use of any gender shall be applicable to all genders and the use of singular number shall include the plural and conversely.

INSPECTOR - A person, persons, or firm authorized by the Engineer to make detailed reviews, observations, reports and determinations of contract performance.

MAY - Used to refer to permissive actions.

METHOD OF MEASUREMENT - The manner in which a pay item is measured to conform with the pay unit.

NOTICE OF CLAIM - A written notification submitted to the Engineer that a demand or request for additional compensation or additional time may be made. The notification shall
Contain the words "notification of a potential claim" within its Subject line or the first paragraph
Describe the occurrence which is the reason that the Notice of Claim is being presented

NOTICE TO PROCEED - Written notice to the Contractor to proceed with the contract work including, when applicable, the date of beginning of contract time. Start of Construction, as defined below, may start at a later date.

PLANS - The drawings and pictures depicting the location and special orientation of the work to be done.

PROJECT - The work to be completed pursuant to this contract.

PROPOSAL - A standard form plus information supplied by the City, which contains spaces for completion by the Bidder which, when completed in its entirety and executed by the Bidder, along with all required additional documents, shall constitute the Bid. Said Bid shall constitute the Contractor's offer to perform all Work required as set forth in the Contract Documents for the amount of money stated in the Bid.

PROPOSAL FORM - The documents furnished by the City on which the offer of a bidder is submitted.

PROPOSAL GUARANTY - The security furnished with a proposal to Guaranty that the bidder will enter into the Contract if the proposal is accepted.

RIGHT OF WAY - A general term denoting land, property, or interest therein, acquired for or devoted to the construction of an improvement.

SALVABLE MATERIAL - Material that can be saved or salvaged. Unless otherwise designated or directed by the City or shown on the plans, all salvable material shall become the property of the Contractor.

SAMPLES - Samples are physical examples furnished or constructed by the Contractor to illustrate materials, equipment, workmanship or finishes, and to establish standards by which the Work will be judged.

SHALL - Refers to mandatory actions by either the Contractor or the City.

SHOP DRAWINGS - Drawings, diagrams, illustrations, certificates, test reports, schedules, performance charts, brochures, shop layouts, fabrication layouts, assembly layouts, foundation layouts, wiring and piping layouts, specifications and descriptive literature required by the Contract Documents which the Contractor is required to submit for approval.

START OF CONSTRUCTION – The date in which the Contractor begins physical work at the project site. Restrictions on start of construction are provided in the General Conditions and may be specified in the Special Conditions.

SUBCONTRACTOR - Party supplying labor and/or material for work at the site of the project for, and under separate contract or agreement with, the Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between the City and any subcontractor.

SUBSTANTIAL COMPLETION - The date when the work is sufficiently completed so it may be safely, conveniently, and beneficially utilized by the City for all of the purposes for which it was intended. Reduced liquidated damages are chargeable for a project or portions thereof which have separately specified damages, if there are items of work remaining to be performed relative to such work once full substantial completion status has been attained. In such cases the amount of liquidated damages due shall be twenty-five percent (25%) of the unreduced liquidated damage amount stated in the contract.

SUPERINTENDENT - The Contractor's authorized representative in charge of the Work.

WORK - The furnishing of all labor, materials, equipment, and all other incidentals necessary to the successful and acceptable completion of all obligations as described in the Contract Documents, and the carrying out of all of the duties and obligations imposed by the Contract.

4. CONTRACTOR'S UNDERSTANDING

It is understood and mutually agreed that by submitting a proposal, the Contractor acknowledges that he has carefully examined all documents pertaining to the Work, the locations, accessibility, and general character of the site of the Work and all existing buildings and structures within and adjacent to the site, and has satisfied himself as to the nature of the Work, the condition of existing buildings and structures, the conformation of the ground, subsurface conditions, the character, quality, and equipment, machinery, plant, and any other facilities needed preliminary to and during prosecution of the Work, the general and local conditions, the construction hazards, and all other matters, including but not limited to any labor situation which can in any way affect the Work under the Contract. It is further mutually agreed that by submitting a proposal, the Contractor acknowledges that he has satisfied himself as to the feasibility and correctness of the Contract Documents for the construction of the Work and that he accepts all the terms, conditions, and stipulations contained therein; and that he is prepared to work in peace and harmony with other Contractors performing work on the site.

No verbal agreement or conversation with any officer, agent, or employee of the City, either before or after the execution of the Contract, shall affect or modify any of the terms, conditions, or other obligations set forth in any of the Contract Documents.

The Contractor understands that, unless specifically stated otherwise in the contract documents, the intent of the contract documents is to provide complete and operable facilities. The Contractor's bid amount for this project, therefore, shall be and is considered to be for completion in conformity with this understanding, regardless of whether some aspect of the work to be performed is named as a separate bid item or not.

5. DEFECTIVE WORK

A City Representative, designated by the Director of Wastewater, shall give written notice of the noncompliance to the Contractor, when, and as often as the City Representative determines through his inspection that procedures, material, equipment or workmanship incorporated in the Project does not meet the requirements of the Contract. Within five (5) days from the receipt of such notice, the Contractor shall undertake the work necessary to correct such deficiencies, and to bring the work into compliance with the Contract Documents. Should the Contractor not agree with the City Representative's determination, and as a condition precedent to any request for either additional compensation or time extension, or both, resulting from the City Representative's determination, the Contractor shall within three (3) days provide a Notice of Claim to the Engineer that he may claim additional compensation, time or both, and detailed explanation of the Contractor's position. The Contractor shall document the costs associated with the corrective work with daily records and cost data and shall furnish such information to the Inspector daily. Receipt of cost data shall not be construed to be an acceptance of the corrective work, or an authorization for a Change Order to cover the corrective work. Failure by the Contractor to provide the specified written notice of an intention to make a claim shall be sufficient basis to reject any related claim subsequently submitted.

Prior to initial acceptance of the Project, the City may, at its option, retain work, which is not in compliance with the Contract if the City determines that such defective work is not of sufficient magnitude or importance to make the work dangerous or undesirable. The City also may retain defective work, if in the opinion of the Inspector, and with concurrence of the City Engineer, removal of such work is impractical or will create conditions, which are dangerous or undesirable. Just and reasonable value, for such defective work, shall be judged, by the Engineer and appropriate deductions shall be made in the payments due, or to become due to the Contractor. Initial acceptance shall not act as a waiver of the City's right to recover from the Contractor an amount representing the deduction for retention of defective work.

6. NOTICE AND SERVICE THEREOF

Where the manner of giving notice is not otherwise provided for in the Contract Documents, any notice to the Contractor from the City relative to any part of the Contract shall be in writing and considered delivered and the service thereof

shown, a modification of the schedule shall be requested in writing to and approved by the City. The schedule shall also:

Be updated at least once each 30 days and presented to the City as the current schedule.
Show work tasks progress in time periods of seven days or less unless otherwise approved by the Engineer.
Identify the critical path(s) for the work and task float.
Identify tasks corresponding to bid item descriptions when possible. Less comprehensive task designations may be used to comply with 2 above.
Conform to any time and location constraints identified in permits and the contract documents.
Span the current contract date to the end of the contract time.

The schedule format (size, color, type format) shall be such that the different tasks, durations, critical path and durations can be easily distinguished. The Contractor shall also provide a listing of tasks and durations with the schedule. If the schedule and list is being provided prior to a Notice to Proceed it need not include dates for start and completion of tasks. Any schedule and list provided after the Notice to Proceed has been issued shall include dates. A schedule and list shall be provided on the date of the Notice to Proceed. The Contractor shall begin work on the project site within 5 days of the Notice to Proceed, unless stated otherwise in specifications. Failure to do so is sufficient cause for termination in addition to other remedies the City may have.

Where the City's operations require specific sequencing of the work, such sequencing requirements as provided for in the Contract Documents shall be followed.
The Contractor shall provide the City with a list of emergency phone numbers, addresses, pager numbers, facsimile numbers, and electronic mail addresses for contacting key personnel in the case of any after-hours emergency.

The Contractor shall furnish the City with a schedule for hours of work. In it the Contractor shall note the begin work, begin daily clean-up and daily shutdown times to be followed by the Contractor during the project unless otherwise changed. The Contractors regular work hours on regular workdays shall be between 7:00 AM and 5:30 PM Monday thru Thursday and between 7:00 AM and 4:00 PM on Friday unless otherwise stated in the specifications. This work hours time frame shall be considered to include start-up of equipment and daily clean-up of the work area. Weekends and Holidays for the City of Sedona shall be considered non-regular work hours. Permission to work non-regular work hours shall be subject to approval of the Director. The Director may deduct $250 per day for work outside of approved work hours after issuance of one written warning during the course of the project.

8. ASSIGNMENTS

The Contractor shall not assign the whole or any part of the Contract or any monies due or to become due hereunder without the written consent of the City and of the Surety on the Contractor's Bond. A copy of such consent of Surety, together with a copy of the assignment, shall be filed with the City. If the Contractor assigns all or any part of any monies due or to become due under the contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims and liens of all persons, firms, and corporations for services rendered; for the payment of all materials and equipment furnished and for payment of all materials and equipment used or rented in the performance of the Work called for in the Contract; and for the payment of any liens, claims, or amounts due the Federal, State, or local government or any of their funds.

9. SUBCONTRACTING

Subcontractors will not be recognized as employees or agents of the City, nor as having any privity of contract with the City. All persons engaged in the work of construction will be considered by the City to be employees of the Contractor. The Contractor will be held responsible for their work and for all materials provided by them, which shall be subject to the provisions of the Contract.

Each subcontract shall contain a suitable provision for cancellation or termination thereof should the Subcontractor neglect or fail to conform to every provision of the contract.

Subcontractors collectively shall not perform more than fifty percent (50%) of the value of the total work required pursuant to the Contract Documents. The Contractor agrees that should this percentage be exceeded the City may consider the Contractor in breach of this contract and/or make deductions equal to one half of one percent of the total approved contract value for each one percent of subcontracted work beyond that allowed above. The Contractor shall perform fifty percent (50%) of the contract work using the Contractor's own organization as construed in ADOT Standard Specifications 2000 Section 108.01.

The City of Sedona encourages all contractors to utilize minority and women owned businesses whenever possible.

10. COOPERATION AND COLLATERAL WORK

In general, the Contractor shall be responsible for the scheduling and coordination of his work with any other work, which may be, carried on in the construction areas for this project by other parties or by the City simultaneously with his construction work. The contractor shall include in his bid any costs, which may be involved on his part as a result of coordinating his construction with such other activity.

When two or more Contractors are employed by the City in related or adjacent work, each shall conduct his operations in such manner as to not cause any delay or hindrance to the other and shall properly connect and coordinate the execution of their respective work with the other. The City will not be responsible for damage caused by such delays, and such delays will not entitle the contractor(s) to an extension of time. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work.

If the proper execution of any part of the Contractor's work depends upon the work of any other Contractor, the Contractor shall inspect and promptly report to the City Engineer any discrepancies between the executed work and the drawings or any defects in such work that render it unsuitable for such proper execution. The failure of the Contractor to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of his own work. The exception is for defects, which may develop in the other contractor's work, after the execution of the Contractor's collateral work that would not have been discovered before the Contractor's collateral work began.

The contractor shall coordinate his work, and cooperate with any other persons or entities operating on or adjacent to the site of the project.

Where persons employed by other persons or entities are engaged in or near the construction areas for this project, and where such work on the part of said parties results in a delay in performance by the Contractor, and where such delay, in the opinion of the City Engineer, is of such nature that it could not have reasonably been foreseen or anticipated by the Contractor in time for him to take steps to prevent same, then the Contractor shall be entitled to an extension of time.

The Contractor shall promptly make good any injury or damage caused by him that may be sustained by other Contractors or employees of the City. The

Contractor shall join his work to that of others and perform his work in proper sequence in relation to that of others.

11. DRAWINGS SHOWING CHANGES DURING CONSTRUCTION

Throughout the progress of construction, the Contractor shall maintain a careful up-to-date record of all changes on the plans and drawings during actual construction. *With each progress payment invoice the Contractor shall provide a "Status As-Built" showing all work completed to date.* Callouts will identify type, size and quantity of each item installed. The Contractor shall annotate all sewer taps stationing upstream to downstream using swing ties from adjacent manholes or other method the Engineer may approve in writing. Upon completion of Work, and prior to acceptance by the City, the Contractor shall file with the City one set of complete contract drawings with all changes and Contractor's field construction notes neatly and legibly recorded thereon. Such drawings shall include but not be limited to, the exact routing and clearances, if changed from drawing location, of sewer, water, gas, oxygen supply, condenser water lines, fuel oil tanks and lines, fire protection lines, and any other major buried utility lines and routing of buried electrical feeder lines and changes to routing of conduit runs which are buried or concealed in concrete slabs. The Contractor shall furnish such As-Built utility and drainage invert and rim elevations as well as gutter, top of curb shots and horizontal location of valves and hydrants placed as a part of this construction. This information is for use by the City in the preparation of record "As-Built" Drawings. Curb and gutter shots shall be spaced no further than 50 feet apart and shall include any significant bends, drops or other deviations from a straight horizontal or vertical alignment.

12. PAYMENT WITHHELD

The City may decline to certify payment on account of subsequently discovered evidence or observations, may nullify the whole or any part of any payment certificate previously issued to such extent as may be necessary to protect the City from loss on account of any one or more of the following:

Defective Work not remedied.

A reasonable doubt that the Contract can be completed for the balance then unpaid.

Unsatisfactory prosecution of the Work.

Not maintaining a current project schedule.

Not providing adequate progress payment "Status As-Builts".

Deductions for not conforming to daily clean-up requirements.

Deductions for reimbursement of City overtime inspection.

Liquidated damages payable by the Contractor.

In addition, the City reserves its rights under ARS Sections 32-1129.01 and 34-221I.

13. PROTECTION OF PERSONS

The Contractor shall:

At all times protect the lives and health of his employees under the Contract,
Take all necessary precautions for the safety of all persons on or in the vicinity of the Work site,
Comply with all applicable provisions of Federal, State, and Municipal safety laws and building codes, and
Comply with all pertinent provisions of the "Manual of Accident Prevention on Construction" issued by the Associated General Contractors of America, Inc., latest edition, to prevent accidents or injury to persons, on, or adjacent to the premises where the Work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of persons and shall post danger signs warning against the hazards created by such features of construction as protruding nails, rod hoists, well holes, elevator hatchways, scaffolding, window openings, stairways, and falling materials; and he shall designate a responsible member of his organization on the Work site whose duty shall be the prevention of accidents.

Contractor shall comply with all provisions of the "Occupational Safety and Health Act" (OSHA), including any amendments thereto and rules and regulations issued pursuant thereto, applicable to the Work and performance of the Contract. Whereas state in which Work is performed has passed legislation bearing on Occupational Safety and Health, such legislation and amendments thereto, together with rules and regulations issued pursuant thereto shall be complied with by the Contractor.

14. WARRANTY PERIOD

Besides guarantees required elsewhere, the Contractor shall and hereby does guarantee all work for a period of two years (731 days) after the date of final acceptance of the work by the City and shall repair and replace any and all work together with any other work, which may be displaced in so doing, that may prove

defective in workmanship or materials within the two-year period from the date of final acceptance, without expense whatsoever to the City, ordinary wear and tear and unusual abuse or neglect excepted. If the Contractor is required to repair or replace any portion of the Project pursuant to the two-year guarantee provided by this section, the repair or replacement shall similarly be guaranteed for an additional one-year period from the date of completion of the repair. In the event of failure to comply with the above mentioned conditions, within a week (seven consecutive days) after being notified in writing by the City, the City is hereby authorized to proceed to have the defects repaired and made good at the expense of the Contractor, who hereby agrees to pay the cost and charges therefore immediately upon demand by the City. In case of emergency, where, in the opinion of the City, delay could cause serious loss or damage, repairs may be made without notice being sent to the Contractor and the expenses in connection therewith shall be charged to the Contractor.

The Contractor guarantees to the City that all materials and equipment furnished under this Contract will be new and of good and sufficient quality, free from faults and defects as is necessary to complete the project as required by the plans and specifications.

15. CHARACTER OF WORKERS, METHODS, AND EQUIPMENT

The Contractor shall at all times employ sufficient skilled labor in accordance with Federal, State and local labor laws; and the proper equipment for completing the project in the manner and time required by the Contract. All equipment, which is proposed to be used on the project, shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the project shall be used such that it will not damage property adjacent to the work area.

Any person employed by the Contractor or any Subcontractor who, in the opinion of the Engineer, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed from the work by the Contractor or Subcontractor employing such person, and shall not be employed again in any portion of the work without the approval of the Engineer. Should the Contractor or Subcontractor fail to remove such person as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the work, the Engineer may suspend the work by written notice until such orders by the Engineer are followed by the Contractor. The Contractor or Subcontractor shall hold the City harmless from damages or claims for compensation that may occur in the enforcement of this section.

The City may require submittal of Certified Payrolls at any time from the Contractor showing the employee names, addresses, Social Security Numbers, rates of pay, payments received, payroll deductions, occupational classification(s),

and hours per day worked in such classification(s) for work performed on this project by employees. The contractor shall retain such records for the minimum time required by law or three years after project completion, whichever is longer. The Contractor shall also be responsible to produce upon request from the City such payroll records from its subcontractors.

TECHNICAL SPECIFICATIONS

PART 1 GENERAL

1.01 SUMMARY

A. Provide labor, tools, materials and equipment necessary to deliver a complete electrical, instrumentation and control system, tested and ready for continuous use as specified and as indicated on the Drawings. The contract documents include descriptions of functional operation and performance, as well as standards, but do not necessarily enumerate detailed specifications for all components and devices which are necessary. However, all components and devices are to be furnished and installed as required to provide complete and operable systems for accomplishing the described functions and meeting the performance requirements.

B. Scope of work includes:
   1. Provide submittals as specified herein.
   2. Verify, disconnect, test and tag existing electrical, instrumentation and control wiring associated with the existing control panel to be rebuilt.
   3. Remove existing interior control panel components and subpanel.
   4. Clean existing enclosure as specified herein.
   5. Install new subpanel assembly and miscellaneous components provided by others.
   6. Install new internal wiring to fully interconnect new miscellaneous components to subpanel assembly as indicated on the Drawings.
   7. Reconnect existing electrical, instrumentation and control wiring to fully interconnect and make operational all power and control systems as indicated on the Drawings.
   8. Verify that equipment is ready and safe before energizing.
   9. Verify power is provided at proper voltage and ampacity to all system components.
   10. Verify calibration of existing equipment and recalibrate if necessary.
   11. Provide testing and startup services and documentation associated as described and specified.
   12. Other miscellaneous equipment, materials, and work as necessary to achieve a fully tested and operational electrical, instrumentation and control system.

C. Products to be Installed But Not Supplied Under This Section:
   1. Subpanel assembly and miscellaneous components provided loose for field installation to rebuild the existing control panel as indicated on the Drawings.

D. Contractor to sign and comply with the City of Sedona Departmental Contract. The time for performance of the whole work including provision of completed record drawings and closeout documentation shall be completed by June 15, 2016. Owner stated liquidated damages shall be $75.00 per calendar day. Contractor shall notify Owner in writing a minimum of fourteen (14) calendar days in advance as to when the system will be ready for testing and startup services so that Owner can schedule Alfa Laval to be onsite for testing and startup services.

1.02 UNIT PRICES

A. Unit prices are to be established for the following items and be provided in the initial bid proposal in the event these are deemed necessary during the project:
   1. #16 AWG XHHW-2 Stranded Copper (Owner will provide to Contractor for installation)
   2. #14 AWG XHHW-2 Stranded Copper (Owner will provide to Contractor for installation)
   3. #12 AWG XHHW-2 Stranded Copper (Owner will provide to Contractor for installation)
   4. #10 AWG XHHW-2 Stranded Copper
   5. #8 AWG XHHW-2 Stranded Copper
   6. #6 AWG XHHW-2 Stranded Copper
   7. #4 AWG XHHW-2 Stranded Copper

8. #2 AWG XHHW-2 Stranded Copper
9. #1 AWG XHHW-2 Stranded Copper
10. #1/0 AWG XHHW-2 Stranded Copper
11. #2/0 AWG XHHW-2 Stranded Copper
12. #3/0 AWG XHHW-2 Stranded Copper
13. #4/0 AWG XHHW-2 Stranded Copper
14. #16 AWG TWSH Type TC
15. 3/4" PVC Coated Rigid Metal Conduit
16. 1" PVC Coated Rigid Metal Conduit
17. 1-1/2" PVC Coated Rigid Metal Conduit
18. 2" PVC Coated Rigid Metal Conduit
19. 3" PVC Coated Rigid Metal Conduit

B. Contractor to provide a supplier's cost list in the initial bid proposal for the aforementioned items and state their markup on the cost list price. The Owner reserves the right to reject a proposal based upon excessive markup.

1.03 DEFINITIONS

A. The term "Provide" means "Furnish and Install".

1.04 SYSTEM DESCRIPTION

A. If contradictions, contrasts, or inconsistency appears, the strictest criteria noted and the collective requirements in the project documents are to apply. Contractor shall notify Owner of contradictions, contrasts, or inconsistencies in writing, immediately upon becoming aware of the issue. The Contractor has the responsibility to check planned work area conditions prior to installing, repairing, cleaning, removal, startup and shutdown activities to see if issues are evident or may eventuate.

B. Provide functional systems in compliance with manufacturer's instructions, performance requirements specified or as indicated on the Drawings, and modifications resulting from reviewed shop drawings, field coordinated drawings and startup/testing services.

C. The electrical, instrumentation and control systems are to be furnished and installed complete and ready to operate, including all necessary interconnections and connections, with all required accessories as specified or as indicated on the Drawings, or as recommended for safe and best operation by the manufacturer of the equipment furnished.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Electrical, instrumentation and control work to be performed in accordance with the latest published regulations, codes, and standards, of the following:
      a. National Electrical Code (NEC)
      b. State and local codes
      c. Institute of Electrical and Electronic Engineers (IEEE)
      d. American National Standards Institute (ANSI)
      e. American Society for Testing and Materials (ASTM)
      f. Insulated Cable Engineers Association (ICEA)
      g. National Electrical Manufacturers Association (NEMA) Standards
      h. Federal Occupational Safety and Health Act (OSHA)
      i. National Fire Protection Association (NFPA)
      j. National Electrical Testing Association (NETA)

B. In case of conflict or disagreement between codes, standards, laws, ordinances, rules, regulations, drawings and specifications, or within either document itself, the more stringent condition shall govern.

C. Qualifications:
   1. Contractor performing the work is to have a minimum of ten (10) years of experience performing similar work in similar industries. Project Superintendent to have a minimum of seven (7) years of experience with similar installations within the last ten (10) years. Project Superintendent shall have not been terminated for performance of duties within the last five (5) years. All contractors' personnel are to be trained and experienced in best current construction practices.

1.06 SUBMITTALS

A. Intent:
   1. Work is to be organized so that a complete electrical, instrumentation and control system for the facility will be provided and will be supported by accurate shop drawings, record drawings and closeout documentation. Submit detailed and organized shop drawings and manufacturers data for all materials, components and equipment to be supplied for this project prior to purchase, fabrication of equipment and installation. Electronic submittals are acceptable and preferred. Submit detailed and organized preliminary and final closeout documentation. Electronic submittals are acceptable for preliminary closeout documentation. Submit one (1) hard copy and two (2) electronic copies of the final closeout documentation.
   2. Submittals are to be neatly grouped and organized. Related information is to be annotated and/or highlighted, and the specific product is to be marked. Submittals are to be complete, and presented in one package. Incomplete submittals will be returned without review. If a portion of the project requires a fast track schedule, that portion only may be submitted earlier under a separate cover letter.
   3. Work performed or equipment provided without engineer reviewed submittals is done at contractor's risk. Cost to re-work or re-supply will be born solely by the contractor.
   4. Submittals for this project will be reviewed and returned to the Contractor within five (5) to ten (10) working days. Contractor may request submittals to be reviewed up to two times for each specific submittal. For additional submittal reviews, Contractor shall reimburse Owner for additional labor incurred at an hourly rate of three times the direct labor cost, but not less than $150.00 per hour. If seventy-five percent (75%) of submittals are not complete upon first review then Contractor shall reimburse Owner at the hourly rate noted above for all second reviews beyond twenty-five percent (25%) of submittals.

B. Product Data:
   1. Provide manufacturer's information on products to be used, including the manufacturer's name, product specification, descriptive data, electrical data, technical literature, performance charts, catalog cuts, equipment dimensions and installation instructions where applicable. The above are to clearly show compliance with the specified requirements as described herein and as indicated on the Drawings, including but not limited to specific UL and NEMA rating and technical capabilities.
   2. When general data sheets are provided as part of the submittal, specifically identify the products to be used on this Project.

C. Schedule:
   1. Submit a detailed work schedule showing work to be performed, proposed shutdown of existing equipment and systems, sequence of work, major milestones and staff loading. Identify start/finish dates, task durations, task sequencing, required preceding activities, critical path, operational impacts, and coordination with other trades. An updated work schedule covering the current week plus the next two (2) future weeks shall be provided to the Owner each week. Contractor proposed plans for shutdown of existing equipment and systems and testing and startup services shall be provided to Owner a minimum of fourteen (14) calendar days prior to the event. The event shall not start for one (1) week minimum after Owner approval of the plans, unless approved by the Owner, at its sole discretion.

D. Startup/Testing Plan:
   1. Submit a detailed startup/testing plan for review/comment by Engineer and Owner. Plan should include the following information, as a minimum:
      a. Order in which the various facility systems will be started up and tested.
      b. Work that is to be performed prior to the startup.
      c. Documentation to be maintained by the contractor and provided to the Engineer and Owner validating that the startup/testing was performed in a complete, safe and efficient manner.

E. Closeout Submittals:
   1. Contractor to document changes or revisions that deviate from the original plans. Maintain a marked up neat, legible, and intelligible set of these original plans onsite during construction. Include final conductor identification for the electrical, instrumentation and control wiring on the marked up plans. Provide the marked up plans to the Engineer and Owner for review/comment and incorporation into the record drawings for this project. Contractor to address comments provided by the Engineer and Owner and resubmit the marked up plans for final review. This will provide the Owner with comprehensive information on systems and components to enable operation, service, maintenance and repair.
   2. Calibration, testing and startup result verifications, reports and acceptance.

1.07 STORAGE, PROTECTION, UNPACKING AND HANDLING

A. New subpanel assembly and miscellaneous components provided by others are to remain sealed as originally shipped until equipment is ready for installation. Contractor shall verify equipment is free of dirt, dust, water, grease, rust, damaged parts or components.

B. Store and protect new subpanel assembly and miscellaneous components provided by others as recommended by manufacturer. Protect from physical damage, moisture, dirt/dust, or extremes of temperature. Repair, restore or replace damaged, corroded and rejected items due to improper storage and protection at no additional cost to the Owner.

C. Ensure that equipment is not used as steps, ladders, scaffolds, platforms, or for storage-either inside or on top of enclosures.

D. Unpacking, handling and installing new subpanel assembly and miscellaneous components provided by others is to be performed in a manner which assures materials and equipment will not be damaged during these activities. Contractor to replace any material or equipment damaged due to improper unpacking, handling and installation at no additional cost to Owner.

1.08 PROJECT/SITE CONDITIONS

A. Visit the facility prior to bidding to become familiar with existing conditions and other factors, which may affect the execution of the work. Include all related costs including general conditions in the initial bid proposal. A mandatory pre-bid site meeting will be held at the facility and attendance is required to be a qualified bidder. The date and time for the mandatory pre-bid site meeting will be stated in the invitation to bid.

B. Verify site conditions before bidding or performing work.

C. Follow any and all environmental requirements pertaining to the site.

D. Examine the site and be thoroughly familiar with any site requirements and existing conditions which may affect the work or storage of materials and equipment.

E. Maintain a safe and clean job site.

1.09 SEQUENCING

A. Coordinate all work with other trades and other onsite work.

B. Contractor shall notify Owner in writing a minimum of fourteen (14) calendar days in advance as to when the system will be ready for testing and startup services so that Owner can schedule Alfa Laval to be onsite for testing and startup services.

1.10 SCHEDULING

A. Provide and maintain a detailed schedule for performance of the work. Indicate work to be performed, proposed shutdown of existing equipment and systems, sequence of work, major milestones and staff loading. Identify start/finish dates, task durations, task sequencing, required preceding activities, critical path, operational impacts, and coordination with other trades. Organize procurement, deliveries, and staff labor to perform the work in the time required by the schedule.

1.11 CALIBRATION OF EXISTING EQUIPMENT

A. Verify calibration of existing equipment and recalibrate if necessary. Submit calibration sheets containing the following information, as a minimum:
   1. Equipment or instrument tag number.
   2. Equipment or instrument manufacturer and model number.
   3. Person who performed the calibration.
   4. Manufacturer, model and serial number of the calibrating device.
   5. Date that calibrating device was last calibrated.
   6. Detailed calibration information and documentation.
   7. For analog instruments, process range and associated analog signal in at least 5 increments (For example: 4.00 maDC/0 psig, 8.00 maDC/25 psig, 12.00 maDC/50 psig, 16.00 maDC/75 psig, 20.00 maDC/100 psig).
   8. For switches, process values at which the switch changes state and at which the switch resets.

1.12 SYSTEM STARTUP/TESTING

A. After installation, testing and startup of electrical, instrumentation and control equipment and systems, energize equipment and leave ready for continuous operation.

B. General:
   1. Provide labor, tools, equipment, and accessories to perform startup/testing of the facility in a safe and efficient manner.
   2. Facility is to be started up by system as applicable to this project. A system is defined as a collection of mechanical, electrical, instrumentation and controls equipment configured to perform a specific function or purpose. Examples may be a UV disinfection system, a dissolved oxygen blower system, a grit removal system, etc.... The order in which the systems will be started is to be submitted by contractor in the startup/testing plan and accepted by Engineer and Owner. Any variance in this schedule is to be accepted by Engineer and Owner.
   3. Unless accepted otherwise by Engineer and Owner, follow the recommended startup sequence detailed below. The following work is to be complete prior to beginning the startup:
      a. All mechanical equipment installed and tested in accordance with manufacturers recommendations.
      b. All motors have been rotation checked.
      c. Electrical power is available and wired to all mechanical equipment.
      d. All equipment and instruments have been calibrated and installed in accordance with the manufacturer's recommendations.
      e. Control system communication systems are installed and fully operational. This includes DH+ networks, Modbus+ networks, Ethernet networks, radio telemetry systems, telephone systems, etc.... as applicable to this project.
      f. All power, instrumentation and control wiring is installed, labeled (both ends), rung out, tested, and validated to be in accordance with the contract documents.
      g. Programmable logic controllers, SCADA computers, Operator Interface Terminals, etc.... are installed, have their programs installed, and these devices are fully operational and functioning in their design configuration. Programming for this project is to be performed by Alfa Laval.

C. Recommended System Startup Sequence:
   1. By manipulation of the instrument or direct signal injection at the instrument, verify that the control signal (discrete or analog) is received at the programmable logic controller or by the hard wired control circuit.
   2. For motorized equipment, disconnect the power leads at the starter, VFD, or solid state motor controller.
   3. Completely exercise the control circuit in Local, Manual, Remote, and Automatic modes and verify that all interlocks and permissives are functioning correctly.
   4. Verify that the programmable logic controller can start and stop the motor in Auto or Remote. Motors may be "bumped" by forcing PLC outputs but these program forces are to be removed immediately afterward.
   5. Verify that run status, signal levels, and alarms display properly on the OIT and the SCADA screens.
   6. Reconnect the motor power leads.
   7. Verify PID loop operating correctly (either direct or reverse) and adjust gain constants to achieve critically damped operation.
   8. Configure the mechanical system for normal operation and leave system ready for normal operation.
   9. Utilize colored tagging scheme to identify startup condition. Red is not ready for startup, yellow is mechanically and electrically ready but not yet tested or started up, and green is fully tested and ready for normal operation. Place these tags on all mechanical, electrical, instrumentation, and control components of each system.
   10. As facility systems are started up, coordinate and remedy any coordination or interface issues between systems.

D. Remedies for Damages:
   1. Repair or replace mechanical or electrical equipment damaged due to improper startup procedures without additional cost to owner.
   2. Jumpers are not to be installed around any process or safety interlock either with wiring or within a PLC program without the express written permission of both the Engineer and Owner. All jumpers, hardwired and programmed, are to be maintained in a log book. Entries are to include:
      a. Name of person placing the jumper.
      b. Date of installation.
      c. Reason for installation.
      d. Acceptance of Engineer and Owner.
      e. Date of removal.
      f. Name of person removing the jumper.

1.13 WARRANTY

A. Installation and non-City supplied equipment shall be warrantied for 731 days after acceptance of as-constructed drawings. Said acceptance shall be stated in writing by Owner. Warranty repairs shall be warrantied for 731 days upon completion of warranty work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers and model numbers indicated on Drawings or listed in the specifications are intended to establish a minimum standard of quality and acceptability.

2.02 MATERIALS

A. All materials to be new and of the best quality, manufactured in accordance with the latest revision of NEMA, ANSI, UL, or other applicable standards. The use of manufacturers' names, models, and numbers is intended to establish style, quality, appearance, usefulness, and bid price.

B. Miscellaneous Metal, Mounting Channels, Accessories and Hardware:
   1. Miscellaneous Metal:
      a. Type 316 stainless steel, unless otherwise indicated on the Drawings.
   2. Mounting Channels:
      a. 1-5/8" by 1-5/8", Type 316 stainless steel as manufactured by Unistrut, or equal.
   3. Accessories:
      a. Parts and brackets for assembly of channels shall be Type 316 stainless steel as manufactured by Unistrut, or equal.
   4. Hardware:
      a. Screws, bolts, washers and nuts shall be Type 316 stainless steel.

C. Nameplates:
   1. Laminated sheet plastic, approximately 1/16" thick, engraved black letters on white background, adhesive backing and mounting screw holes. Minimum height of letters, 5/16".

D. Wire and Cable Markers:
   1. Machine printed, heat shrink sleeve types, manufactured by W.H. Brady Company, or equal.

E. Wire Terminations:
   1. Insulated ferruled connectors attached with manufacturer's recommended tool, manufactured by Phoenix Contact – Clipline, Thomas & Betts, Weidmuller, or equal.

F. Wire, Cable, Splices, Terminations and Pulling Lubricant:
   1. Internal Control Panel Interconnection Wiring:
      a. Internal control panel interconnection wiring to be provided is to comply with the requirements of the subpanel assembly manufacturer/fabricator.
   2. External Power, Control and Alarm Interconnection Wiring:
      a. External power, control, and alarm interconnection wiring of 480 volts or less shall be rated for 600 volts and be listed by UL as Type XHHW-2. Wire sizes shall be American Wire Gauge (AWG) sizes with Class B stranded construction. Wires shall be new and be soft drawn copper with not less than 97 percent conductivity. The wire and cable shall have size, grade of insulation, voltage, and manufacturer's name permanently marked on the outer covering at not more than 2-foot intervals. Wires shall conform to the latest Standards of the ASTM, and ICEA, and shall be tested for their full length by these Standards. Insulation thickness shall be no less than that specified by the National Electrical Code. Number 2 AWG and smaller shall be factory color coded with a separate color for each phase and neutral, which shall be used consistently throughout the system. Larger cables shall be coded by the use of colored tape. Where wire size is not indicated, they shall be of the size required by the NEC, except that no power wire external to panels shall be less than No. 12 AWG, and no control and alarm wire external to panels shall be less than No. 14 AWG, unless specifically noted on the Drawings.
      b. Acceptable Manufacturers: Okonite Company, Encore Wire Corporation, Southwire Company, Service Wire Company, General Cable, or equal.
   3. External Instrumentation Class Cable:
      a. External instrumentation class cable for process signal and controls shall be Type TC, and have the number of individually shielded twisted pairs indicated on the Drawings and shall be insulated for not less than 600 volts. Unless otherwise indicated, conductor size shall be No. 16 AWG minimum. Wire conductor colors shall be black (-neg) and red (+pos), unless indicated otherwise. Shielded, grounded instrumentation cable shall be used for analog signals.
      b. Acceptable Manufacturers: Belden, Okonite, or equal.
   4. Splices and Terminations:
      a. Cable shall be rated 600 volts. Other parts of cable systems such as splices and terminations shall be rated at not less than 600 volts.
      b. Splices in wires No. 10 AWG and smaller may be made with preinsulated spring connectors.
      c. Splices in wires No. 8 AWG and larger shall be made with compression type copper splice fittings. Splices shall be taped and covered with materials recommended by the cable manufacturers, to provide insulation equal to that on the conductors.
      d. Insulated conductor splices below grade or in wet locations shall be waterproofed. Compression type splices shall be waterproofed by a sealant-filled, thick wall, heat shrinkable, thermosetting tubing or by pouring a thermosetting resin into a mold that surrounds the joined conductor.
      e. Bare conductor splices in wet locations or below grade shall be of the exothermic type.
   5. Pulling Lubricant:
      a. Cables shall be properly coated with pulling compound such as ClearGluide, Aqua Gel, Polywater, or equal before being pulled into conduits so as to prevent mechanical damage to the cables during installation. "Yellow 77" is not acceptable.

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS

A. Contractors having a minimum ten (10) years of experience in the design, procurement, and construction of industrial water/wastewater electrical, instrumentation and control systems.

B. Contractor for this project is to be licensed in Arizona and have been in business in (and is still located in) Arizona for a minimum of ten (10) years. Contractor is to have installed and connected a minimum of fifty (50) control panels for wastewater treatment facilities located in Arizona that were supported by shop drawings/submittals, record drawings and closeout documentation. Contractor is to have performed systems integration, instrumentation calibrations, and start-up/testing services for a minimum of twenty (20) wastewater treatment facility projects located in Arizona. If requested by Engineer and/or Owner, Contractor is to be prepared to provide supporting documentation to confirm the above noted and a drawing package from a recent panel which Contractor had installed and connected to the Engineer and Owner for review along with a minimum of five (5) local references. Contractor shall provide within three (3) working days such supporting documentation upon Owners written request.

3.02 EXAMINATION

A. Site Verification of Conditions:
   1. Visit job site and ascertain any environmental or physical conditions which may affect the performance of the work or the equipment requirements.

3.03 INSTALLATION

A. The completed installation to comply with latest revision of applicable federal, state, and local codes, ordinances, and regulations. The contractor to obtain necessary permits and inspections required by the authorities having jurisdiction. All work to be completed in a neat, workmanlike, finished and safe manner in accordance with the latest NECA Standards of installation under competent supervision. Install grounding per NEC.

B. Coordinate the work with other trades.

C. Install equipment in accordance with the manufacturers' instructions and requirements.

D. Install equipment so it is readily accessible for operation and maintenance.

E. Equipment is not to be blocked or concealed.

F. Do not install electrical equipment such that it interferes with normal maintenance requirements of other equipment.

G. Equipment is to be installed plumb, square and true with the building construction, and be securely fastened.

H. Verify that equipment will fit layouts as indicated on the drawings.

I. Screen or seal openings into equipment to prevent the entrance of rodents and insects.

J. Provide necessary anchoring devices, supports and hardware. Use supports as specified and as indicated on the Drawings. Where not indicated on the Drawings or specified, use supports and anchoring devices rated for the equipment load and as recommended by the manufacturer. Supporting and mounting channels, associated accessories and hardware are to be Type 316 stainless steel. Do not cut, or weld to, building structural members.

K. Field verify exact location and dimensions for installation of subpanel assembly and miscellaneous components furnished by others. Proceeding without proper information may require the Contractor to remove and replace work that does not meet the conditions imposed by the equipment supplied. Do not endanger the stability of any structural member by cutting, drilling, etc.... Provide additional reinforcing if required. Use proper tools and methods to cut or make other penetrations.

L. Discrepancies indicated on different Plans, between Plans and actual field conditions, or between Plans and Contract Documents are to be promptly brought to the attention of the Engineer and Owner for clarification, prior to installing equipment.

M. Provide parts and pieces necessary for installation of the equipment, in accordance with the best practice of the trade, and in conformance with the requirements of the Contract Documents.

N. Items not specifically mentioned in the Contract Documents, or noted on the Plans, or as indicated on Drawings, but which are necessary to make a complete working installation, are to be deemed to be included herein.

O. Wherever dissimilar metals, except conduit and conduit fittings, come in contact, the Contractor is to isolate these metals, as required, with neoprene washers, 9 mil polyethylene tape, or gaskets.

P. Provide electrical danger, caution, warning or safety instruction signs in accordance with applicable safety standards.

Q. Install nameplates as specified and as indicated on the Drawings. Drill and tap holes and secure nameplates with Type 316 stainless steel screws, nuts and cap nuts.

R. Install subpanel assembly and miscellaneous components provided loose in accordance with the requirements and recommendations of the manufacturer/fabricator of the subpanel assembly and all applicable electrical codes and standards.

S. Run all conductors within control panels in plastic wiring ducts as indicated on Drawings as "Customer Only" or neatly bundle where not possible to run in wiring duct.

T. As far as practical, wiring shall be continuous from origin to termination without splices. Sufficient slack shall be left at the termination to make proper connections. In no case is a splice to be pulled into the conduit. Conductor splicing is not permitted without the Engineer's acceptance.

U. Feeder and branch circuits shall be isolated from each other, and from instrumentation and control circuits.

V. Maintain electrical continuity of the shield when splicing twisted shielded pair conductors. Drain wires shall be terminated inside enclosures at grounded terminal blocks. Only one end of each instrument loop cable drain wire shall be grounded. Ground drain wire of shielded conductors at one end only. The shield and/or drain wire shall only be grounded within the PLC enclosure.

W. Terminate power wiring as indicated on Drawings. Terminate instrumentation and control wiring on terminal boards mounted inside control panels as indicated on Drawings. Do not terminate field wiring directly to devices. Cap, tag and neatly coil and secure spare conductors within control panels.

X. Identify all electrical, instrumentation and control wires and cables at each end with machine printed, heat shrink sleeve type wire markers. Conductor identification to be included on wire markers is to be coordinated with the Engineer and Owner prior to printing and installing. Include final conductor identification for the electrical, instrumentation and control wiring on the marked up plans to be submitted with the closeout documentation.

Y. Terminate all field and internal component wiring using insulated ferruled connectors attached with manufacturer's recommended tool. Excessive stripping of the wire so as to allow bare wire outside the insulated ferrule is not permitted. Utilize insulated double ferruled connectors wherever two wires terminate on the same terminal block connection.

Z. Duct sealing compound is to be installed in existing conduit openings associated with this project.

3.04 REPAIR/RESTORATION

A. Repair damage caused by construction or demolition work to restore damaged areas to original condition.

B. Factory finishes damaged during construction, are to be restored to original new condition. Rust is to be removed, and bare metal surfaces are to be primed and painted to match the original surrounding finish.

C. Repair any damages caused by the installation or erection to original condition.

3.05 FIELD QUALITY CONTROL

A. Visually compare the conductor connections with connection diagrams. Perform individual circuit continuity checks using electrical circuit testers.

B. Test each electrical, instrumentation and control circuit to demonstrate that the circuit and connected equipment perform satisfactorily and that they are free from improper grounds and short circuits.

C. Verify, disconnect, test and tag existing electrical, instrumentation and control wiring associated with the existing control panel to be rebuilt.

D. Individually test 600V rated cables for insulation resistance between phases and from each phase to ground. Test cables prior to termination and before they are put into service with a megger whose rating is suitable for the tested circuit.

E. Test shielded instrumentation cable shields with an ohmmeter for continuity along the full length of the cable and for shield continuity to ground.

F. Connect shielded instrumentation cables to a calibrated 4 to 20 mADC signal transmitter and receiver. Test at 4, 8, 12, 16 and 20 milliamp transmitter settings.

G. Individually test 600 volt cable mechanical connections after installation and before they are put in service with a calibrated torque wrench. Values shall be in accordance with manufacturers' recommendations.

H. Test grounded and metal parts for continuity of connection.

I. Test and calibrate equipment in accordance with other parts of this document.

J. Testing is to be conducted in the presence of Engineer and/or Owner. Test results shall be documented and provided with closeout submittals.

K. After installation, test electrical equipment and systems in accordance with other parts of this document.

L. Verify systems coordination and operation.

3.06 ADJUSTING

A. Calibrate and set adjustable electrical equipment including circuit breakers, motor circuit protectors, and overload relays.

3.07 CLEANING

A. Thoroughly vacuum, clean and wipe down the interior of enclosures to remove dirt and debris after demolition of existing equipment and components and prior to installation of new equipment and components.

B. Relays, starters, circuit breakers, switches, contacts, insulators, mechanisms, buses, etc.... are to be free of dust, dirt, oil, moisture, metal shavings, and other debris before testing and energizing equipment. Vacuum and wipe down inside and outside of electrical enclosures and control panels.

C. Clean dirt and debris from surfaces.

D. Apply touch-up paint as required to repair scratches, etc.

E. Replace nameplates damaged during installation.

F. Remove and dispose of construction debris daily. Wipe down and vacuum out all enclosures.

G. Leave the facility clean. Remove all debris, empty cartons, tools, conduit, wire scraps and all miscellaneous spare equipment and materials used in the work during construction. All components to be free of dust, grit and foreign materials, left as new before final acceptance of the work. Damaged paint and finishes to be touched up or repainted with matching color paint and finish.

3.08 DEMONSTRATION

A. Demonstrate equipment in accordance with other parts of this document.

B. Demonstrate proper operation of the energized electrical and mechanical devices. Correct any wiring deficiencies.

C. The PLC program and I/O shall be thoroughly tested. Each input and output signal shall be tested for correct indication and control function. Demonstrate operation of the PLC control logic with simulated inputs, before the entire system is started, and run in automatic mode.

D. Provide personnel, tools, equipment, and accessories to fully test, debug, and startup the facility and associated components. Specifically, validate that each I/O point is properly terminated and wired to the correct PLC card and channel within the control panel. Validate that all I/O is properly addressed and represented within the PLC and OIT. Validate that all PLC programming functions as intended. Validate that all OIT and SCADA programming functions as intended. Validate that all communication paths including radio and hard-wired function as intended. Demonstrate to Engineer and Owner that these requirements have been met.

3.09 PROTECTION

A. Protect electrical, instrumentation and control material and equipment installed against damage by other trades, weather conditions, or any other preventable causes. Equipment damaged during construction, prior to acceptance by the Engineer or the Owner, will be rejected as defective.

END OF SECTION

MEMO

TO: City of Sedona **DATE:** December 9, 2015

FROM: Stanley Consultants, Inc.

SUBJECT: Alfa Laval Decanter Centrifuge Control Panel LCP-1180 Upgrade
Submittal Package – 10/09/15

Stanley Consultants has reviewed the Alfa Laval Submittal Package dated 10/09/15 along with the Alfa Laval responses to Stanley's original comments (both attached to this memo) and find the design to be acceptable for fabrication and installation. Minor revisions to the design documents as noted in the comment responses can be made as part of the "As Built" revisions to the documents after the installation has been completed.

MEMO

TO: City of Sedona **DATE:** November 6, 2015

FROM: Stanley Consultants, Inc.

SUBJECT: Alfa Laval Decanter Centrifuge Control Panel LCP-1180 Upgrade
Submittal Package – 10/09/15

Stanley Consultants has reviewed the Alfa Laval Submittal Package and has the following review comments and questions:

SEDONA LCP-1180 STARTER PANEL DRAWINGS 8733636:

1. Sheet 3 – Please explain the design philosophy behind the use of the DC bus tie between the two VFD drives as opposed to using separate AC power feeds to each.
2. Sheet 3 – Please explain the reason for using the DC bus as the power source for the two panel internal 24V power supplies.
3. Sheet 3 – The previous drawings for the old panel showed a thermal protection switch in the main drive motor windings rather than the thermistors shown on the new drawings. Were the previous drawings incorrect?
4. Sheet 5 – The second thermistor relay should be labeled as Back Drive rather than Main Drive.
5. Sheet 5 – Does the Ethernet connection to LCP-1181 allow communication between the two PLC's? If so is there any configuration or programming work required on that PLC?
6. Sheet 8 – The sludge feed control remote setpoint was not in the previous panel design. Where does this signal originate and is it only active when the panel is in the Remote Mode?
7. Sheet 9 – There is no description included for the analog control functions. Does the "Sludge Feed Speed Control" output control the pump speed or a control valve position?
8. Sheet 9 – For the sludge feed and polymer feed pumps, are there similar control outputs for the second set of pumps coming from LCP-1181? If so are they active only when the #2 pump is selected and the LCP-1180/LCP-1181 selector switch is in the LCP-1181 position?
9. Sheet 11 – No feedback signals are available for the #2 Grinder or Polymer pumps. Are the alarms for these developed in LCP-1181 and if so are they available over the communications link for control action in this panel?
10. Sheet 12 – The digital input labeled "Conveyor Sludge Pump Select" seems to come from a selector switch contact that is already being used on sheet 6.
11. Sheet 14 – The previous panel drawings showed Forward and Reverse control outputs for the conveyor. Has the reversing feature been changed?
12. Sheet 15 – The previous panel drawings showed separate Start (NO) and Stop (NC) contacts for the Grinder. Are they required?

13. Page 10 – The sequence chart shows Conveyor Forward and Reverse steps but the panel design only lists Conveyor Start and Stop functions.
14. Page 15 – Power Factor correction steps are not applicable for this Decanter.
15. Page 17 – In CIP steps 1 and 2, the forward and reverse timer descriptions are opposite from those on the sequence chart on page 12.
16. Page 18 – There are no control outputs associated with the Lube System or the Grease System on this decanter, however, there is a control output for the Solids Conveyor Flush Water Valve.
17. Page 20 – The panel drawings show selection of the polymer pump #1 is made from a selector switch rather than the DLM. Can it be made from either device?
18. Page 21 – The method of selecting the equipment control locations should be clarified. The panel drawings indicate that the "LCP-1180/LCP-1181" selector switch only changes the control location for the sludge feed pumps and conveyor. They also show a separate "Remote" selector switch (on Sh. 12) located on panel LCP-1130 to change the grinder control location and they show a selector switch for "Grinder #1/Grinder #2" in addition to the DLM.
19. Page 23 – Under the Conditions for Close Diverter Gate it should read Diverter Gate Disabled rather than Enabled.
20. Page 26 – The panel drawings do not show any inputs for Conveyor Pull Cord Alarms. Are they combined with the Conveyor Fault input?
21. Page 27 – The pump selection function should mention the "LCP-1180/LCP-1181_selector switch.
22. Page 27 – There is no discussion of the analog control of feedrate. The panel drawings show an input for "Remote Feedrate Setpoint". Is this signal only used when the Remote Mode is selected on the device screen? Is there a capability to enter a local setpoint when in the Local mode?
23. Page 28 – The panel drawings show a Polymer #1/Polymer #2 selector switch. Can the pump selection be made from either this switch or the device screen? Since there is only a control output for pump #1 from this panel, when pump #2 is selected does the control output come from LCP-1181?
24. Page 28 – The analog control of polymer feed rate is not discussed. Is there a capability for manual input of a setpoint or is the polymer federate setpoint derived from the sludge feed rate?
25. Page 40 – Power factor correction capacitors are not used for this decanter.
26. Page 41 – Under the Type I shutdown description is describes ramping down the drive motor using the VFD after the main contactor has been shutoff. The panel drawings show that the contactor will immediately cut off power to the motor and will not allow a ramp down from the VFD.
27. Page 44 – Under the Conditions to Activate Alarm, a Profibus connection is mentioned. Is this the same as the fiber optic communication loop?
28. Page 47 – The motor contactor M528 also provides a hardwired "enable" signal which could be a condition for alarm activation.
29. Page 51 – The motor contactor M532 also provides a hardwired "enable" signal similar to the main drive.
30. Page 53 – The fault description mentions the high speed counter input to the PLC. Can the pulse encoder module on the VFD also generate an alarm?
31. Page 57 – The operator actions sections mentions running a CIP operation prior to restarting the decanter but the CIP requires the decanter to be running.

32. Page 59 – The operator actions section mentions checking the active torque level vs. the controller torque level. What do these refer to and can this be done with the drive shut down? Also please define the differential setting.
33. Page 61 – No inputs are shown on the panel drawings for bearing oil flow.
34. Page 62 – The Alarm Description refers to the differential speed between the decanter bowl and the conveyor, however, there is no input for conveyor speed. Please define this differential speed.
35. Page 65 – The operator actions section mentions sludge feed pump VFD's. Are these pumps VFD controlled? The panel drawings show feedback from a sludge feedrate control valve.
36. Page 66 – Since only polymer pump #1 is controlled from this panel will alarms for pump #2 show on this panel or only on panel LCP-1181?
37. Page 70 – No separate inputs are provided for conveyor pull cord switches. Can this alarm be distinguished from the conveyor fault alarm?
38. Page 71 – No inputs for Grinder #2 are available from this panel. Will alarms for Grinder #2 show up on this panel or only on LCP-1181.
39. Page 73 – Power factor correction is not applicable to this decanter.

Response to Sedona Submittal Comments from Stanley Consultants, INC dated 11/6/15

Sedona LCP-1180 Starter Panel Drawings 8733636

1. Tying the DC bus together allows us to provide what we refer to as "power loss ride-through." If power is loss during centrifuge operation, the rotating mass of the centrifuge bowl provides regenerating power, which keeps the main drive vfd powered up for some period of time. Since the back drive is powered through the DC bus link, it too stays powered up, allowing us to keep the back drive running to try and scowl out the solids while to centrifuge is shutting down. There is no guarantee as to how long we can run with no supply voltage, but a rough estimate could be 15 minutes.
2. Powering the 24VDC power supply from the DC bus allows us to keep the power supply active during a power outage if the centrifuge is running. This goes along with the question above. Note that this power loss design is patented by ABB.
3. From a design standpoint, it does not matter if the thermal protection is a bi-metal switch or thermistors. By that I mean that we still wire either directly to the thermistor relay. The relay can handle both.
4. You are correct, module TPR515 should be labeled back drive. The text will be corrected with our "as-installed" drawings.
5. LCP-1181 program will need to be changed as the communication between the two systems is going to be MMS over Ethernet. The current method is Comli via serial.
6. This signal is on the LCP-1181, and the goal is to make the two systems as similar as possible. That be said, I don't believe the signal is being used as they do not use the centrifuge in remote. If the signal is not used upon completion of commissioning, the signal can be designated as "spare" with the as-installed drawings.
7. The 4-20mA signal controls the valve position.
8. Yes. The selector switch on LCP-1180 (SS704) determines which system is controlling the conveyor and sludge pump (LCP-1180 / LCP-1181). Selector switch (SS1408) determines which system is controlling the polymer.
9. Each centrifuge control system (LCP-1180 & LCP-1181) will know the status of each grinder and polymer pumps through use of communications. (see the centrifuge pump control scheme dated 5/25/2007).
10. The signal does come from the same switch on sheet (6). The switch has qty. (3) contact blocks.
11. You must be referencing an older revision of the drawings. The latest revision for that drawing is Rev.F. The conveyor runs in one direction only. Both panels (LCP-1180 & 1181) have a conveyor run command. The position of SS704 determines which system is in control.
12. You must be referencing an older revision of the drawings. The latest revision for that drawing is Rev.F. No separate start / stop contacts required.
13. Page 10 is defining the divert operation, which can be a diverter gate or conveyor. For Sedona site, a diverter gate is used, and the conveyor run in the forward direction only. Page (8) states that the conveyor will start during the auto start sequence if enabled.
14. The sequence document includes optional equipment, which is why "if enabled" is included in the descriptions.
15. Noted, text will be revised.

DEVICE ID	ADDRESS	DESCRIPTION
AI704	IW0.11.1.01	BOWL SPEED PICK-UP 4-20MA
AI704	IW0.11.1.02	PINION SPEED PICK-UP 4-20MA
AI704	IW0.11.1.03	SPARE 4-20MA
AI704	IW0.11.1.04	SPARE 4-20MA
AI704	IW0.11.1.05	SLUDGE FEED FLOW RATE 4-20MA (0-200GPM)
AI704	IW0.11.1.06	POLYMER FEED FLOW RATE 4-20MA
AI704	IW0.11.1.07	SLUDGE FLOW CONTROL VALVE POSITION 4-20MA (0-100%)
AI704	IW0.11.1.08	SLUDGE FEED REMOTE SETPOINT 4-20MA (0-200GPM)
AO803	QW0.11.2.01	SLUDGE FEED SPEED CONTROL 4-20MA
AO803	QW0.11.2.02	POLYMER FEED SPEED CONTROL 4-20MA (DIAPHRAGM PUMP CONTROL UNIT)
AO803	QW0.11.2.03	POLYMER FEED FLOW RATE 4-20MA (TO LCP-1181)
AO803	QW0.11.2.04	SLUDGE FEED FLOW RATE 4-20MA (TO LCP-1181)
AO803	QW0.11.2.05	SPARE 4-20MA
AO803	QW0.11.2.06	SPARE 4-20MA
AO803	QW0.11.2.07	SPARE 4-20MA
AO803	QW0.11.2.08	SPARE 4-20MA
DI1003	IX0.11.3.01	CONTROL POWER ON
DI1003	IX0.11.3.02	ALARM SILENCE
DI1003	IX0.11.3.03	EMERGENCY STOP
DI1003	IX0.11.3.04	DECANTER COVER SWITCH
DI1003	IX0.11.3.05	MAIN DRIVE MOTOR THERMISTOR
DI1003	IX0.11.3.06	BACK DRIVE MOTOR THERMISTOR
DI1003	IX0.11.3.07	BACK DRIVE BLOWER MOTOR RUNNING
DI1003	IX0.11.3.08	VIBRATION SWITCH TRIP
DI1003	IX0.11.3.09	DIVERTER GATE OPEN
DI1003	IX0.11.3.10	DIVERTER GATE CLOSED
DI1003	IX0.11.3.11	DIVERTER GATE FAULT
DI1003	IX0.11.3.12	CONVEYOR RUNNING
DI1003	IX0.11.3.13	CONVEYOR FAULT
DI1003	IX0.11.3.14	SPARE
DI1003	IX0.11.3.15	SPARE
DI1003	IX0.11.3.16	SPARE
DI1103	IX0.11.4.01	REMOTE AUTO START
DI1103	IX0.11.4.02	REMOTE AUTO STOP
DI1103	IX0.11.4.03	REMOTE CIP START
DI1103	IX0.11.4.04	REMOTE CIP STOP
DI1103	IX0.11.4.05	SPARE
DI1103	IX0.11.4.06	SPARE
DI1103	IX0.11.4.07	GRINDER #1 RUNNING
DI1103	IX0.11.4.08	GRINDER #1 FAULT
DI1103	IX0.11.4.09	SLUDGE FEED #1 RUNNING
DI1103	IX0.11.4.10	SLUDGE FEED #1 FAULT
DI1103	IX0.11.4.11	SLUDGE FEED #2 RUNNING
DI1103	IX0.11.4.12	SLUDGE FEED #2 FAULT
DI1103	IX0.11.4.13	POLYMER FEED #1 RUNNING
DI1103	IX0.11.4.14	POLYMER FEED #1 FAULT
DI1103	IX0.11.4.15	SPARE
DI1103	IX0.11.4.16	SPARE

DEVICE ID	ADDRESS	DESCRIPTION
DI1203	IX0.11.5.01	GRINDER IN REMOTE (FROM LCP-1130)
DI1203	IX0.11.5.02	CONVEYOR SLUDGE PUMP SELECT 1180/1181
DI1203	IX0.11.5.03	POLYMER #1 SELECTED
DI1203	IX0.11.5.04	POLYMER #2 SELECTED
DI1203	IX0.11.5.05	SLUDGE GRINDER #1 SELECTED
DI1203	IX0.11.5.06	SLUDGE GRINDER #2 SELECTED
DI1203	IX0.11.5.07	SLUDGE CONTROL VALVE FAIL
DI1203	IX0.11.5.08	SPARE
DI1203	IX0.11.5.09	SPARE
DI1203	IX0.11.5.10	SPARE
DI1203	IX0.11.5.11	SPARE
DI1203	IX0.11.5.12	SPARE
DI1203	IX0.11.5.13	SPARE
DI1203	IX0.11.5.14	SPARE
DI1203	IX0.11.5.15	SPARE
DI1203	IX0.11.5.16	SPARE
DO1303	QX0.11.6.01	ALARM HORN
DO1303	QX0.11.6.02	ALARM LIGHT
DO1303	QX0.11.6.03	COMMON ALARM (TO CUSTOMER)
DO1303	QX0.11.6.04	COMMON ALERT (TO CUSTOMER)
DO1303	QX0.11.6.05	CENTRIFUGE RUNNING (TO CUSTOMER)
DO1303	QX0.11.6.06	CIP RUNNING (TO CUSTOMER)
DO1303	QX0.11.6.07	SLUDGE FEED PERMISSIVE (TO CUSTOMER)
DO1303	QX0.11.6.08	POLYMER FEED PERMISSIVE (TO CUSTOMER)
DO1303	QX0.11.6.09	FLUSH WATER (TO CUSTOMER)
DO1303	QX0.11.6.10	CIP FLUSH WATER (TO CUSTOMER)
DO1303	QX0.11.6.11	DIVERTER GATE FLUSH WATER (TO CUSTOMER)
DO1303	QX0.11.6.12	CONVEYOR FLUSH WATER (TO CUSTOMER)
DO1303	QX0.11.6.13	SPARE
DO1303	QX0.11.6.14	SPARE
DO1303	QX0.11.6.15	SPARE
DO1303	QX0.11.6.16	SPARE
DO1403	QX0.11.7.01	MAIN DRIVE VFD ENABLE
DO1403	QX0.11.7.02	BACK DRIVE VFD ENABLE
DO1403	QX0.11.7.03	BACK DRIVE BLOWER MOTOR RUN
DO1403	QX0.11.7.04	GRINDER START/STOP (TO CUSTOMER)
DO1403	QX0.11.7.05	SLUDGE FEED #1 START/STOP (TO CUSTOMER)
DO1403	QX0.11.7.06	SLUDGE FEED #2 START/STOP (TO CUSTOMER)
DO1403	QX0.11.7.07	POLYMER FEED #1 START/STOP (TO CUSTOMER)
DO1403	QX0.11.7.08	SPARE
DO1403	QX0.11.7.09	DIVERTER GATE OPEN
DO1403	QX0.11.7.10	DIVERTER GATE CLOSE
DO1403	QX0.11.7.11	CONVEYOR START/STOP (TO CUSTOMER)
DO1403	QX0.11.7.12	CENTRIFUGE STARTING (TO CUSTOMER)
DO1403	QX0.11.7.13	REMOTE MODE (TO CUSTOMER)
DO1403	QX0.11.7.14	SPARE
DO1403	QX0.11.7.15	SPARE
DO1403	QX0.11.7.16	SPARE

NOTE:
DEVICE ID IS THE LINE NUMBER THAT THE PLC CARD STARTS AT.

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ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 10/1/15

APPROVALS

ENG'R	MET.	Q.C.
CCG	~	PWF

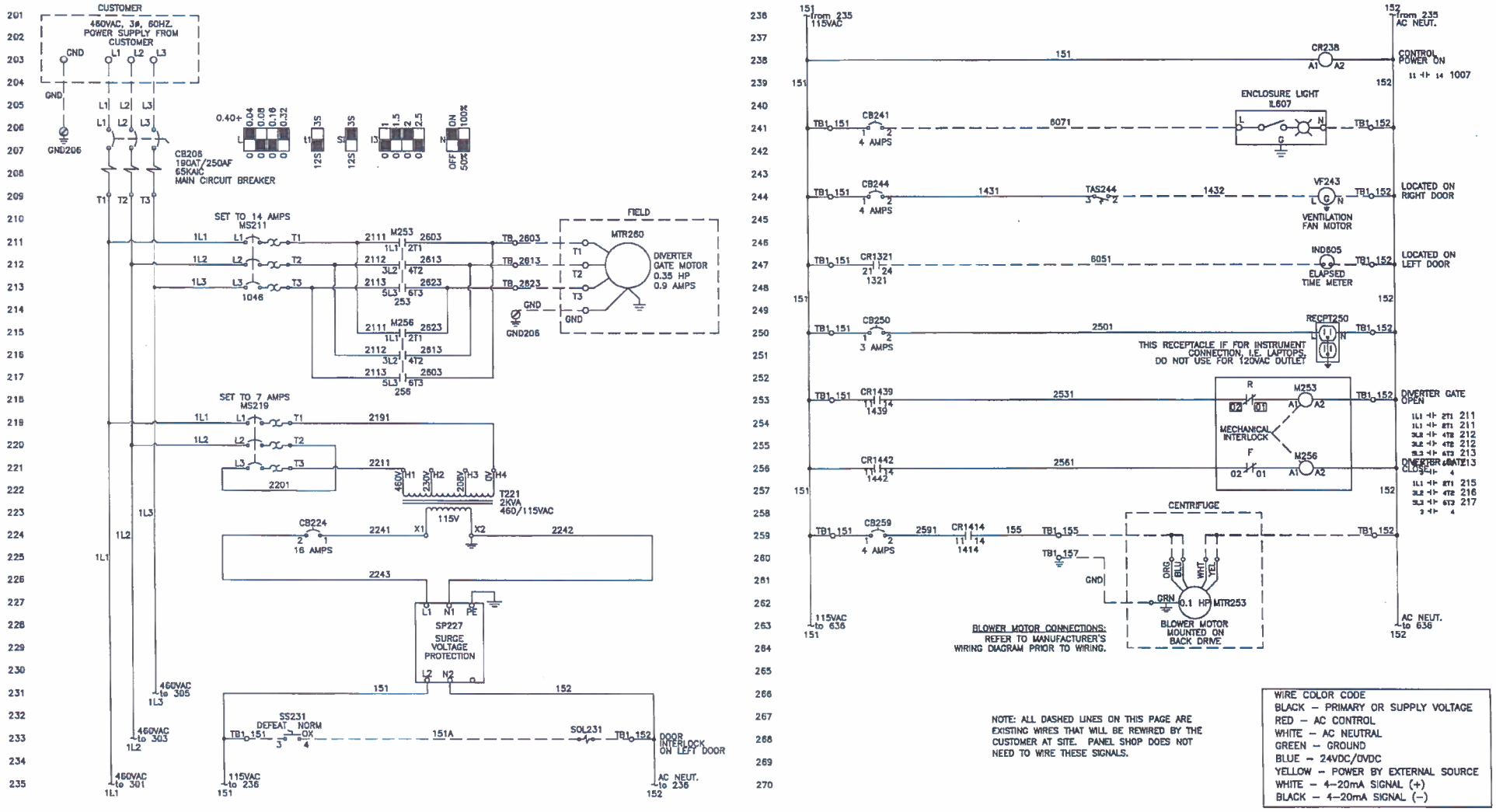
ABB PROJECT #: U8384/ED0016011
MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 STARTER PANEL I/O LIST

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 1 OF 23



NOTE: ALL DASHED LINES ON THIS PAGE ARE EXISTING WIRES THAT WILL BE REWIRED BY THE CUSTOMER AT SITE. PANEL SHOP DOES NOT NEED TO WIRE THESE SIGNALS.

WIRE COLOR CODE
BLACK – PRIMARY OR SUPPLY VOLTAGE
RED – AC CONTROL
WHITE – AC NEUTRAL
GREEN – GROUND
BLUE – 24VDC/0VDC
YELLOW – POWER BY EXTERNAL SOURCE
WHITE – 4–20mA SIGNAL (+)
BLACK – 4–20mA SIGNAL (–)

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APPROVALS: ENG'R ccd; MFG. ~; Q.C. Puf
FILE: SEDONA LCP-1180 UPGRADE.ZIP
ABB PROJECT #: U8384/E00016011
MACHINE TYPE: DS403
FOLDER LOCATION:

TITLE: SEDONA LCP-1180 STARTER PANEL WIRING DIAGRAM
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
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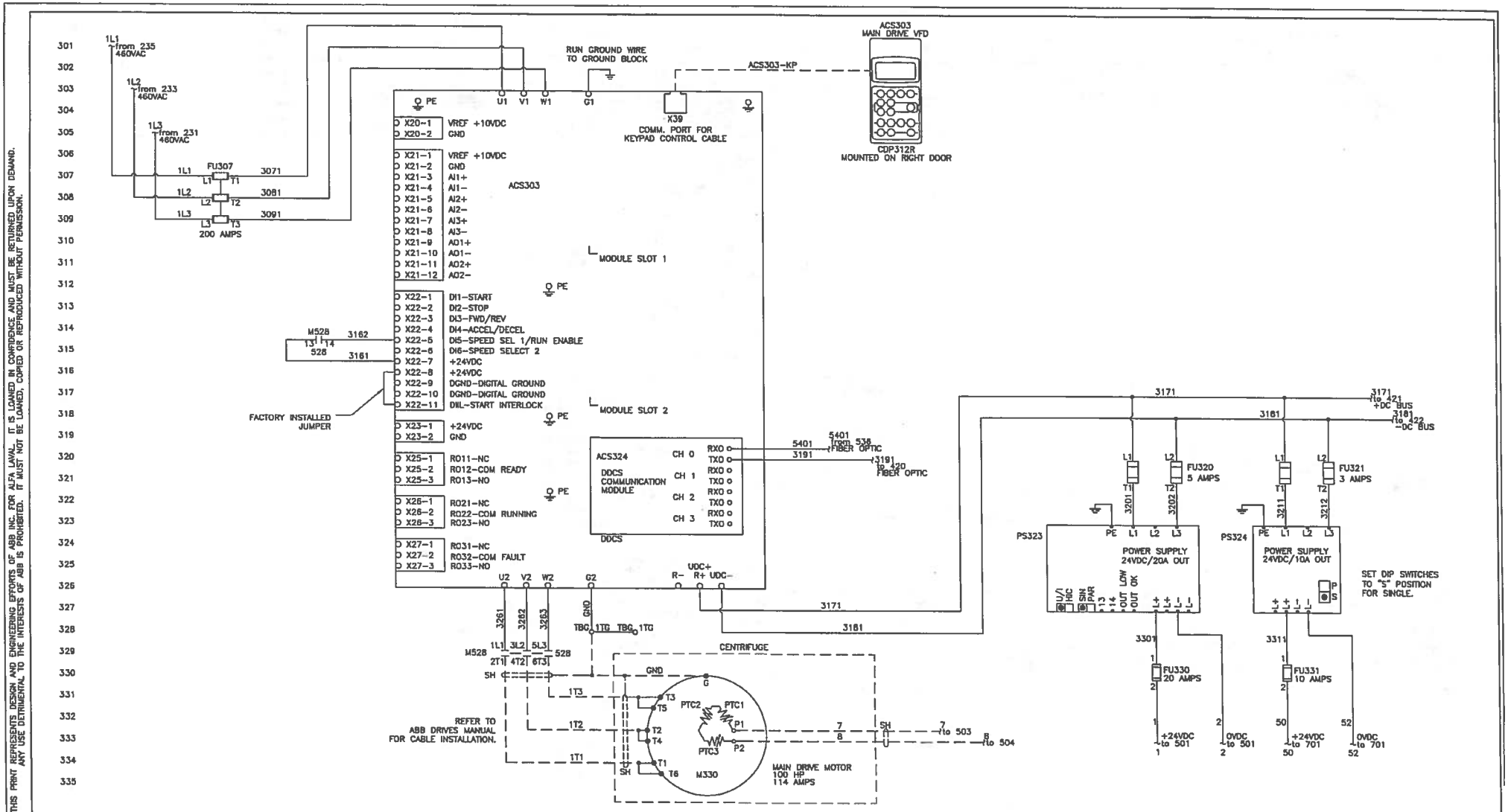
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 2 OF 23



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DRAWN: JB	9/2/15			
CHECKED: JG	10/1/15	CCD	~	PWF

FILE: SEDONA LCP-1180 UPGRADE.ZIP
ABB PROJECT #: U8384/E00016011
MACHINE TYPE: DS403
FOLDER LOCATION:

TITLE: SEDONA LCP-1180 STARTER PANEL MAIN DRIVE WIRING

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

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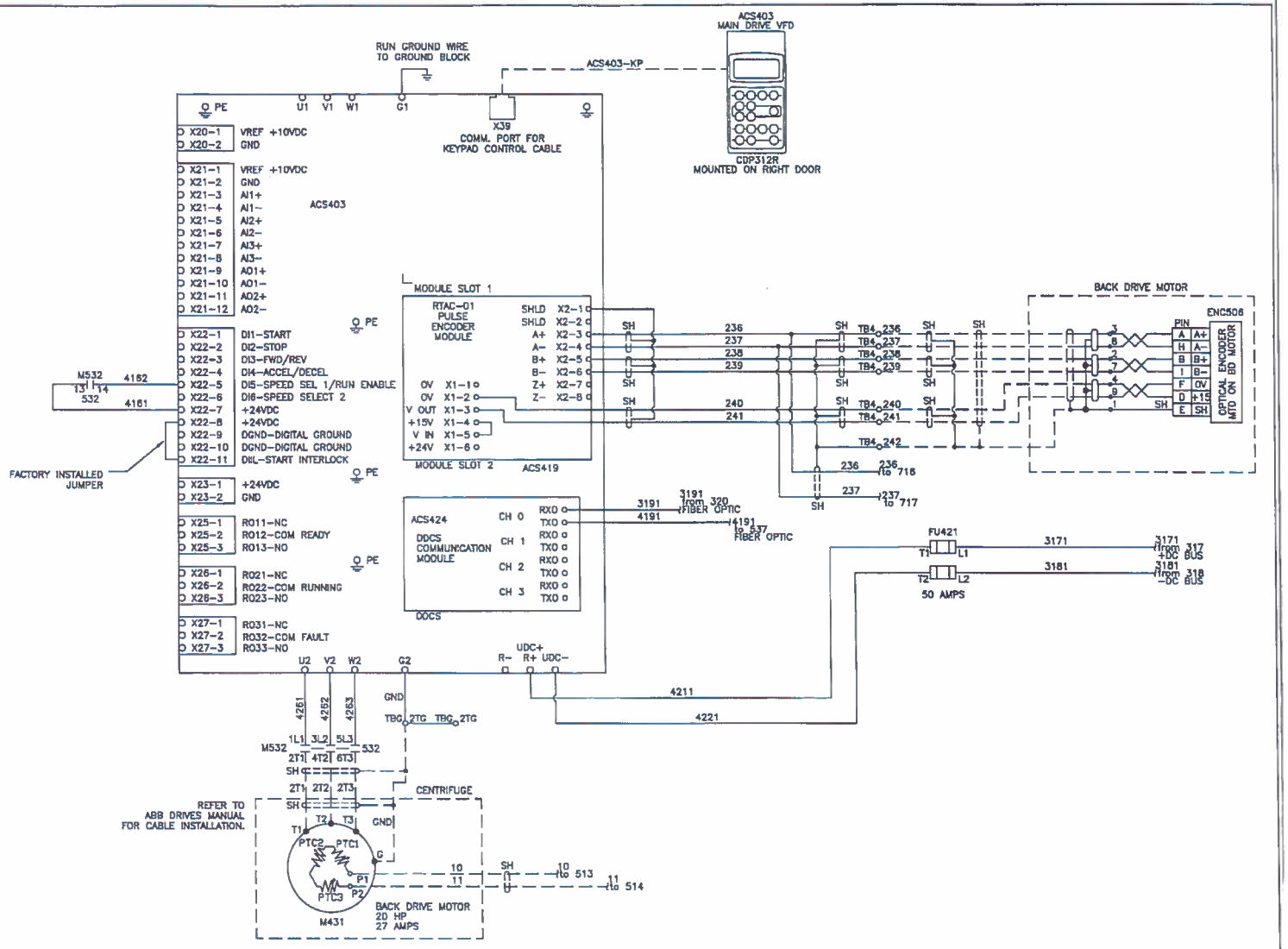
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 3 OF 23



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SCALE:	DATE:	APPROVALS		
		ENG'R	MFT.	Q.C.
DRAWN: JB	9/2/15			
CHECKED: JG	10/1/15	CCJ	~	PWF

FILE: SEDONA LCP-1180 UPGRADE.ZIP
ABB PROJECT #: U8364/E00016011
MACHINE TYPE: DS403
FOLDER LOCATION:

TITLE: SEDONA LCP-1180 STARTER PANEL BACK DRIVE WIRING
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
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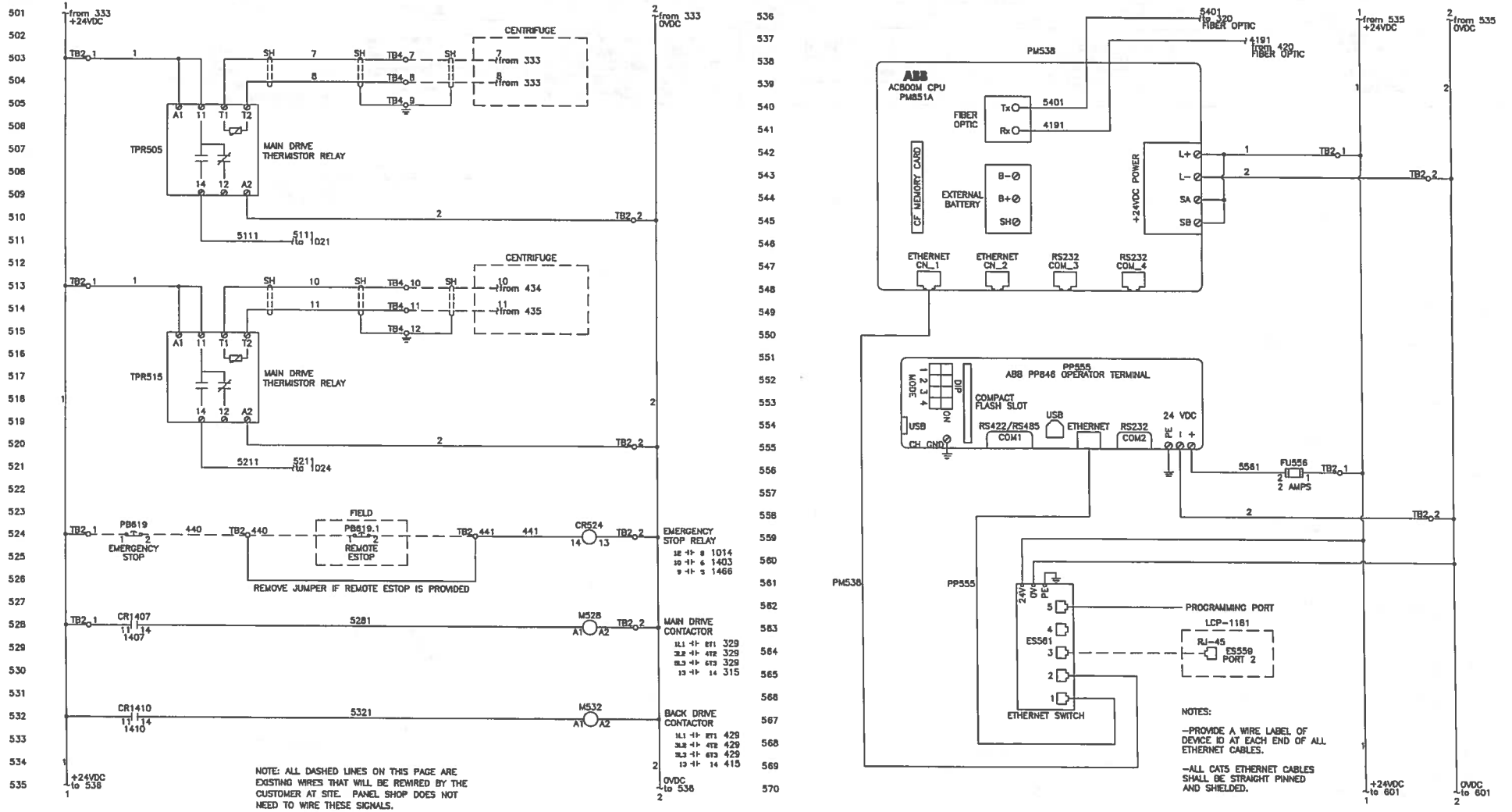
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 4 OF 23



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FILE: SEDONA LCP-1180 UPGRADE.ZIP
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DATE: 9/2/15
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DATE: 10/1/15
ABB PROJECT #: U8384/E00018011

APPROVALS

	ENG'R	MFG.	Q.C.
	CCB	~	PWF

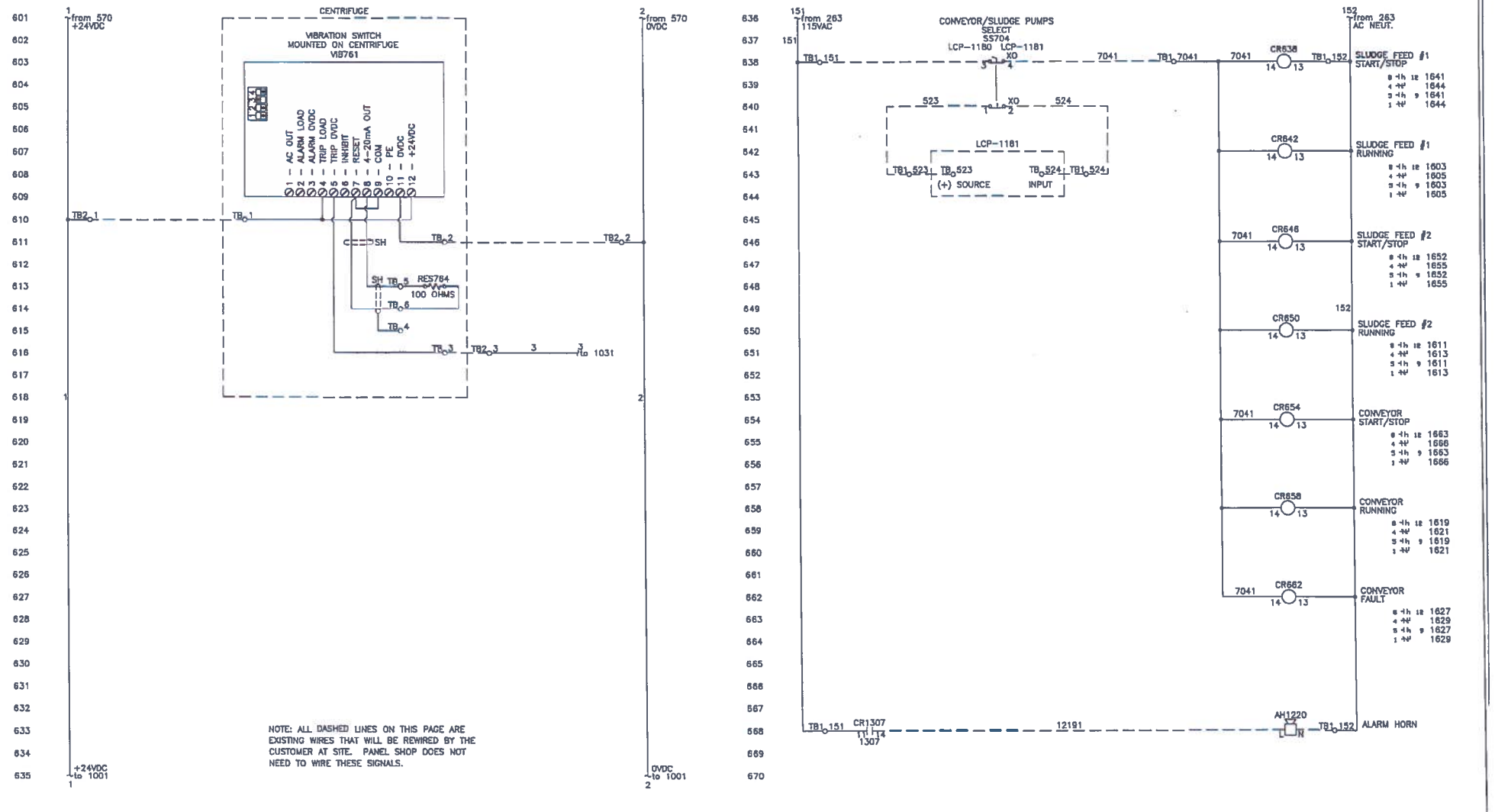
MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 STARTER PANEL WIRING DIAGRAM

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
853 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 5 OF 23



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PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP–1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 10/1/15
DATE:

APPROVALS

ENG'R	MET.	Q.C.
CCB	~	PWF

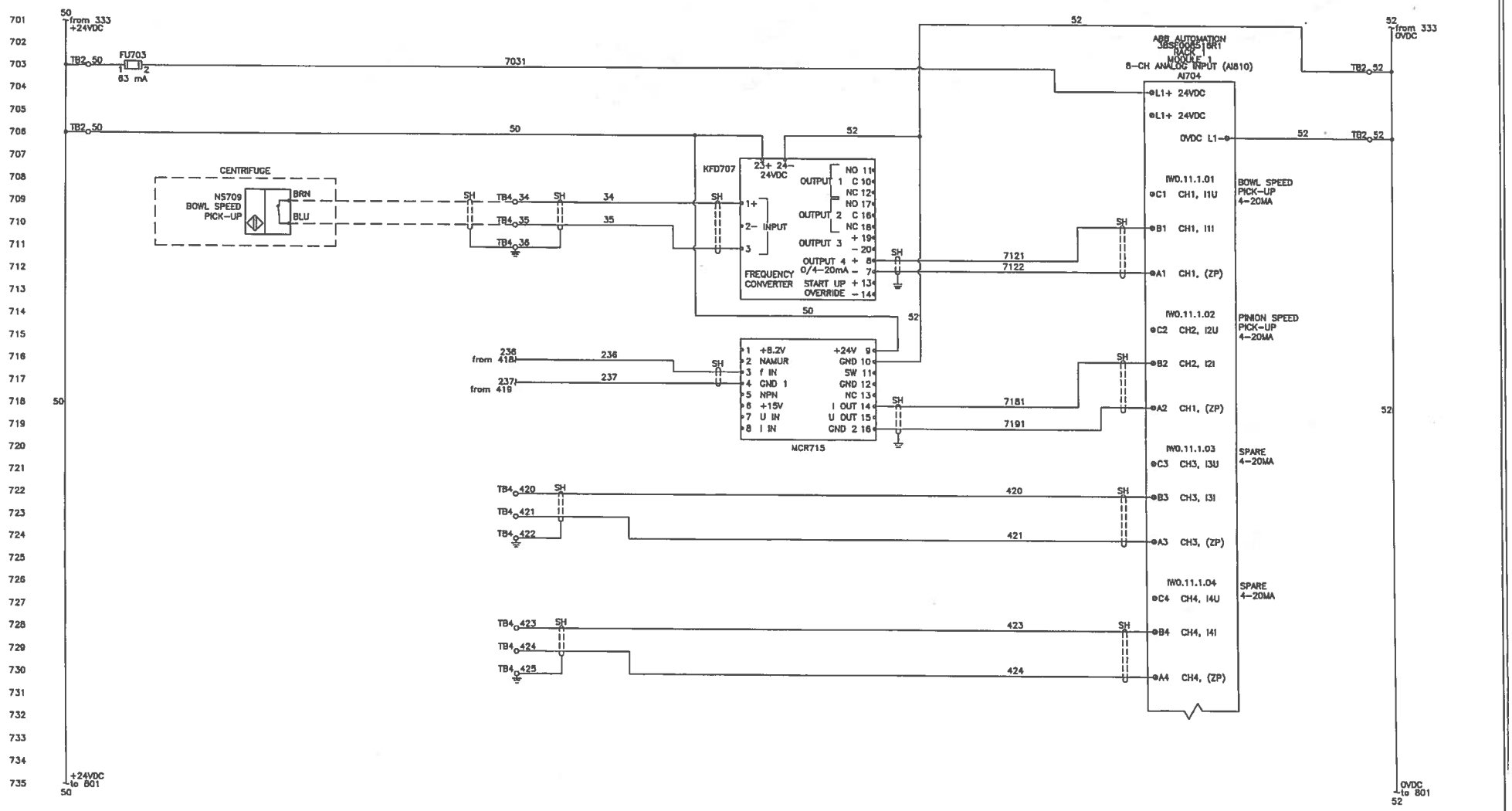
ABB PROJECT #: UB364/E00016011
MACHINE TYPE: DS403

TITLE: SEDONA LCP–1180 STARTER PANEL WIRING DIAGRAM

PROJECT NAME: SEDONA LCP–1180 UPGRADE
S.O. 1828980

ALFA LAVAL
855 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 6 OF 23



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PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DRAWN: JB — DATE: 9/2/15
CHECKED: JG — DATE: 10/1/15
ABB PROJECT #: U8364/ED0016011

APPROVALS

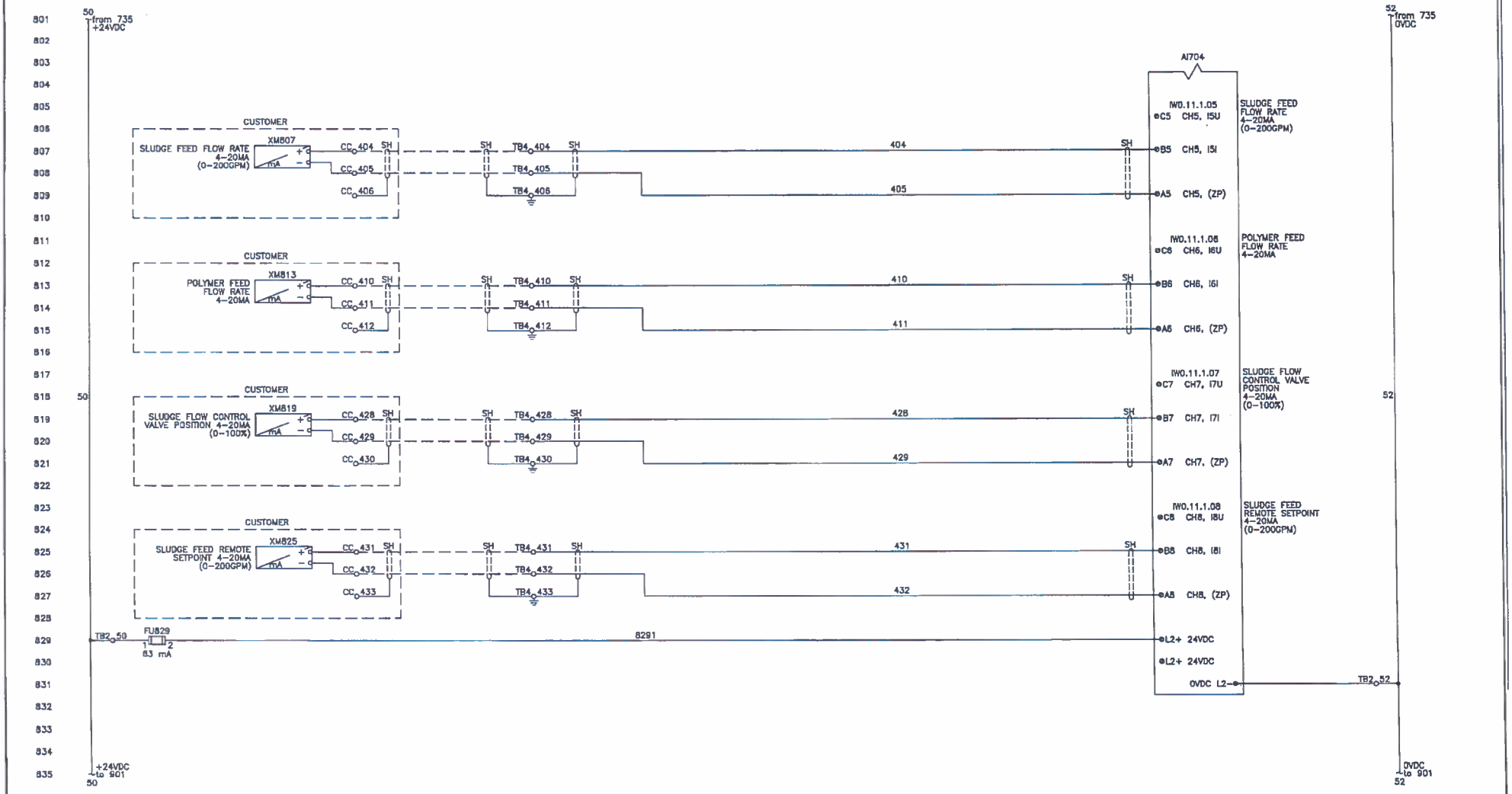
	ENG'R	MET.	Q.C.
	CCB	~	Put

MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 STARTER PANEL ANALOG INPUT CARD PT. 1
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
835 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 7 OF 23



THIS PRINT REPRESENTS DESIGN AND ENGINEERING EFFORTS OF ABB INC. FOR ALFA LAVAL. IT IS LOANED IN CONFIDENCE AND MUST BE RETURNED UPON DEMAND. ANY USE DETRIMENTAL TO THE INTERESTS OF ABB IS PROHIBITED. IT MUST NOT BE LOANED, COPIED OR REPRODUCED WITHOUT PERMISSION.

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 10/1/15

APPROVALS

	ENG'R	MFG.	Q.C.
	CCJ	~	PMF

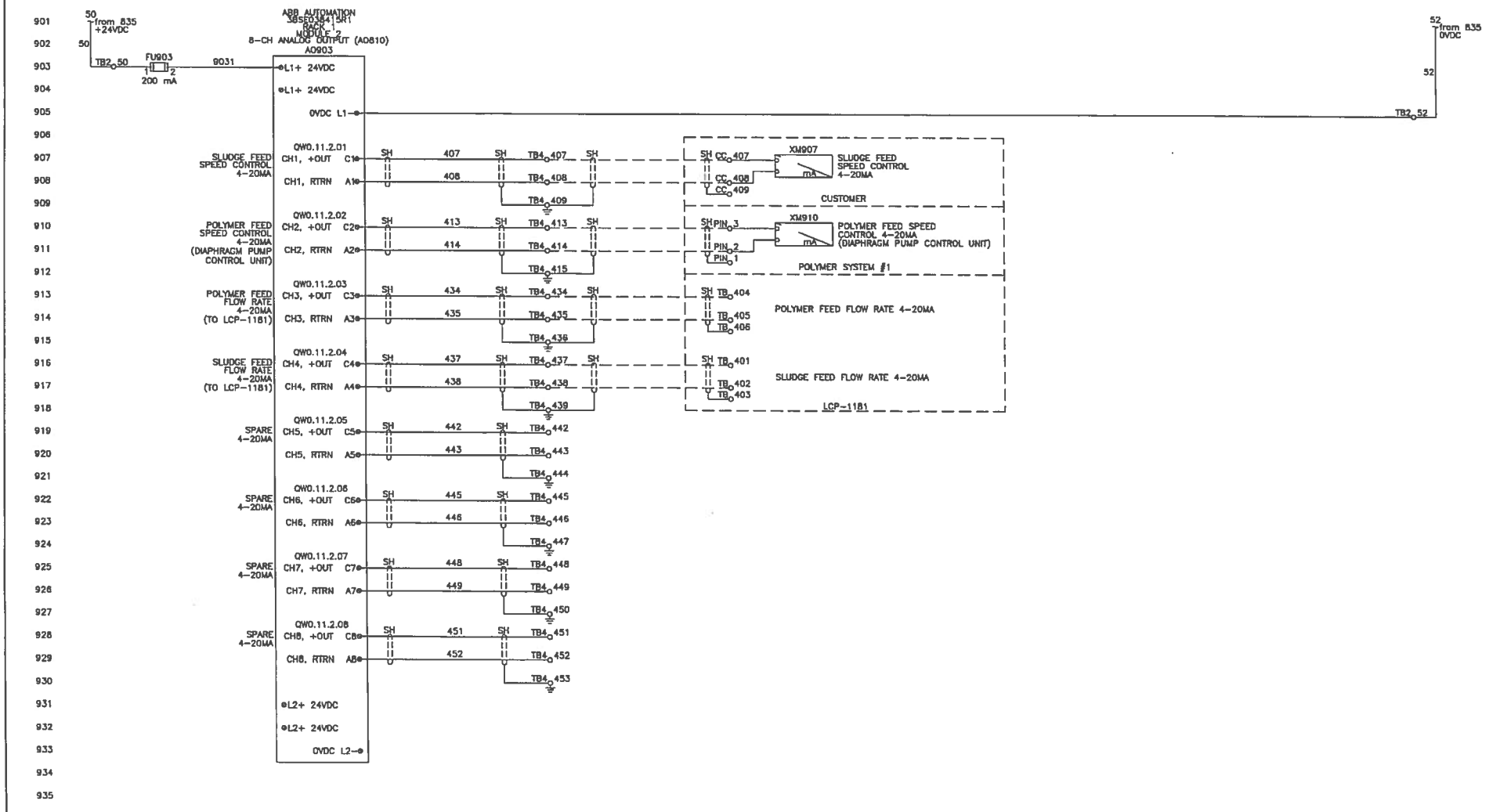
FILE: SEDONA LCP-1180 UPGRADE.ZIP
ABB PROJECT #: U8364/E00016011
MACHINE TYPE: DS403
FOLDER LOCATION:

TITLE: SEDONA LCP-1180 STARTER PANEL ANALOG INPUT CARD PT. 2

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
853 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 8 OF 23



REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 10/11/15

ABB PROJECT #: U8364/E00016011

APPROVALS

ENG'R	MET.	Q.C.
CCJ	~	PWF

MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 STARTER PANEL ANALOG OUTPUT CARD

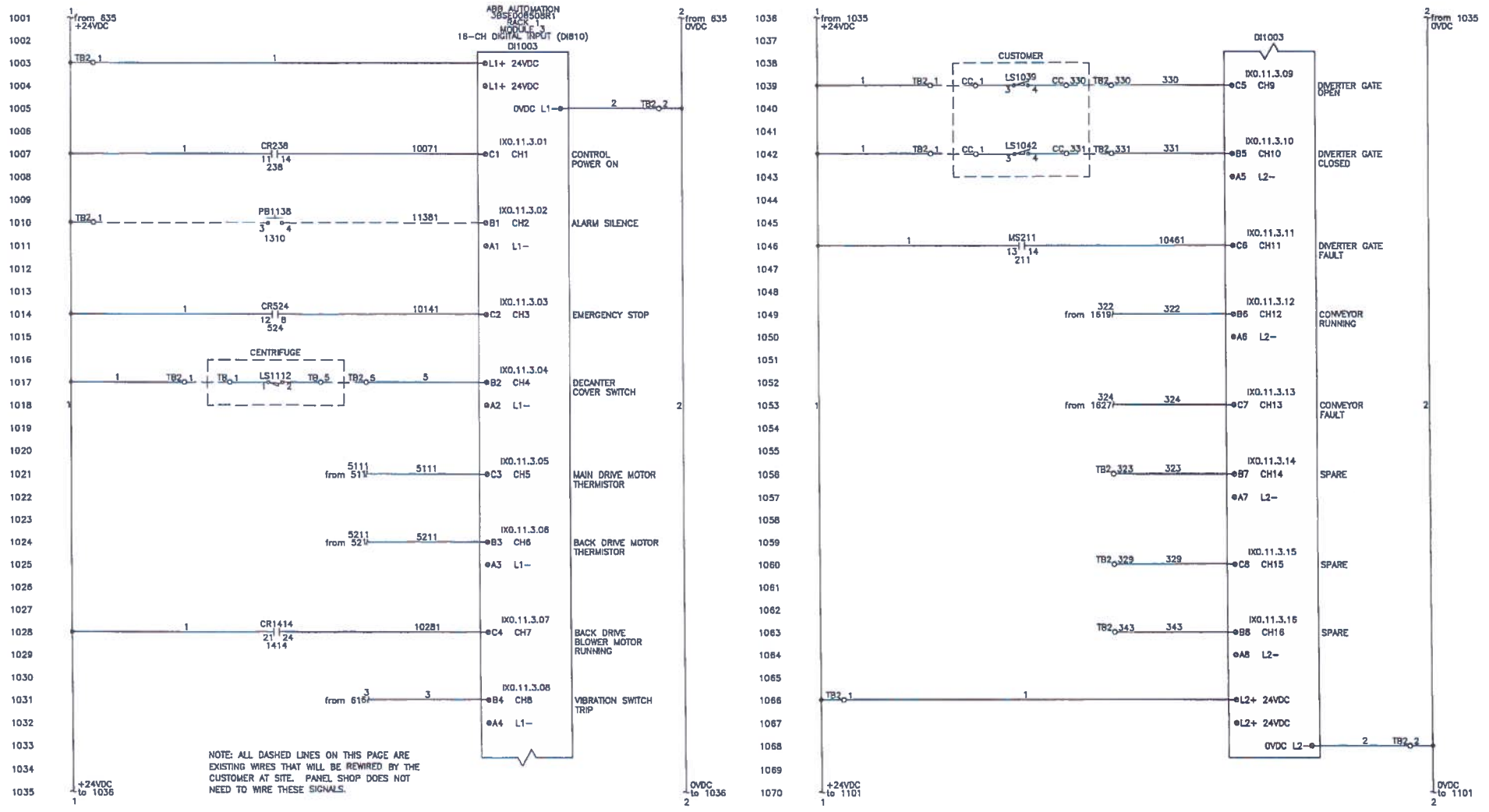
PROJECT NAME: SEDONA LCP-1180 UPGRADE

S.O. 1828980

ALFA LAVAL
855 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636

SHEET 9 OF 23



REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 10/1/15
ABB PROJECT #: U8364/E00016011
MACHINE TYPE: DS403

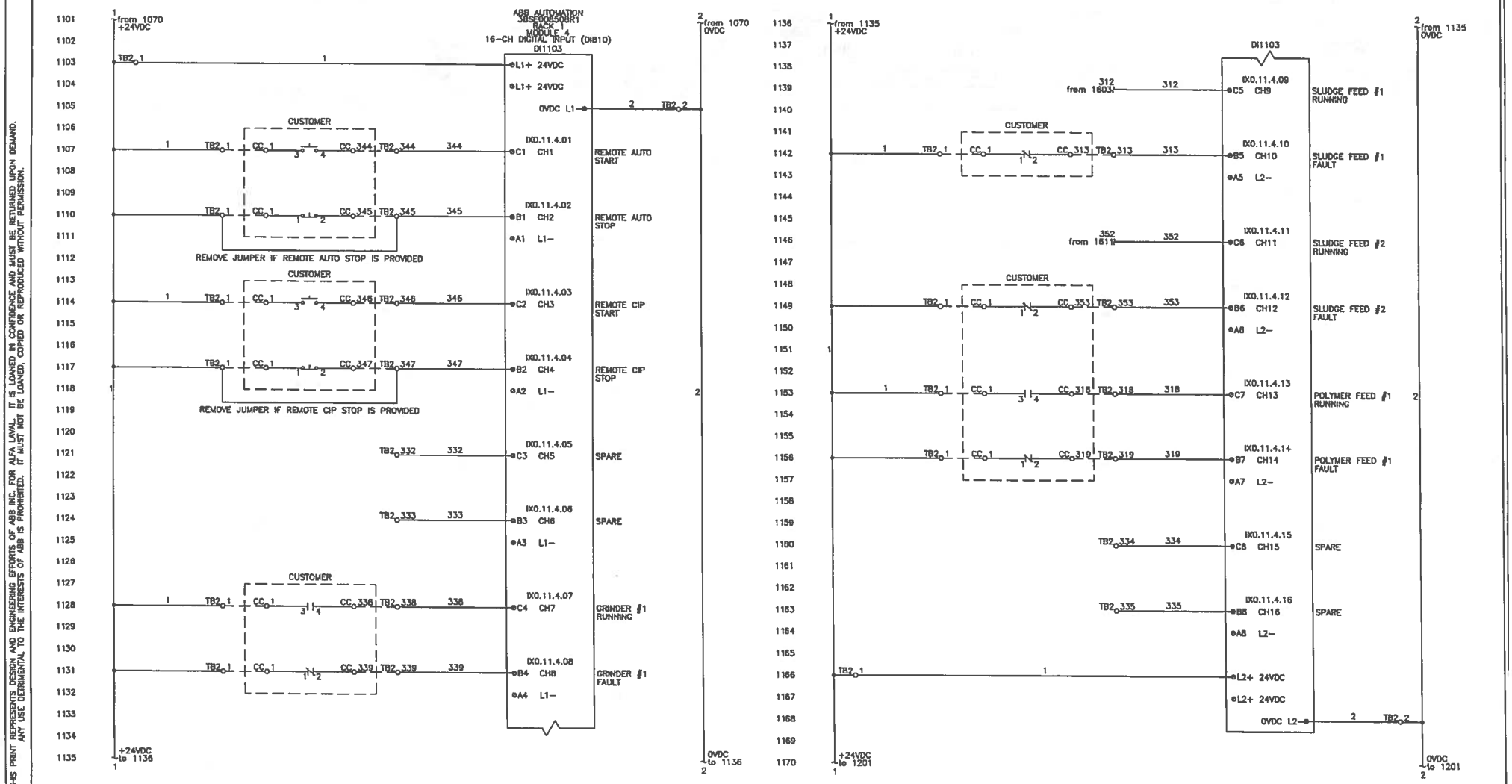
APPROVALS

	ENG'R	MET.	Q.C.
	CCB	~	PWF

TITLE: SEDONA LCP-1180 STARTER PANEL DIGITAL INPUT CARD 1
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
855 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 10 OF 23



THIS PRINT REPRESENTS DESIGN AND ENGINEERING EFFORTS OF ABB INC. FOR ALFA LAVAL. IT IS LOANED IN CONFIDENCE AND MUST BE RETURNED UPON DEMAND. ANY USE DETRIMENTAL TO THE INTERESTS OF ABB IS PROHIBITED. IT MUST NOT BE LOANED, COPIED OR REPRODUCED WITHOUT PERMISSION.

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 10/1/15
ABB PROJECT #: U8364/E00018011

APPROVALS

	ENG'R	MET.	Q.C.
	CCJ	~	Puf

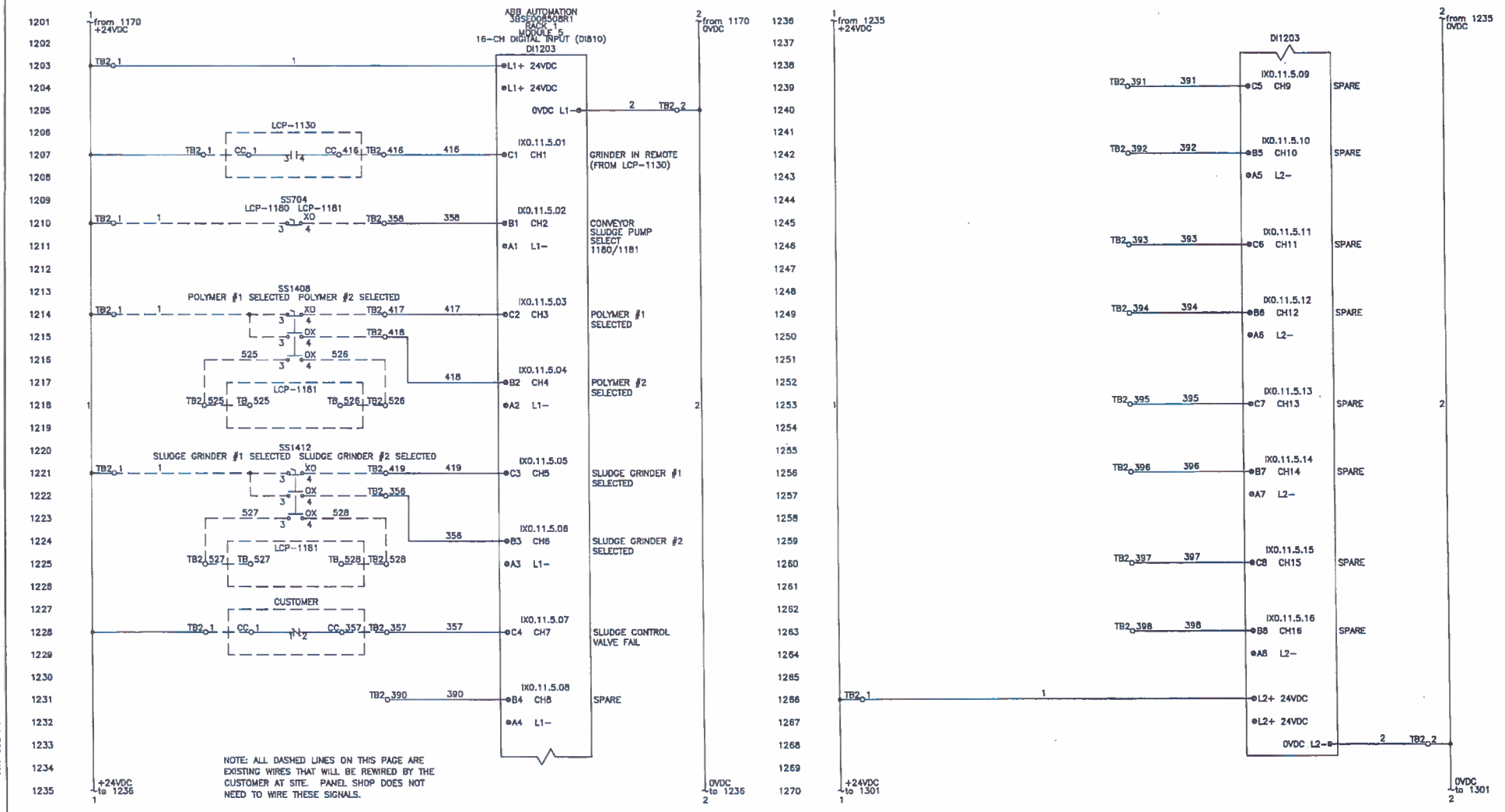
MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 STARTER PANEL DIGITAL INPUT CARD 2

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
835 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 11 OF 23



REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 10/1/15

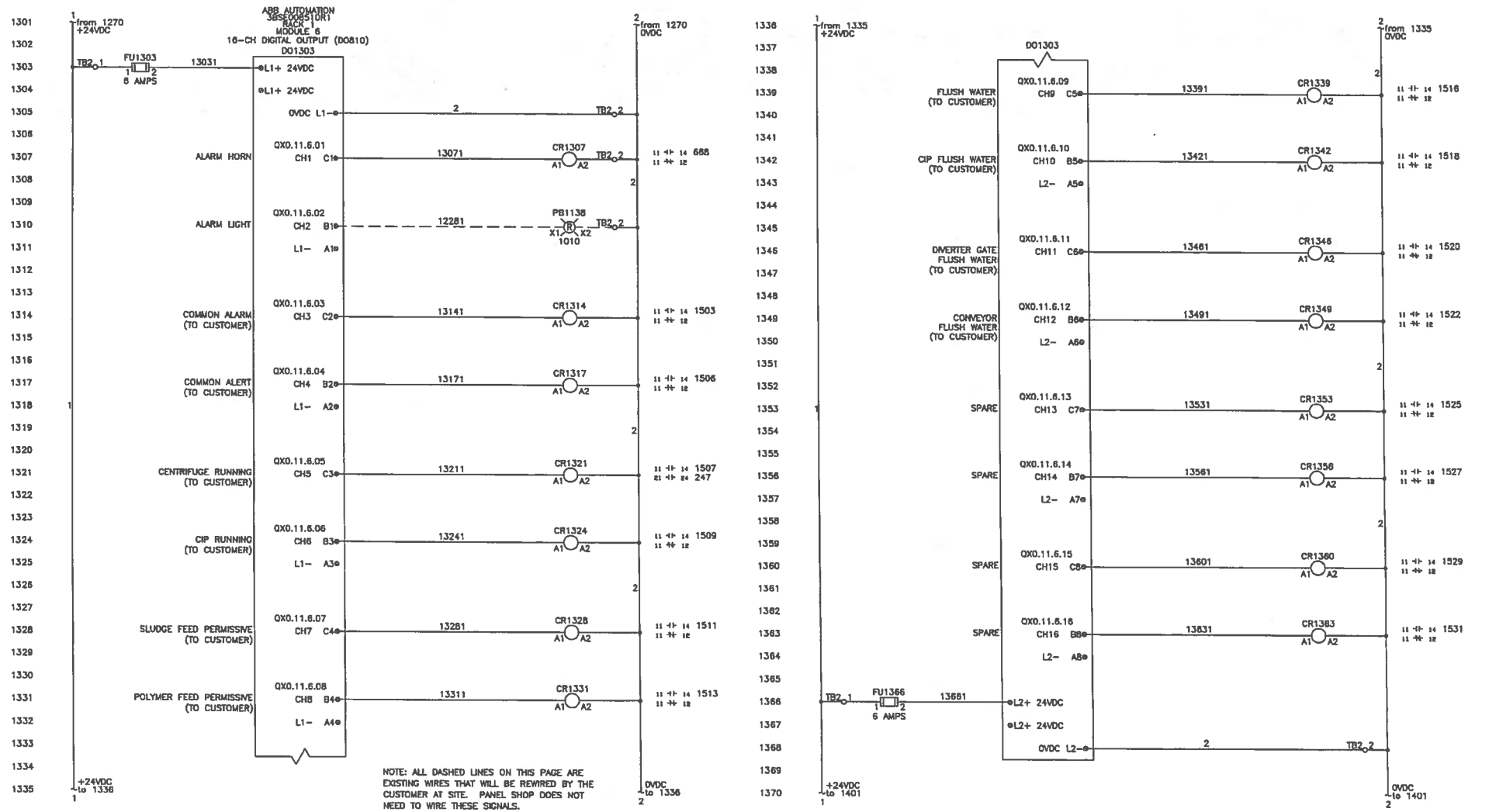
APPROVALS	ENG'R	MET.	Q.C.
	CCH	~	RWF

ABB PROJECT #: U8364/E00016011
MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 STARTER PANEL DIGITAL INPUT CARD 3
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O.

ALFA LAVAL
853 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 12 OF 23



REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ, 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

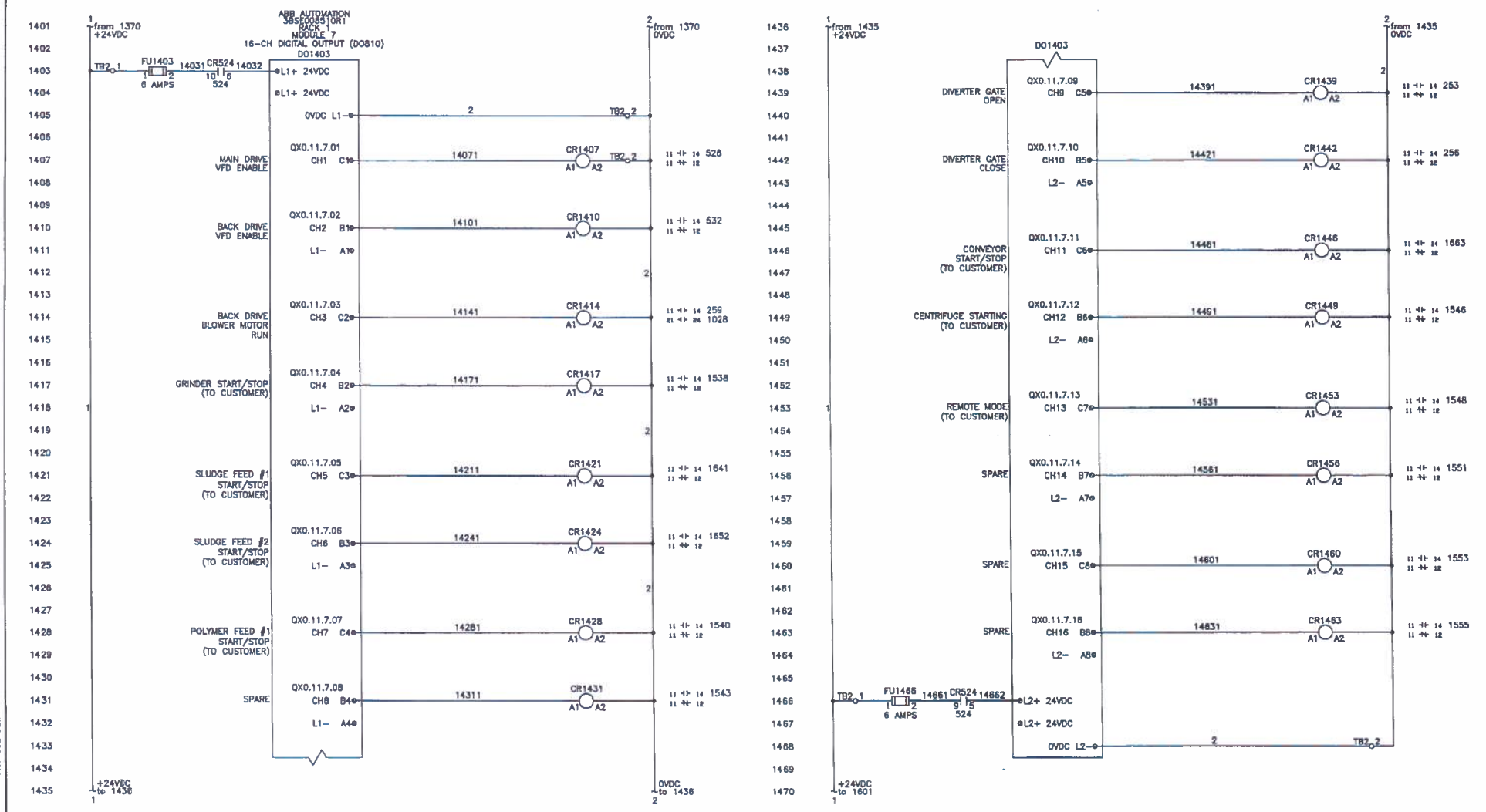
SCALE:	DATE:	APPROVALS		
~		ENG'R	MFT.	Q.C.
DRAWN: JB	9/2/15			
CHECKED: JG	10/1/15	CCF	~	PWF

FILE: SEDONA LCP-1180 UPGRADE.ZIP
ABB PROJECT #: U8384/E00016011
MACHINE TYPE: DS403
FOLDER LOCATION:

TITLE: SEDONA LCP-1180 STARTER PANEL DIGITAL OUTPUT CARD 1
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 13 OF 23



REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

SCALE: ~	DATE:
DRAWN: JB	9/2/15
CHECKED: JG	10/1/15

APPROVALS	ENG'R	MFT.	Q.C.
	CCJ	~	PWF

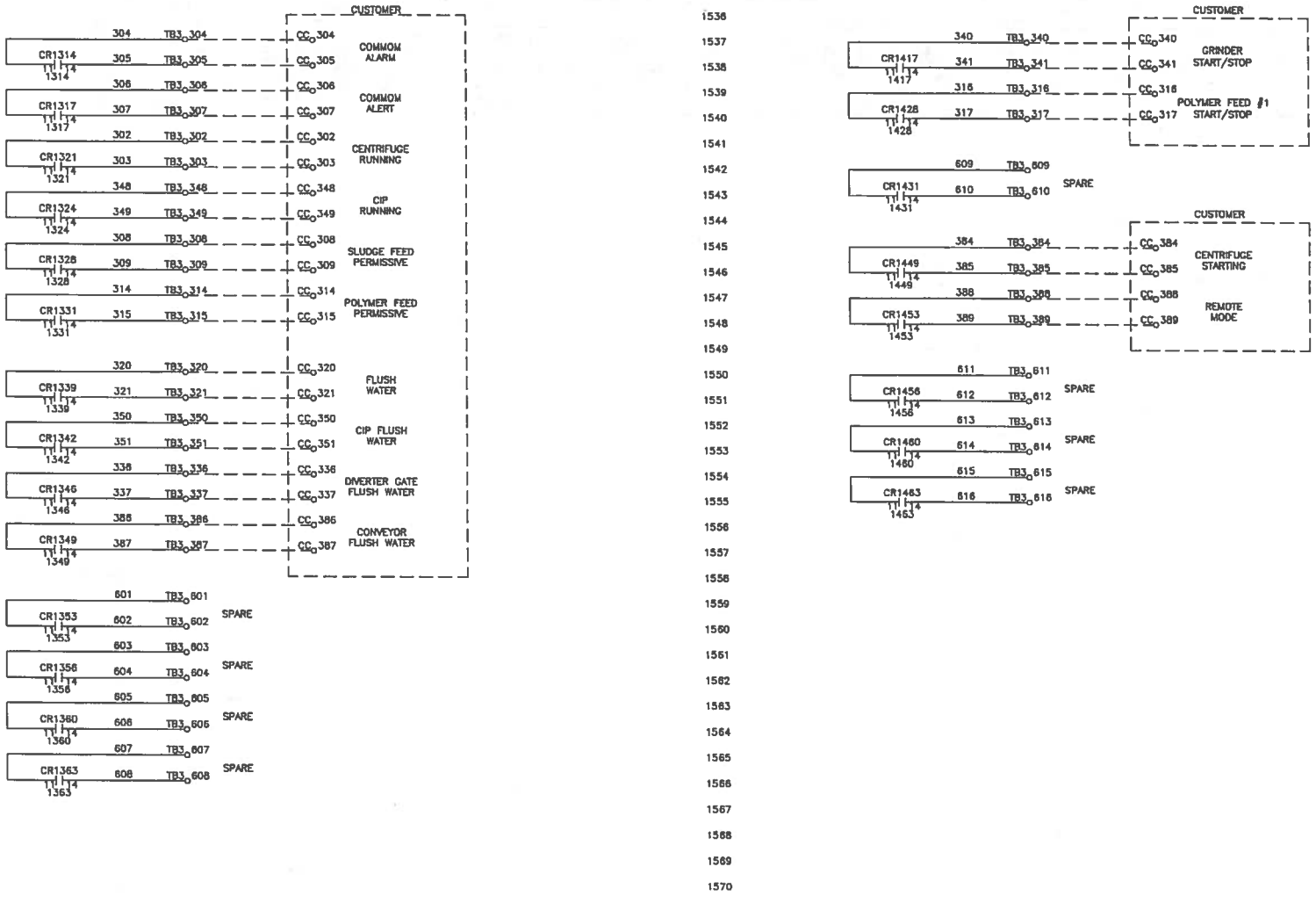
FILE: SEDONA LCP-1180 UPGRADE.ZIP
ABB PROJECT #: U8364/E00016011
MACHINE TYPE: DS403
FOLDER LOCATION:

TITLE: SEDONA LCP-1180 STARTER PANEL DIGITAL OUTPUT CARD 2

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 14 OF 23



REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DATE:
DRAWN: JB 9/2/15
CHECKED: JG 10/1/15
ABB PROJECT #: U8364/E00016011

APPROVALS

ENG'R	MET.	Q.C.
CCJ	~	PWF

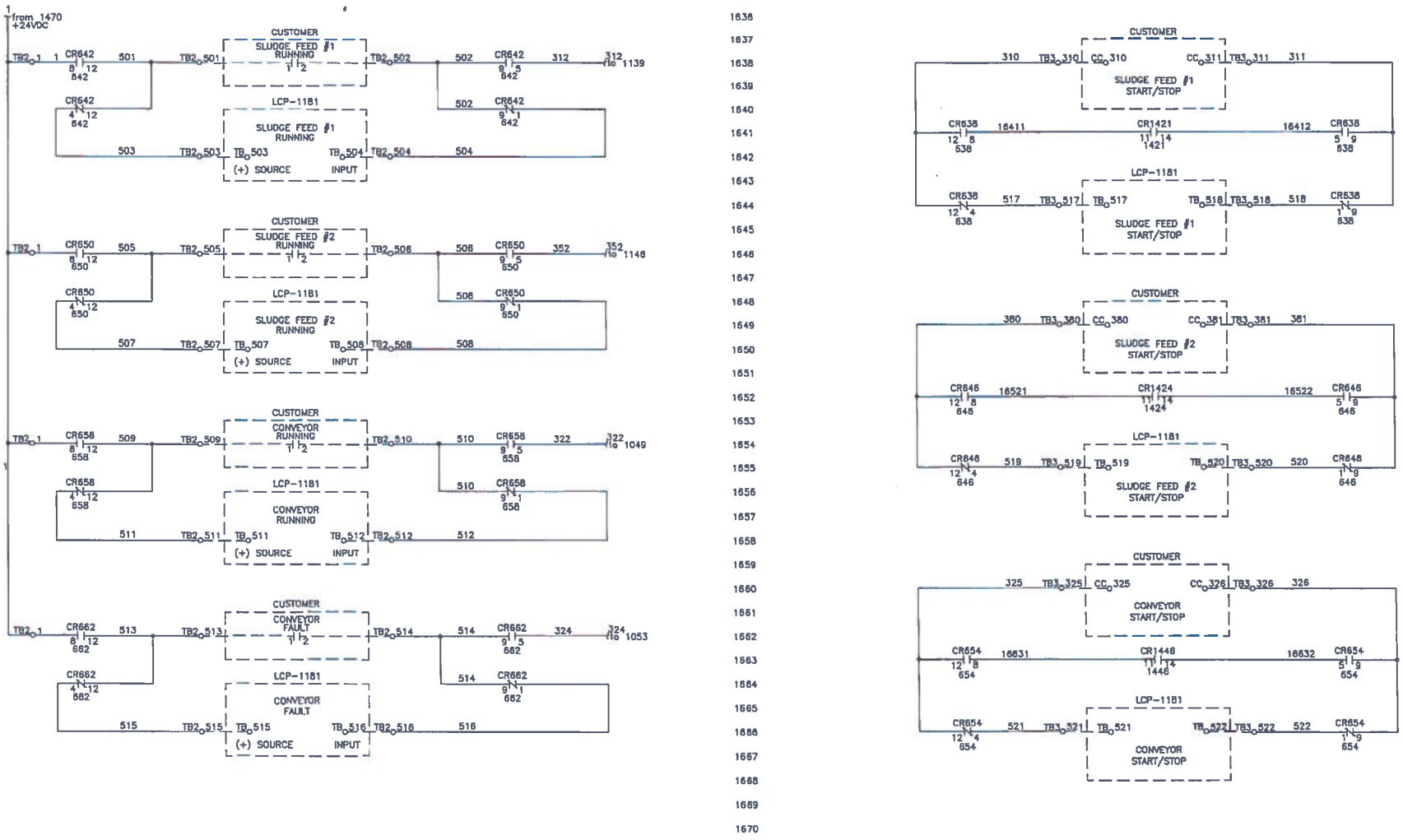
MACHINE TYPE: DS403

TITLE:
SEDONA LCP-1180 STARTER PANEL RELAY OUTS TO CUSTOMER

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 15 OF 23



REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 10/1/15
ABB PROJECT #: U8364/E00016011
MACHINE TYPE: DS403

APPROVALS

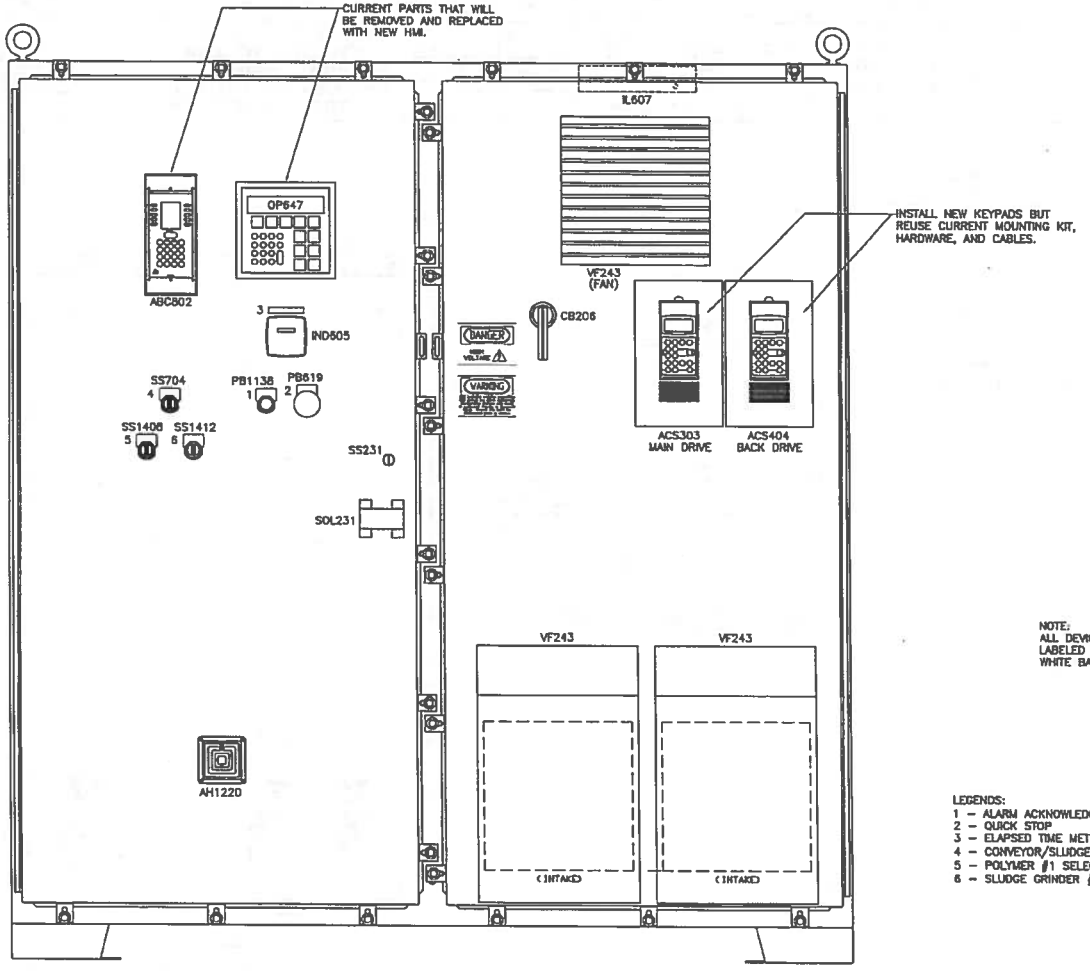
ENG'R	MET.	Q.C.
CCJ	~	PWF

TITLE: SEDONA LCP-1180 STARTER PANEL RELAY OUTS TO LCP-1181

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 16 OF 23



NOTE:
ALL DEVICES INSIDE AND OUT SHALL BE LABELED WITH LAMICOIDS. LAMICOIDS SHALL BE WHITE BACKGROUND WITH BLACK LETTERING.

UL LABEL REQUIRED

LEGENDS:
1 – ALARM ACKNOWLEDGE/LAMPTEST – COMMON ALARM
2 – QUICK STOP
3 – ELAPSED TIME METER
4 – CONVEYOR/SLUDGE PUMPS SELECT LCP1180–LCP1181
5 – POLYMER #1 SELECTED – POLYMER #2 SELECTED
6 – SLUDGE GRINDER #1 SELECTED – SLUDGE GRINDER #2 SELECTED

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DATE:
DRAWN: JB 9/2/15
CHECKED: JG 10/1/15

APPROVALS

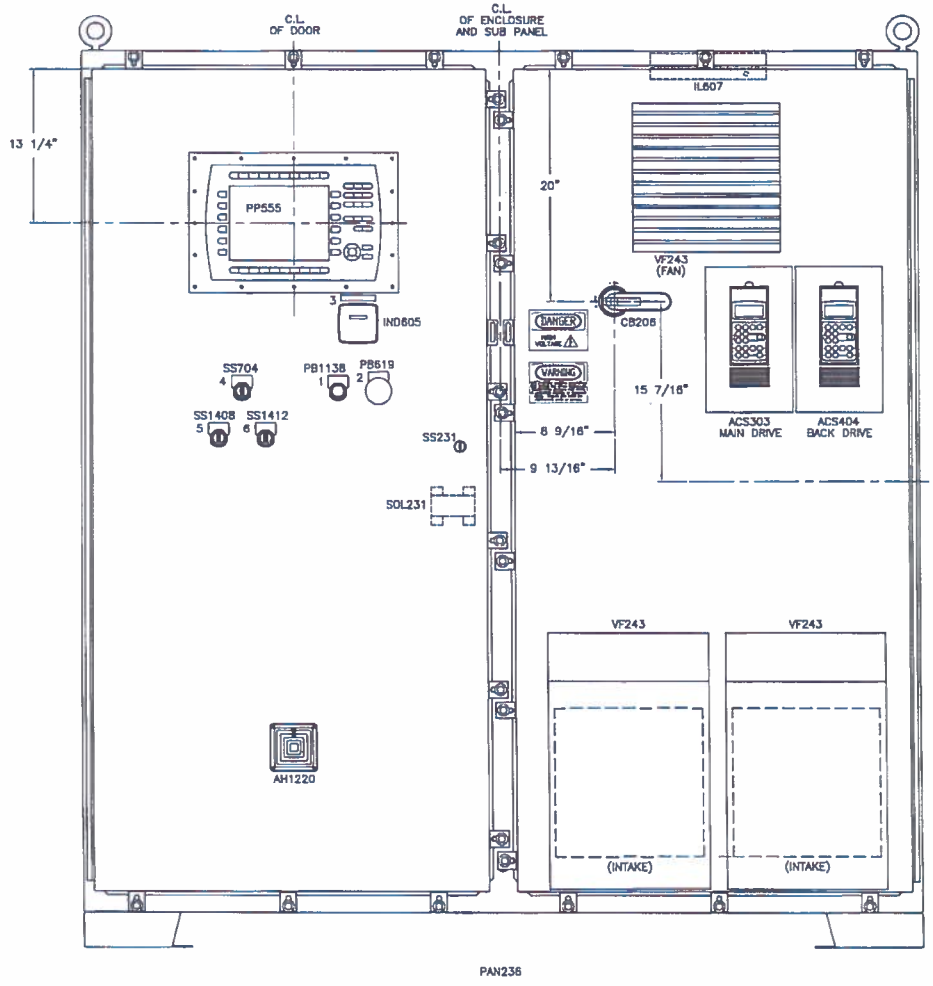
	ENG'R	MET.	Q.C.
	CCJ	~	PMF

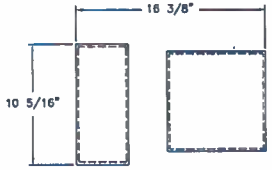
ABB PROJECT #: U8364/ED0016011
MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 STARTER PANEL ENCLOSURE LAYOUT (EXISTING)
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

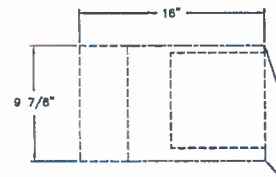
ALFA LAVAL
853 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 17 OF 23





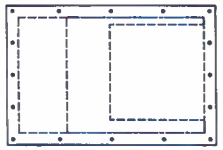
CURRENT OVERALL DIMENSIONS OF PARTS MOUNTED ON DOORS.
SOLID LINES = COMPONENTS
DASHED LINES = CUTOUTS



CURRENT OVER ALL DIMENSIONS OF CUTOUTS OF PARTS.

THESE DASHED LINES INDICATE WHERE NEW CUTOUT WILL BE.

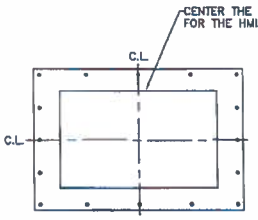
NEW MOUNTING PLATE SHOWN OVERLAPPING EXISTING CUTOUTS.

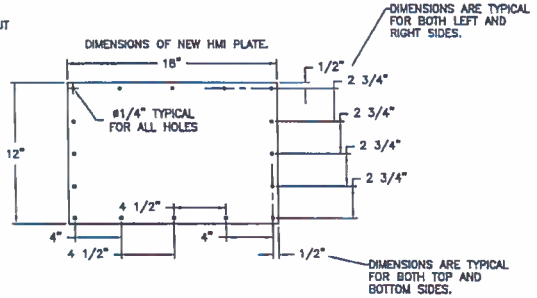


NOTE:
ALL DEVICES INSIDE AND OUT SHALL BE LABELED WITH LAMICOIDS. LAMICOIDS SHALL BE WHITE BACKGROUND WITH BLACK LETTERING.

UL LABEL REQUIRED

LEGENDS:
1 – ALARM ACKNOWLEDGE/LAMPTEST – COMMON ALARM
2 – QUICK STOP
3 – ELAPSED TIME METER
4 – CONVEYOR/SLUDGE PUMPS SELECT LCP1180–LCP1181
5 – POLYMER #1 SELECTED – POLYMER #2 SELECTED
6 – SLUDGE GRINDER #1 SELECTED – SLUDGE GRINDER #2 SELECTED





REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 10/1/15

APPROVALS

	ENG'R	MET.	Q.C.
	CCJ	~	Puf

FILE: SEDONA LCP-1180 UPGRADE.ZIP
ABB PROJECT #: U8364/E00016011
MACHINE TYPE: DS403
FOLDER LOCATION:

TITLE: SEDONA LCP-1180 STARTER PANEL ENCLOSURE LAYOUT (NEW)
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 18 OF 23

*DETAIL A

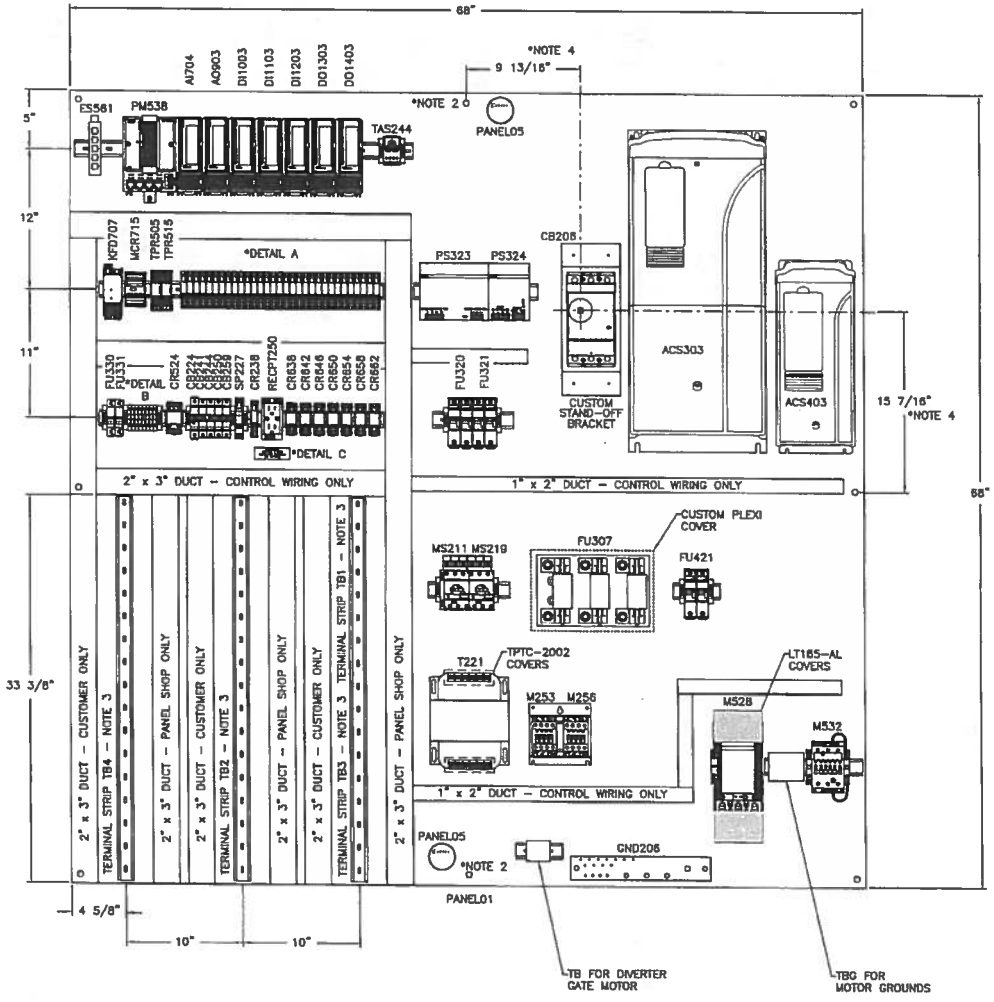
CR1307 CR1314 CR1317 CR1321 CR1324 CR1328 CR1331 CR1339 CR1342 CR1346 CR1349 CR1353 CR1356 CR1360 CR1363 CR1407 CR1410 CR1414 CR1417 CR1421 CR1424 CR1428 CR1431 CR1439 CR1442 CR1446 CR1449 CR1453 CR1456 CR1460 CR1463

*DETAIL B

FU556 FU703 FU829 FU903 FU1303 FU1366 FU1403 FU1468

*DETAIL C

RECEPTACLE
115 VAC, 3 AMPS
INSTRUMENT USE ONLY
(I.E. LAPTOPS)



NOTES:
1 – ALL DEVICES INSIDE AND OUT SHALL BE LABELED WITH LAMICOIDS. LAMICOIDS SHALL BE WHITE BACKGROUND WITH BLACK LETTERING.

2 – TOP AND BOTTOM MIDDLE MOUNTING HOLES FOR THE SUB PANEL MUST BE ENLARGED BY THE CUSTOMER AT SITE TO ENSURE HOFFMAN PANEL WILL MOUNT IN THE EXISTING RITTAL ENCLOSURE. HOFFMAN SUB PANEL WILL BE USED INSTEAD OF RITTAL DUE TO THE EXISTING SUB PANEL PART # BEING DISCONTINUED.

3 – MOUNT TERMINAL STRIPS STARTING FROM THE BOTTOM OF THE DIN RAIL AND WORKING UP. THIS IS TO ENSURE TERMINALS STAY CLOSE TO THE BOTTOM FOR CUSTOMER RE-CONNECTION OF SIGNALS.

4 – CENTERLINES TO THE CIRCUIT BREAKER MECHANISM ARE FROM THE CENTER OF THE SUB PANEL TO THE CENTER OF THE SHAFT HOLE. DIMENSIONS MUST BE OBTAINED IN ORDER FOR THE NEW BREAKER TO LINE UP WITH THE EXISTING HANDLE ON THE ENCLOSURE. ABB WILL PROVIDE A NEW HANDLE AND IT WILL BE INSTALLED BY CUSTOMER AT SITE.

UL LABEL REQUIRED

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

SCALE: ~
DRAWN: JB
DATE: 9/2/15
CHECKED: JG 9/11/15

APPROVALS

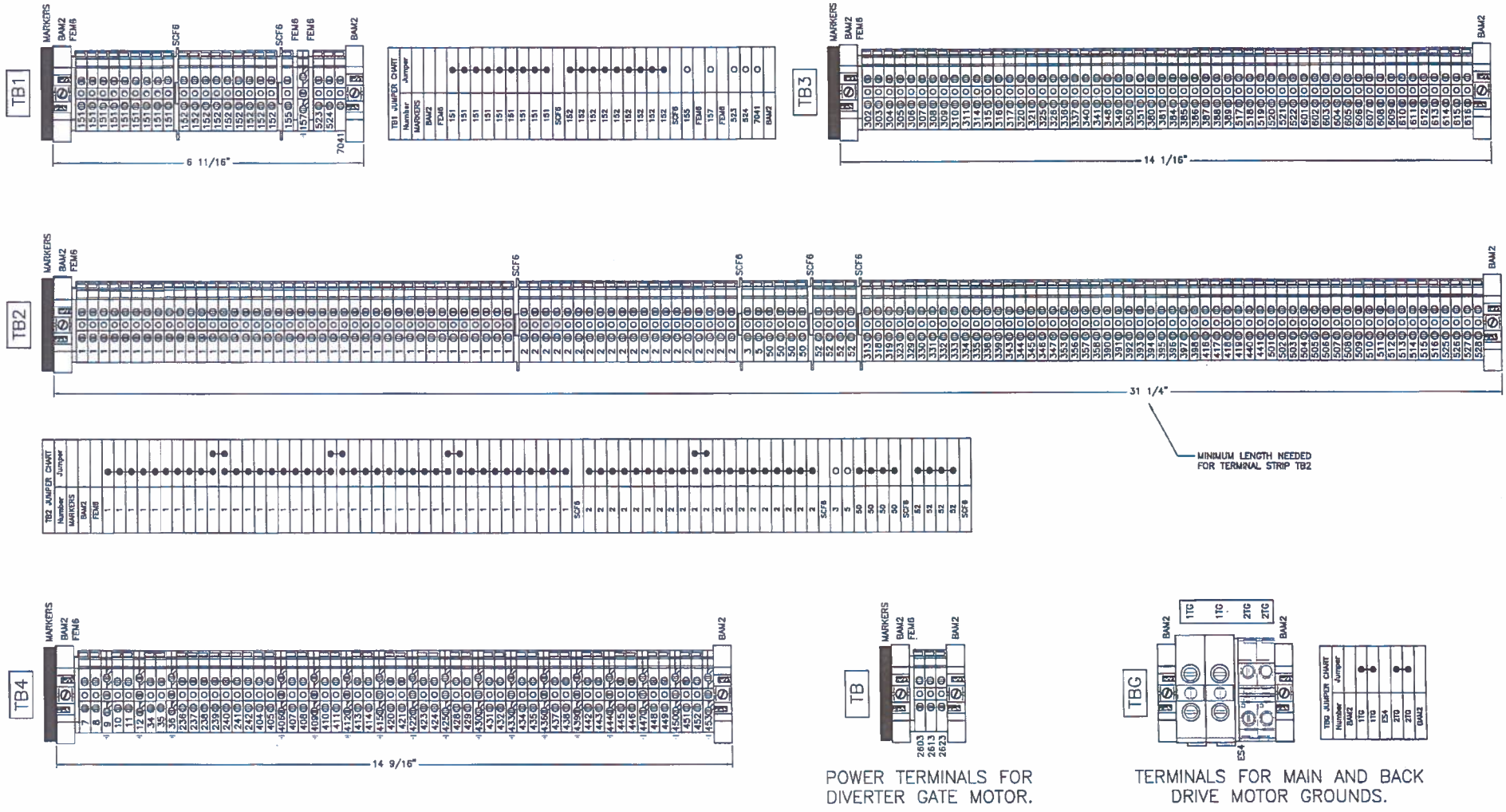
	ENG'R	MET.	Q.C.
	CCJ	~	PWF

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:
ABB PROJECT #: U8364/E00016011
MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 STARTER PANEL PANEL LAYOUT (NEW PANEL)
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 19 OF 23



REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR, SEDONA, AZ, 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 9/29/15
ABB PROJECT #: U8364/E00016011

APPROVALS

	ENG'G	MFG.	Q.C.
		~	PWF

MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 STARTER PANEL TERMINAL BLOCK LAYOUT
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 20 OF 23

TIGHTEN LUG MOUNTING BOLTS, CABLE CONNECTIONS AND GROUND CONNECTIONS TO THESE RATINGS.

TORQUE SETTINGS

TAGNAME	CAT	USER3
ACS303	ACS800-U1-0120-5+P901	WIRE/CABLE - 14.8 - 29.5 LBF FT : GND - 5.9 LBF FT
ACS403	ACS800-U1-0020-5+P901	WIRE/CABLE - 1.1 LBF FT : LUGS MOUNTING - --- : GND - 1.1 LBF FT
CB206	T4HQ250BW	WIRE/CABLE - 274 LB IN : LUG MOUNTING - 79 LB IN : GND - ---
FU307	82003J	WIRE/CABLE - 375 LB IN : LUGS MOUNTING - --- : GND - ---
FU320	US142I	WIRE/CABLE -35 LBS IN : LUGS MOUNTING - --- : GND - ---
FU321	US142I	WIRE/CABLE -35 LBS IN : LUGS MOUNTING - --- : GND - ---
FU421	US142I	WIRE/CABLE -35 LBS IN : LUGS MOUNTING - --- : GND - ---
M253	A26R-30-10-84	WIRE/CABLE - 15 LB IN : LUGS MOUNTING - --- : GND - ---
M528	AF145-30-11-72	WIRE/CABLE - 160-177 LB IN : LUGS MOUNTING 160-177 LB IN : GND - ---
M532	AF50-30-11-72	WIRE/CABLE - 35-40 LB IN : LUGS MOUNTING - --- : GND - ---
MS211	MS325-16	WIRE/CABLE - 14 LB IN : LUGS MOUNTING - --- : GND - ---
MS219	MS325-9.0	WIRE/CABLE - 14 LB IN : LUGS MOUNTING - --- : GND - ---
PS323	1SVR427056R0000	WIRE-INPUT - 9 LB IN : WIRE-OUTPUT - 5.5 LB IN : GND - 9 LB IN
PS324	1SVR427055R0000	WIRE-INPUT - 9 LB IN : WIRE-OUTPUT - 5.5 LB IN : GND - 9 LB IN

NOTE:
CHECK TORQUE ON LUG MOUNTING BOLTS, CABLE CONNECTIONS AND GROUND CONNECTIONS AND APPLY A PAINT TORQUE MARKING ON CONNECTIONS PRIOR TO SHIPPING (BY PANEL BUILDER). AFTER INSTALLATION (BY INSTALLING CONTRACTOR). PANEL MAINTENANCE WILL REQUIRE A RECHECK OF TORQUE EVERY SIX MONTHS (BY PLANT MAINTENANCE).

WARNING - LOOSE CONNECTIONS CAN CAUSE OVERHEATING AND LEAD TO COMPONENT DAMAGE OR FAILURE

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR, SEDONA, AZ, 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DATE:
DRAWN: JB 9/2/15
CHECKED: JG 9/29/15
ABB PROJECT #: U8364/E00016011
MACHINE TYPE: DS403

APPROVALS

ENG'G	MET.	Q.C.
	~	PWF

TITLE: SEDONA LCP-1180 STARTER PANEL TORQUE SETTINGS

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 21 OF 23

DEVICE ID	QTY	CATALOG	MFG	DESCRIPTION	CATCUT
ACS303	1	ACS800-U1-0120-5+P901	ABB DRIVES	AC DRIVE, 380-480VAC, 125HP, 155A INPUT, 157A/202A (NORMAL/MAX) OUTPUT, R6 FRAME, IP21, UL TYPE 1, CLASS T FUSE	1125
ACS324	1	NLWC-03	ABB DRIVES	FIBER OPTIC CABLE, 3M LONG (CONTAINS 2 CABLES)	282
ACS324,ACS424	2	RDCO-03	ABB DRIVES	DDCS COMMUNICATION CARD FOR INTERFACE FROM ACS800 DRIVE TO AC800M CPU	1122
ACS403	1	ACS800-U1-0020-5+P901	ABB DRIVES	AC DRIVE, 380-480VAC, 20HP, 24A INPUT, 27A/32A (NORMAL/MAX) OUTPUT, R3 FRAME, IP21, UL TYPE 1, CLASS T FUSE	1125
ACS419	1	RTAC-01	ABB DRIVES	PULSE ENCODER MODULE FOR COMMUNICATION TO ACS800 DRIVES, 15/24 VDC	1124
ACS424	1	NLWC-02	ABB DRIVES	FIBER OPTIC CABLE, 2M LONG (CONTAINS 2 CABLES)	282
AI704	1	3BSE008516R1	ABB AUTOMATION	AI810 ANALOG INPUT MODULE, 8 CHANNEL, 2 GROUPS OF 4 (ISOLATED), 24VDC, 40mA, 2W, 0(4)-20mA, 0(2)-10V	633
AI704,AO903,DI1003,DI1103,DI1203,DO1303,DO1403	7	3BSE013230R1	ABB AUTOMATION	TU810V1 COMPACT MODULE TERMINATION UNIT, 16 CHANNEL (2 GROUPS OF 8), 50V, 2A PER CHANNEL, SCREW TERMINALS	631
AO903	1	3BSE038415R1	ABB AUTOMATION	AO810V2 ANALOG OUTPUT MODULE, 8 CHANNEL, 24VDC, 200mA, 3W, 0(4)-20mA	674
CB206	1	T4HQ250BW	ABB CONTROL	T4H Tmax CIRCUIT BREAKER, THREE POLE, 250A FRAME, 65KAIC, 100% RATED ELECTRONIC TRIP UNIT	1929
CB206	1	KT4250-3	ABB CONTROL	TERMINAL LUGS, FOR T4 BREAKERS, 6AWG-350kCMIL, 250 AMPS, 3 PIECES PER PACK	1658
CB206	1	KT4250-3C	ABB CONTROL	TERMINAL LUGS, FOR T4 BREAKERS, 6AWG-350kCMIL, 250 AMPS, WITH POWER CONTROL TAPS, 3 PIECES PER PACK	1658
CB206	1	KT4LTC-3	ABB CONTROL	TERMINAL COVERS, FOR T4 BREAKERS, LOW PROFILE, 3 POLE, 2 PIECES PER PACK	1658
CB206	1	KT5VD-M	ABB CONTROL	CIRCUIT BREAKER MECHANISM BASE FOR T4 & T5 BREAKERS	1658
CB206	1	OHB125L10	ABB CONTROL	PISTOL GRIP HANDLE, FOR USE WITH .39" x .39" SHAFTS, FOR T4-T6 BREAKERS, NEMA TYPE: 1, 3R, 4, 4X, 12	1658
CB206	1	OXP10X500	ABB CONTROL	SHAFT, .39 " x .39", 19.7" LONG, FOR USE WITH PISTOL GRIP HANDLES, FOR T4-T6 BREAKERS	1658
CB206	1	CB STANDOFF2	CUSTOM	CIRCUIT BREAKER STANDOFF BRAKCET, FOR T4 BREAKERS, 13" x 5" x 6" (LxWxD) SHEET METAL PAINTED WHITE	---
CB224	1	S201U-K16	ABB CONTROL	1-POLE CIRCUIT BREAKER, 16 AMP 480Y/277VAC, 10kA INTERRUPTING, K-CURVE, UL RATED	962
CB241,CB244,CB259	3	S201-K4	ABB CONTROL	1-POLE CIRCUIT BREAKER, 4 AMP, 480Y/277VAC, 10kA INTERRUPTING, K-CURVE	132
CB250	1	S201-K3	ABB CONTROL	1-POLE CIRCUIT BREAKER, 3 AMP, 480Y/277VAC, 10kA INTERRUPTING, K-CURVE	132
CR1307	1	2966692	PHOENIX CONTACT	PLUG IN BRIDGE FOR RELAYS, BLUE, 500mm LONG, INSULATED, FINGER SAFE	1735
CR1307,CR1314,CR1317,CR1324,CR1328,CR1331,CR1339,CR1342,CR1346,CR1349, CR1353,CR1356,CR1360,CR1363,CR1407,CR1410,CR1417,CR1421,CR1424,CR1428, CR1431,CR1436,CR1442,CR1446,CR1449,CR1453,CR1456,CR1460,CR1463	29	2967620	PHOENIX CONTACT	CONTROL RELAY, SPDT, 24VDC COIL, 10 AMP CONTACTS, BASE - 2967772, RELAY - 2961312	475
CR1321,CR1414	2	2967073	PHOENIX CONTACT	CONTROL RELAY, DPDT, 24VDC COIL, 6 AMP CONTACTS	1400
CR238	1	2967662	PHOENIX CONTACT	CONTROL RELAY, SPDT, 120VAC COIL, 10 AMP CONTACTS, BASE - 2967811, RELAY - 2961338	475
CR524	1	RH3B-ULC-DC24V	IDEC	CONTROL RELAY, 3PDT, 24 VDC COIL, INDICATOR, CHECK BUTTON, PLUG-IN, WITH SH3B SOCKETS	272
CR524	1	SH3B-05C	IDEC	RELAY SOCKET, FINGER SAFE, DIN RAIL OR PANEL MOUNTABLE, FOR RH3B* RELAYS	272
CR638,CR642,CR646,CR650,CR654,CR658,CR662	7	SH2B-05C	IDEC	RELAY SOCKET, FINGER SAFE, DIN RAIL OR PANEL MOUNTABLE, FOR RH2B* RELAYS	272
CR638,CR642,CR646,CR650,CR654,CR658,CR662	7	RH2B-ULC-AC110-120	IDEC	CONTROL RELAY, DPDT, 110-120 VAC COIL, INDICATOR, CHECK BUTTON, PLUG-IN, WITH SH2B SOCKETS	272
DI1003,DI1103,DI1203	3	3BSE008508R1	ABB AUTOMATION	DI810 DIGITAL INPUT MODULE, 16 CHANNEL, 2 GROUPS OF 8(ISOLATED), 24VDC, 6mA PER CH., CURRENT SINKING	632
DO1303,DO1403	2	3BSE008510R1	ABB AUTOMATION	DO810 DIGITAL OUTPUT MODULE, 16 CHANNEL, 2 GROUPS OF 8(ISOLATED), 24VDC, 0.5A PER CH.	554
ES561	1	943 824-002	HIRSCHMANN	ETHERNET SWITCH, 5 PORT, RJ45, 10/100 BASE-T, 24 VDC	1488
FU1303,FU1366,FU1403,FU1466	4	GMA6	BUSSMANN	FUSE - GLASS, FAST ACTING 6 AMPS, 125 VAC, 5mm X 20mm	34
FU1303,FU1366,FU1403,FU1466,FU556,FU703,FU829,FU903	8	0115 663.23	ABB CONTROL	FUSE HOLDER FOR 5mm X 20mm GLASS FUSES, 24 VDC, DIODE LED INDICATOR	22
FU307	3	HSJ200	MERSEN	FUSE - HIGH SPEED CLASS J, 200 AMP, 600VAC/500VDC, USE WITH 6200 STYLE FUSE BLOCKS	2778
FU307	1	62003J	MERSEN	3 POLE FUSE BLOCK - CLASS J, 600VAC/DC, 101-200AMPS, 6AWG-350KCMIL, SIDE-CLIP, COPPER/ALUMINUM WIRE	2775
FU320	2	FWP-5A14F	BUSSMANN	FUSE - SEMICONDUCTOR, 5A, 690-700VAC, 800VDC, 14mm x 51mm	332
FU320,FU321,FU421	3	US1421	MERSEN	2 POLE FUSE HOLDER - SEMICONDUCTORS, 750VAC/DC, 50AMPS, FOR 14 x 51mm FUSES, WITH INDICATOR	2448
FU321	2	FWP-3A14F	BUSSMANN	FUSE - SEMICONDUCTOR, 3A, 690-700VAC, 14mm x 51mm	332
FU330	1	KLM-20	BUSSMANN	FUSE - 20AMPS, 600VDC, MIDGET 13/32 X 1-1/2	2594
FU330,FU331	2	USM1I-DC24	MERSEN	1 POLE FUSE HOLDER - MIDGET, 24VDC, 30AMPS, FOR 10.3mm X 38mm, (13/32" x 1-1/2") FUSES, WITH INDICATOR	2448
FU331	1	KLM-10	BUSSMANN	FUSE - 10AMPS, 600VDC, MIDGET 13/32 X 1-1/2	2594
FU421	2	FWP-50A14F	BUSSMANN	FUSE - SEMICONDUCTOR, 50A, 690-700VAC, 800VDC, 14mm x 51mm	332
FU556	1	GMA2	BUSSMANN	FUSE - GLASS, FAST ACTING 2 AMPS, 240 VAC, 5mm X 20mm	34
FU703,FU829	2	GMA63MA	BUSSMANN	FUSE - GLASS, FAST ACTING 63 mA, 240 VAC, 5mm X 20mm	34
FU903	1	GMA200MA	BUSSMANN	FUSE - GLASS, FAST ACTING 200 mA, 240 VAC, 5mm X 20mm	34
GND206	1	GND BLOCK_2	CUSTOM	GROUND BLOCK, 12" X 2"	---
KFD707	1	KFD2-UFC-1.D	PEPPERL & FUCHS	FREQUENCY CONVERTER, DIGITAL INPUT TO ANALOG OUTPUT, 20-30VDC POWER, (2) RELAY OUTS, PROGRAMMABLE, 0.0001-12K Hz.	1769
M253	1	A26R-30-10-84	ABB CONTROL	A-LINE CONTACTOR, UL RATED, REVERSING, 3 PHASE, 600V, 28A MOTOR SWITCHING CURRENT, 20HP, 110-120VAC COIL, 1 N.O. AUX.	1345
M528	1	AF145-30-11-72	ABB CONTROL	A-LINE CONTACTOR, UL RATED, 3 PHASE, 600V, 130A SWITCHING CURRENT, 100HP, 20-60VDC COIL, (1) CAL18-11 AUX. CONTACT BLOCK	1155
M528	2	ATK185	ABB CONTROL	LUG KIT, FOR A/AF145-185 CONTACTORS AND OVERLOADS, 6-250 MCM, 3 PIECES PER PACK	1430
M528	1	LT185-AL	ABB CONTROL	TERMINAL SHOURD, EXTENDED MOUNT, FOR AF145-185 CONTACTORS, 2 PIECES PER PACK	1864
M532	1	AF50-30-11-72	ABB CONTROL	A-LINE CONTACTOR, 3 PHASE, 600V, UL RATED, 20-60VDC COIL, 54A SWITCHING CURRENT, 40HP, (1) CAL5-11 AUX. CONTACT BLOCK	227
MCR715	1	28 14 60 5	PHOENIX CONTACT	UNIVERSAL FREQUENCY TRANSDUCER, MCR-F-UI-DC, 20-30VDC POWER, 0-10V/(0)4-20mA INPUT, 0-10V/(0)4-20mA OUTPUT, .1-120kHZ.	648

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

SCALE: ~	DATE:	APPROVALS		
		ENG'R	MFT.	Q.C.
DRAWN: JB	9/2/15			
CHECKED: JG	10/1/15	CCJ	~	PWF

FILE: SEDONA LCP-1180 UPGRADE.ZIP
ABB PROJECT #: U8364/ED0016011
MACHINE TYPE: DS403
FOLDER LOCATION:

TITLE: SEDONA LCP-1180 STARTER PANEL BILL OF MATERIALS

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 22 OF 23

DEVICE ID	QTY	CATALOG	MFG	DESCRIPTION	CATCUT
MS211	1	MS325-16	ABB CONTROL	MANUAL MOTOR STARTER, 3-POLE, 600VAC, 12.5 - 16AMP SETTING, 25A OPERATING CURRENT, IP20 RATED	97
MS211	1	MS325-HK11	ABB CONTROL	AUXILIARY CONTACT BLOCK, 1 N.O. 1 N.C., SIDE MOUNT, FOR MS325 MANUAL STARTERS	355
MS211,MS219	2	S3-M3	ABB CONTROL	LINE SIDE FEEDER BLOCK FOR MS325, REQUIRED FOR UL 508 TYPE E	1963
MS219	1	MS325-9.0	ABB CONTROL	MANUAL MOTOR STARTER, 3-POLE, 600VAC, 6.3 - 9AMP SETTING, 25A OPERATING CURRENT, IP20 RATED	97
PANEL01	1	A72P72	HOFFMAN	SUBPANEL, PAINTED WHITE, 68" x 68", FOR 72" x 72" FLOOR MOUNT ENCLOSURES	1356
PANEL01	1	UL LABEL	CUSTOM	UL LABEL REQUIRED FOR PANEL	---
PANEL02	6	F2X3LG6	PANDUIT	WIRING DUCT, NARROW SLOTTED, LIGHT GRAY, 2.00" WIDE x 3.00" HIGH, 6 FOOT PER PIECE	2882
PANEL02	6	C2LG6-F	PANDUIT	COVER FOR WIRING DUCT, 2.00" WIDE, LIGHT GRAY, WITH PROTECTIVE FILM COVER, 6 FOOT PER PIECE	2883
PANEL03	2	F1X2LG6	PANDUIT	WIRING DUCT, NARROW SLOTTED, LIGHT GRAY, 1.00" WIDE x 2.00" HIGH, 6 FOOT PER PIECE	2882
PANEL03	2	C1LG6-F	PANDUIT	COVER FOR WIRING DUCT, 1.00" WIDE, LIGHT GRAY, WITH PROTECTIVE FILM COVER, 6 FOOT PER PIECE	2883
PANEL04	6	010159826	ABB CONTROL	ZINC/STEEL DIN RAIL EN 50022 (35mm x 15mm x 2m)	2732
PANEL05	2	VPCI-111	CORTEC CORP	CORROSION INHIBITOR	1487
PM538	1	3BSED68485R1	ABB AUTOMATION	PM851A PROCESSOR UNIT, 24VDC/180mA POWER, 8MB RAM, 48 MHz, (2) ETHERNET, (2) RS232 COM. PORTS, BATTERY, TP830 BASE	849
PM538,PP555	2	SAMSCF-256	SANDISK	MEMORY CARD, 256MB COMPLACT FLASH CARD, WITH GENUINE SAMSUNG MEMORY	---
PP555	1	3BSED42238R2	ABB AUTOMATION	PP846A PROCESS PANEL, 24VDC/1A POWER, 4MB RAM, (1)ETHERNET, (2)USB, (1)RS232, (1)RS422/485, 10.4" DISPLAY, NEMA 4	1784
PP555	1	CUSTOM MOUNTING PLATE	CUSTOM	CUSTOM MOUNTING PLATE FOR HMI, NEMA 4X STAINLESS STEEL, WITH GASKETING AND HARDWARE, SEE DRAWINGS FOR DIMENSIONS	---
PS323	1	1SVR427056R0000	ABB CONTROL	POWER SUPPLY, THREE-PHASE, CP-T 24/20.0, INPUT: 340-575VAC, 480-820 VDC, OUTPUT: 24VDC/20A	2215
PS324	1	1SVR427055R0000	ABB CONTROL	POWER SUPPLY, THREE-PHASE, CP-T 24/10.0, INPUT: 340-575VAC, 480-820 VDC, OUTPUT: 24VDC/10A	2214
RECPT250	1	1SNA892481R1500	ABB CONTROL	DUPLEX RECEPTACLE, DIN RAIL MOUNTED, 125 VAC, 15 AMPS MAX, UL APPROVED	1720
RECPT250	1	NP_RECEPTACLE	CUSTOM	LABEL - RECEPTACLE NAMEPLATE, REQUIRED FOR U.L., SEE LAYOUT FOR DESCRIPTION AND SIZE	---
SP227	1	28 39 33 4	PHOENIX CONTACT	SURGE PROTECTOR, 120 VAC, PT-2-PE/S-120AC-ST	1770
SP227	1	28 39 28 2	PHOENIX CONTACT	BASE UNIT FOR SURGE PROTECTOR, PT-BE/FM	1770
T221	1	X42K1	ABB CONTROL	INDUSTRIAL CONTROL TRANSFORMER, 2000VA, 480VAC PRIMARY, 115VAC SECONDARY	390
T221	2	TPTC-2002	ABB CONTROL	IP20 FINGER SAFE TERMINAL COVER, FOR 6 TERMINALS ON 350VA TO 5KVA ABB TRANSFORMERS	2725
TAS244	1	TWR60	HOFFMAN	THERMOSTAT, 100-250VAC, 1 N.O. CONACT, 32-140 DEGREES F., USED WITH SF STYLE FANS	2658
TB,TB1,TB2,TB3,TB4	249	0115 116.07	ABB CONTROL	TERMINAL BLOCK - M 4/6, GREY, FEED THROUGH, 30AMPS, 22-10AWG	21
TB,TB1,TB2,TB3,TB4	7	0118 388.16	ABB CONTROL	END SECTION - FEM6, GREY, FOR M4/6, M6/8, M10/10 TERMINALS	21
TB,TB1,TB2,TB3,TB4	5	0822194	PHOENIX CONTACT	TERMINAL MARKERS, SNAP IN, UC2F-TM6, 5 x 4mm, BLANK LABELS, 80 PER SHEET, 10 SHEET PER BOX, FOR ABB TERMINALS	2609
TB,TB1,TB2,TB3,TB4,TBG	26	0206 351.16	ABB CONTROL	END STOP - BAM2, SCREW CLAMP FOR RAIL CONATCT	19
TB1,TB2	6	0118 707.03	ABB CONTROL	SEPARATOR END SECTION - SCF6, GREY, FOR M4/6, M6/8, M10/10 TERMINALS	1700
TB1,TB2	8	0176 867.04	ABB CONTROL	JUMPER BAR, ASSEMBLED - 10 POSITION, BJM6-10, FOR M4/6 TERMINALS, 10 PIECES PER PACK	1114
TB1,TB4	18	0165 113.16	ABB CONTROL	TERMINAL BLOCK FOR GROUND WIRES - M 4/6.P, GREEN/YELLOW, FEED THROUGH, 30AMPS, 22-10AWG, W/RAIL CONTACT	1086
TBG	2	1SNK 516 010 R0000	ABB CONTROL	TERMINAL BLOCK - ZS35, GREY, FEED THROUGH, 150AMPS, 14-1/0AWG	2848
TBG	1	1SNK 916 302 R0000	ABB CONTROL	JUMPER BAR, ASSEMBLED - 2 POSITION, JB16-2, FOR ZS35 TERMINALS	2848
TBG	2	1SNK 510 010 R0000	ABB CONTROL	TERMINAL BLOCK - ZS16, GREY, FEED THROUGH, 67AMPS, 14-4AWG	2852
TBG	1	1SNK 910 302 R0000	ABB CONTROL	JUMPER BAR, ASSEMBLED - 2 POSITION, JB10-2, FOR ZS16 TERMINALS	2852
TBG	1	1SNK 505 910 R0000	ABB CONTROL	END SECTION - ES4, GREY, FOR ZS4-ZS25 TERMINALS	2855
TPR505,TPR515	2	1SVR730700R0100	ABB CONTROL	THERMISTOR PROTECTION RELAY, CM-MSS-12S, 24VAC/DC COIL, POWER AND TRIP INDICATION LIGHTS, AUTO RESET, 1 C/O CONTACT	2941

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DATE:
DRAWN: JB 9/2/15
CHECKED: JG 9/8/15
ABB PROJECT #: U8364/ED0016011

APPROVALS: ENG'G | MFG. | Q.C.
MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 STARTER PANEL BILL OF MATERIALS
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O. 1828980

ALFA LAVAL
835 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733636
SHEET 23 OF 23

WIRE NO.	LOCATION 1	COMPONENT 1	PIN 1	LOCATION 2	COMPONENT 2	PIN 2	COMPONENT DESCRIPTION	POWER DESCRIPTION
L1	CUSTOMER		L1	STARTER PANEL	CB206	L1	MAIN INCOMING POWER PHASE 1	460VAC POWER FEED
L2	CUSTOMER		L2	STARTER PANEL	CB206	L2	MAIN INCOMING POWER PHASE 2	460VAC POWER FEED
L3	CUSTOMER		L3	STARTER PANEL	CB206	L3	MAIN INCOMING POWER PHASE 3	460VAC POWER FEED
GND	CUSTOMER		GND	STARTER PANEL	GND206		MAIN INCOMING GROUND	GROUND WIRE
1T1	STARTER PANEL	M528	2T1	CENTRIFUGE	M330	T1 & T6	MAIN DRIVE MOTOR POWER PHASE 1	460VAC MOTOR POWER
1T2	STARTER PANEL	M528	4T2	CENTRIFUGE	M330	T2 & T4	MAIN DRIVE MOTOR POWER PHASE 2	460VAC MOTOR POWER
1T3	STARTER PANEL	M528	6T3	CENTRIFUGE	M330	T3 & T5	MAIN DRIVE MOTOR POWER PHASE 3	460VAC MOTOR POWER
GND	STARTER PANEL	TBG	1TG	CENTRIFUGE	M330	G	MAIN DRIVE MOTOR GROUND	MOTOR GROUND
2T1	STARTER PANEL	M532	2T1	CENTRIFUGE	M431	T1	BACK DRIVE MOTOR POWER PHASE 1	460VAC MOTOR POWER
2T2	STARTER PANEL	M532	4T2	CENTRIFUGE	M431	T2	BACK DRIVE MOTOR POWER PHASE 2	460VAC MOTOR POWER
2T3	STARTER PANEL	M532	6T3	CENTRIFUGE	M431	T3	BACK DRIVE MOTOR POWER PHASE 3	460VAC MOTOR POWER
GND	STARTER PANEL	TBG	2TG	CENTRIFUGE	M431	G	BACK DRIVE MOTOR GROUND	MOTOR GROUND
2603	STARTER PANEL	TB	2603	FIELD	MTR260	T1	DIVERTER GATE MOTOR POWER PHASE 1	460VAC MOTOR POWER
2613	STARTER PANEL	TB	2613	FIELD	MTR260	T2	DIVERTER GATE MOTOR POWER PHASE 2	460VAC MOTOR POWER
2623	STARTER PANEL	TB	2623	FIELD	MTR260	T3	DIVERTER GATE MOTOR POWER PHASE 3	460VAC MOTOR POWER
GND	STARTER PANEL	GND206	GND	FIELD	MTR260	GND	DIVERTER GATE MOTOR GROUND	MOTOR GROUND
155	STARTER PANEL	TB1	155	CENTRIFUGE	MTR253	ORG & BLU	BACK DRIVE BLOWER MOTOR HOT	115VAC POWER FEED
152	STARTER PANEL	TB1	152	CENTRIFUGE	MTR253	WHT & YEL	BACK DRIVE BLOWER MOTOR NEUTRAL	115VAC NEUTRAL FEED
GND	STARTER PANEL	TB1	157	CENTRIFUGE	MTR253	GRN	BACK DRIVE BLOWER MOTOR GROUND	GROUND WIRE
523	STARTER PANEL	TB1	523	LCP-1181	TB	523	CONVEYOR/SLUDGE PUMPS SELECT TO LCP-1181	115VAC POWER FEED
524	STARTER PANEL	TB1	524	LCP-1181	TB	524		115VAC POWER FEED

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DRAWN: JB 9/2/15
CHECKED: JG 9/29/15
ABB PROJECT #: U8364/E00016011

APPROVALS

	ENG'R	MET.	Q.C.
		~	PWF

MACHINE TYPE: DS403

TITLE: SEDONA LCP-1180 INTERCONNECT 460VAC/115VAC POWER
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O.

ALFA LAVAL
685 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733637
SHEET 1 OF 4

WIRE NO.	LOCATION 1	COMPONENT 1	PIN 1	LOCATION 2	COMPONENT 2	PIN 2	COMPONENT DESCRIPTION	POWER DESCRIPTION
1	STARTER PANEL	TB2	1	CENTRIFUGE	TB	1	VIBRATION SWITCH 24VDC	24VDC POWER FEED
2	STARTER PANEL	TB2	2	CENTRIFUGE	TB	2	VIBRATION SWITCH 0VDC	0VDC COMMON
3	STARTER PANEL	TB2	3	CENTRIFUGE	TB	3	VIBRATION SWITCH TRIP	24VDC POWER FEED
1	STARTER PANEL	TB2	1	CENTRIFUGE	TB	1	DECANTER COVER SWITCH	24VDC POWER FEED
5	STARTER PANEL	TB2	5	CENTRIFUGE	TB	5		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	DIVERTER GATE OPEN	24VDC POWER FEED
330	STARTER PANEL	TB2	330	CUSTOMER	CC	330		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	DIVERTER GATE CLOSED	24VDC POWER FEED
331	STARTER PANEL	TB2	331	CUSTOMER	CC	331		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	SLUDGE FEED #1 FAULT	24VDC POWER FEED
313	STARTER PANEL	TB2	313	CUSTOMER	CC	313		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	SLUDGE FEED #2 FAULT	24VDC POWER FEED
353	STARTER PANEL	TB2	353	CUSTOMER	CC	353		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	POLYMER FEED #1 RUNNING	24VDC POWER FEED
318	STARTER PANEL	TB2	318	CUSTOMER	CC	318		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	POLYMER FEED #1 FAULT	24VDC POWER FEED
319	STARTER PANEL	TB2	319	CUSTOMER	CC	319		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	GRINDER #1 RUNNING	24VDC POWER FEED
338	STARTER PANEL	TB2	338	CUSTOMER	CC	338		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	GRINDER #1 FAULT	24VDC POWER FEED
339	STARTER PANEL	TB2	339	CUSTOMER	CC	339		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	REMOTE AUTO START	24VDC POWER FEED
344	STARTER PANEL	TB2	344	CUSTOMER	CC	344		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	REMOTE AUTO STOP	24VDC POWER FEED
345	STARTER PANEL	TB2	345	CUSTOMER	CC	345		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	REMOTE CIP START	24VDC POWER FEED
346	STARTER PANEL	TB2	346	CUSTOMER	CC	346		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	REMOTE CIP STOP	24VDC POWER FEED
347	STARTER PANEL	TB2	347	CUSTOMER	CC	347		24VDC POWER FEED
1	STARTER PANEL	TB2	1	CUSTOMER	CC	1	SLUDGE CONTROL VALVE FAIL	24VDC POWER FEED
357	STARTER PANEL	TB2	357	CUSTOMER	CC	357		24VDC POWER FEED
1	STARTER PANEL	TB2	1	LCP-1130	CC	1	GRINDER IN REMOTE (FROM LCP-1130)	24VDC POWER FEED
416	STARTER PANEL	TB2	416	LCP-1130	CC	416		24VDC POWER FEED
440	STARTER PANEL	TB2	440	FIELD	PB619.1	1	REMOTE EMERGENCY STOP PUSH BUTTON	24VDC POWER FEED
441	STARTER PANEL	TB2	441	FIELD	PB619.1	2		24VDC POWER FEED
501	STARTER PANEL	TB2	501	CUSTOMER		1	SLUDGE FEED #1 RUNNING	24VDC POWER FEED
502	STARTER PANEL	TB2	502	CUSTOMER		2		24VDC POWER FEED
503	STARTER PANEL	TB2	503	LCP-1181	TB	503	SLUDGE FEED #1 RUNNING	24VDC POWER FEED
504	STARTER PANEL	TB2	504	LCP-1181	TB	504		24VDC POWER FEED
505	STARTER PANEL	TB2	505	CUSTOMER		1	SLUDGE FEED #2 RUNNING	24VDC POWER FEED
506	STARTER PANEL	TB2	506	CUSTOMER		2		24VDC POWER FEED
507	STARTER PANEL	TB2	507	LCP-1181	TB	507	SLUDGE FEED #2 RUNNING	24VDC POWER FEED
508	STARTER PANEL	TB2	508	LCP-1181	TB	508		24VDC POWER FEED
509	STARTER PANEL	TB2	509	CUSTOMER		1	CONVEYOR RUNNING	24VDC POWER FEED
510	STARTER PANEL	TB2	510	CUSTOMER		2		24VDC POWER FEED
511	STARTER PANEL	TB2	511	LCP-1181	TB	511	CONVEYOR RUNNING	24VDC POWER FEED
512	STARTER PANEL	TB2	512	LCP-1181	TB	512		24VDC POWER FEED
513	STARTER PANEL	TB2	513	CUSTOMER		1	CONVEYOR FAULT	24VDC POWER FEED
514	STARTER PANEL	TB2	514	CUSTOMER		2		24VDC POWER FEED
515	STARTER PANEL	TB2	515	LCP-1181	TB	515	CONVEYOR FAULT	24VDC POWER FEED
516	STARTER PANEL	TB2	516	LCP-1181	TB	516		24VDC POWER FEED
525	STARTER PANEL	TB2	525	LCP-1181	TB	525	POLYMER #2 SELECTED	24VDC POWER FEED
526	STARTER PANEL	TB2	526	LCP-1181	TB	526		24VDC POWER FEED
527	STARTER PANEL	TB2	527	LCP-1181	TB	527	SLUDGE GRINDER #2 SELECTED	24VDC POWER FEED
528	STARTER PANEL	TB2	528	LCP-1181	TB	528		24VDC POWER FEED

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

FILE: SEDONA LCP-1180 UPGRADE.ZIP
FOLDER LOCATION:

SCALE: ~
DATE:
DRAWN: JB 9/2/15
CHECKED: JTG 9/29/15
ABB PROJECT #: U8364/ED0018011
MACHINE TYPE: DS403

APPROVALS

ENG'R	MET.	Q.C.
	~	

TITLE: SEDONA LCP-1180 INTERCONNECT 24VDC SIGNALS

PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O.

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733637
SHEET 2 OF 4

WIRE NO.	LOCATION 1	COMPONENT 1	PIN 1	LOCATION 2	COMPONENT 2	PIN 2	COMPONENT DESCRIPTION	POWER DESCRIPTION
302	STARTER PANEL	TB3	302	CUSTOMER	CC	302	CENTRIFUGE RUNNING	DRY CONTACT TO CUSTOMER
303	STARTER PANEL	TB3	303	CUSTOMER	CC	303		DRY CONTACT TO CUSTOMER
304	STARTER PANEL	TB3	304	CUSTOMER	CC	304	COMMON ALARM	DRY CONTACT TO CUSTOMER
305	STARTER PANEL	TB3	305	CUSTOMER	CC	305		DRY CONTACT TO CUSTOMER
306	STARTER PANEL	TB3	306	CUSTOMER	CC	306	COMMON ALERT	DRY CONTACT TO CUSTOMER
307	STARTER PANEL	TB3	307	CUSTOMER	CC	307		DRY CONTACT TO CUSTOMER
308	STARTER PANEL	TB3	308	CUSTOMER	CC	308	SLUDGE FEED PERMISSIVE	DRY CONTACT TO CUSTOMER
309	STARTER PANEL	TB3	309	CUSTOMER	CC	309		DRY CONTACT TO CUSTOMER
310	STARTER PANEL	TB3	310	CUSTOMER	CC	310	SLUDGE FEED #1 START/STOP	DRY CONTACT TO CUSTOMER
311	STARTER PANEL	TB3	311	CUSTOMER	CC	311		DRY CONTACT TO CUSTOMER
314	STARTER PANEL	TB3	314	CUSTOMER	CC	314	POLYMER FEED PERMISSIVE	DRY CONTACT TO CUSTOMER
315	STARTER PANEL	TB3	315	CUSTOMER	CC	315		DRY CONTACT TO CUSTOMER
316	STARTER PANEL	TB3	316	CUSTOMER	CC	316	POLYMER FEED #1 START/STOP	DRY CONTACT TO CUSTOMER
317	STARTER PANEL	TB3	317	CUSTOMER	CC	317		DRY CONTACT TO CUSTOMER
320	STARTER PANEL	TB3	320	CUSTOMER	CC	320	FLUSH WATER	DRY CONTACT TO CUSTOMER
321	STARTER PANEL	TB3	321	CUSTOMER	CC	321		DRY CONTACT TO CUSTOMER
325	STARTER PANEL	TB3	325	CUSTOMER	CC	325	CONVEYOR START/STOP	DRY CONTACT TO CUSTOMER
326	STARTER PANEL	TB3	326	CUSTOMER	CC	326		DRY CONTACT TO CUSTOMER
336	STARTER PANEL	TB3	336	CUSTOMER	CC	336	DIVERTER GATE FLUSH WATER	DRY CONTACT TO CUSTOMER
337	STARTER PANEL	TB3	337	CUSTOMER	CC	337		DRY CONTACT TO CUSTOMER
340	STARTER PANEL	TB3	340	CUSTOMER	CC	340	GRINDER START/STOP	DRY CONTACT TO CUSTOMER
341	STARTER PANEL	TB3	341	CUSTOMER	CC	341		DRY CONTACT TO CUSTOMER
348	STARTER PANEL	TB3	348	CUSTOMER	CC	348	CIP RUNNING	DRY CONTACT TO CUSTOMER
349	STARTER PANEL	TB3	349	CUSTOMER	CC	349		DRY CONTACT TO CUSTOMER
350	STARTER PANEL	TB3	350	CUSTOMER	CC	350	CIP FLUSH WATER	DRY CONTACT TO CUSTOMER
351	STARTER PANEL	TB3	351	CUSTOMER	CC	351		DRY CONTACT TO CUSTOMER
380	STARTER PANEL	TB3	380	CUSTOMER	CC	380	SLUDGE FEED #2 START/STOP	DRY CONTACT TO CUSTOMER
381	STARTER PANEL	TB3	381	CUSTOMER	CC	381		DRY CONTACT TO CUSTOMER
384	STARTER PANEL	TB3	384	CUSTOMER	CC	384	CENTRIFUGE START	DRY CONTACT TO CUSTOMER
385	STARTER PANEL	TB3	385	CUSTOMER	CC	385		DRY CONTACT TO CUSTOMER
386	STARTER PANEL	TB3	386	CUSTOMER	CC	386	CONVEYOR FLUSH WATER	DRY CONTACT TO CUSTOMER
387	STARTER PANEL	TB3	387	CUSTOMER	CC	387		DRY CONTACT TO CUSTOMER
388	STARTER PANEL	TB3	388	CUSTOMER	CC	388	REMOTE MODE	DRY CONTACT TO CUSTOMER
389	STARTER PANEL	TB3	389	CUSTOMER	CC	389		DRY CONTACT TO CUSTOMER
517	STARTER PANEL	TB3	517	LCP-1181	TB	517	SLUDGE FEED #1 START/STOP	DRY CONTACT TO LCP-1181
518	STARTER PANEL	TB3	518	LCP-1181	TB	518		DRY CONTACT TO LCP-1181
519	STARTER PANEL	TB3	519	LCP-1181	TB	519	SLUDGE FEED #2 START/STOP	DRY CONTACT TO LCP-1181
520	STARTER PANEL	TB3	520	LCP-1181	TB	520		DRY CONTACT TO LCP-1181
521	STARTER PANEL	TB3	521	LCP-1181	TB	521	CONVEYOR START/STOP	DRY CONTACT TO LCP-1181
522	STARTER PANEL	TB3	522	LCP-1181	TB	522		DRY CONTACT TO LCP-1181

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

SCALE:	DATE:
~	
DRAWN: JB	9/2/15
CHECKED: JG	9/9/15

APPROVALS		
ENG'R	MET.	Q.C.
CK	~	PWF

FILE: SEDONA LCP-1180 UPGRADE.ZIP
ABB PROJECT #: UB364/E00016011
MACHINE TYPE: DS403
FOLDER LOCATION:

TITLE: SEDONA LCP-1180 INTERCONNECT DRY CONTACT SIGNALS
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O.

ALFA LAVAL
855 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733637
SHEET 3 OF 4

WIRE NO.	LOCATION 1	COMPONENT 1	PIN 1	LOCATION 2	COMPONENT 2	PIN 2	COMPONENT DESCRIPTION	POWER DESCRIPTION
7	STARTER PANEL	TB4	7	CENTRIFUGE	M330	P1	MAIN DRIVE MOTOR THERMISTOR	THERMISTOR WIRING
8	STARTER PANEL	TB4	8	CENTRIFUGE	M330	P2		THERMISTOR WIRING
SH	STARTER PANEL	TB4	9	CENTRIFUGE	M330			SHIELD
10	STARTER PANEL	TB4	10	CENTRIFUGE	M431	P1	BACK DRIVE MOTOR THERMISTOR	THERMISTOR WIRING
11	STARTER PANEL	TB4	11	CENTRIFUGE	M431	P2		THERMISTOR WIRING
SH	STARTER PANEL	TB4	12	CENTRIFUGE	M330			SHIELD
34	STARTER PANEL	TB4	34	CENTRIFUGE	NS709	BRN	BOWL SPEED PICK-UP	ANALOG 4-20MA SIGNAL
35	STARTER PANEL	TB4	35	CENTRIFUGE	NS709	BLU		ANALOG 4-20MA SIGNAL
SH	STARTER PANEL	TB4	36	CENTRIFUGE				SHIELD
236	STARTER PANEL	TB4	236	CENTRIFUGE	ENC506	3	BACK DRIVE ENCODER MODULE - A+	ANALOG PULSE SIGNAL
237	STARTER PANEL	TB4	237	CENTRIFUGE	ENC506	8	BACK DRIVE ENCODER MODULE - A-	ANALOG PULSE SIGNAL
238	STARTER PANEL	TB4	238	CENTRIFUGE	ENC506	2	BACK DRIVE ENCODER MODULE - B+	ANALOG PULSE SIGNAL
239	STARTER PANEL	TB4	239	CENTRIFUGE	ENC506	7	BACK DRIVE ENCODER MODULE - B-	ANALOG PULSE SIGNAL
240	STARTER PANEL	TB4	240	CENTRIFUGE	ENC506	4	BACK DRIVE ENCODER MODULE - 0V	ANALOG 0V SIGNAL
241	STARTER PANEL	TB4	241	CENTRIFUGE	ENC506	9	BACK DRIVE ENCODER MODULE - +15V	ANALOG +15V SIGNAL
SH	STARTER PANEL	TB4	242	CENTRIFUGE	ENC506	1	BACK DRIVE ENCODER MODULE - SH	SHIELD
404	STARTER PANEL	TB4	404	CUSTOMER	CC	404	SLUDGE FEED FLOW RATE 4-20MA (0-200GPM)	ANALOG 4-20MA SIGNAL
405	STARTER PANEL	TB4	405	CUSTOMER	CC	405		ANALOG 4-20MA SIGNAL
SH	STARTER PANEL	TB4	406	CUSTOMER	CC	406		SHIELD
407	STARTER PANEL	TB4	407	CUSTOMER	CC	407	SLUDGE FEED SPEED CONTROL 4-20MA	ANALOG 4-20MA SIGNAL
408	STARTER PANEL	TB4	408	CUSTOMER	CC	408		ANALOG 4-20MA SIGNAL
SH	STARTER PANEL	TB4	409	CUSTOMER	CC	409		SHIELD
410	STARTER PANEL	TB4	410	CUSTOMER	CC	410	POLYMER FEED FLOW RATE 4-20MA	ANALOG 4-20MA SIGNAL
411	STARTER PANEL	TB4	411	CUSTOMER	CC	411		ANALOG 4-20MA SIGNAL
SH	STARTER PANEL	TB4	412	CUSTOMER	CC	412		SHIELD
413	STARTER PANEL	TB4	413	POLYMER SYSTEM #1	PIN	3	POLYMER FEED SPEED CONTROL 4-20MA (DIAPHRAGM PUMP CONTROL UNIT)	ANALOG 4-20MA SIGNAL
414	STARTER PANEL	TB4	414	POLYMER SYSTEM #1	PIN	2		ANALOG 4-20MA SIGNAL
SH	STARTER PANEL	TB4	415	POLYMER SYSTEM #1	PIN	1		SHIELD
428	STARTER PANEL	TB4	428	CUSTOMER	CC	428	SLUDGE FLOW CONTROL VALVE POSITION 4-20MA (0-100%)	ANALOG 4-20MA SIGNAL
429	STARTER PANEL	TB4	429	CUSTOMER	CC	429		ANALOG 4-20MA SIGNAL
SH	STARTER PANEL	TB4	430	CUSTOMER	CC	430		SHIELD
431	STARTER PANEL	TB4	431	CUSTOMER	CC	431	SLUDGE FEED REMOTE SETPOINT 4-20MA (0-200GPM)	ANALOG 4-20MA SIGNAL
432	STARTER PANEL	TB4	432	CUSTOMER	CC	432		ANALOG 4-20MA SIGNAL
SH	STARTER PANEL	TB4	433	CUSTOMER	CC	433		SHIELD
434	STARTER PANEL	TB4	434	LCP-1181	TB	401	POLYMER FEED FLOW RATE 4-20MA (TO LCP-1181)	ANALOG 4-20MA SIGNAL
435	STARTER PANEL	TB4	435	LCP-1181	TB	402		ANALOG 4-20MA SIGNAL
SH	STARTER PANEL	TB4	436	LCP-1181	TB	403		SHIELD
437	STARTER PANEL	TB4	437	LCP-1181	TB	404	SLUDGE FEED FLOW RATE 4-20MA (TO LCP-1181)	ANALOG 4-20MA SIGNAL
438	STARTER PANEL	TB4	438	LCP-1181	TB	405		ANALOG 4-20MA SIGNAL
SH	STARTER PANEL	TB4	439	LCP-1181	TB	406		SHIELD

REV.	DATE	BY	DESCRIPTION

THIS DRAWING CERTIFIED FOR:
CUSTOMER: CITY OF SEDONA
ADDRESS: 102 ROADRUNNER DR. SEDONA, AZ. 86336
PROJECT: CITY OF SEDONA, WWTP CONTROLS UPGRADE
SOLD TO: CITY OF SEDONA
PURCHASE ORDER #:
ALFA LAVAL PO #: 1828980
CONSULTING ENG.:
CERTIFIED BY: DATE:

ALL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE & LOCAL CODES.

SCALE:	DATE:	APPROVALS		
DRAWN: JB	9/2/15	ENG'R	MFG.	Q.C.
CHECKED: JG	10/1/15	CC8	~	PWF

FILE: SEDONA LCP-1180 UPGRADE.ZIP
ABB PROJECT #: U8364/E00016011
MACHINE TYPE: D5403
FOLDER LOCATION:

TITLE: SEDONA LCP-1180 INTERCONNECT ANALOG SIGNALS
PROJECT NAME: SEDONA LCP-1180 UPGRADE
S.O.

ALFA LAVAL
955 MEARNS ROAD
WARMINSTER, PA 18974, U.S.A.

DRAWING NUMBER: 8733637 SHEET 4 OF 4

Sequence Of Operation DLM+

City of Sedona
Alfa Laval #1828980
ABB #E00016011

Alfa Laval

Issued by	Date	Ref.	Page
ABB Industrial Systems	Oct. 2, 15	Decanter Logic Manager	(1) Of (74)

Subject	Document type
Small Decanter Logic Manager **VFD Maindrive / VFD Backdrive**	Seq. Of Operation Approved by

Index

Flow Diagram

Key

Start of Sequence

Process Step

Conditional Transition - Required Condition to Move to Next Step

Indicates Optional Equipment: May be Enabled or Disabled from the Decanter Logic Manager

Branching Decision Box

(A) — Index Reference - See Individual Sequences for More Details

Subject

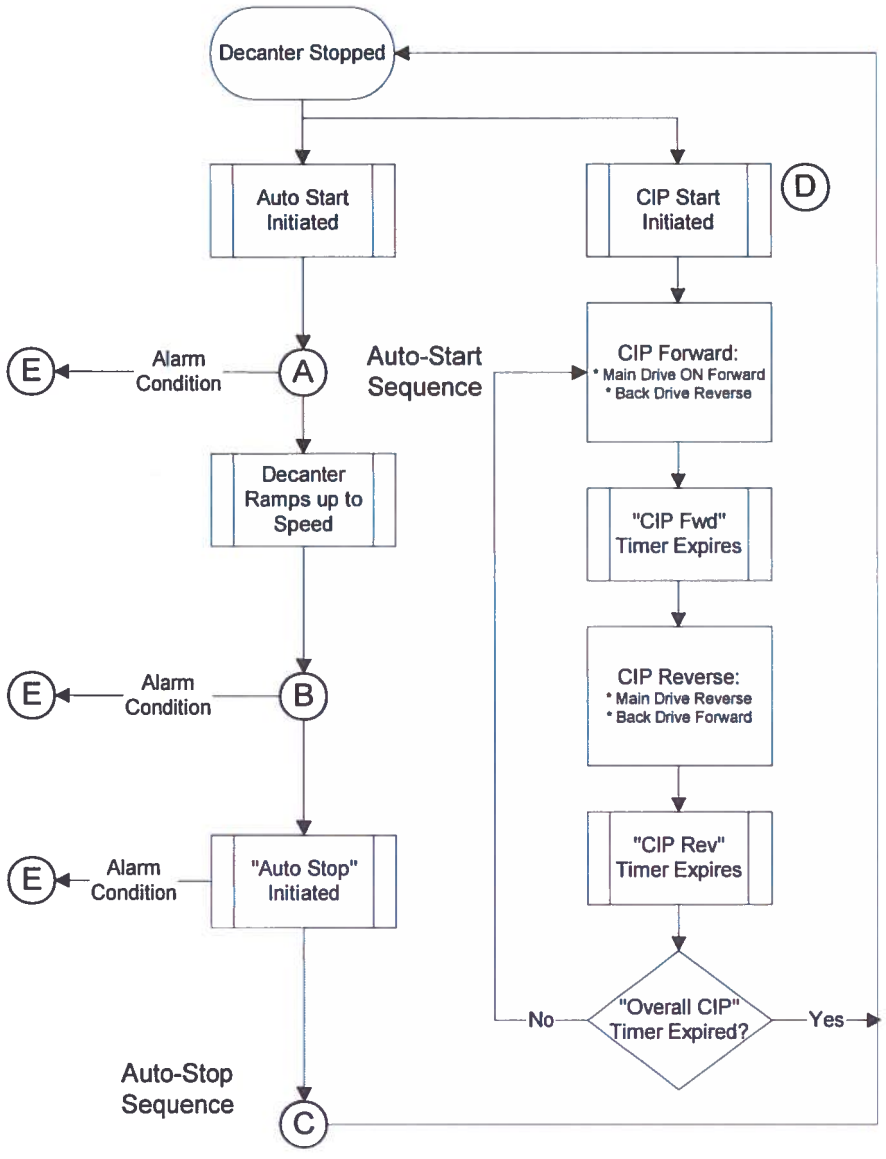
Small Decanter - Decanter Logic Manager

Flow Diagram - System Overview

Document type: Seq. of Operation

Approved by:

System Overview



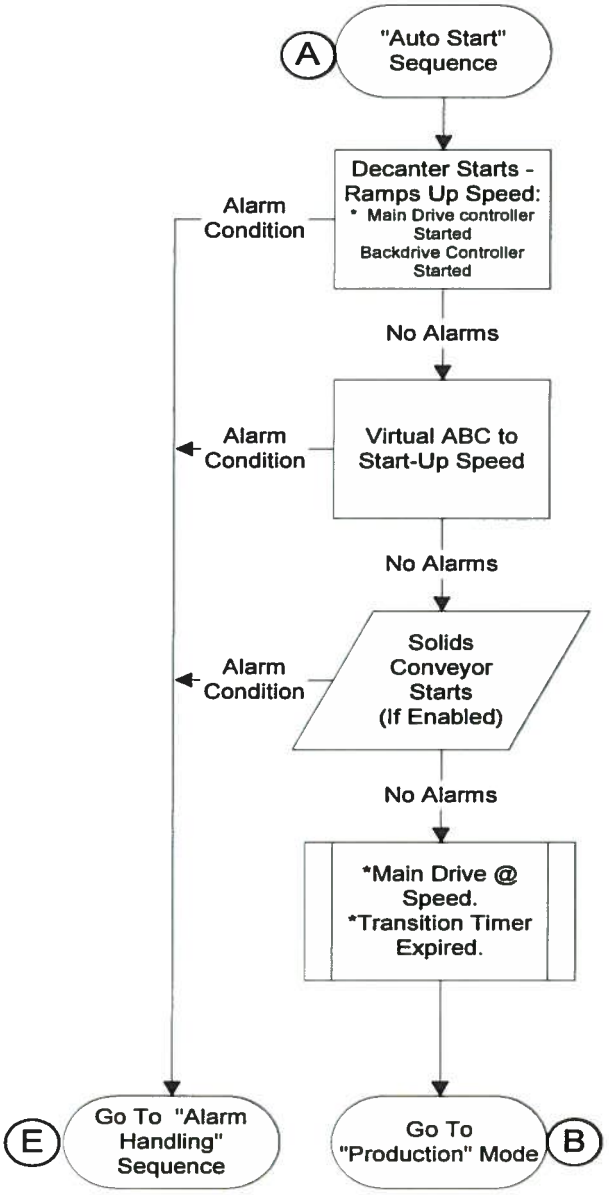
Subject: **Small Decanter - Decanter Logic Manager**

Flow Diagram - Auto Start Sequence

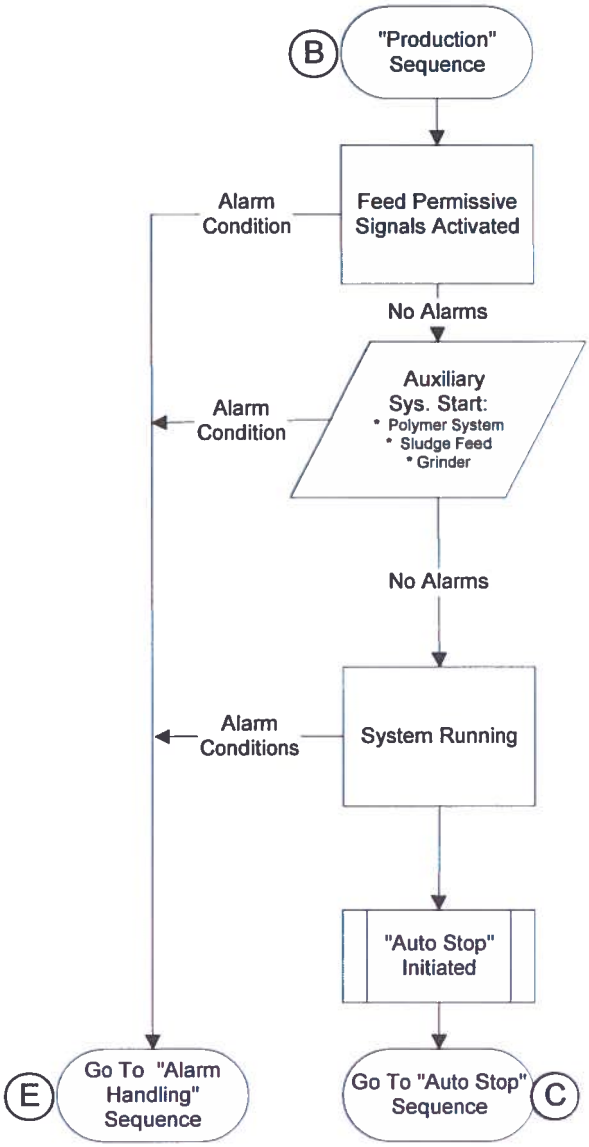
Document type: Seq. of Operation

Approved by:

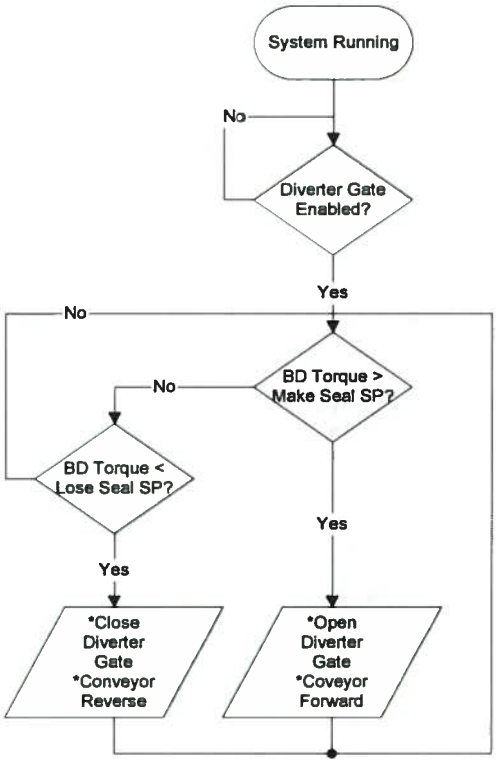
Auto Start Sequence



Production Mode



Diverter Gate Sequence



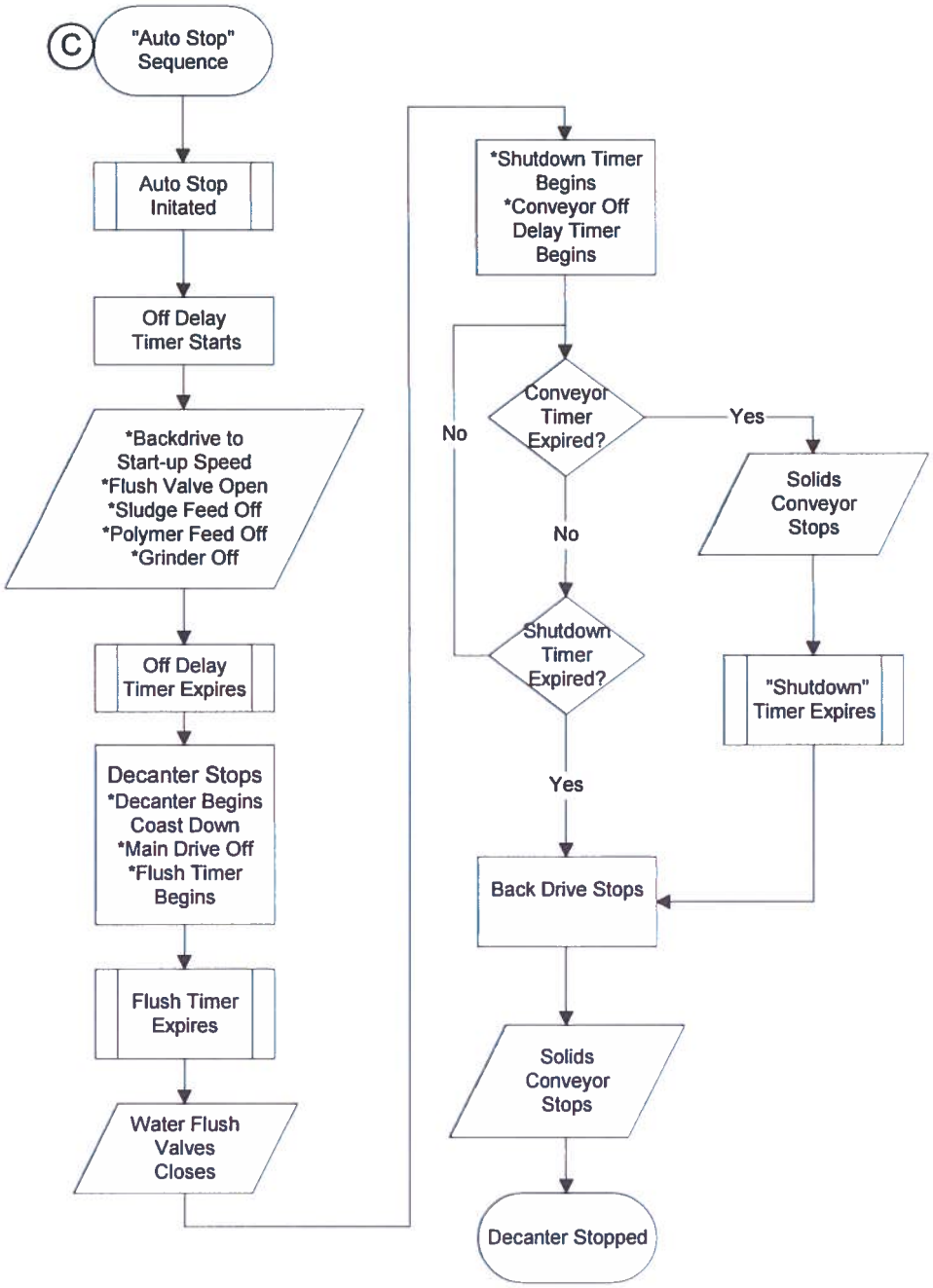
Subject: **Small Decanter - Decanter Logic Manager**

Flow Diagram - Auto Stop Sequence

Document type: Seq. of Operation

Approved by:

Auto Stop Sequence



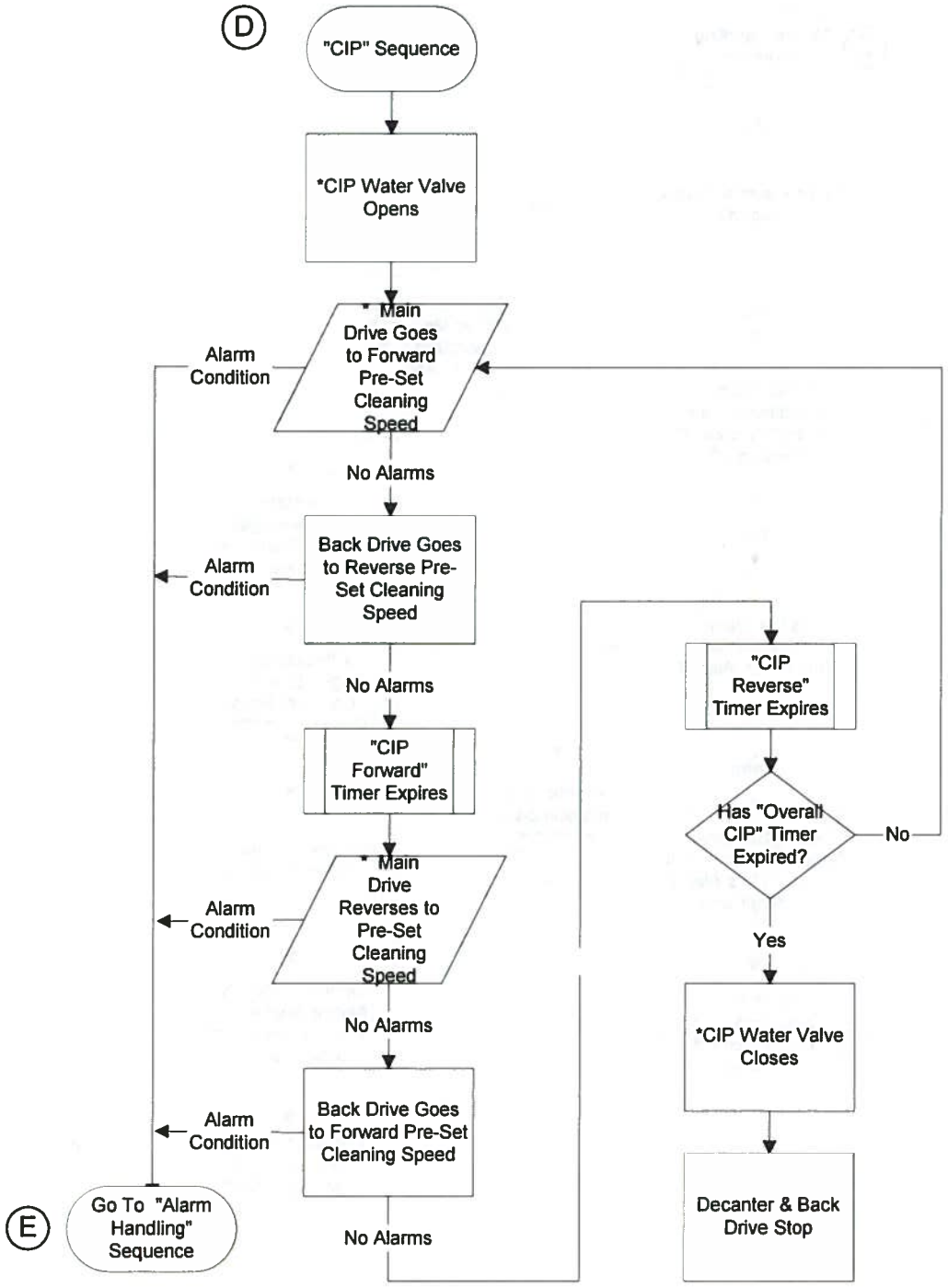
Subject: **Small Decanter - Decanter Logic Manager**

Flow Diagram - Auto Stop Sequence

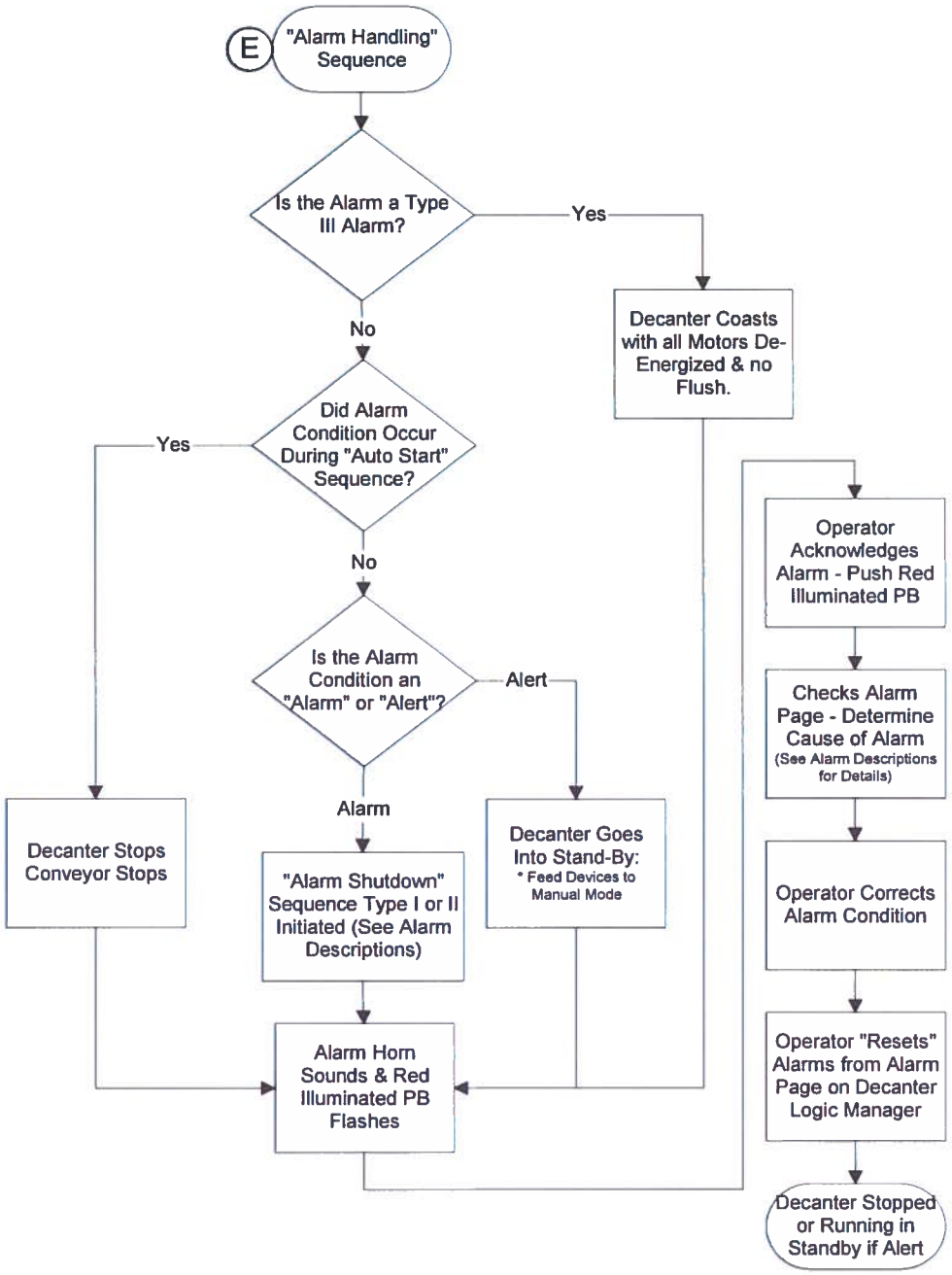
Document type: Seq. of Operation

Approved by:

CIP Sequence



Alarm Handling



System Sequence Steps

System Start/Stop

Operator Action:

- ❑ Open manual valves needed for proper Decanter operation
- ❑ Select "Auto Start" from Decanter Logic Manager (DLM)
- ❑ Remote "Auto Start" signal closed with DLM in "Remote" mode

Conditions Required to Initiate Sequence:

- ❑ No active alarms
- ❑ System off, System in Auto Run Down or System in Manual run up mode
- ❑ Remote "Auto Stop" signal closed

Sequence of Events:

Step 0: Idle	• System Stopped • Decanter Stop Light on • Shutdown Timer Expired/Reset • All devices off • Virtual ABC in Start-Up mode
Step 2: Process Run Up	• Auto-Start Initiated • Decanter Start Light flashing • Transition Timer Counting • Decanter Main Motor Accelerating • Virtual ABC in Start-Up mode • Backdrive to Start-up Speed • Discharge Conveyor running (If Enabled) • Diverter gate function activated (If Enabled)
Step 3A: Process Run	• Transition Timer Expired • Main Drive Motor at Speed • Decanter Start Light On Solid • Virtual ABC in Production • Centrifuge Running Output to Customer Closed • Feed Permissive closed • Feed Pump Running (If Enabled) • Feed PID Output Active (If Enabled) • Polymer System Running (If Enabled) • Polymer PID Output Active (If Enabled) • Grinder Running (If Enabled)

	• Power Factor Timer Counting (If Enabled go to Step 3B) • If in Standby Step and No Alarms
Step 3B: Process Run with PF Correction	• Power Factor Timer Expired (If Enabled) • Power Factor Contactor closes (If Enabled)
Step 4: Standby/Offline	• Common Alert Output To Customer Open (if common Alert is present) • Feed Permissive Off • Feed Pump Off • Polymer Pump Off • Grinder Off • Decanter Start Light on
Step 5: Process Off Delay	• Auto-Stop Initiated • Decanter Stop Light Flashing • Off Delay Timer Starts • Decanter running • Virtual ABC in Start-Up mode • Flush Valve Opens (if Enabled) contact closed • Feed Permissive Contact open • Feed Pump Off • Polymer System Off • Grinder Off • Off Delay Timer Expires or Fault occurs
Step 6: Process Run Down with Flush	• Decanter Stop Light flashing • Decanter Main Motor off • Decanter begins Shutdown • Flush Timer Counting (If Enabled, else go to Step 7)
Step 7: Process Run Down	• Decanter Stop Light Flashing • Flush Timer Expired (if Enabled) • Flush Valve closed • Coastdown Timer Counting
Step 8: Process Off	• Decanter Stop Light On Solid • Shutdown Timer Expires • Backdrive Stops • Solids Conveyor Stops (if Enabled) • Decanter Stops • Return to Idle

Conditions to Terminate Sequence:

- ❑ If the operator selects "Auto Stop" from the Decanter Logic Manager, the Shutdown sequence will be activated
- ❑ If any Shutdown alarm is active, the appropriate Shut Down sequence will be activated, see alarm description
- ❑ Remote Decanter Stop Signal Opens (in Local or Remote)

Functional Comments:

- ❑ Devices may be placed in manual mode via the Decanter Logic Manager (see manual operation).
- ❑ Common Alarm and Alert Contacts are closed under normal conditions

CIP sequence

Operator Action:

- Make sure the Decanter is completely stopped.
- Enabled CIP from configuration menus.
- Select "CIP Start" from Decanter Logic Manager
- Remote "CIP Start" signal closed when in remote

Conditions Required to Initiate Sequence:

- No active alarms
- System in stopped mode.
- Remote "CIP Stop" signal closed when in (Local or remote)

Sequence of events:

Step 0: Idle	❑ CIP off ❑ CIP Stop Light on
Step 1: CIP reverse	❑ Back drive will be activated in reverse direction at CIP speed. ❑ Main drive will be activated in forward direction at CIP speed ❑ When reverse timer has expired go to step 2 ❑ When CIP Overall Timer has expired, go to step 0 ❑ CIP Start Light on
Step 2: CIP forward.	❑ Back drive will be activated in forward direction at CIP speed ❑ Main drive will be activated in reverse direction at CIP speed ❑ When forward timer has expired, go to step 1 ❑ When CIP Overall Timer has expired, go to step 0 ❑ CIP Start Light on

Conditions to Terminate Sequence:

- Overall CIP time expired.
- Select "CIP Stop" from Decanter Logic Manager
- If the operator presses the Emergency Stop.
- Remote "CIP Stop" signal opened (in Local or Remote)

Functional Comments:

- Cip flush valve will be active during the CIP sequence.

Manual Operation

Manual operation of individual devices is possible through the Decanter Logic Manager (DLM+). Below is a listing of control screens and devices that can be manually operated: Depending on which devices are Enabled.

Screen Name	Device Name
Input Devices	* Feed Pump #1 * Feed Pump #2 * Polymer Pump#1 * Polymer Pump#2 *Grinder
Decanter Detail	*Flush Water *CIP Flush Water *Diverter Gate *Diverter Gate Flush Water *Lube System *Grease System
Output Devices	*Solids Conveyor

Run Feed Pump (#1 or #2)

Required Operator Selection:

- ❑ Both LCP1180 and LCP1181 will have the ability to select between digested sludge feed pumps 1 or 2;
- ❑ The selector switch mounted on LCP1180 labeled as "1180/1181" will enable either one of the centrifuge to control the sludge feed pump.

Operator Action:

- ❑ Press the function key on the Decanter Logic Manager (DLM) labeled "Input Devices"
- ❑ Press the function key labeled "Pri Feed" or "Sec Feed" to make the device active
- ❑ Press the function key labeled "Manual"
- ❑ Press the function key labeled "Start" to run the pump

Conditions to Start Manual Operation:

- ❑ Feed Pump enabled in the Configuration menu of the DLM
- ❑ No active Feed System Alert
- ❑ No active Shutdown Alarm
- ❑ Grinder running (if enabled)
- ❑ Decanter up to speed

Conditions to Stop Manual Operation:

- ❑ Feed Pump disabled in the Configuration menu of the DLM
- ❑ Press the function key labeled "Stop" while the feed pump is the active device
- ❑ Feed Pump Alert
- ❑ Centrifuge Shutdown Alarm
- ❑ Grinder not running (If Enabled)
- ❑ Decanter shutdown initiated

Functional Comments:

- ❑ The Feed Pump is interlocked with the Decanter so that operation of the pump is not possible unless the Decanter is up to speed and no alarms or alert conditions present.
- ❑ If automatic operation of the device is desired, the device must be returned to "Auto" mode.

Run Polymer System (#1 or #2)

Required Operator Selection:

- ❑ The selector switch mounted on LCP1180 labeled as "1180/1181" will enable either one of the centrifuge to control the polymer pump.

Operator Action:

- ❑ Press the function key on the Decanter Logic Manager (DLM) labeled "Input Devices"
- ❑ Press the function key labeled "Pri Poly" or "Sec Poly" to make the device active
- ❑ Press the function key labeled "Manual"
- ❑ Press the function key labeled "Start" to run the pump

Conditions to Start Manual Operation:

- ❑ Polymer System enabled in the Configuration menu of the DLM
- ❑ No active Feed System Alert
- ❑ No active Centrifuge Shutdown alarm
- ❑ Decanter up to speed

Conditions to Stop Manual Operation:

- ❑ Polymer Pump disabled in the Configuration menu of the DLM
- ❑ Press the function key labeled "Stop" while the polymer pump is selected as the active device.
- ❑ Centrifuge Shutdown Alarm activation
- ❑ Feed System Alert activation
- ❑ Decanter shutdown initiated

Functional Comments:

- ❑ The polymer system is interlocked with the Decanter so that operation of the pump is not possible unless the Decanter is up to speed and no alarms or alert conditions present.
- ❑ It is possible to select polymer systems to run if enabled in the configuration setup.
- ❑ If automatic operation of the device is desired, the device must be returned to "Auto" mode.

Run Feed Grinder

Required Operator Selection:

- ❑ The selector switch mounted on LCP1180 labeled as "1180/1181" will enable either one of the centrifuge to control the grinder.

Operator Action:

- ❑ Press the function key on the Decanter Logic Manager (DLM) labeled "Input Devices"
- ❑ Press the function key labeled "Grinder" to make the device active
- ❑ Press the function key labeled "Manual"
- ❑ Press the function key labeled "Start" to run the Grinder

Conditions to Start Manual Operation:

- ❑ Feed Grinder enabled in the Configuration menu of the DLM
- ❑ No active Feed alarm
- ❑ No active Centrifuge Shutdown alarm

Conditions to Stop Manual Operation:

- ❑ Grinder disabled in the Configuration menu of the DLM
- ❑ Press the function key labeled "Stop" while the Grinder is selected as the active device
- ❑ Centrifuge Shutdown alarm activation
- ❑ Feed System alert activation

Functional Comments:

- ❑ The Feed Grinder can be selected/deselected at any time that there is no Emergency stop alarm or Grinder alarm.
- ❑ The Feed Pump will stop if the Feed Grinder is stopped or faulted.
- ❑ If automatic operation of the device is desired, the device must be returned to "Auto" mode.

Open Flush Valve

Operator Action:

- ❑ Press the function key on the Decanter Logic Manager (DLM) labeled "Decanter Detail"
- ❑ Press the function key labeled "Flush Water" to make the device active
- ❑ Press the function key labeled "Manual"
- ❑ Press the function key labeled "Start" to open the valve

Conditions to Start Manual Operation:

- ❑ Flush Valve enabled in the Configuration menu of the DLM

Conditions to Stop Manual Operation:

- ❑ Flush water disabled in the Configuration menu of the DLM
- ❑ Press the function key labeled "Stop" with the flush valve selected as the active device

Functional Comments:

- ❑ The Flush Valve can be selected/deselected at any time.
- ❑ The flush output signal will close during flush
- ❑ The flush Valve will also operate under the flush timer setting in order to avoid accidental prolonged flushing of the decanter.
- ❑ If automatic operation of the device is desired, the device must be returned to "Auto" mode.

Diverter Gate Open/Close

Operator Action:

- ❑ Press the function key on the Decanter Logic Manager (DLM) labeled "Decanter Detail"
- ❑ Press the function key labeled "Divert Gate" to make the device active
- ❑ Press the function key labeled "Manual"
- ❑ Press the function key labeled "Start" or "Stop" to open/close the gate

Conditions to Open the Diverter Gate:

- ❑ Diverter Gate enabled in the Configuration menu of the DLM
- ❑ No active Emergency Stop or Diverter Gate alarms
- ❑ Press the key labeled "Start" with the Diverter Gate selected as the active device

Conditions to Close the Diverter Gate:

- ❑ Diverter Gate enabled in Configuration menu
- ❑ Press the key labeled "Stop" with the Diverter Gate selected as the active device
- ❑ Emergency Stop activation

Functional Comments:

- ❑ The Diverter Gate can be selected/deselected at any time.
- ❑ If the Diverter Gate is manually closed during production and feed is not turned off, care must be taken that solids do not build up and block the discharge from the centrifuge.
- ❑ If automatic operation of the device is desired, the device must be returned to "Auto" mode.

Open CIP Flush Valve

Operator Action:

- ❑ Press the function key on the Decanter Logic Manager (DLM) labeled "Decanter Detail"
- ❑ Press the function key labeled "Flush Water" to make the device active
- ❑ Press the function key labeled "Manual"
- ❑ Press the function key labeled "Start" to open the valve

Conditions to Start Manual Operation:

- ❑ CIP Flush Valve enabled in the Configuration menu of the DLM
- ❑ Select CIP flush from the DLM

Conditions to Stop Manual Operation:

- ❑ CIP Flush disabled in the Configuration menu of the DLM
- ❑ Press the function key labeled "Stop" with the CIP flush valve selected as the active device

Functional Comments:

- ❑ The CIP Flush Valve can be selected/deselected at any time.
- ❑ The CIP flush output signal will close during flush
- ❑ If automatic operation of the device is desired, the device must be returned to "Auto" mode.

Open Diverter Gate Flush Valve

Operator Action:

- ❑ Press the function key on the Decanter Logic Manager (DLM) labeled "Decanter Detail"
- ❑ Press the function key labeled "Divert Gate Flush" to make the device active
- ❑ Press the function key labeled "Manual"
- ❑ Press the function key labeled "Start" to open the valve

Conditions to Start Manual Operation:

- ❑ Diverter Gate Flush Valve enabled in the Configuration menu of the DLM
- ❑ Select Divert Gate flush water valve from the DLM

Conditions to Stop Manual Operation:

- ❑ Diverter gate flush disabled in the Configuration menu of the DLM
- ❑ Press the function key labeled "Stop" with the diverter gate flush valve selected as the active device

Functional Comments:

- ❑ The Diverter Gate Flush Valve can be selected/deselected at any time.
- ❑ The Diverter Gate Flush output signal will close during flush
- ❑ The Diverter Gate Flush Valve will also operate under the diverter flush timer setting in order to avoid accidental prolonged flushing.
- ❑ If automatic operation of the device is desired, the device must be returned to "Auto" mode.

Run Solids Conveyor

Required Operator Selection:

- ❑ The selector switch mounted on LCP1180 labeled as "1180/1181" will enable either one of the centrifuge to control the solid conveyor.

Operator Action:

- ❑ Press the function key on the Decanter Logic Manager (DLM) labeled "Output Devices"
- ❑ Press the function key labeled "Solids Conveyor" to make the device active
- ❑ Press the function key labeled "Manual"
- ❑ Press the function key labeled "Start" to run the conveyor

Conditions to Start Manual Operation:

- ❑ Solids Conveyor enabled in Configuration menu of the DLM
- ❑ No active Emergency Stop, Solids Conveyor, or Pull-Cord alarms
- ❑ Press the key labeled "Start" with Solids Conveyor selected as the active device

Conditions to Stop Manual Operation:

- ❑ Solids Conveyor disabled in the Configuration menu of the DLM
- ❑ Press the function key labeled "Stop" with the Solids Conveyor selected as the active device
- ❑ Emergency Stop, Solids Conveyor, or Pull-Cord Alarms

Functional Comments:

- ❑ If the Solids Conveyor is manually turned off during production and feed is not turned off, care must be taken that solids do not build up on the conveyor and block the discharge from the Decanter.

Feed Pump Selection #1

Operator Action:

- ❑ From the Input Device Screen, press the function key labeled "Pump Select Screen."
- ❑ Maneuver the cursor to the feed pump selection box using the up/down arrow keys on the DLM, then press the "Enter"
- ❑ Select the desired pump from the selection box

Conditions to Select Feed Pump:

- ❑ The desired feed pump enabled in the Configuration Menu

Conditions to De-Select Feed Pump:

- ❑ Feed Pump Disabled in Configuration Menu
- ❑ De-Select pump from the pump select screen

Functional Comments:

- ❑ The development of alarms for the Feed Pump #1 will not be activated unless the pump is enabled for operation.
- ❑ Selection of Pumps only effects Automatic operation. If the Pump is enabled, it can be run manually even if it is not selected.

Polymer Pump #1 Selection

Operator Action:

- ❑ From the Input Device Screen, press the function key labeled "Pump Select Screen."
- ❑ Maneuver the cursor to the polymer pump selection box using the up/down arrow keys on the DLM, then press the "Enter"
- ❑ Select the desired pump from the selection box

Conditions to Select Feed Pump:

- ❑ The desired polymer pump enabled in the Configuration Menu

Conditions to De-Select Feed Pump:

- ❑ Polymer Pump Disabled in Configuration Menu
- ❑ De-Select pump from the pump select screen

Functional Comments:

- ❑ The development of alarms for the Polymer Pump #1 will not be activated unless the pump is enabled for operation.
- ❑ Selection of Pumps only effects Automatic operation. If the Pump is enabled, it can be run manually even if it is not selected.

Timers

General

All applicable timer settings are changeable through the DLM settings screen when logged in with a security level of at least (1). Consult the DLM user manual for information on entering security levels.

Transition Watchdog Timer

Description of timer:

- This timer monitors how long the starting cycle is taking. If the starting cycle is not completed by the time the watchdog timer expires, an alarm is generated and the Decanter is shutdown.

Range:

- 0 - 9999 Seconds.

Default setting:

- 360 Seconds.

Off Delay Timer

Description of timer:

- The Off Delay timer provides a full speed flush step, prior to shutdown. The Off Delay Timer is the amount of time from when the Auto Stop is initiated until shutdown of the main drive is initiated. During Off Delay Time, the sludge feed and polymer feed is removed and flush water is introduced into the Decanter. The Backdrive goes to start up speed.

Range:

- 0 - 9999 Seconds.

Default setting:

- 120 Seconds.

Flush Timer

Description of timer:

- The Flush Timer determines how long the Decanter stays in the flushing cycle during a shutdown. The flush water valve is open during the flushing cycle, unless it is in manual control and set to off, or disabled in the configuration menu of the DLM.

Range:

- 0 - 9999 Seconds.

Default setting:

- 360 Seconds.

Coast Down Timer

Description of timer:

- The Coast Down Timer is the period of time that the Decanter takes to coast to rest after the flushing cycle is completed. When the coast down timer expires, the decanter shutdown cycle is complete and all motor operation is stopped.

Range:

- 0 - 9999 Seconds.

Default setting:

- 1800 Seconds.

CIP Overall Timer

Description of timer:

- The CIP Overall Timer is the period of time that the clean-in-place cycle runs. When the CIP timer expires, the decanter goes to rest.

Range:

- 0 – 9999 seconds.

Default setting:

- 3600 seconds.

CIP Forward Timer

Description of timer:

- The CIP Forward Timer is the period of time that the clean-in-place cycle runs in the forward direction. During this period, the main drive motor (If VFD Enabled) rotates in the forward direction and the back drive motor rotates in the reverse direction.

Range:

- 0 – 9999 seconds.

Default Setting:

- 240 seconds.

CIP Reverse Timer

Description of timer:

- The CIP Reverse Timer is the period of time that the clean-in-place cycle runs in the reverse direction. During this period, the main drive motor (If VFD Enabled) rotates in the reverse direction and the back drive motor rotates in the forward direction.

Range:

- 0 – 9999 seconds.

Default Setting:

- 120 seconds.

Alarm Delay Timer (Short)

Description of timer:

- The Alarm Delay (short) Timer allows time for feedback signals from field devices to register in the Decanter PLC, delaying feedback alarms. Devices that require only a brief delay period are linked to this timer.

Range:

- 0 – 9999 seconds.

Default Setting:

- 5 seconds.

Alarm Delay Timer (Medium)

Description of timer:

- The Alarm Delay (medium) Timer allows time for feedback signals from field devices to register in the Decanter PLC, delaying feedback alarms. Devices that require a longer delay period than what is supplied by the "short" delay timer are linked to this timer.

Range:

- 0 – 9999 seconds.

Default Setting:

- 15 seconds.

Alarm Delay Timer (Long)

Description of timer:

- The Alarm Delay (long) Timer allows time for feedback signals from field devices to register in the Decanter PLC, delaying feedback alarms. Devices that require a long delay period are linked to this timer.

Range:

- 0 – 9999 seconds.

Default Setting:

- 30 seconds.

Power Factor Correction Capacitor Timer

Description of timer:

- Time after Wyw-Delta Transition until the Power Factor Correction Capacitor Contactor is energized.

Range:

- 0 – 9999 seconds.

Default Setting:

- 5 seconds.

Alarm Descriptions

General

- ❑ All applicable alarms will be displayed on the operator interface as described in the following alarm pages.
- ❑ The probable causes for the alarms are listed on the individual alarm pages to assist in troubleshooting.
- ❑ All alarms will sound the alarm horn and flash the alarm light until acknowledged. After being acknowledged, the alarm horn will be silenced and the alarm light will be on solid until alarm is reset.
- ❑ Device specific faults for accessory equipment will always terminate that components operation.
- ❑ Three types of Malfunctions
    1. Warning - Normal operation continues, common alert output to customer opens.
    2. Alert – Standby mode, operation without feed, Common alert output to customer opens
    3. Alarms – Shutdown of centrifuge per Type description below, Common alarm output to customer opens.

Three types of Alarm Shutdowns

Type I Shutdown (Normal Shutdown)

- ❑ Open Feed Permissive contacts and shutdown all feed to Centrifuge
- ❑ Shutdown Drive Motor Main controller (contactor) and rampdown (shutdown) drive motor with VFD
- ❑ Backdrive will continue to run until coast down timer times out, then it will shutdown
- ❑ Flush water on until flush timer expires
- ❑ Solids Conveyors will continue to run until the coast down timer times out, then it will shutdown. (If enabled)

Type II Shutdown

- ❑ Open Feed Permissive contact and shutdown all feed to Centrifuge
- ❑ Open Drive Motor Main contactor and coastdown drive motor
- ❑ Open backdrive controller and shutdown backdrive motor
- ❑ Flush water on until flush timer expires
- ❑ Solids Conveyors will continue to run until the coast down timer times out, then it will shutdown. (If enabled)

Type III Shutdown

- ❑ Open Feed Permissive contact and shutdown feed to Centrifuge
- ❑ Open Centrifuge Ready Permissive contact to control system
- ❑ Open Drive Motor Main contactor and shutdown drive motor
- ❑ Open backdrive contactor and shutdown backdrive motor
- ❑ Open Solids Conveyor contactor and shutdown conveyor motor
- ❑ Bypass flush water and coast-down timers and go directly to the stopped state of decanter operation.

Main Drive Motor Over Temperature Alarm

Description of Alarm:
- ❑ Main Motor temperature too high

Source of Alarm:
- ❑ Thermal Protector in Main Motor windings

Conditions to Activate Alarm:
- ❑ Power on to operator/control panel and starter panel
- ❑ Contact from Main Motor Thermal protector open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type I Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Wait until Decanter has completely stopped and lockout all power
- ❑ Check Thermal Protector
- ❑ Check Thermal Protector wiring between motor and DLM
- ❑ If faulted during start-up, check bowl and discharge for blockage
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Main Drive VFD Feedback Alarm

Description of Alarm:
- ❑ Drive failed to start when commanded to run

Source of Alarm:
- ❑ Main Drive VFD

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Main Drive configured as VFD type
- ❑ No run feedback signal from the VFD. Feedback signal communicated through Profibus connection

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type I Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Verify that the main drive VFD keypad is in remote mode
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Main Drive Overspeed Alarm

Description of Alarm:
- ❑ Bowl overspeed detected

Source of Alarm:
- ❑ Frequency transducer module/Bowl Speed Pick-up

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Scaled Analog (4-20mA) output from the module is greater than the bowl operating speed of the Decanter

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type II Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Wait until Decanter has completely stopped and lockout all power
- ❑ Inspect the bowl speed pickup sensor and the frequency transducer module
- ❑ Inspect wiring between the Decanter junction box and the starter panel
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Main Drive/Backdrive VFD Fiber Optic Fault

Description of Alarm:

- ❑ Fiber Optic Communication fault between the Main Drive VFD/ Backdrive VFD module and the Controller Fiber Optic port

Source of Alarm:

- ❑ Controller port unstable word

Conditions to Activate Alarm:

- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Main Drive configured as VFD Type
- ❑ Backdrive configured as VFD Type
- ❑ Fiber Optic cable Failure on VFD
- ❑ NDCO Board Failure on VFD

System Response to Alarm:

- ❑ Alarm horn/light is activated
- ❑ Decanter Type II Auto Shutdown sequence is initiated

Operator Action:

- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Check alarm display on the Main Drive VFD/ Backdrive VFD keypad
- ❑ Wait until Decanter has completely stopped and lockout all power
- ❑ Check Fiber Optic cable connections
- ❑ Reset active alarms from display
- ❑ Reset Comm Fault at the Main Drive VFD/ Backdrive VFD
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Main Drive VFD Run Enable Fault

Description of Alarm:
- ❑ Main Drive VFD not ready to accept a run command.

Source of Alarm:
- ❑ Main Drive VFD run enable signal is lost at Main Drive Controller when being enabled.

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Main Drive configured as VFD Type
- ❑ Fault present at Main Drive VFD

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type I Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Check Main Drive VFD keypad for active alarms
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Main Drive Speed Module Fault

Description of Alarm:
- ❑ Malfunctioning of Bowl Speed Pick-up Sensor

Source of Alarm:
- ❑ Loss of Bowl Speed Pick-up Sensor or failure of high speed counter card

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Low value of high speed counter input while the main drive is running
- ❑ Wire break between the Bowl Speed Pick-up Sensor and the high speed counter card.

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type Ii Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Wait until Decanter has completely stopped and lockout all power
- ❑ Check condition of Bowl Speed Pick-up Sensor
- ❑ Check Field Wiring Connections
- ❑ Check Power Supply to the high speed counter card
- ❑ Check operation of the high speed counter card
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Back Drive Motor Over Temperature Alarm

Description of Alarm:
- ❑ Back Drive Motor temperature too high

Source of Alarm:
- ❑ Thermal Protector in motor windings

Conditions to Activate Alarm:
- ❑ Power on to operator/control panel and starter panel
- ❑ Back drive configured as VFD or DC type
- ❑ Contact from back drive motor thermal protector open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type I Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Wait until Decanter has completely stopped and lockout all power
- ❑ Check Thermal Protector
- ❑ Check Thermal Protector wiring between motor and DLM
- ❑ If faulted during start-up, check bowl and discharge for blockage
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Back Drive Feedback Alarm

Description of Alarm:
- ❑ Back Drive failed to start when commanded to run

Source of Alarm:
- ❑ Back Drive Controller (Running Signal)

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Back drive configured as VFD or DC type
- ❑ No feedback signal from Drive Controller after command to run

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type II Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Wait until Decanter has completely stopped and lockout all power
- ❑ Inspect feedback signal from Drive Controller
- ❑ Inspect wiring between Back Drive Controller and DLM
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Back Drive VFD Run Enable Fault

Description of Alarm:
- ❑ Back Drive VFD not ready to accept a run command.

Source of Alarm:
- ❑ Back Drive VFD run enable signal is lost at Backdrive Controller when being Enabled.

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Back Drive configured as VFD Type
- ❑ Fault present at Back Drive VFD

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type II Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Check Back Drive VFD keypad for active alarms
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Back Drive Overspeed Alarm

Description of Alarm:
- ❑ Back Drive Motor overspeed detected

Source of Alarm:
- ❑ Backdrive Motor Optical Encoder

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Output from the Optical Encoder is greater than the maximum pinion speed set in the configuration menu
- ❑ Backdrive speed greater then Bowl speed

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type II Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Wait until Decanter has completely stopped and lockout all power
- ❑ Inspect the Back Drive Optical Encoder operation
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Back Drive Speed Module Fault

Description of Alarm:
- ❑ Malfunction of Pinion speed sensor circuit

Source of Alarm:
- ❑ Loss of Pinion Speed sensor or failure of high speed counter card

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Low value of high speed counter input while the back drive is running
- ❑ Wire break between the of Pinion Speed sensor and high speed counter card

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type II Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Wait until Decanter has completely stopped and lockout all power
- ❑ Check condition of Pinion Speed Sensor
- ❑ Check Field Wiring Connections
- ❑ Check Power Supply to the high speed counter card
- ❑ Check operation of the high speed counter card
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Back Drive Blower Motor Feedback Alarm

Description of Alarm:
- ❑ Blower Motor failed to start when commanded to run

Source of Alarm:
- ❑ Feedback signal from auxiliary contact of start/stop relay

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Back drive configured as VFD or DC type
- ❑ No feedback signal after command to run

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type I Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Wait until Decanter has completely stopped and lockout all power
- ❑ Inspect feedback signal from Blower Motor start/stop relay to DLM
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Diverter Gate Feedback Alarm

Description of Alarm:
- ❑ Diverter Gate failed to travel to desired position

Source of Alarm:
- ❑ Diverter Gate open or close position sensor

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Diverter Gate Enabled in the configuration menu of the DLM
- ❑ Diverter Gate commanded open or close
- ❑ No feedback signal after command to open or close and Long Alarm delay timer expires

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Diverter Gate control goes to “Manual”
- ❑ Alert type shutdown of all Feed components

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Verify that the alarm delay “long” timer specified in the settings screen of the DLM allows sufficient time for travel
- ❑ Check diverter gate open/close position sensors
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter Feed
- ❑ Return diverter gate control to automatic mode

Diverter Gate Overload Alarm

Description of Alarm:
- ❑ Diverter Gate overload protection tripped

Source of Alarm:
- ❑ Diverter Gate motor starter

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Diverter Gate Enabled in the configuration menu of the DLM
- ❑ Diverter Gate overload tripped

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Diverter Gate control goes to "Manual"
- ❑ Alert type shutdown of all Feed components

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Reset diverter gate overload device
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter Feed
- ❑ Return diverter gate control to automatic mode

High Vibration Shut Down Alarm

Description of Alarm:
- ❑ High vibration detected in running Decanter

Source of Alarm:
- ❑ Vibration switch mounted on Decanter frame

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Vibration switch contact open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type I Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Wait until Decanter has completely stopped and lockout all power
- ❑ Check Decanter for missing tiles, dried solids stuck to conveyor/bowl, etc.
- ❑ Reset active alarms from display
- ❑ Run CIP if so equipped
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Decanter Cover Opened

Description of Alarm:
- ❑ Decanter cover is open

Source of Alarm:
- ❑ Cover switches mounted on the Decanter frame

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Any cover switch contact open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type II Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Check Cover Switches for damage
- ❑ Check Cover Switch wiring
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, restart Decanter

Torque Overload

Description of Alarm:
- ❑ Decanter Back Drive torque too high

Source of Alarm:
- ❑ Back Drive Controller torque signal

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Back Drive Controller torque signal greater than the High-High alarm limit set in the configuration menu of the DLM

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type II Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Check active torque level against backdrive controller torque level
- ❑ Check Feedrate setting
- ❑ Check Differential setting
- ❑ Reset active alarms from display
- ❑ Run CIP is so equipped
- ❑ If no fault is detected or if fault has been corrected, restart Decanter

Torque Warning

Description of Alarm:
- ❑ Decanter Back Drive torque high warning

Source of Alarm:
- ❑ Back Drive Controller torque signal

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Back Drive Controller torque signal greater than the High alarm limit set in the configuration menu of the DLM

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Alert type shutdown of all Feed components.

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Check active torque level against backdrive controller
- ❑ Check Feedrate setting
- ❑ Check Differential setting
- ❑ Apply flush water to clear solids
- ❑ Reset active alarms from display and reapply feed

Bearing Low Flow Alarm (Front/Rear)

Description of Alarm:
- ❑ Bearing oil flow too Low

Source of Alarm:
- ❑ Flow switch on lube oil system (Front/Rear)

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Lube Oil System enabled in the configuration menu of the DLM
- ❑ Bearing oil flow switch contact open (Front/Rear)

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type I Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Check hydraulic flow on lube oil system
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, rest alarm and restart Decanter

Low Differential Speed

Description of Alarm:
- ❑ Low differential speed in-between conveyor and Decanter bowl e.g. solids are not being scrolled through the machine.

Source of Alarm:
- ❑ Virtual Backdrive Controller

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Differential speed less than the value entered in the differential alarm setpoint field on the configuration menu of the DLM

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Alert type shutdown of all Feed components.

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Check active torque level against backdrive controller
- ❑ Check active differential speed
- ❑ Check feed rate setting
- ❑ Apply flush to clear excess solids
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, restart Decanter feed

Emergency Stop Alarm

Description of Alarm:
- ❑ To detect if local or remote emergency stop has been activated

Source of Alarm:
- ❑ Local or remote emergency stop push button station

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Any emergency stop push button contacts open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Decanter Type III Auto Shutdown sequence is initiated

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Reset active alarms from display
- ❑ Check cause for activated emergency stop
- ❑ Reset Emergency Stop
- ❑ If no fault is detected or if fault has been corrected, restart Decanter.

Sludge Feed Pump Feedback Alarm

Description of Alarm:
- ❑ Sludge Feed pump failed to start when commanded to run

Source of Alarm:
- ❑ Feed pump run feedback signal from motor controller

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Feed pump enabled in the configuration menu of the DLM
- ❑ Feed pump run feedback signal open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Alert type shutdown of all Feed components
- ❑ Sludge feed pump turned off and placed in “manual” mode

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display on DLM
- ❑ Check display on feed pump VFD
- ❑ Reset active alarms on feed pump VFD and verify that the VFD is ready to accept a run command
- ❑ Reset active alarms from display of DLM
- ❑ If no fault is detected or if fault has been corrected, restart Decanter feed
- ❑ Return sludge feed pump control to automatic mode

Sludge Feed Pump Overload Alarm

Description of Alarm:
- ❑ Sludge Feed pump overload protection tripped

Source of Alarm:
- ❑ Feed pump overload (fault) signal from motor controller

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Feed pump enabled in the configuration menu of the DLM
- ❑ Feed pump fault signal open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Alert type shutdown of all Feed components
- ❑ Sludge feed pump turned off and placed in “manual” mode

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display on DLM
- ❑ Check display on feed pump VFD
- ❑ Reset active alarms on feed pump VFD and verify that the VFD is ready to accept a run command
- ❑ Reset active alarms from display of DLM
- ❑ If no fault is detected or if fault has been corrected, restart Decanter feed
- ❑ Return sludge feed pump control to automatic mode

Polymer Pump Feedback Alarm

Description of Alarm:
- ❑ Polymer pump failed to start when commanded to run

Source of Alarm:
- ❑ Polymer pump run feedback signal from motor controller

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Poly pump enabled in the configuration menu of the DLM
- ❑ Polymer pump run feedback signal open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Alert type shutdown of all Feed components
- ❑ Polymer pump turned off and placed in "manual" mode

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display on DLM
- ❑ Check polymer system for faults
- ❑ Reset active alarms on polymer system and verify that it is ready to accept a run command
- ❑ Reset active alarms from display of DLM
- ❑ If no fault is detected or if fault has been corrected, restart Decanter feed
- ❑ Return polymer pump control to automatic mode

Polymer Pump Overload Alarm

Description of Alarm:
- ❑ Polymer pump overload protection tripped

Source of Alarm:
- ❑ Polymer pump overload (fault) signal from motor controller

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Poly pump enabled in the configuration menu of the DLM
- ❑ Polymer pump fault signal open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Alert type shutdown of all Feed components
- ❑ Polymer pump turned off and placed in “manual” mode

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display on DLM
- ❑ Check polymer system for faults
- ❑ Reset active alarms on polymer system and verify that it is ready to accept a run command
- ❑ Reset active alarms from display of DLM
- ❑ If no fault is detected or if fault has been corrected, restart Decanter feed
- ❑ Return polymer pump control to automatic mode

Solids Conveyor Feedback Alarm

Description of Alarm:
- ❑ Conveyor motor failed to start when commanded to run

Source of Alarm:
- ❑ Conveyor motor controller run feedback

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Conveyor enabled in the configuration menu of the DLM
- ❑ No feedback signal when conveyor is commanded to run

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Conveyor turned off and placed in manual mode
- ❑ Alert type shutdown of all Feed components.

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Reset active alarms from display
- ❑ Check field wiring of conveyor feedback signal
- ❑ If no fault is detected or if fault has been corrected, restart Decanter feed
- ❑ Return conveyor control to automatic mode

Solids Conveyor Fault Alarm

Description of Alarm:
- ❑ Conveyor overload protection tripped

Source of Alarm:
- ❑ Conveyor overload device

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Conveyor enabled in the configuration menu of the DLM
- ❑ Conveyor overload contact open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Conveyor turned off and placed in manual mode
- ❑ Alert type shutdown of all Feed components.

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Try to reset Conveyor Motor overload.
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, restart Decanter feed
- ❑ Return conveyor control to automatic mode

Solids Conveyor Pull-Cord Alarm

Description of Alarm:
- ❑ Conveyor emergency pull-cord activated

Source of Alarm:
- ❑ Conveyor pull-cord

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Conveyor pull-cord contact open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Conveyor turned off and placed in manual mode
- ❑ Alert type shutdown of all Feed components.

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Check cause for activated pull-cord alarm
- ❑ Reset conveyor pull-cord switch
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, restart Decanter feed
- ❑ Return conveyor control to automatic mode

Grinder Feedback Alarm

Description of Alarm:
- ❑ Grinder failed to start when commanded to run

Source of Alarm:
- ❑ Grinder run feedback signal

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Grinder enabled in the configuration menu of the DLM
- ❑ No feedback signal when Grinder is commanded to run

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Grinder turned off and placed in manual mode
- ❑ Alert type shutdown of all Feed components.

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Reset active alarms from display
- ❑ Check Grinder controller and field wiring
- ❑ If no fault is detected or if fault has been corrected, restart Decanter feed
- ❑ Return grinder control to automatic mode

Grinder Overload Alarm

Description of Alarm:
- ❑ Grinder motor protection tripped

Source of Alarm:
- ❑ Grinder overload contact

Conditions to Activate Alarm:
- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Grinder enabled in the configuration menu of the DLM
- ❑ Grinder overload contact open

System Response to Alarm:
- ❑ Alarm horn/light is activated
- ❑ Grinder turned off and placed in manual mode
- ❑ Alert type shutdown of all Feed components.

Operator Action:
- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Check Grinder overload protection
- ❑ Reset active alarms from display
- ❑ If no fault is detected or if fault has been corrected, restart Decanter feed
- ❑ Return grinder control to automatic mode

Power Factor Correction Feedback Alarm

Description of Alarm:

- ❑ Power Factor Correction Capacitor (PFCC) contactor failed to energize when commanded

Source of Alarm:

- ❑ Feedback signal from auxiliary contact of PFCC contactor

Conditions to Activate Alarm:

- ❑ Power on Operator/Control panel and Starter Panel
- ❑ Power Factor Correction enabled in the configuration menu of the DLM
- ❑ No feedback signal when PFCC is commanded to run

System Response to Alarm:

- ❑ Alarm horn/light is activated

Operator Action:

- ❑ Push Alarm Acknowledge push-button to silence horn
- ❑ Check alarm display
- ❑ Inspect wiring of PFCC contactor
- ❑ Reset active alarms from display

Blank