Colorado Water Conservation Board

Emergency Funding for Damaged River Diversions/Dams from the September 2013 Flood Event

Emergency Loan Application and Feasibility Study

Prepared for:

[Louden Irrigating Canal & Reservoir Co
[8109 S Cty Rd 9
[Fort Collins, Co. 80528
970-226-2897]

Prepared by:
[Telesto Solutions, Inc]
2950 E Harmony Rd]
[Fort Collins, Co 80528]
[970-484-7704]

Signature	
Dale A Leach, President	Return a signed hard copy and an electronic copy to: CWCB Finance Section 1580 Logan, Suite 600 Denver, CO 80203 Attn: Anna Mauss Ph. 303.866.3441x 3224 e-mail: anna.mauss@state.co.us
Completed By/Title (Print) Dale A Leach 3/31/14 Signature/Date	

Application Deadlines:
October 16, 2013(noon)
November 1, 2013(noon)
December 2, 2013 (noon)

FEASIBILITY STUDY APPROVAL
Pursuant to Colorado Revised Statutes 37-60-121 &122, and in accordance with policies adopted by the Board, the CWCB staff has determined this Feasibility Study meets all applicable requirements for approval.

Signed 5/9/2014 Date

Agency/Company Information	
Name: Louden Irrigating Canal & Reservoir Co	
Address: 8109 S Cty Rd 9, Fort Collins, Co. 80528	
Phone: (970) 226-2897	Email:
Organization Type: [X] Ditch Co, [ ] Irrigation District, or _____	Incorporated: YES
Incorporation Date: 1/28/1878	In good standing with the Secretary of State: YES
Number of acres irrigated 2184	Number of [X] Shares/ [ ] Taps 600
Avg. Water Diverted/Yr__12 to 16__ acre-feet/share	
Number of Shareholders? Approx. 120	Current Assessment $ 270 /share
	Projected Assessment $ 270 /share

Contact Information	
Contact/Title: Dale A Leach, President	
Address: 4009 E Cty Rd 30 Fort Collins, Co 80528	
Phone: (970)420-8201	Email: dleach@telesto-inc.com
Engineer: Walter L Niccoli PE	
Phone: (970)484-7704	Email:wniccoli@telesto-inc.com
Attorney: Randall W Starr	
Phone: (970)667-1029	Email: Randy@starrwestbrook.com

Project Location Information	
County: Larimer	Water District: Div 1 Dist 4
River Basin: South Platte	Water Source: Big Thompson

Project Summary	
Project Type: (circle one or more) Diversion Structure / Dam / Well / Ditch Rehabilitation / Other	
Estimated Engineering Costs: 35000	Estimated Construction Costs:115000
Other Costs (Describe Above): 55000	Estimated Total Project Costs:215000
Requested Loan Amount: 160,000	Date Funding is Needed? July 2014
Possible other funding sources: interim financing from Western States Bank	

Attachments	
[X]	Last two years Financial Statements
[ ]	Shareholders List
[X]	Articles of Incorporation/ By-laws
[ ]	Location Map/Service Area
[X]	Shareholder Resolution (submit prior to contracting)
[ ]	Attorney Opinion Letter (submit prior to contracting)

Project Background

During the unprecedented flood of September 2013 in the tributaries to the South Platte River, a significant number of diversion structures and dams along the river corridor were damaged. The Project repair/rehabilitation proposed in this Feasibility Study received significant damage as a result of the flood.

Pre flood, Louden diverted water from the Big Thompson under rights totaling 170 cfs. After the flood, the first 3000 ft of the ditch were either totally silted in plus trash and the ditch was breached back to the river in two places. The flood undercut the ditch in areas causing significant slides that threatened the ditch.

Water Rights

The water rights impacted by this project include:

Name	Water Court Case	Appropriation Date	Adjudication Date	Amount (cfs or AF)	Avg. Annual Yield (AF)
Louden		11/10/1861	5/28/1883	7 cfs	
Louden		10/1/1871	5/28/1883	40 cfs	
Louden		11/1/1877	5/28/1883	123 cfs	

Project Description

Louden first surveyed the damage on September 16, 2013 along with their engineers (Telesto Solutions, Inc). A plan was prepared and a contractor hired to remove the trash, excavate the silt, repair the diversion structure and rebuild the ditch as necessary. The engineer was on site during construction and has documented their involvement in their report which is attached. Project was completed by the end of November 2013 and test diversions of 100 cfs for a two week period were made.

Alternative 1 – Do Nothing: This alternative is considered unacceptable.

Failure to complete the restoration of the ditch would result in no future water diversions which was not acceptable. Therefore the project to restore and rebuild was initiated.

Alternative 2 – Rebuilding Collaboratively with Improvements: The ditch was cleaned and rebuilt where required. Trash was removed and the ditch service road was rebuilt.

Louden would like to have the option to replace the river diversion headgates with gates that are safer, more accurate and adaptable to remote operation.

Selected Alternative 3 – [Project]:

Cost Estimate

The Project cost estimate, provided by Louden, is $215,000_ and is further broken down as follows:

The excavation of the dirt and trash, repair of the diversion structure and repair the ditch has been completed and report is attached. That portion of the project amounted to $160,000. To be completed is to upgrade the diversion headgates from the old ratchet style to a more accurate wheel gate that can be retrofitted with operator and possible remote sensing and reading. The concrete structure is in place and the gates (3) just need to be replaced for precision and safely reasons.

Task	Cost
Design	35000
Permitting	
Construction	115000
Other – new diversion gates	65000
Contingency	
Total	215000

[Borrower] is applying for a loan not to exceed $_160,000._____.

(Note: Depending on project scope, this may need to be an Engineer's Estimate of Probable Cost or a contractor's estimate. We understand damage assessments may still be ongoing and some of these cost will be rough estimates. Depending on project scope, a more detailed cost analysis may be required prior to contracting.)

Financial Analysis

The [Borrower] has $_100,000__ in existing debt as summarized below:

Lender	Original Balance	Current Balance	Annual Payment	Maturity Date	Collateral
Western States Bank	100000	100000	14300	4/15/2020	
CWCB		182359	10322	4/1/2042	Water rights/structures

The [Louden's] sources of income include: Assessments

Note: Be sure to attach

- Two years of financial statements (required)
- Shareholder list (showing owner name, # of shares owned, and identify each owner as agricultural or municipal)
- Articles of Incorporation/By-laws

Schedule

Construction (rehabilitation) began in mid-October and was completed by the end of November 2013. At that point water was diverted and the ditch checked. Work involving reseeding, hand rails and patching/grouting of the diversion structure is to be completed spring of 2014. The replacement and upgrade of the diversion gates are scheduled for the fall of 2014 or spring of 2015 depending upon river conditions.

Economic, Social, and Environmental Effects

Failure to restore the diversion and ditch system would have resulted in a 100% loss of water diverted for agricultural purposes. It is unknown as to the total economic impact to agriculture but would have affected farmers sole source of irrigation water the entire 25 mile distance of the ditch.

Permits

A 404 permit was obtained from the Army Corp of Engineers on October 9, 2013 allowing the necessary work to be done. A copy of the permit is attached.

LOUDEN IRRIGATING CANAL AND RESERVOIR COMPANY

Profit & Loss

	2012	2013	2014 (BUDGET)
INCOME			
211 – Note Payable Extension	4,000.00	8,000.00	5,000
400 – Assessments	101,399.85	137,864.00	165,000
401 – Carriage Charges	1507.50	1742.50	1,800
402 – Stock Transfer Fees	1,300.00	1100.00	1200
403 – Pump Permits	8860.00	7,467.30	10,000
406 – Crossing Fees	5,000.00	10,000.00	10,000
408 – R/B Assessments	193.38	265.81	250
409 – Reimbursed Expenses	8,136.25	13,357.27	16,000
416 – Insurance Refunds	946.00	-0-	-0-
417 – Patronage Dividends	-0-	6.92	7
450 - Rents Received	12,596.00	44,566.00	20,000
472 – Miscellaneous Income	2,283.64	2,807.63	2,500
490 - Interest Income	381.47	252.57	250
Total Income	146,604.09	227,430.30	232,007

Expenses	2012	2013	2014
211 – Note Payable/Extension	-0-	-0-	17,000
511 - Stock Transfer Expense	800.00	100.00	-0-
530 – Salaries & Wages	50,955.25	89,609.00	90,000
533.03 – Payroll Taxes	3,898.08	6,855.10	7,000
602 - Accounting	1,875.00	1,950.00	2,000
604 – Bank Charges	54.22	574.10	60
614 – Directors Fees	7,400.00	8,300.00	7,500
616 – Dues & Subscriptions	200.00	-0-	200
617 – Engineering Fees	9,889.68	26,443.74	5,000
618 – Entertainment & Meals	231.71	337.52	350
619 – Equipment Rental	4,270.48	3,000.00	3,000
624 – Gas, Fuel & Oil	2,480.88	2,965.71	3,500
626 – Insurance	13,103.90	12,625.00	13,500
630 – Legal	10,302.83	10,642.30	10,000
632 – Machine Hire	2,233.75	115,176.36	3,000
634 – Miscellaneous	1,119.16	776.61	1,200
636 – Office Supplies	948.44	1,740.35	1,200
638 - Outside Labor	14,775.00	145.00	500
642 – Postage	546.29	836.85	700
646 – Repairs & Maintenance	5,624.81	4,275.30	5,000
647 – Machinery Repairs	-0-	1,993.76	3,000
648 – Spray & Chemicals	-0-	372.60	2,000
652 – Supplies	1,280.87	821.78	1,200
654 – Taxes & Licenses	307.96	-0-	500
658 – Phone	842.92	1,355.03	1,400
662 – Water Rent	15,000.00	17,000.00	15,000
663 – Water Assessments	1,860.00	160.00	160
700 – Interest Expense/RB	5,633.27	6,944.88	6,515
153 – Capitol/Mach & Eq	5,118.84	8,533.70	6,545
157 – Ditch Repair	-0-	3,087.00	4,000
260 – Note Payable	-0-	3,677.50	3,806
Total Expenses	160,753.34	330,299.19	214,836

The Louden Irrigating Canal and Reservoir Company

ARTICLE I.

Section 1. Officers. The officers of this company shall be a president, a vice-president, and a secretary-treasurer.

The stock, property, and business of this corporation shall be under the care, management, and control of a Board of Directors, a majority of whom shall constitute a quorum when assembled to do business for the company.

Section 2. The president and the vice-president shall be a member of the Board of Directors. The secretary-treasurer may or may not be a member of the Board of Directors.

Section 3. The officers of the company shall hold their office for one year from the time of their election, or until their successors are elected.

Section 4. Vacancies in any office or upon the Board of Directors, occasioned by death, resignation, inability or continued failure to perform the duties of the position may be filled by the Board of Directors at any time.

Section 5. The company does and will indemnify each officer and director of the company for damages, judgments, settlements, costs, charges and expenses incurred in connection with the defense of any action, suit, or proceeding or any appeal therefrom to which any director or officer may be a party or with which he may be threatened, pursuant to law, common or statutory, arising from alleged wrongful acts by said officers or directors in their capacity or capacities as such officers or directors.

ARTICLE II.
DUTIES OF OFFICERS

Section 1. President:

a) It shall be the duty of the president of the company to preside at all meetings of the stockholders of the company and at all meetings of the Board of Directors.

b) The president shall sign all bonds, deeds, agreements and other instruments of writing made or entered into by or on behalf of the company, as well as all certificates of stock and orders upon the treasurer to pay out funds belonging to the company; and in general perform all duties usually performed by a presiding officer, and such duties as are especially assigned to him by these by-laws.

c) The president shall exercise a general supervision over the ditch, the repairs of the same, the division and distribution of water, and shall investigate complaints made by stock holders regarding the conduct of the superintendent of the ditch; provided however that the board may appoint a manager to exercise general supervision over the ditch, the repairs, etc., under the supervision of the president.

Section 2. Vice-President:

It shall be the duty of the vice-president to perform the duties regularly performed by the president, in the absence or failure or inability of the president to act.

Section 3. Secretary Treasurer:

a) Shall have charge of the books, records, papers, and stock books of the company, and shall be custodian of the corporate seal.

b) Shall keep in permanent form, in books to be provided by the company, a full and correct record of the proceedings of all meetings of the stockholders of the company and of all meetings of the Board of Directors.

c) Shall collect all monies due the company and keep an accurate account of all monies collected, all monies paid, all monies due the company, and of all indebtedness of the company, in books to be provided by the company for that purpose.

d) Shall countersign all certificates of stock, and all orders drawn on the treasurer by the president, attest other instruments signed by the president as such, and attach the seal of the company to all instruments requiring the seal.

e) Shall prepare and deliver to the superintendent of the company a correct list giving the names of all stockholders of the company, with the amount of stock owned by each.

F Shall, whenever required by the Board of Directors, make a statement of the affairs of the company, and shall regularly prepare, and submit to the Board of Directors a fall and complete financial statement of the condition of the affairs of the company.

g) Shall receive a suitable compensation for his services, the amount thereof to be determined by the Board of Directors at the time of his election.

h) Shall audit all bills and accounts against the company and prepare a report for submission to the stockholders at their annual meeting. Said audit may be conducted either by the directors themselves or a committee appointed by them, or by a certified public accountant, as the directors shall determine from time to time.

ARTICLE III.
BOARD OF DIRECTORS

Section 1. The Board of Directors shall be 5 in number. Each stockholder that is not a person, but rather is an entity, shall be allowed to designate a representative who is a person to serve as a member of the Board of Directors. No entity shall be represented by more than one person on the Board of Directors at any one time. The Company shall also have two associate directors who will deliberate with and assist the directors. An associate director shall have no vote on the Board of Directors. In all other respects, an associate director shall be director under these bylaws except as otherwise specifically provided.

Section 2. The Board of Directors shall be elected by the shareholders as provided by these by-laws, and shall hold office until their successors are duly elected.

Section 3. The Board of Directors shall meet upon call of the president not less than 3 days notice of the time and place of meeting having been given by mail or otherwise to each member of the board, and the secretary shall call a meeting of the board when requested to do so in writing, by two or more members thereof.

Section 4. When the directors of the company shall be present at any meeting, however called or notified or shall sign a written consent thereto, on the record of such meeting, the acts of such meeting shall be valid as if called and notified.

Section 5. A majority of the directors shall constitute a quorum for the transaction of business at any meeting, whether called or adjourned, provided that if a quorum be not present at any meeting the same may be adjourned by the directors present to some future time, and notice of such time and place of adjournment shall be given to all members not present at such meeting.

Section 6. The Board of Directors shall exercise the corporate powers of the company, and have a general supervision over the company affairs. The Board of Directors shall receive and pass upon the reports of the secretary-treasurer.

Section 7. The members of the Board of Directors shall receive as compensation for their services a reasonable sum as determined from time to time by the board.

a) If for any cause, directors should not be elected at the annual meeting, the Board of Directors shall hold over until their successors be elected, which may be at an adjourned meeting or by proper notice being given to the stockholders.

b) When a vacancy occurs in the said Board of Directors by death or resignation the vacancy shall be filled until the next general election by the Board of Directors.

c) The Board of Directors shall be permitted to borrow funds, in case of emergency, to keep the ditch in operation and to deliver water to the stockholders.

ARTICLE IV.
MEETING OF STOCKHOLIDERS

Section 1. The annual stockholders meeting of the company, for the purpose of electing the Board of Directors, passing upon the assessment to be levied and transaction of any and all business properly to come before them, shall be held in the County of Larimer on the first Saturday of February of each year. Notice of such meeting shall be given to all stockholders by mail. The secretary shall be responsible for having such notice mailed. Special meetings shall be held upon ten days notice mailed to each stockholder. At all stockholders meetings, each share shall entitle the holder thereof to one vote, and the vote may be made in person or by proxy. If a quorum of the capital stock is not represented at such meeting, in person or by proxy, adjournment may be taken by the stockholders present to a date not exceeding 60 days thereafter, and notice shall be given by

the secretary of the time and place of such adjournment. A quorum shall consist of 20% of the capital stock represented in person or by proxy.

ARTICLEV.
ASSESSMENTS

Section 1. The question of making any assessment upon the stock of the company shall, before such assessment is made, be first submitted to the stockholders of the company, at an annual meeting, or at a special meeting called for that purpose, and will not be levied without a majority vote of the stock present at such meeting.

Section 2. Assessments shall become due and payable as the stockholders shall from time to time determine and delinquent assessments shall bear interest as the stockholders shall from time to time determine. The minimum assessment is the assessment of one-half share. The secretary shall give notice of such assessments by written or printed notice. All stock upon which any assessment shall remain due and unpaid for a period of one year may be sold as provided by Section 4 of Article VU of these by-laws.

ARTICLE VI.
ELECTIONS

Section 1. Election of directors shall be made by such of the stockholders as shall attend at a regular of special meeting called for that purpose, either in person or by proxy, provided a quorum is present.

Section 2. Cumulative voting will not be allowed.

ARTICLE VII.
STOCK

Section 1. No transfer of stock shall be recognized by the company except upon the books of the company and the issuance of a new certificate to the transferee.

Section 2. The secretary shall not transfer, cancel, or reissue any stock upon which there is due and unpaid any assessment or other indebtedness to the company, nor will stock be transferred or a new certificate issued for less than one-half share.

Section 3. The company shall charge such fee for the transfer of stock as the Board of Directors shall from time to time determine.

Section 4. The Board of Directors, may, at its option, purchase on behalf of the company any or all stock upon which any assessment shall remain due and unpaid, in whole or in part, for a period of one year or longer. The purchase price for the stock so purchased shall be the amount of the delinquent assessment upon such stock, together with all applicable interest. Payment for stock so purchased shall be made by canceling all such delinquent assessments and interest upon the stock to be purchased. Failure in any one year by the Board of Directors to purchase any stock subject to purchase as provided in this Section shall not be deemed a waiver of the Board of Directors' right to so purchase such stock in any succeeding year. All stock so purchased may be canceled, declared to be treasury stock, sold or transferred, or otherwise treated as the Board of

Directors may determine. Provided, however, no stock shall be so purchased before demand shall have been made for the amount due thereon, either in person or by written or printed notice duly mailed to the last-known address of the owner of said stock, as shown by the books of the company, said demand to be made at least 30 days prior to the time when purchase of said stock by the company is to take place, the first day of said period to be the date when said demand is placed in the mail or given in person, as appropriate.

ARTICLE VIII.
SUPERINTENDENT

Section 1. The superintendent shall be appointed by the Board of Directors and shall receive compensation as shall be determined upon by the Board of Directors.

Section 2. Under the instructions and control of the Board of Directors, the superintendent shall have the direct care and management of the ditch and other property of the company, and directly or indirectly in the distribution of the water to the stockholder, and shall be the custodian of all tools, implements and machinery belonging to the company.

Section 3. The superintendent shall keep all headgates, flumes and other property of the company in repair; distribute to the stockholders fairly and in proportion to their rights, as certified to him by the secretary, the waters of the company flowing in the ditch of the company, and keep the ditch in proper condition for such distribution.

ARTICLE IX.
SEAL

Section 1. The seal of the company shall be an impression made upon paper or parchment in circular form and containing the name of the company.

ARTICLE X.
RULES AND REGULATIONS AND AMENDMENT TO BY-LAWS

Section 1. The Board of Directors is empowered to make rules and regulations for the operation of the ditch and all of the works of the company, not inconsistent with these by-laws. Said rules and regulations shall have the force and effect as is set forth in the articles of incorporation or in these by-laws. These by-laws may be amended, repealed, or otherwise modified by the Board of Directors at any regular meeting of the board, or at a meeting called for that purpose, provided that notice of intention to move an amendment or other change shall have been filed with the secretary, in writing, at least ten days before such meeting, such notice to state the portion of the by-laws proposed to be changed, as it then stands and also as it will read when so amended; and when any such notice is filed with the secretary he shall at once mail to each of the members of the board a copy of such notice.

Robert Dickinson - Secretary/Treasurer

July 3, 2003 Version

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
DENVER REGULATORY OFFICE, 9307 SOUTH WADSWORTH BOULEVARD
LITTLETON, COLORADO 80128-6901

October 9, 2013

Dale Leach
Telesto Solutions, Inc.
2950 East Harmony Road, Suite 200
Fort Collins, CO 80528

RE: 2013 Flood - Louden Headgate Repair – Big Thompson River – Larimer County
Corps File No. NWO-2013-01964-DEN

Dear Mr. Leach:

Reference is made to the above-mentioned project, located in Larimer County, Colorado. This project involves repair of the Louden ditch and diversion structure located on the Big Thompson River. The Louden ditch and diversion structure were damaged during the 2013 flood. Work proposed under this project involves repairs to the diversion structure, removal of accumulated sediments, repair of stream bank scour, repair of stream bed scour, and the restoration of uplands.

This project has been reviewed in accordance with Section 404 of the Clean Water Act under which the U.S. Army Corps of Engineers regulates the discharge of dredge and fill material and certain excavation activities in waters of the United States. Waters of the U.S. includes ephemeral, intermittent and perennial streams, their surface connected wetlands and adjacent wetlands and certain lakes, ponds, drainage ditches and irrigation ditches that have a nexus to interstate commerce.

This letter is to inform you that the proposed repair work to the Louden ditch and diversion structure, including work within the Big Thompson River, as depicted and described in the October 7, 2013 email submittal, is the type of activity that is included in the Section 404(f) exemption found at 33 C.F.R. Part 323.4(a)(3) Construction or maintenance of farm or stock ponds or irrigation ditches, or the maintenance (but not construction) of drainage ditches. Discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption.

Although a Department of the Army permit will not be required for these activities, this does not eliminate the requirements that other applicable federal, state, tribal, and local permits are obtained if needed. If there are any questions, please call Nathan Morey at 303-979-4120 and reference **Corps File No. NWO-2013-1964-DEN.**

Sincerely,

Kiel Downing
Chief, Denver Regulatory Office

Copies Furnished:

Sarah Fowler - Environmental Protection Agency

RESOLUTIONS OF THE SHAREHOLDERS OF LOUDEN IRRIGATING CANAL AND RESERVOIR COMPANY

The Shareholders of the Louden Irrigating Canal and Reservoir Company (Company), at a Shareholders' meeting held February 1, 2014, located at 7649 REA Parkway, Fort Collins, Colorado, adopted the following resolutions concerning a secured loan from the State of Colorado Water Conservation Board (CWCB), for the purpose of the Irrigation System Improvements Project in the amount of $160,000 or such actual amount, more or less, as may be needed by the Company and available from the CWCB including the CWCB loan origination fee of 1% of the loan amount.

At said meeting, the Shareholders charged that these resolutions are irrepealable during the term of the loan and, pursuant to the Company's bylaws, authorized the Board of Directors and officers, RESOLVED as follows:

1. to enter into and comply with the terms of a contract with the Colorado Water Conservation Board for a loan in the amount of $160,000 or such actual amount, more or less, as needed to finance the project costs, including the CWCB loan origination fee of 1%, and
2. to levy and collect assessments from the shareholders in an amount sufficient to pay the annual amounts due under the LOAN CONTRACT, and to pledge assessment revenues and the Company's right to receive said revenues for repayment of the loan, and
3. to place said pledged revenues in a special account separate and apart from other COMPANY revenues, and
4. to make the annual payments required by the PROMISSORY NOTE and to make annual deposits to a debt service reserve fund, and
5. to pledge, as COLLATERAL, for the loan the Company's, assessment revenues backed by a rate covenant and an undivided one hundred percent (100%) interest in the BIG THOMPSON RIVER DIVERSION AND HEADGATE, and
6. to execute all documents as required by THE LOAN CONTRACT, including, but not limited to, a PROMISSORY NOTE, SECURITY AGREEMENT, and DEED OF TRUST necessary to convey a security interest in said property to the CWCB, and
7. to take such other actions and to execute such other documents as may be necessary to consummate and implement the loan.

CERTIFICATION

THE UNDERSIGNED, RESPECTIVELY, THE PRESIDENT AND SECRETARY OF THE COMPANY, HEREBY CERTIFY THAT THE FOREGOING ARE TRUE AND CORRECT COPIES OF RESOLUTIONS DULY ADOPTED AT A MEETING OF THE COMPANY'S SHAREHOLDERS DULY CALLED AND HELD AS ABOVE RECITED, PURSUANT TO THE COMPANY'S BYLAWS, AND THAT SAID RESOLUTIONS HAVE NOT BEEN AMENDED OR RESCINDED.

GIVEN UNDER OUR HANDS AND THE SEAL OF THE COMPANY THE 1ST DAY OF FEBRUARY, 2014.

(S E A L)

By _____
Signature—Dale A. Leach, President

ATTEST:

NAME: Dale A. Leach

By _____
Signature of Corporate Secretary
Robert Dickinson

TITLE: President
DATE: FEBRUARY 1, 2014

DATE FEBRUARY 1, 2014

Appendix 3a to Loan Contract C_____

As-Constructed Report
Louden Irrigation Canal
2013 Flood Repair

January 2014

TELESTO
SOLUTIONS • INCORPORATED

PREPARED FOR:
LOUDEN IRRIGATING CANAL AND RESERVOIR COMPANY
4009 E. COUNTY RD 30
FORT COLLINS, CO 80528

PREPARED BY:
TELESTO SOLUTIONS, INC.
2950 EAST HARMONY ROAD
SUITE 200
FORT COLLINS, COLORADO 80528

As-Constructed Report
Louden Irrigation Canal 2013 Flood Repair

Prepared for

Louden Irrigating Canal and Reservoir Company
4009 E. County Rd 30
Fort Collins, Colorado 80528

Prepared by

Telesto Solutions Inc.
2950 East Harmony Rd. Suite 200
Fort Collins, Colorado 80528

January 2014

TELESTO
SOLUTIONS • INCORPORATED

Signature Page

As-Constructed Report
Louden Irrigation Canal 2013 Flood Repair

January 2014

Telesto Solutions, Inc.

_____

Parker Sherman – Primary Author

The enclosed report entitled "As-Constructed Report, Louden Irrigation Canal 2013 Flood Repair" have been prepared for Louden Irrigating Canal and Reservoir Company. This report has been prepared by Telesto Solutions Inc., under the direct supervision of Walter L. Niccoli, registered as a Professional Engineer in the State of Colorado, Registration Number 33826.

_____

Walter L. Niccoli, P.E. – Report Review

Contributors:

April Tischer
Kurt Stauder
Tracy Emmanuel

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1.0 INTRODUCTION

An extreme storm stretching from Laramie, Wyoming south to Boulder, Colorado started on September 9, 2013 and lasted through September 15, 2013. This storm system produced large-scale flooding along the Big Thompson River causing major damage along its path. During the storm, the Big Thompson River basin received 7 to 16 inches of rain. A recent study performed by Ayres and Associates in Loveland, CO, showed that the Big Thompson River, which normally flows under 100 cubic feet per second (cfs) in September, peaked at approximately 10,500 cfs at the mouth of the Big Thompson Canyon. The Louden Irrigation and Ditch Company's (Louden's) diversion structure and headgate for the Louden Ditch (Ditch) are located on the Big Thompson River (Figure 1), just east of the canyon mouth and west of Loveland.

Louden was diverting water into the Ditch when the flood started. This water filled reservoirs located along the Ditch. As the flood progressed, the headgate could not be reached safely for operations. During the flood, water overtopped the headgate structure by at least 3 to 4 feet (ft), resulting in damage to the headgate and Ditch downstream.

Louden engaged Telesto Solutions, Inc (Telesto) to:

- Assist in the evaluation of the flood damage
- Provide field engineering support for repairs
- Provide guidance on permitting and funding acquisition
- Oversee construction repairs
- Submit a completion report to support funding and document work completed

Louden set goals requiring that the Ditch be operational before the first freeze (i.e., end of construction season) so that in the spring it could deliver water to its members. Not only did the Ditch have to be operational, but it had to have capacity to carry the decreed diversion amount of 170 cfs. Louden, Telesto and John Moen's team (the contractor) worked in conjunction to meet these goals by November 30, 2013.

2.0 FIELD ENGINEERING/SUPPORT

The Ditch and headgate were initially inspected by Louden and Telesto on September 16, 2013 and again on October 3, 2013. While Louden selected a contractor, Telesto developed an initial damage inventory and repair guidance summarized in an October 16th, 2013 letter (Appendix A). Appendix A, Figure 1 provides the locations and overview for the majority of the damages to the Ditch. Telesto's safety team prepared a Hazardous Waste Awareness program for the contractor due to the high potential for hazardous materials that could be encountered in the post-flood area (Appendix B).

The headgate structure was buried by flood debris, which initially prevented a complete damage inventory of the structure. Once the contractor was selected, debris and sediment removal from the Ditch was initiated. After debris had been removed from the headgate and the flood waters receded, a second damage inventory of the headgate, diversion structure, and Ditch was completed on October 21, 2013. On November 1, 2013, Telesto provided Louden and the contractor with a supplemental damage inventory and repair guidance summary letter for the headgate, diversion structure, and Ditch (Appendix C).

Once all repairs were complete and the Ditch was deemed suitable to carry water, an initial performance test was completed. Telesto and Louden completed a final inspection on November 11, 2013. Before and after photos of the repairs are shown in Appendix D. The following sections summarize the damages and repair work for each structure.

2.1 Headgate

Appendix A Photo 1 shows the pre-flood headgate, diversion, and surrounding fill. Appendix A Photo 2 was taken as the flood started when the surrounding fill was still intact. Appendix A Photo 3 was taken September 16, 2013 just after the flood water receded. Based on the inspections of the Ditch's headgate the following major damages were observed:

- Large debris piles
- Rock, gravel, and loam soil abutments on the downstream side of the headgate were washed out

- Dirt road 3,000-square-foot roundabout was washed out
- Steel safety rails embedded in the concrete along the top of the headgate were washed away or significantly bent
- One gate mechanism was cracked from the force of the flood (Appendix C Photo 3)

The headgate showed no major damage once the large debris pile was removed. The major washout directly below the headgate and the roundabout was backfilled with approximately 300 cubic yards (cy) of material from the flood outwash located in the general vicinity of the headgate. Large concrete blocks (2-ft by 2-ft by 6-ft) were placed as erosion control along the bank of the river just downstream of the diversion structure. Small boulders, cobble, and gravel from the general vicinity of the headgate was used to backfill behind the blocks. The sediment that was cleaned out of the Ditch was used for the remainder of the roundabout fill, creating an interlocking matrix capable of sustaining vegetation. Louden welded the cracked gate mechanism.

Appendix C Photos 2 and 3 show the headgate after debris had been cleared. Appendix D Photo Sets 1 through 4 show the headgate, diversion structure and surrounding area before and after the completed repairs. Louden also cleared the debris piles from beneath the trailer park bridge west of the headgate (Appendix D Photo Set 5).

2.2 Diversion Structure

The Ditch's concrete diversion structure is located approximately perpendicular to the headgate. This diversion structure spans the width of the Big Thompson River and is used to divert water to the headgate. Damage to the diversion structure included the following:

- Pocketing in the concrete on the downstream face of the diversion structure (Appendix C Photo 1)
- A large scour pocket along the bank on the south side of the diversion structure where the root balls of two trees had eroded out toppling the trees (Appendix C Photo 5)
- Erosion and undercutting of the diversion toe (Appendix C Photo 4)

Using methods similar to the roundabout on the north side of the river, the void at the south side of the diversion structure and the undercut diversion toe was filled with large boulders, cobble and gravel. The fill material was taken from accumulated flood deposits located along the bank of the river in the general vicinity of the diversion structure. Appendix D Photo Sets 6 and 7 show the diversion structure before and after the completed repairs.

2.3 Louden Ditch

The flood caused massive sedimentation along the Ditch. This sediment mostly consisted of silt to sand extending from the headgate to approximately 3,500 ft down ditch. It was estimated that the average depth of the sediment deposition throughout the Ditch was approximately 4 ft in thickness creating nearly 11,300 cy of material that needed to be excavated and re-deposited. In multiple locations, where the pre-flood Ditch and banks were covered with sediment, the sediment was excavated until resistance was felt by the operator. This resistance generally aligned with the pre-flood ditch banks. The excavated material was placed on the south side of the Ditch along the ditch access road. The excavated sediment was used to build up the ditch road and reform the roundabout near the headgate. Appendix D Photo Set 8 shows a typical section of the Ditch before and after the completed repairs.

2.4 Ditch Access Road

The ditch access road runs adjacent to the Ditch. Flood water deposited silt in the Ditch and piled debris up at the subdivision bridge and the Highway 34 bridge. The debris and sediment limited the Ditch carrying capacity. Due to the flood flows exceeding the Ditch's limited capacity, the Ditch overtopped at multiple locations. Overtopping eroded the ditch bank of the Ditch and the access road at three locations. The debris from around both bridges was removed and the sediment was excavated (Appendix D Photo Sets 9 and 10). Locations where minor overtopping but no erosion occurred, the height of the ditch road was increased using excavated ditch sediments, as described in Section 2.3.

Three major breaches occurred along the Ditch. The first occurred approximately 600 ft down ditch from the headgate and approximately 500 ft up ditch from the subdivision bridge. This washout eroded the right ditch bank and part of the road. Although the subdivision experienced major flooding from the Big Thompson River, it appears that water running into the subdivision from the washed out Ditch saved several residences by pushing river debris away from homes. As part of the repair, large concrete blocks (2-ft by 2-ft by 6-ft) were placed along the Ditch wall to stabilize the banks and add structure to the ditch access road. Excavated sediment from the Ditch was used as fill material behind the blocks (Appendix A Sketch 1; Appendix D Photo Set 11).

Two other major washouts occurred, approximately 3,500 ft down ditch from the headgate. The original design was to buttress and fill in these sections; the larger of the two washouts would have required about 500 cy of fill and the smaller about 35 cy of fill. Two major issues were encountered during the planning of the repair: 1) limited access and space for required equipment and 2) the large quantity of material required. Considering the condition of the road and the location of the washouts, the original repair plan (as shown in Appendix A Sketch 3) was not feasible in terms of time and cost. Telesto, the contractor, and Louden discussed other options to repair the ditch access road and the washouts. Utilizing a field engineering and design approach, a plan was developed to realign the Ditch to the north of the washed-out region (Appendix C Sketch 1 and Figure 2). The completed realignment of the Ditch allowed for a straighter flow path and improved maneuverability. Furthermore, the realignment of the Ditch provided the appropriate material necessary to repair the washout areas. The completed repairs and realignment are shown in Appendix D Photo Sets 12 through 14.

3.0 CURRENT STATUS

During the week of October 28, 2013, the excavation and repair to the Ditch was completed by the contractor and Louden ran approximately 100 cfs of water through the newly completed Ditch for three days as a performance test. This test allowed for a review on the stability and functionality of the repairs, and it cleaned out the sediment that could not easily be excavated from under the bridges. No problems were detected

during the 3-day performance test. Based on engineering judgment and calculations, the freeboard above the water line during the performance test was determined to be enough to convey at least an additional 70 cfs.

On November 4, 2013 Telesto and Louden completed an assessment of the work on the Ditch. All major repairs have been completed with the exception of the concrete patch work on the diversion structure. This can be completed in the spring of 2014 when weather permits. Thus, as of November 4, 2013 the work completed met the goals Louden set forth for the projects. The Ditch is capable of delivering the full 170 cfs diversion to Louden users next spring.

4.0 REMAINING WORK AND RECOMMENDATIONS

There are a few remaining items that would enhance the Ditch in the areas of the repair:

- Establishing vegetation on bare ground created by the repair work is extremely important and should be completed as soon as feasible. Seeding in early spring with a spring or summer germinating grass mix is recommended. Vegetation will make the road surface drivable when it rains, and prevent erosion on the slopes. The estimated amount of bare ground is about 1 acre. The ground should be roughened prior to seeding. A single species like western wheat could be used at about 22 pounds per acre.
- The pocketing in the face of the concrete diversion structure should be patched prior to large springtime flows to prevent larger cracks from forming.
- Louden has commissioned the replacement of the safety rails at the headgate when weather allows.
- Telesto advises the consideration of replacing the gate mechanisms with newer, safer wheel-operated mechanisms.

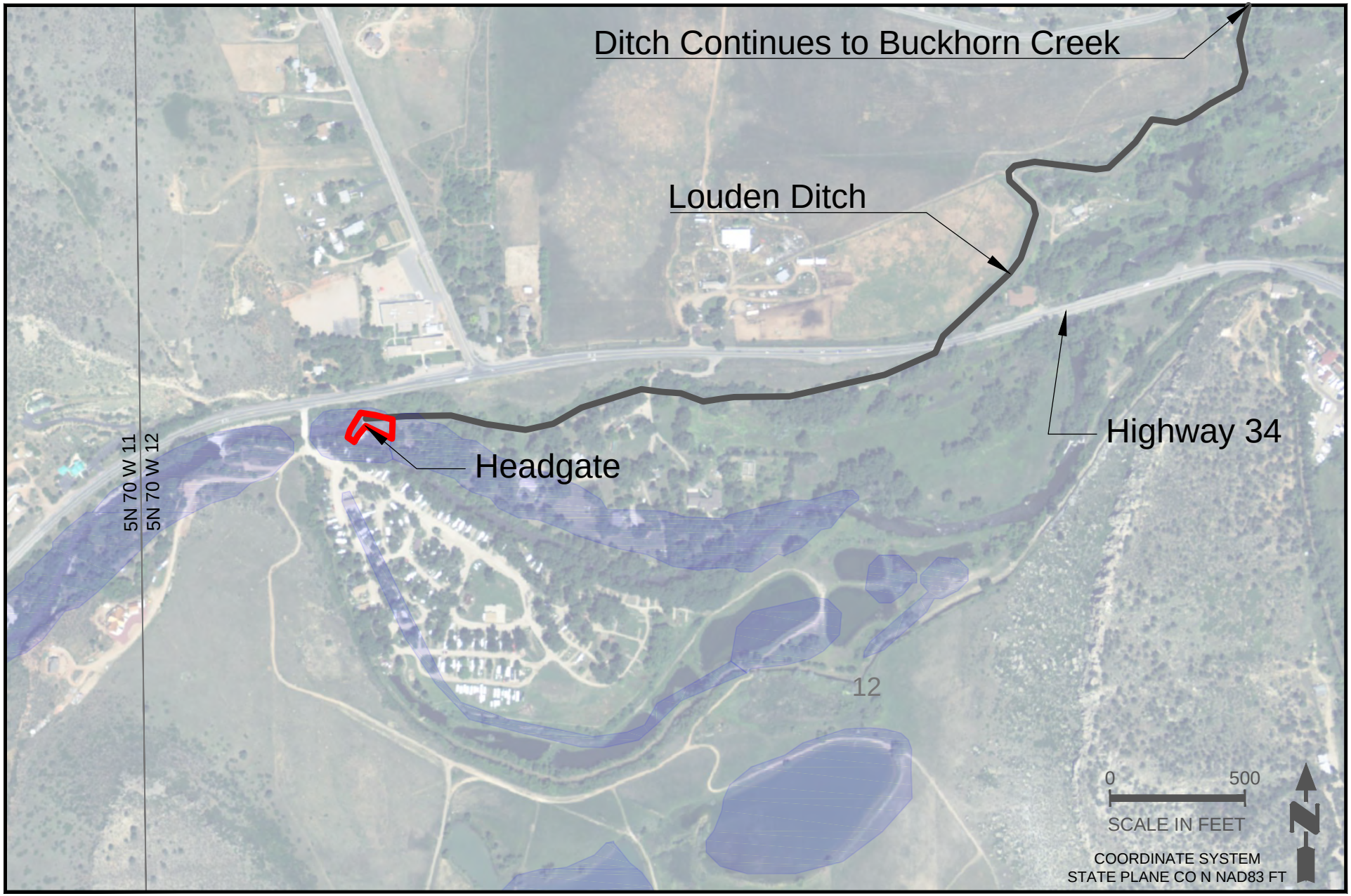
Louden diligently maintains and monitors their entire infrastructure. Telesto recommends remaining vigilant and suggests the following monitoring activities:

- Periodically inspecting the embankment on the south side of the diversion structure, where the scour hole was repaired, to ensure eddies do not form that would erode into and around the diversion structure. Telesto advises planting one or two tree saplings in this area to replace the trees lost in the flood.
- The river immediately downstream of the diversion structure should remain free of turbulence/churning that would erode beneath the structure. Water

should flow smoothly over the diversion and remain smoothly flowing for about 20 ft downstream.

- Although care was taken to keep the original ditch bottom intact, excavating sediment, installing the concrete blocks, and realigning a portion of the Ditch creates the potential for leaks and seeps to form. The toe along the repaired section of the Ditch should be walked periodically to check for any signs of erosion or wet spots anywhere at the toe or on the embankments. Familiarity with the existing conditions will ensure a change is noticed, should a problem develop.

FIGURES



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PROJECT: | TASK:

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

FIGURE 1
Louden Ditch Headgate and Diversion Location

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

APPENDIX A

Headgate and Ditch Damage Inventory and Repair Guidance Summary Letter

TELESTO
SOLUTIONS • INCORPORATED

October 16, 2013

Dale A Leach, President
Louden Irrigating Canal and Reservoir Company
4009 E Cty Rd 30
Fort Collins, Co 80528

Subject: Louden Irrigating Canal and Reservoir Company 2013 head gate and ditch damage inventory and Engineering repair guidance summary

Dear Mr. Leach:

Due to the recent flooding of the Thompson River, we have summarized currently known damages to the head gate and in the ditch from the headgate to about 3,500 feet downstream. This letter also includes engineering guidance in order to complete repairs.

The Louden headgate is located near Highway 34 between North Carter Lake Road and North County Road 27, at coordinates 105° 11' 23.1792" W and 40° 25' 3.4104" N, Larimer County Township 5 North Range 70 West, Section 12. The headgate location is shown on Figure 1. Photo 1 shows the pre-flood headgate, diversion, and surrounding fill. Photo 2 was taken as the flood started when the surrounding fill is still intact. Photo 3 was taken September 16, 2013 just after the flood water receded. The intent of the damage lists and engineering guidance herein is to return the diversion, headgate, and ditch to pre-flood conditions.

Damage Assessment

The Louden ditch has been filled with significant amount of sand, with damage to the embankments. The embankments near the headgate have been washed away. It is possible that there is damage to the headgate structure foundations, as well as the gates themselves. Debris is currently burying the headgate, preventing a complete damage assessment of the headgate as this time. The diversion itself appears to be in working order, however a complete assessment would be done once water levels drop and mud and debris has been removed from around the structure.

Based upon a field investigation on September 16, 2013 and on October 3, 2013 the following areas require repair. Quantities are estimated and were not measured in the field unless otherwise noted. Figure 1 describes the damage locations.

- A 55 foot long, 24 foot tall area of major erosion requiring about 500 cy of fill and rock

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Fort Collins, Colorado 80528
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New Mexico Office
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Silver City, New Mexico 88061
575-538-5620 / 575-538-5625(FAX)

stabilization at the toe (Photo 4). The fill was calculated using rough field measurements -the road eroded away along a 55 foot span on a slope about 24 feet high, which would be filled back to existing slope which is about 1.7:1 -> 760 cy of fill.

- A second area of the ditch embankment has a channelized erosion path approximately 20-feet wide and 1-foot deep requiring about 35 cy of fill (20*1*47 ft /27 = 35 cy).
- Approximately 3,500-feet of ditch has 2-6 feet of sediment build up, totaling around 11,280 cy, requiring removal (Photo 5; ~6.5' wide across top of sediment- 3,500 feet * approximately 87 square foot cross section/27 = ~11,280 cy).
- Approximately 140 feet of ditch downstream of the bridge requires repair, excavation, and embankment replacement.
- The downstream side of the ditch (as the water exists the headgate) is washed out for approximately 10-feet. This area previously was constructed with large rock and local soils (Photo 2).
- Rock, gravel, loam soil fills downstream of the headgate are washed out, requires approximately 200-300 cy of fill to restore previous ramp to the top of the diversion structure (Photo 2).
- Dirt road roundabout is washed out, an area of about 3,000 square feet (Photo 6).
- Steel safety rails embedded in the concrete along the top of the headgate have been washed away or significantly bent.
- A tree growing right at the end of the diversion structure on the south side of the river has fallen over ripping out its root ball and exposing the south side end of the diversion. This will eventually allow water to erode rocks and soils beneath the diversion structure (Photo 7).

Immediate Repairs

Work to be completed prior to the first winter freeze would include:

- Removing debris, loose silt and sediments from the top and sides of the headgate.
- Rock, gravel, loam soil fills downstream of the headgate are washed out, requires approximately 200-300 cy of fill to restore previous ramp to the top of the diversion structure. Surrounding materials can supply some of the fill.
- Replace any small areas of washed out headgate foundations with River Fill, described in the fill section below. If large areas of the foundation are washed out temporary River Fill should be placed. The need for permanent concrete fills will be evaluated in the spring. Detailed notes and photos of any temporary fills should be kept.
- Fill in the area at the south side of the river immediately adjacent to the diversion where the tree root ball has been torn out with the River Fill described in the fill section. Rock immediately downstream, near where a power line pole has been washed out, can be pulled back to fill the space. Additional off-site non-concrete rock fill may be needed. Leave space to re-plant a sapling tree in this area in the spring.

- Extend the headgates downstream concrete wall by about 10 feet to replace a washed out section of the ditch immediately adjacent to the diversion. This area previously was constructed with large rock and local soils, and should be replaced with concrete grouted large diameter rock. This area may be filled in with a temporary earth and rock fill and the concrete work may be done early next spring if necessary.
- Replace rock, gravel, earth fills downstream of the headgate to restore previous ramp to the top of the diversion structure (about 200-300 cy from surrounding materials). This work may be done early next spring if necessary.
- The land Owner to the south of the 230 foot washed out section, would like to bring up the whole area. The ditch company may permanently fill in the area to the south within 100-feet of the centerline of the ditch with Sand Fill. The ditch embankment should be constructed with concrete blocks with a total fill of about 500 cy per Sketch 1.
- Other washed out sections of ditch embankment as well as low sections which overtopped should be filled with concrete chucks/rock and earth fill from Donath Lake as described in the fill section and Sketch 2. The low section of the ditch road as well as the fill depth should be marked by an Engineer (suggest spray-paint) prior to fill placement. The amount of fill need for this is about 400cy of material.
- Two sections of the ditch embankment have been washed out requiring about 535 cy of fill. These sections should be replaced per Sketch 3 using Concrete Chunk/Rock Fill as described in the fill section. Repairs may be done with an excavator that can reach to the toe of the embankment or by constructing a temporary ramp down to the toe of the embankment. In either case fill material should not be end dumped over the eroded surface but rather carefully place by building the slope back up in 1 foot -compacted lifts with 4 –foot benches (Sketch 3). Compaction should be done by tamping down each lift with the excavator bucket or similar method.
- Sand excavated from the ditch may be placed on parts of the ditch road that did not overtop and are not marked by an Engineer for special fill. These sections of road will be later stabilized by seeding. The fill should make an even drivable surface.

Early Spring Repairs

- A complete Engineering assessment of the headgate, this may be done this fall if the area is cleared of debris prior to snowfall.
- Repair and patch any loose concrete work.
- Repair steel gates and mechanisms as needed.
- Grade existing ground to re-create previously existing dirt road roundabout, an area of about 3,000 square feet.
- Plant tree saplings and an appropriate seed mixture in disturbed areas. Seed mixture recommendation will be made in the spring.

Fill Materials

Fill material requirements can vary depending on location and use. There are four main fill types associated with this work:

Concrete Chucks/Rock and Earth Fill from Donath Lake (Structural Fill) - Fill material within 7 feet of the ditch below the normal ditch water line should be generally free of debris and organic matter. Sand excavated from the ditch should not be placed in these sections. This material should be used to build up the damaged sections of the ditch as well as undamaged low spots on the ditch road.

Concrete Chunk/Rock Fill– Fill material placed on the outer ditch embankments in the two sections that have washed out should be free draining with a stable surface. The interior of this fill should be composed of concrete chucks and/or rocks. Sand should be added only on the outer surface to allow vegetation to grow on the outer surface and should not comprise a large portion of the fill.

Sand Fill - Fill on-top of the existing Louden road could tolerate settlement and could be anything that could create a drivable surface. Trees, sand and other organic matter may be used. These areas will settle at different rates over time, future low maintenance to maintain a smooth drivable surface will be needed.

Placing material on wet or frozen surfaces can prevent intimate contact between layers of material creating a greater chance for the layers to separate (failure plain) and increase maintenance issues.

The bottom of ditch near the headgate likely has a rocky, naturally formed channel bed. Downstream sections of the ditch likely have clay or natural rock surface. The pre-flood ditch bottom should not be penetrated when excavating debris or during ditch reconstruction. Leaving a layer of sediment on top would be preferable to risking penetrating this layer. Penetrating this layer can increase water loss through the bottom of the ditch and create a weak spot allowing erosion to propagate. If the ditch bottom is damaged it should be repaired prior to the irrigation season. Repair would include excavating out the damaged spot and placing high clay content materials similar in texture, size, and composition to the undamaged ditch bottom and compacting in thin layers.

Please contact Walt Niccoli, wniccoli@telesto-inc.com or April Tischer, atischer@telesto-inc.com with any questions or concerns, 970 484 7704.

Sincerely,

Telesto Solutions, Inc.

April Tischer
Engineer

AT: KS
Enclosure
cc:

Photo 1 Pre Flood Headgate

Photo 2 Headgate Start of the Flood September 12, 2013

Photo 3 Headgate September 16, 2013

Photo 4 September 16, 2013 Outer Ditch Embankment Slide

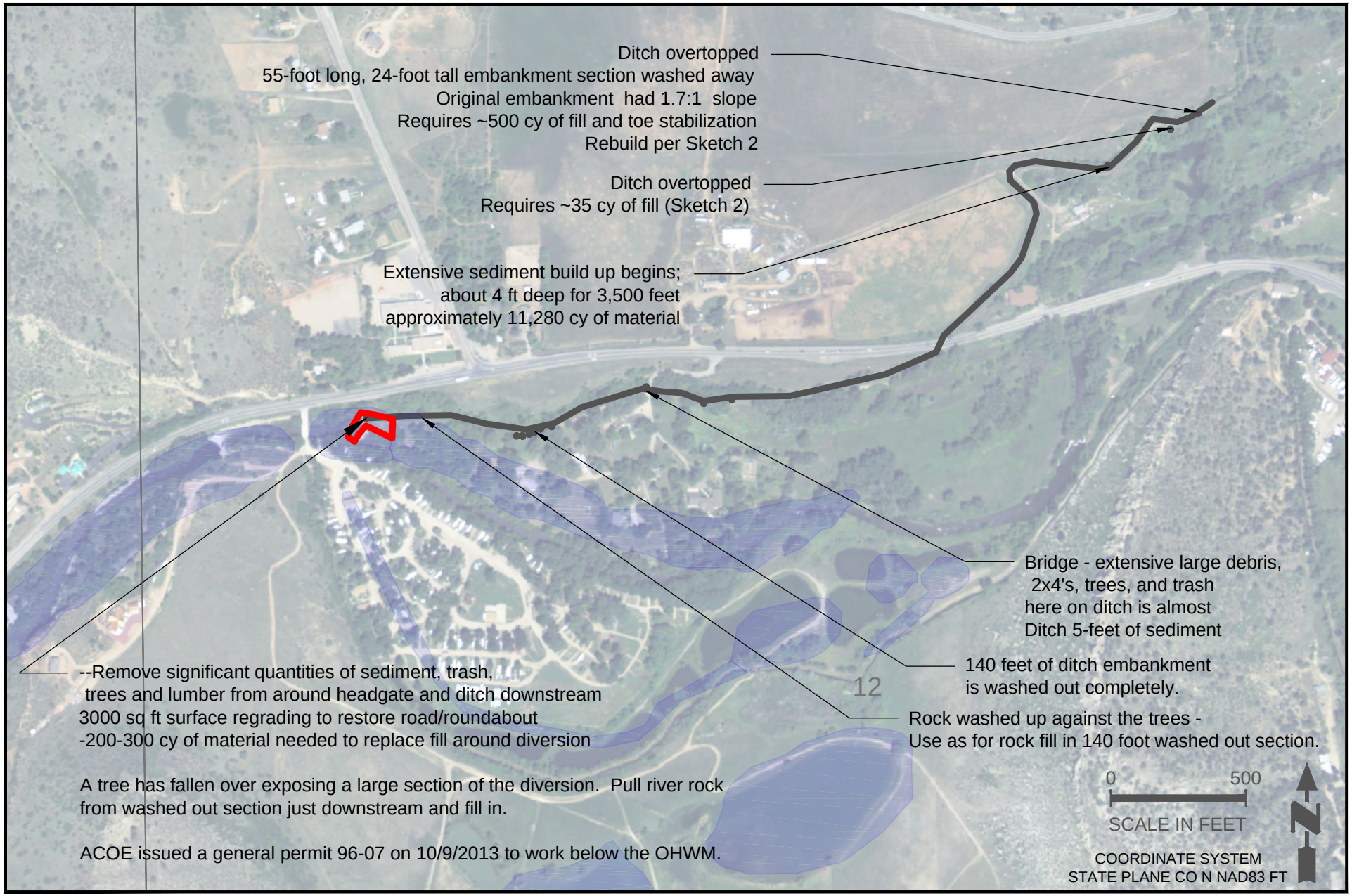
Photo 5 September 16, 2013 Typical Sediment Build Up

Photo 6 September 16, 2013 Previous Roundabout

Photo 7 October 3, 2013 South end of the Diversion Structure

Photo 8 October 3, 2013 Headgate looking downstream

Photo 9 September 16, 2013 Ditch Embankment Washout



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PROJECT:	TASK:
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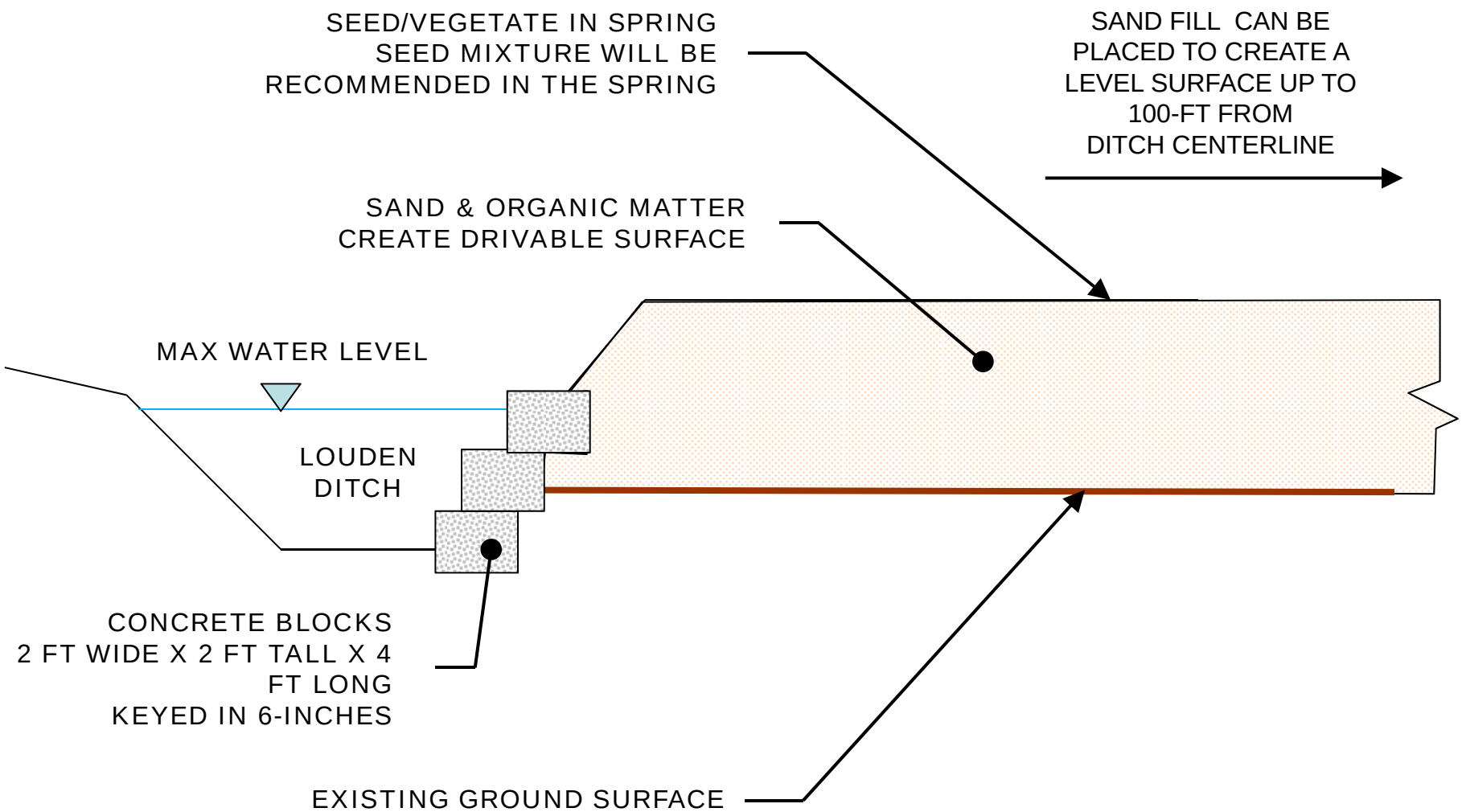
PREPARED BY: TELESTO SOLUTIONS INCORPORATED

FIGURE 1
Louden Ditch 2013 Flood Overview

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY



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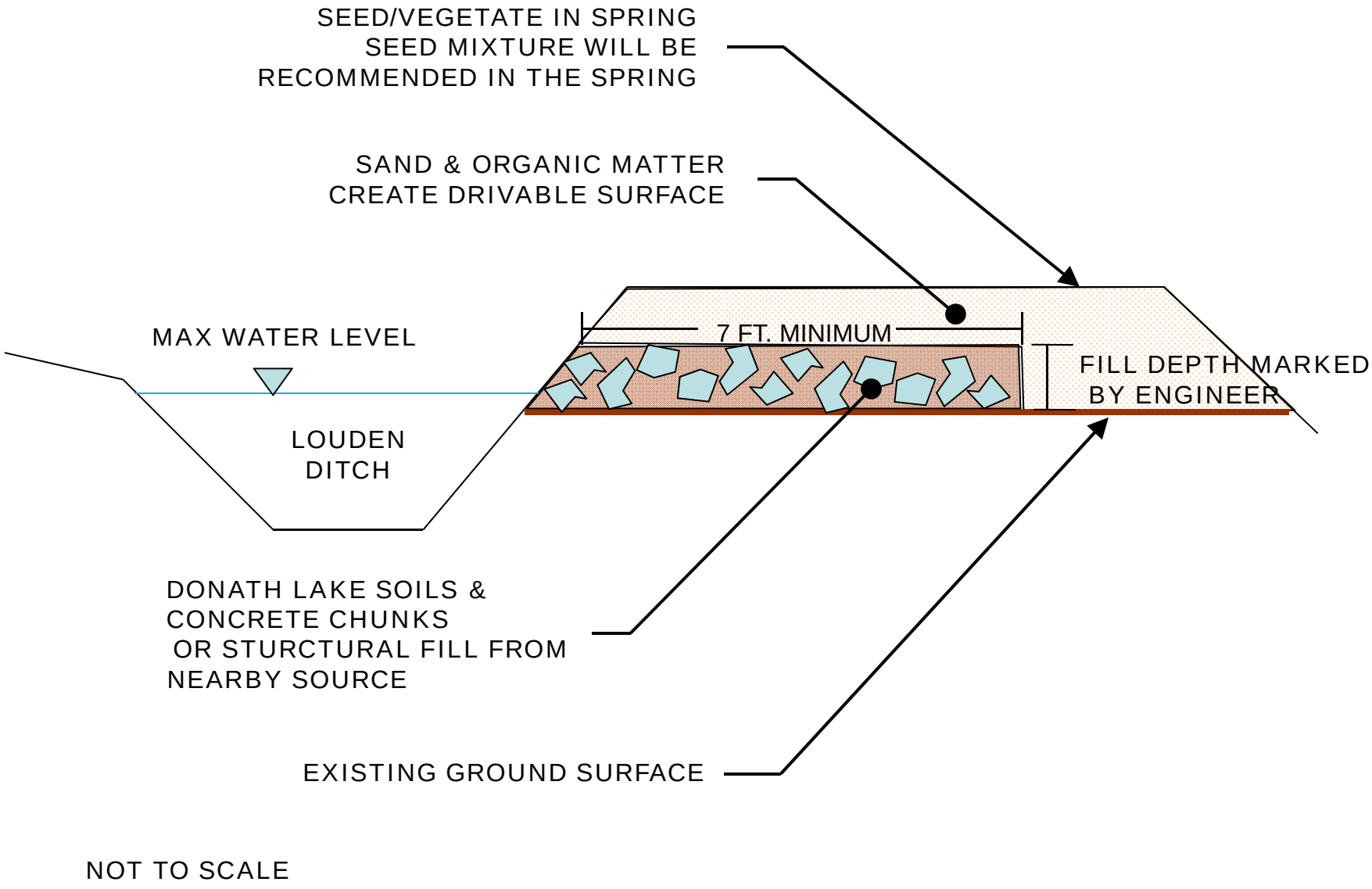
PROJECT: 413201	TASK 01
PREPARED BY: TELESTO SOLUTIONS INCORPORATED	

SKETCH 1
WASHED OUT DITCH EMBANKMENT DOWNSTREAM OF HEADGATE
APPROXIMATLY 230-FT LONG

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY



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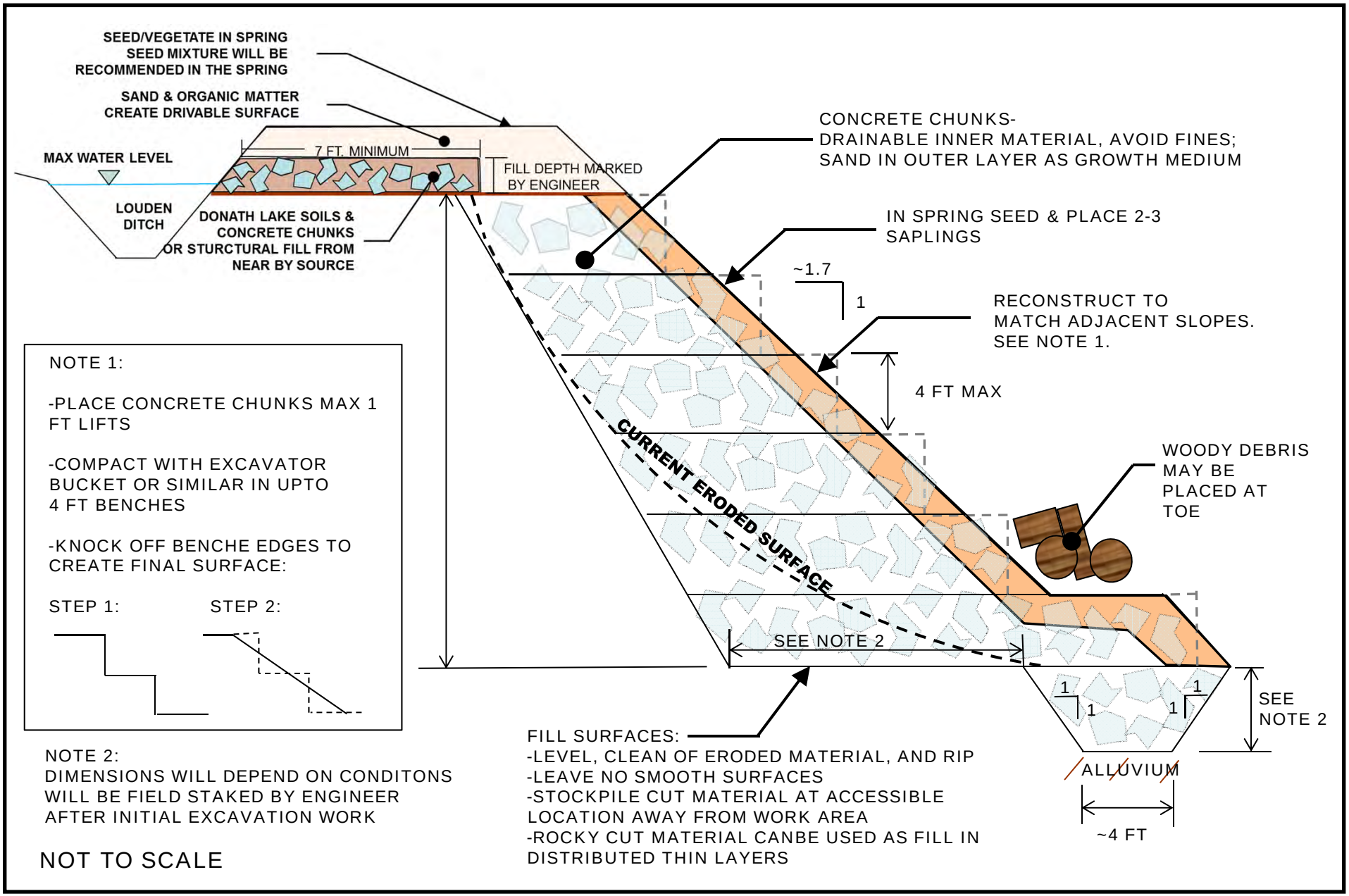
PROJECT:	TASK
413201	01

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

SKETCH 2
DAMAGED AND LOW DITCH ROAD SECTIONS

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY



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PROJECT:	TASK
413201	01

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

SKETCH 3
EMBANKMENT EROSION REPAIR

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

APPENDIX B
Hazard Waste Awareness Materials

What does it look like?

Look for containers and symbols such as these below to identify if it is potentially hazardous

Contact Information

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2950 East Harmony Road Suite 200
Fort Collins, CO 80528
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Handling Hazardous Wastes On-site

What is Hazardous Waste?

Debris carried by the recent flooding has the potential to include material that would be classified as hazardous wastes. The first step in dealing with potentially hazardous waste is to recognize it. Material classified as hazardous waste includes:

- Industrial or household chemicals including aerosols, paints, acids, de-greasers and solvents
- Fertilizers, pesticides, herbicides
- Diesel, gasoline, motor oil, propane tanks
- Storage barrels, tanks or cans for petroleum-based chemical, such as motor oil, lubricants and fuel
- Compressed air tanks such as acetylene welding or diving tanks
- Pool chemicals such as chlorine, calcium hypochlorite and chlorinated isocyanurate
- Medical waste such as used syringes, biohazard containers, medicines or supplies including oxygen tanks
- Electronics, cellphones and household appliances like refrigerators

What do I do with it?

First, make sure you are wearing personal protective equipment (PPE) before handling hazardous material containers. Thick nitrile or latex gloves, eye-protection, long-sleeve shirts, long pants and closed-toe shoes will help prevent spills from contacting your skin and eyes.

If the container is **empty** it is no longer considered a hazardous waste and can be disposed of with the regular trash. An empty container has no more pourable material.

Potentially hazardous wastes should be separated and compiled for proper disposal. Different types of waste need to be stored away from each other. For example, oxygen tanks should not be stored with flammable materials. Carefully look for any labels to identify the specific chemical properties of each container. If a container does not have a label it should be stored away from other containers if possible.

If a container is leaking, try to put that container into another larger container to keep it from seeping into the ground or bodies of water. If it is a large container attempt to create a berm around the container to control the spill.

Unconventional Wastes

The manufacturing of illegal drugs such as methamphetamine creates waste products that are extremely hazardous but difficult to identify. Lookout for propane tanks with discolored valves, two liter soda bottles containing unknown liquids or dried solids, bottles or jugs with tubing extending from the top, and discarded coolers.

APPENDIX C

Supplemental Headgate and Ditch Damage Inventory and Repair Guidance Summary Letter

November 1, 2013

Dale A Leach, President
Louden Irrigating Canal and Reservoir Company
4009 E Cty Rd 30
Fort Collins, CO 80528

Subject: Louden Irrigating Canal and Reservoir Company 2013 headgate and ditch damage inventory and engineering repair guidance summary, supplemental.

Dear Mr. Leach:

In response to the damage caused by the recent flooding of the Big Thompson River on October 16, 2013, Telesto Solutions Inc. (Telesto) provided a damage inventory and repair guidance letter for the headgate and in the ditch from the headgate to approximately 3,500 feet downstream. Since then, sediment removal from the ditch has been completed; the large debris pile surrounding and on the headgate, has been removed and hauled away. Additionally, the Big Thompson River flows have decreased allowing for a closer inspection of the diversion structure as well as the headgate. This letter provides supplemental damage inventory and repair guidance for the diversion structure and the headgate. Also included in this letter are revised engineering designs for the washed out areas occurring along the ditch northeast of the Highway 34 bridge.

Headgate and Diversion Damage Assessment

Based on a field investigation performed on October 21, 2013 Telesto recommends the following:

- Multiple holes were discovered to have formed along the eastern concrete face of the diversion structure (Photo 1) and requires repair
- An assessment of the headgate showed no major damage to the structure (Photo 2). However, one gate mechanism was cracked (Photo 3) and requires repair
- Repair to the toe of the diversion structure where the river bed has been eroded leaving a void below the bottom lip of the diversion structure (Photo 4)

Recommended Headgate and Diversion Repairs

The holes in the diversion face are small, ranging in size from 6 to 30 inches, and may be repaired with concrete patches. Drying the east face of the diversion will be necessary to

complete the patch work. Drying can be accomplished by diverting the river through the diversion return flow gate. The patches should be cured before flow over the diversion resumes.

The cracked gate mechanisms should be welded and the gate lowered (Photo 3). Although the other gate mechanisms are undamaged, it is recommended for wheel and worm gear mechanisms that are safer and easier to operate, be installed.

The void at the toe of the diversion should be backfilled with large rock and covered with smaller cobble and sand to stabilize the toe of the diversion. The same fill should be used in the scour hole at the south end of the diversion (Photo 5).

Revised Embankment Washout Designs

Engineering designs for the washed out areas that occurred along the ditch to the northeast of the Highway 34 bridge have been revised since the recommendations letter on the 16th of October. The original plan called for approximately 535 cubic yards of fill to be placed with in the washed out sections by carefully building the slope back up in 1 foot -compacted lifts with 4 foot benches. This plan became unfeasible due to the cost and transport distance of appropriate backfill materials, coupled with unsafe access to the washed out sections. The revised plan is to re-align the Louden ditch and access road about 50 feet to the north, cutting across the corner where the washed out sections are located (Figure 1 and Sketch 1). The ditch access road will then be located on an existing stable surface, away from the washed out sections. The excess material from this re-alignment will be used as miscellaneous fill material in the washed out sections.

The material present in the area of excavation for the new Louden Ditch alignment needs to be evaluated for its composition. Depending on the composition of the material the new section of ditch may require a bentonite liner, or other methods to prevent leakage. The new alignment of the ditch will allow for a shallower grade, which will slightly increase flow depth from its past alignment through that section.

When all earth work has been completed a native grass seed should be planted in the area for added hill slope stabilization.

Please contact Walt Niccoli, wniccoli@telesto-inc.com or April Tischer, atischer@telesto-inc.com with any questions or concerns, 970 484 7704.

Sincerely,

Telesto Solutions, Inc.

Parker Scherman
Geologist

For

April Tischer
Engineer
AT: KS

Enclosure

cc:

Photo 1 Diversion Dam damage on eastern/downstream face

Photo 2 Headgate October 21, 2013

Photo 3 Broken headgate hoist mechanism

Photo 4 Diversion Dam Damage and Undercut Toe

Photo 5 Scour hole to the south side of the Diversion Dam

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Job No.: _____ Client: _____ Page ____ of ____

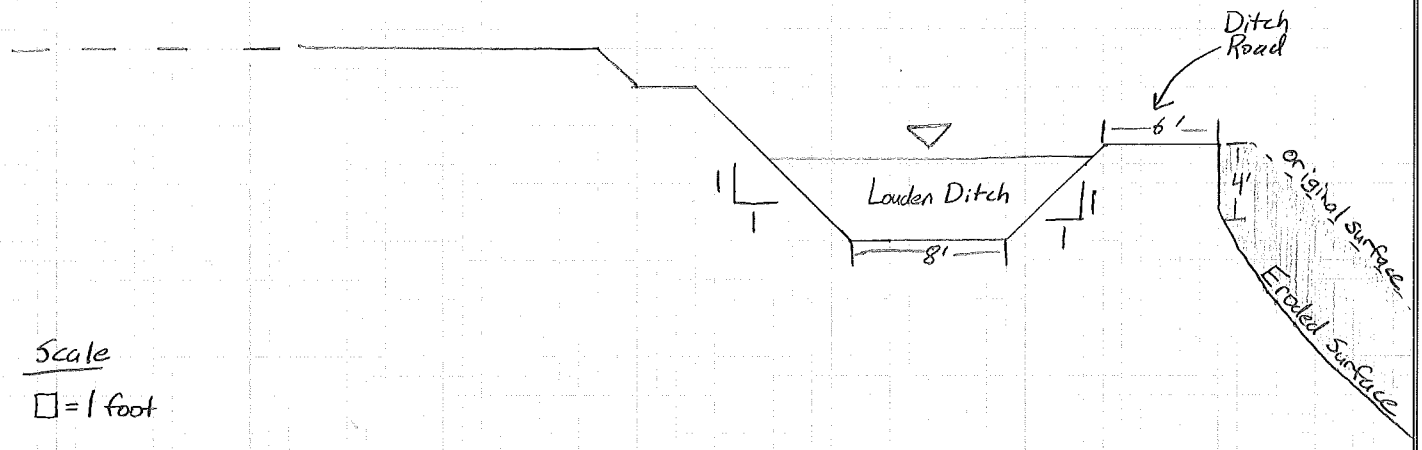
Task: SKETCH 1 Computed By: Parker Scherman

_____ Checked By: _____ Date: _____

North

CURRENT CONDITIONS

South



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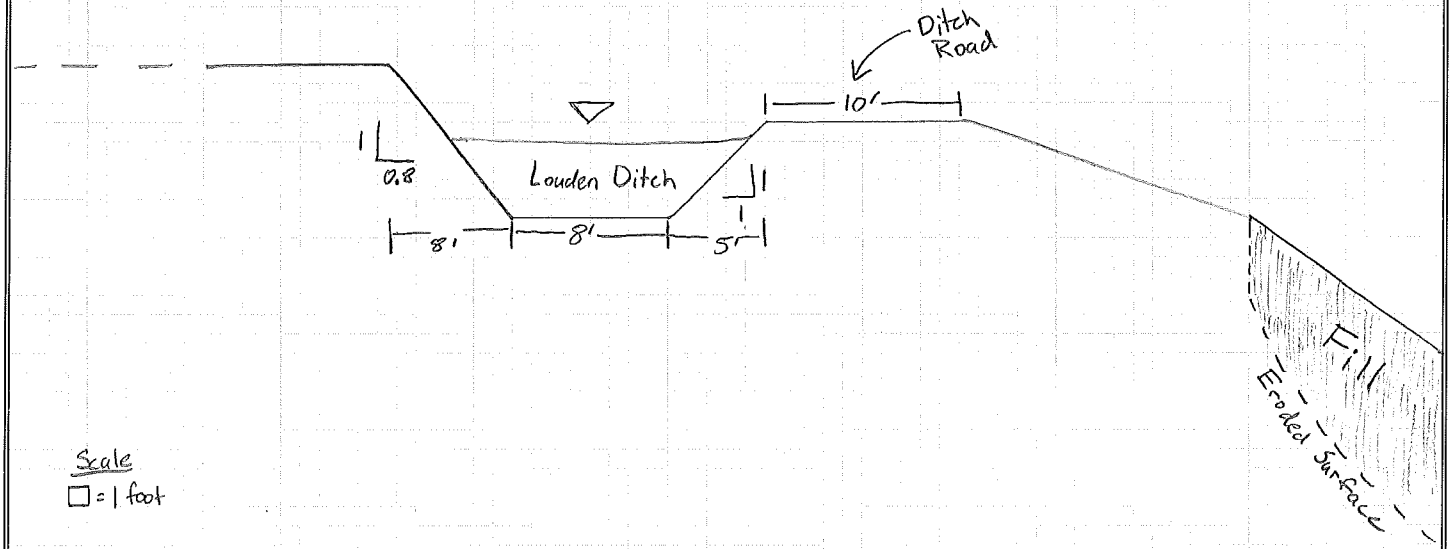
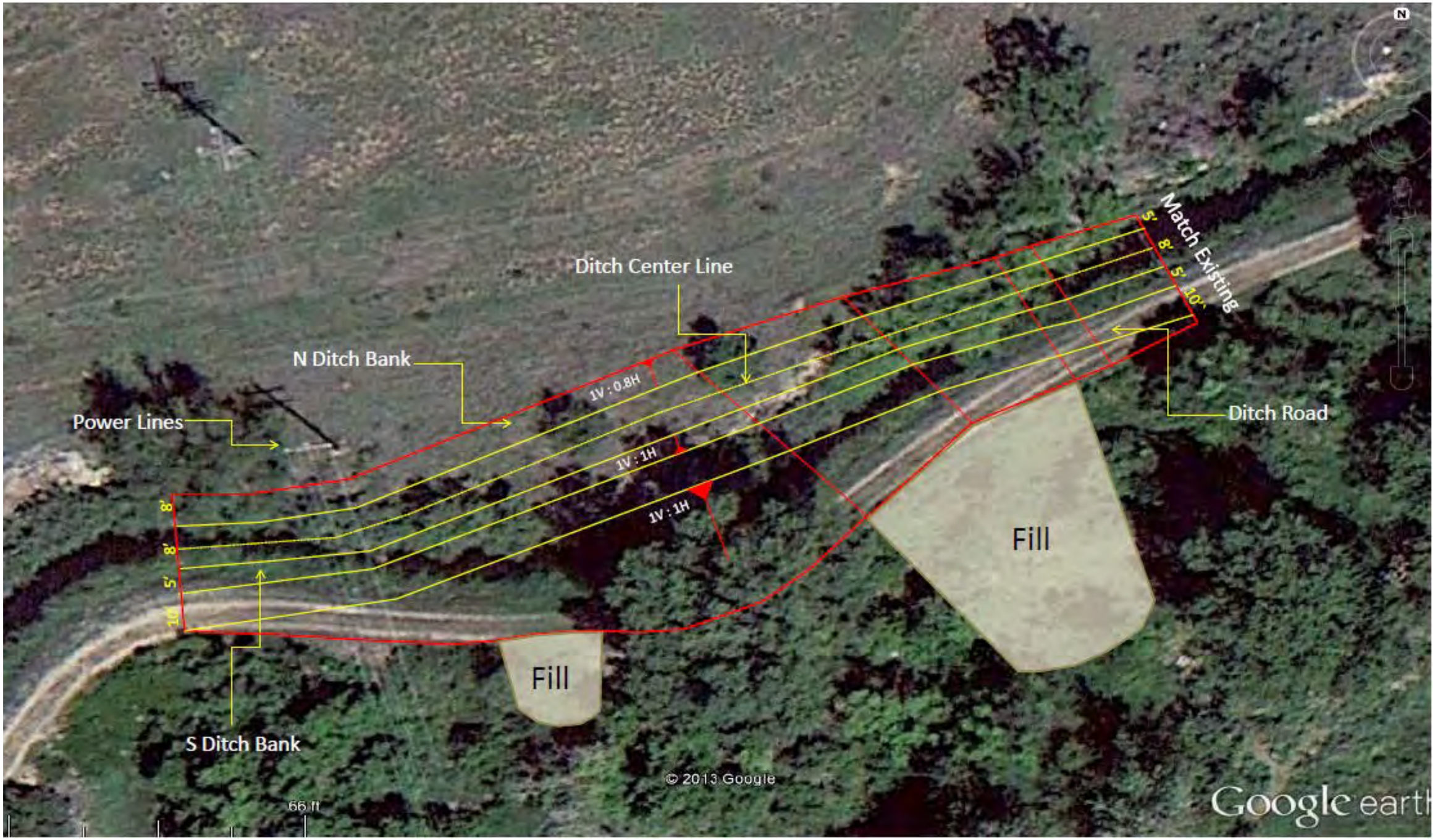
North

NEW DITCH ALIGNMENT

South



Scale
□ = 1 foot



PLACE PATH AND FILE NAME OF POWERPOINT FILE HERE

PROJECT:	TASK:
-	-

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

Figure 2
Louden Ditch Realignment

APPENDIX D
Photographs of Before and After Completed Repairs

BEFORE REPAIR

Looking Up Ditch

Looking Down Ditch

AFTER REPAIR

PROJECT:	TASK
413201	01

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

Photo Set 1
Headgate

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

BEFORE REPAIR

AFTER REPAIR

Silt Gate

Looking Up River

PROJECT: 413201 | TASK 01

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Photo Set 2
Headgate and Silt Gate

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

BEFORE REPAIR

AFTER REPAIR

Looking Up River

PROJECT:	TASK
413201	01

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Photo Set 3
Headgate Surrounding Area

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

BEFORE REPAIR

Looking Down River

AFTER REPAIR

PROJECT:	TASK
413201	01

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Photo Set 4
Headgate Surrounding Area

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

Bridge to the West

BEFORE REPAIR

AFTER REPAIR

PROJECT:	TASK
413201	01

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Photo Set 5
Bridge Cleaning to the West

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BEFORE REPAIR

Looking Southwest

AFTER REPAIR

Looking North

PROJECT:	TASK
413201	01

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Photo Set 6
Diversion

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

BEFORE REPAIR

Looking South and Southwest

AFTER REPAIR

Diversion South Side Close Up

PROJECT: 413201	TASK 01

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Photo Set 7
Diversion South Side

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

BEFORE REPAIR

Looking Down Ditch from Headgate

AFTER REPAIR

PROJECT: 413201	TASK 01

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

Photo Set 8
Excavated Ditch

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

BEFORE REPAIR

AFTER REPAIR

Looking Up Ditch

Looking Down Ditch

PROJECT: 413201	TASK 01
PREPARED BY: TELESTO SOLUTIONS INCORPORATED	

Photo Set 9
Subdivision Bridge

PREPARED FOR:
LOUDEN
IRRIGATION AND RESERVOIR COMPANY

BEFORE REPAIR

AFTER REPAIR

Looking Down Ditch

PROJECT:	TASK
413201	01

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

Photo Set 10
Highway 34 Bridge

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

BEFORE REPAIR

Looking Down Ditch

Looking Up Ditch

AFTER REPAIR

PROJECT: 413201 | TASK 01

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Photo Set 11
Repaired Overbank Erosion

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

Large Washout and Ditch Realignment

BEFORE REPAIR

Looking West

Larger washout

AFTER REPAIR

Repaired Larger washout

PROJECT:	TASK
413201	01

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Photo Set 12
Ditch Realignment Down Ditch of Highway 34

PREPARED FOR: LOUDEN IRRIGATION AND RESERVOIR COMPANY

BEFORE REPAIR

AFTER REPAIR

Looking Down

Larger washout

Repaired larger washout
The other smaller washout was repaired similarly

Looking East

Smaller washout

Larger washout

Larger washout

PROJECT:	TASK
413201	01

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Photo Set 13
Large Overbank Slide Adjacent to Ditch Realignment

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FINISHED DITCH REALIGHNMENT

LOOKING WEST

LOOKING EAST

PROJECT: 413201 | TASK 01

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

Photo Set 14
Finished Ditch Realignment

PREPARED FOR: LOUDEN IRRIGATION AND RESERVIOIR COMPANY