Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem Oregon 97301-1271
(503) 986-0900
www.wrd.state.or.us

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Application for a Permit to Store Water in a Reservoir
(Standard Review)

Standard Review Process (ORS 537): You must use this form for any reservoir storing more than 9.2 acre-feet and with a dam more than 10 feet high.

THIS AN APPLICATION TO APPROPRIATE RESERVED WATER

Use a separate form for each reservoir. However, to obtain authorization for multiple reservoirs, multiple forms may be combined into one application if filed at the same time.

Please type or print in dark ink. If your application is found to be incomplete or inaccurate, we will return it to you. A summary of review criteria and procedures that are generally applicable to these applications is available at www.wrd.state.or.us/OWRD/PUBS/forms.shtml

1. APPLICANT INFORMATION

Applicant: Azure Farms (First) Attn: David Stelzer (Last)

Mailing Address: 79709 Dufur Valley Road

Dufur (City) Oregon (State) 97021 (Zip)

Phone: ____ (Home) ____ (Work) ____ (Other)

Fax: ____ E-Mail Address*: ____

* By providing an e-mail address, consent is given to receive all correspondence from the department electronically. (paper copies of the final order documents will also be mailed.)

I(We) make application for a permit to construct a reservoir and store the following described waters of the State of Oregon. The name of the reservoir is Stiles Reservoir.

2. SOURCE OF WATER for the proposed use: Eightmile Creek and Wolf Run Creek a tributary of Eightmile Creek.

Is the proposed use an enlargement of an existing dam/reservoir? Yes [No]

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If the reservoir is not in channel of a stream, state how it is to be filled:
Reservoir is on the channel of Wolf Run Creek. Reservoir is not in the channel of Eightmile Creek. This water would get to the reservoir through Wolf Run Water Users Ditches.

For Department Use

App. No. 82-88092 Permit No. ____ Date ____

3. DAM HEIGHT AND COMPOSITION

The maximum height of the structure will be 29.67 feet above streambed or ground surface at the centerline of the crest of the dam.

Attach preliminary plans, specifications and supporting information for the dam and impoundment area including dam height, width, crest width and surface area.

*Note: If your dam height is greater than or equal to 10.0' above land surface **AND** your reservoir will store equal to or greater than 9.2 acre-feet, engineered plans and specifications must be approved prior to storage of water.*

The dam will be (check one): [Earthfill] Concrete Flash board Other

If "other" give description:

This dam's plans and specifications were approved by Dam Safety in March 2003 under the name Wolf Run Dam.

4. PRIMARY OUTLET WORKS

Describe the location and the dimensions of the outlet conduit through the dam:

12" diameter mild steel pipe outlet conduit with valve

NOTE: Most dams across a natural stream channel will need an outlet conduit having a minimum diameter of 8 inches or greater.

5. EMERGENCY SPILLWAY

Describe the location and the dimensions of the spillway channel:

A Trapezoidal ditch (8' bottom, 3' deep, 2H:1V sides) will be excavated into slid mative material on the south side of the dam.

6. THE USE(s) of the impounded water will be: Multipurpose Reservoir. The use of some of this water will be for irrigation. After this permit is issued and before any water is taken out of the reservoir the appropriate water right application will be made.

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7. THE AMOUNT OF WATER to be stored is: 55* acre-feet.

The area submerged by the reservoir, when filled, will be 4 acres.

*The approved plans are for 35 Acre feet of storage. Additional storage has been created by the material removed for the dam. Until the as built survey and plans update, the exact storage is not known but this should cover it.

8. PROJECT SCHEDULE: (List **Month** and **Year**)

Proposed date construction work will begin: Started

Proposed date construction work will be completed: 10/1/2017

Proposed date water use will be completed: 10/1/2018

Is this project fully or partially funded by the American Recovery and Reinvestment Act? (Federal stimulus dollars)

9. PROPERTY OWNERSHIP

Do you own all the land where you propose to divert, transport, and use water?

☒ Yes *(Please check appropriate box below then skip to section 10)* For Reservoir

There are no encumbrances

This land is encumbered by easements, rights of way, roads or other encumbrances *(please provide a copy of the recorded deed(s))*

☒ No *(Please check the appropriate box below)* For water delivered through Wolf Run Ditch

I have a recorded easement or written authorization permitting access.

I do not currently have written authorization or an easement permitting access.

Written authorization or an easement is not necessary, because the only affected lands I do not own are state-owned submersible lands, and this application is for irrigation and/or domestic use only (ORS 274.040).

You must provide the legal description of: (1) the property from which the water is to be diverted, (2) any property crossed by the proposed ditch, canal or other work, and (3) any property on which the water is to be used as depicted on the map.

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List the names and mailing addresses of all affected landowners:

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11. WITHIN A DISTRICT

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☒ Check here if the point of diversion or place of use are located within or served by an irrigation or other water district.

Irrigation District Name	Address	
Wolf Run Water Users Association		
City	State	Zip
Dufur	OR	97021

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11. MAP REQUIREMENTS The Department cannot process your application without accurate information showing the source of water and location of water use. You must include a map with this application form that clearly indicates the township, range, section and quarter/quarter section of the proposed reservoir location and place of use. The map must provide tax lot numbers. See the map guidelines sheet for detailed map specifications.

12. SIGNATURE

By my signature below I confirm that I understand:

- I am asking to use water specifically as described in this application.
- Evaluation of this application will be based on information provided in the application packet.
- I cannot legally use water until the Water Resources Department issues a permit to me.
- If I get a permit, I must not waste water.
- If development of the water use is not according to the terms of the permit, the permit can be canceled.
- The water use must be compatible with local comprehensive land use plans.
- Even if the Department issues a permit, I may have to stop using water to allow senior water right holders to get water to which they are entitled.

I certify that the information I have provided in this application is an accurate representation of the proposed water use and is true and correct to the best of my knowledge:

Applicant: _____ President Arcane Farms 2-22-15

Signature *(if more than one applicant, all must sign.)* Date

Before you submit your application be sure to:

- Answer each question completely.
- Attach a legible map that includes township, range, section, quarter/quarter and tax lot.
- Include a Land Use Information Form or receipt stub signed by a local official.
- Include the legal description of all the property involved with this application. You may include a copy of your deed land sales contract or title insurance policy to meet this requirement.
- Include a check payable to the Oregon Water Resources Department for the appropriate amount. The Department's fee schedule can be found at www.wrd.state.or.us or call (503) 986-0900.

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Land Use Information Form

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

Applicant: Azure Farms (First) Attn: David Stelzer (Last)

Mailing Address: 79709 Dufur Valley Road

Dufur (City) OR (State) 97021 (Zip) Daytime Phone:

A. Land and Location

Please include the following information for all tax lots where water will be diverted (taken from its source), conveyed (transported), and/or used or developed. Applicants for municipal use, or irrigation uses within irrigation districts may substitute existing and proposed service-area boundaries for the tax-lot information requested below.

Township	Range	Section	¼ ¼	Tax Lot #	Plan Designation (e.g., Rural Residential/RR-5)	Water to be:			Proposed Land Use:
2S	12E	4	NWofNE	100		☒ Diverted	☒ Conveyed	☒ Used	MULTIPURPOSE RESERVOIR
						☐ Diverted	☐ Conveyed	☐ Used	
						☐ Diverted	☐ Conveyed	☐ Used	
						☐ Diverted	☐ Conveyed	☐ Used	

List all counties and cities where water is proposed to be diverted, conveyed, and/or used or developed:

WASCO COUNTY

B. Description of Proposed Use

Type of application to be filed with the Water Resources Department:

☒ Permit to Use or Store Water ☐ Water Right Transfer ☐ Permit Amendment or Ground Water Registration Modification
☐ Limited Water Use License ☐ Allocation of Conserved Water ☐ Exchange of Water

Source of water: ☐ Reservoir/Pond ☐ Ground Water ☒ Surface Water (name) WOLF RUN AND EIGHTMILE CREEK

Estimated quantity of water needed: 55 ☐ cubic feet per second ☐ gallons per minute ☒ acre-feet

Intended use of water: ☐ Irrigation ☐ Commercial ☐ Industrial ☐ Domestic for _____ household(s)
☐ Municipal ☐ Quasi-Municipal ☐ Instream ☒ Other MULTIPURPOSE RESERVOIR

Briefly describe:

Building a multipurpose reservoir that could be used for any in reservoir use. Requesting to use water reserved by Oregon Department of Agriculture for economic benefits. When this permit is issue a decision will be made wether to go forward and use some of this stored water for irrigation. Another water right application would be needed.

Note to applicant: If the Land Use Information Form cannot be completed while you wait, please have a local government representative sign the receipt at the bottom of the next page and include it with the application filed with the Water Resources Department.

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See bottom of Page 3. →

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For Local Government Use Only

The following section must be completed by a planning official from each county and city listed unless the project will be located entirely within the city limits. In that case, only the city planning agency must complete this form. This deals only with the local land-use plan. Do not include approval for activities such as building or grading permits.

Please check the appropriate box below and provide the requested information

☒ Land uses to be served by the proposed water uses (including proposed construction) are allowed outright or are not regulated by your comprehensive plan. Cite applicable ordinance section(s): SECTION 3.213.A.

Delete ☐ Land uses to be served by the proposed water uses (including proposed construction) involve discretionary land-use approvals as listed in the table below. (Please attach documentation of applicable land-use approvals which have already been obtained. Record of Action/land-use decision and accompanying findings are sufficient.) **If approvals have been obtained but all appeal periods have not ended, check "Being pursued."**

Type of Land-Use Approval Needed (e.g., plan amendments, rezones, conditional-use permits, etc.)	Cite Most Significant, Applicable Plan Policies & Ordinance Section References	Land-Use Approval:	
agricultural structure	3.210.C.1	☐ Obtained ☐ Denied	☐ Being Pursued ☒ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued

Local governments are invited to express special land-use concerns or make recommendations to the Water Resources Department regarding this proposed use of water below, or on a separate sheet.

Wasco County has not approved of a reservoir. Property owner may apply for a reservoir as an agricultural structure. Request is a Type I Review, approved by Wasco County on 11/20/2014; Not a discretionary decision Dawn Baird Assoc. Planner 12/14/17

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Name: Patricia Neighbor Title: Associate Planner

Signature: [signature] Phone: 541.506.2565 Date: 11/20/2014

Government Entity: Wasco County Planning Department

Note to local government representative: Please complete this form or sign the receipt below and return it to the applicant. If you sign the receipt, you will have 30 days from the Water Resources Department's notice date to return the completed Land Use Information Form or WRD may presume the land use associated with the proposed use of water is compatible with local comprehensive plans.

Receipt for Request for Land Use Information

Applicant name: _____

City or County: _____ Staff contact: _____

Signature: _____ Phone: _____ Date: _____

R88072

Land Use Information Form

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

NOTE TO APPLICANTS

In order for your application to be processed by the Water Resources Department (WRD), this Land Use Information Form must be completed by a local government planning official in the jurisdiction(s) where your water right will be used and developed. The planning official may choose to complete the form while you wait, or return the receipt stub to you. Applications received by WRD without the Land Use Form or the receipt stub will be returned to you. Please be aware that your application will not be approved without land use approval.

This form is NOT required if:

1) Water is to be diverted, conveyed, and/or used only on federal lands; **OR**
2) The application is for a water right transfer, allocation of conserved water, exchange, permit amendment, or ground water registration modification, and **all** of the following apply:
   a) The existing and proposed water use is located entirely within lands zoned for exclusive farm-use or within an irrigation district;
   b) The application involves a change in place of use only;
   c) The change does not involve the placement or modification of structures, including but not limited to water diversion, impoundment, distribution facilities, water wells and well houses; **and**
   d) The application involves irrigation water uses only.

NOTE TO LOCAL GOVERNMENTS

The person presenting the attached Land Use Information Form is applying for or modifying a water right. The Water Resources Department (WRD) requires its applicants to obtain land-use information to be sure the water rights do not result in land uses that are incompatible with your comprehensive plan. Please complete the form or detach the receipt stub and return it to the applicant for inclusion in their water right application. You will receive notice once the applicant formally submits his or her request to the WRD. The notice will give more information about WRD's water rights process and provide additional comment opportunities. You will have 30 days from the date of the notice to complete the land-use form and return it to the WRD. If no land-use information is received from you within that 30-day period, the WRD may presume the land use associated with the proposed water right is compatible with your comprehensive plan. Your attention to this request for information is greatly appreciated by the Water Resources Department. If you have any questions concerning this form, please contact the WRD's Customer Service Group at 503-986-0801.

R-88072

Recording requested by and when recorded mail to:

Ter) /.
The Presiding Patriarch,
The Ecclesia of Sinai at Dufur
79709 Dufur Valley Road
Dufur, Oregon
[97021]

Recorded; Archives of Ecclesia of Sinai
Date: 7/17/00 Document #: 349107
Scribe: Evagene Stelzer

rtd @ recording

20002958 (2)
FILED WASCO CTY
THE DALLES OR.
Jul 18 10 21 AM '00
KAREN R. LEBRETON
COUNTY CLERK

STATE OF OREGON, County of Wasco, } ss
I certify that this document was received and recorded in the
Rec ... 7
Att. ... 10

Recorded; Chronicles of Sovereigns: House of Stelzer ...
Date: 7/17/00 Document #: 7170007
Recorder: Kimberly Stelzer

Space above this line for County Recorder's use ONLY

Bargain and Sale Deed

Know All by These Presents that Alfred A. Stelzer and Evagene Stelzer, hereinafter, grantors, for twenty-one (21) US minted silver dollars, lawful money of the united States, and other valuable consideration, do hereby, grant, bargain, sell, and convey unto *The Office of the Presiding Patriarch (Overseer) and his successors, a corporation sole over/for an unincorporated religious Scriptural society, in the nature of Ecclesia, The Popular Assembly of The Ecclesia of Sinai at Dufur*, hereinafter called grantee, and unto grantee's heirs, successors and assigns, all of the grantor's right, title and interest in that certain Real property, said interest comprises a fifty percent (50%) undivided ownership interest, along with all of the tenements, hereditaments and appurtenances thereunto belonging or in any way appertaining, situated in WASCO COUNTY, the OREGON state, more fully described as follows:

SEE SCHEDULE "A" attached hereto and fully incorporated herein by reference.

Dated this 23rd Day of February, 2000

(a) Alfred A. Stelzer — Alfred A. Stelzer

Evagene Stelzer — Evagene Stelzer

20002958

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SALEM, OR

State of Oregon)
) ss
County of Wasco)

On this day personally appeared before me Alfred A. Stelzer and Evagene Stelzer known to me to be the Citizens described herein and who executed the within and foregoing instrument, and acknowledged that they signed the same as their free and voluntary acts and deeds, signed for the uses and purposes therein mentioned. Given under my hand and official seal this 23rd Day of February, 2000.

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OFFICIAL SEAL
PATSY L STEYNEN
NOTARY PUBLIC - OREGON
COMMISSION NO. 310720
MY COMMISSION EXPIRES ...

20002958 (b)

Patsy L. Steynen
NOTARY PUBLIC FOR OREGON

R-88072

Attachment "A"

Township 1 South, Range 12 East of the Willamette Meridian:

Various parcels in Sections 27, 33, 34, and 35 in Township 1 South, Range 12 East, and Sections 2, 3, and 4 Township 2 South, Range 12 East of the Willamette Meridian, more particularly described as:

Section 27: Beginning 200 feet South of the Northeast corner of the Southeast quarter of the Southwest quarter of said Section 27 and thence running in a straight line to the Southwest corner of the Southwest quarter of the Southeast quarter of Section 27; thence East to the Southeast corner of the Southeast quarter of Section 27; thence North to the point of beginning.

ALSO: Beginning at a point 1000 feet North of the Southeast corner of the Southwest quarter of Section 27; thence in a Southwesterly direction in a straight line to the Southwest corner of said Section 27; thence East to the Southeast corner of the Southwest quarter of Section 27; thence North 1000 feet to the point of beginning.

Section 33: Southeast one-quarter of the Northeast quarter, and the East one-half of the Southeast quarter.

ALSO: Beginning at the Northeast corner of Section 33; thence South to the Southeast corner of the Northeast quarter of the Northeast quarter of Section 33; thence West to the Southwest corner of the Northeast quarter of the Northeast quarter of Section 33; thence Northeasterly in a straight line to the point of beginning.

Section 34: The North one-half on Section 34; and the North half of the Southwest quarter of Section 34; and the Southwest quarter of the Southwest quarter of Section 34; and beginning on the South line of Section 34 at the center of said section; thence North 420 feet; thence East 435 feet, more or less, to the Westerly line of the vacated county road; thence southwesterly along the westerly line of said vacated county road to the point of beginning.

Section 35: The North half of Section 36; and the Southwest quarter of Section 35; and the North half of the Southeast quarter of Section 35; and that part of the South half of the Southeast quarter lying North of the county road.

EXCEPTING: that part of the Northeast quarter and the East 1551.0 feet of the Northwest quarter lying North of Rattle Snake Canyon.

ALSO EXCEPTING: a tract of land in the Southwest one-quarter of the Southwest one-quarter of Section 35 described as: beginning at a point on the South line of said Section 35, 530.0 feet East of the Southwest corner of said Section; thence Northerly 200.0 feet and parallel with the westerly line of said section; thence Easterly 480.0 feet and parallel with the Southerly line of said section; thence Southerly 200.0 feet and parallel with the Westerly line of said section to a point on the Southerly line of said Section; thence Westerly along the Southerly line of said Section 480.0 feet to the point of beginning.

20002958(a)

Township 2 South, Range 12 East of the Willamette Meridian:

Section 2: Lot 4, South of the county road.

ALSO: Beginning at the Northwest corner of Lot 4; thence East 530.0 feet; thence South 67.0 feet; thence West to a point 67 feet South and 85 feet East of the Northwest corner of Lot 4; thence South to the Northerly right-of-way line of the county road; thence Southwesterly along the county road 85 feet, more or less, to the West line of Section2; thence North to the point of beginning.

Section 3: Lots 3 and 4.

ALSO: Lots 1 and 2 South of the county road.

ALSO: The Southeast quarter of the Northeast quarter.

ALSO: The North half of the Southwest quarter of the Northeast quarter.

ALSO: The South half of the Northwest quarter except that portion of the South half of the South half of the Northwest quarter lying South of the county road.

Section 4: Lots 1, 2, 3.

All the foregoing in the County of Wasco, State of Oregon.

20002958(a)

R-88072

Application for Water Right
Transfer
Consent by Deeded Landowner

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

State of Oregon)
)ss
County of Wasco)

I Alfred Stelzer in my/our capacity as Presiding Rancher,

mailing address 79915 Dufur Valley Rd Dufur OR 97021,

telephone number _____, duly sworn depose and say that I

consent to the proposed application to Store Water is a Reservoir water right

described in a Application (R-_____) submitted by Azure Farms,
(transfer number, if known)

on the property in tax lot number(s) 100, Section 4, Township 2S, Range 12E, W.M., located on attached Wasco County Assessor map.

Alfred R. Stelzer — Signature of Affiant
2/10/15 — Date

Evagene Stelzer — Signature of Affiant
2/24/15 — Date

Subscribed and Sworn to before me this 24 day of February, 2015.

OFFICIAL SEAL
CHRISTINA S BLISS
NOTARY PUBLIC-OREGON
COMMISSION NO. 464997
MY COMMISSION EXPIRES JANUARY 17, 2016

Notary Public for Oregon

My commission expires January 17, 2016

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Revised 9/2/10

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WATER RIGHTS ISSUED WITHIN THE BOUNDARIES OF A DISTRICT

The Department encourages applicants to coordinate with districts during the planning and preparation of new applications for water rights located within the boundaries of a district.

1. APPLICANT INFORMATION

Name: Azure Farms Attn: David Stelzer

Address: ~~70709~~ 79709 Dufur Valley Road

City: Dufur State:OR Zip:97021

Home Phone: _____ Work Phone: _____ Other Phone: _____

Fax: _____ **E-Mail address: _____

2. DISTRICT INFORMATION

District Name: Wolf Run Water Users

Address: 79106 Wolf Run Road

City: Dufur State:OR Zip:97021

Home Phone: _____ Work Phone: _____ Other Phone: _____

Fax: _____ **E-Mail address: _____

3. DISTRICT CONCURRENCE WITH PROPOSED WATER RIGHT

The district certifies the following:

(1) The applicant has conferred with the district about the proposed water right application;
(2) The district has reviewed the applicant's proposed water right application and maps; and
(3) The district will allow with the proposed water right application.

Robert Durham
District Manager Signature

ROBERT DURHAM
Name (print)

4/5/15
Date

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SALEM, OR

OREGON ...CES DEPARTMENT ...ITY
APPROVED
REVIEW 3-17-03
DATE

Technical Specifications

for the

CONSTRUCTION OF AN EARTHFILL DAM FOR A RESERVOIR TOWNSHIP 2 SOUTH, RANGE 12 EAST, SECTION 4, NEAR THE CITY OF DUFUR, OREGON

Prepared for
AZURE FARMS, INC.
79709 Dufur Valley Road
Dufur, Oregon 97021
(541) 467-2639

Prepared by
TENNESON ENGINEERING CORPORATION
409 Lincoln Street
The Dalles, Oregon 97058
(541) 296-9177

REGISTERED PROFESSIONAL ENGINEER
51,430
OREGON
JULY 13, 1999
DARRIN O. ECKMAN

EXPIRES: 12.31.03

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W.O. #10198

January, 2003

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MAR 13 2003
WATER RESOURCES DEPT
SALEM, OREGON

COPY

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Contents

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Technical Specifications

SCOPE

The work to be done under these specifications consists of reconstruction of one earthfill dam for Azure Farms in northern Wasco County near the City of Dufur, approximately 15 miles south of The Dalles, Oregon. This project will consist of the construction of a dam located on Impoundment Reservoir #1. Reservoir #1 will have an approximate surface elevation of 2,337 feet m.s.l. with a holding capacity of approximately 35.5 acre-feet.

The work will consist of furnishing all the materials, tools, labor, equipment, excavation, backfill, appurtenances and required cleanup, all as specified in these plans and specifications and/or as directed by the Engineer.

The Contractor shall allow access to the site for inspection by the Director of the Water Resources Department at any time during the construction period.

The plans or specifications shall not be altered or changed without the written approval of the Director of the Water Resources Department or his/her authorized representative.

ENVIRONMENTAL QUALITY PROTECTION

A. LANDSCAPE PRESERVATION

1. **General**. The Contractor shall exercise care to preserve the natural landscape and shall conduct its construction operations so as to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. Except where clearing is required for permanent works, for approved construction roads and for excavation operations, all trees, native shrubbery, and vegetation shall be preserved and shall be protected from damage which may be caused by the Contractor's construction operations and equipment. Movement of crews and equipment within the right-of-way and over routes provided for access to the work shall be performed in a manner to prevent damage to grazing land, crops, or property.

   On completion of the work and in addition to all other requirements of the specifications, all work areas should be smoothed and graded in a manner to conform to the natural appearance of the landscape. Where unnecessary destruction, scarring, damage, or defacing may occur as a result of the Contractor's operations, the same shall be repaired, replanted, reseeded, or otherwise corrected at the Contractor's expense.

2. **Construction Roads**. The location, alignment, and grade of construction roads shall be subject to approval of the Engineer. When no longer required by the Contractor, construction roads shall be made impassible to vehicular traffic and the surfaces shall be scarified and left in a condition which will facilitate revegetation.

B. **PREVENTION OF WATER POLLUTION**

The Contractor shall comply with applicable federal, state, and local laws, orders, and regulations concerning the control and abatement of water pollution and use.

The Contractor's construction activities shall be performed by methods which will prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into streams, water courses, lakes and underground water sources. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sewage effluent, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution.

C. **ABATEMENT OF AIR POLLUTION**

The Contractor shall comply with applicable federal, state, and local laws and regulations concerning the prevention and control of air pollution.

In conduct of construction activities and operation of equipment, the Contractor shall utilize such practicable methods and devices as are reasonably available to control, prevent, and otherwise minimize atmospheric emissions or discharges of air contaminants.

Storage and handling of flammable and combustible liquids and provisions of fire prevention shall be in accordance with the Bureau of Reclamation publication "Construction Safety Standards".

D. **DUST ABATEMENT**

During the performance of the work required by these specifications or any operations appurtenant thereto, whether on right-of-way or elsewhere, the Contractor shall furnish all the labor, equipment, materials, and means required, and shall carry out proper and efficient measures wherever and as often as necessary to reduce the dust nuisance, and to prevent dust which has originated from its operations from damaging crops, cultivated fields and dwellings, or causing a nuisance to persons. The Contractor will be held liable for any damage resulting from dust originating from its operations under these specifications.

EXCAVATION

A. CLEARING DAM SITE

The areas to be occupied by the permanent construction required under these specifications and the surfaces of all borrow areas (and stockpile and wastepile sites) shall be cleared of all trees, stumps (exposed), roots, brush, rubbish, and other objectionable matter as determined by the Engineer.

No trees shall be cut outside of areas mentioned above without specific approval, and all trees designated by the Engineer shall be protected from damage by the Contractor's construction operations.

Clearing will consist primarily of the removal of grass, sod, and brush.

The Contractor, by its own investigation, shall have determined the extent of clearing required in accordance with this section.

Grass and sod shall be placed on the outside perimeter of the dam embankment and thoroughly watered to stimulate growth of the grasses.

B. OPEN CUT EXCAVATION, GENERAL

1. **General**. All open cut excavation required for the dam and appurtenant works shall be performed in accordance with this section. Excavation shall be made to the lines, grades, and dimensions shown on the drawings or established by the Engineer.

   During the progress of the work, it may be found necessary or desirable to vary the slopes, grades, or the dimensions of the excavations from those specified herein.

   Excavations shall be made to the full dimensions required and shall be finished to the prescribed lines and grades except individual sharp points of undisturbed formation material will be permitted to extend within the prescribed lines.

2. **Pipe Trenches**. The trenches in which pipe is to be laid shall be excavated carefully to the established lines and grades to provide a firm and uniform bearing for the entire length of the pipe. If the character of the material at any point in the bottom of a pipe trench is such as might cause unequal settlement or provide unequal bearing for the pipe, or is otherwise unsuitable for a foundation for the pipe, the unsatisfactory materials shall be removed to such depth as may be directed by the Engineer.

Excavated materials which are unsuitable for (or are in excess of) dam embankment or other earthwork requirements, as determined by the Engineer, shall be wasted as determined by the Engineer and as shown on the drawings.

The Contractor's operations in excavations shall be such that the excavations will yield as much suitable material for such construction as practicable, and shall be subject to the approval of the Engineer. Where practicable, as determined by the Engineer, suitable materials shall be excavated separately from the materials to be wasted and the suitable materials shall be segregated by loads during the excavation operations. The suitable materials shall be placed in the designed final locations directly from the excavation, or shall be placed in temporary stockpiles and later placed in the designated locations as directed by the Engineer. In excavating materials which are suitable for use in the dam embankment, the Engineer will designate the placement of the best gradation of materials.

Excavated materials which, after drainage or drying, are suitable for the impervious rolled earthfill portion of the dam embankment but which, when excavated, are too wet for immediate compaction in the embankment shall be placed temporarily in stockpiles until the moisture content is reduced sufficiently to permit them to be placed in the embankment.

Should cobbles, boulders, or rock fragments having maximum dimensions of more than five inches (5") be found in otherwise approved earthfill materials, they shall be removed by the Contractor either at the site of the excavation or after being transported to the earthfill, but before the materials are rolled and compacted. Such rock materials shall be placed in other portions of the dam embankment or wasted, as directed by the Engineer.

C. EXCAVATION FOR DAM EMBANKMENT FOUNDATION

1. **General**. Excavation for dam embankment foundation shall be in accordance with this section and includes all:

   (a) Stripping for foundation of dam embankment.

   (b) Excavation below stripping for foundation of dam embankment and other areas if required.

   (c) Excavation for dam embankment drainage system.

   (d) Excavation for open drain ditches - The alignments and excavation lines shown on the drawings are subject to such changes as may be

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found necessary by the Engineer to adapt the dam foundation excavation to the conditions disclosed by the excavation.

Accurate trimming of the slopes of the excavation will not be required, but the excavation shall conform as closely as practicable to the established lines and grades. Loose rock shall be removed from foundation contacts and sharp irregularities shall be reduced to provide satisfactory foundation contours.

All foundation surfaces subject to damage from freezing or air slaking shall be protected.

The finished foundation surfaces against which the earthfill portions of the dam embankment are to be placed shall be cleaned of all loose, soft, and disintegrated materials, including removal of such materials from pockets, irregularities, fissures, and depressions in the foundation.

2. **Stripping**. The entire area to be occupied by the dam embankment shall be stripped to a sufficient depth, as determined by the Engineer, to remove all unsuitable materials. The unsuitable materials to be removed by stripping shall include all surface boulders and loose rock, debris, topsoil, vegetable matter including stumps and roots, and all other perishable and objectionable materials that are unsuitable for use in permanent construction required under these specifications or that might interfere with the proper bonding of the embankment with the foundation, or the proper compaction of the materials in the embankment, or that may be otherwise objectionable as determined by the Engineer. Topsoil shall be stockpiled for use on downstream slope of dam embankment.

3. **Excavation below Stripping**. The dam embankment foundation shall be excavated to a firm basalt surface or as determined by the Engineer.

D. DISPOSAL OF EXCAVATED MATERIAL

So far as practicable, as determined by the Engineer, all suitable materials from excavation required under these specifications shall be used in the permanent construction. Excavated materials that are unsuitable for or are in excess of permanent construction requirements shall be wasted.

The disposal of all excavated materials that are to be wasted shall be subject to the approval of the Engineer. Disposal of waste material from excavation to be outside of dam footprint and any waterway. Owner to assist Contractor in locating suitable disposal areas in adjacent fields.

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Waste piles shall be located where they will not interfere harmfully with the natural flow of the drainage channels, with construction operations in the borrow areas, with the operation of the reservoir, or with the flow of water to or from the spillway or outlet works, and where they will neither detract from the appearance of the completed project nor interfere with the accessibility of the structures for operation. Waste piles shall be leveled and trimmed to reasonably regular lines.

EMBANKMENT

A. EMBANKMENT CONSTRUCTION, GENERAL

For the purposes of these specifications, the term "dam embankment" includes all portions of the dam embankment.

The embankment shall be constructed in accordance with this section. The completed embankment shall be to the lines and grades shown on the drawings.

All openings through the dam embankment required for construction purposes shall be subject to approval.

1. **Foundation Preparation**. No material shall be placed in any portion of the dam embankment until the foundation for each section has been unwatered, stripped, suitably prepared, and has been approved by the Engineer.

   All cavities, depressions, and irregularities, either existing or resulting from removal of rock fragments found within the area to be covered by embankment, and which extend below or beyond the established lines of excavation for dam embankment foundations, shall be filled with embankment materials and compacted as specified for the overlying embankment.

2. **Placing Embankment Materials**. The suitability of each part of the foundation for placing embankment materials thereon, and of all materials for use in embankment construction, will be determined by the Engineer. NO FILL MATERIAL SHALL BE PLACED IN THE EMBANKMENT WHEN EITHER THE MATERIAL OR THE FOUNDATION/EMBANKMENT ON WHICH IT WOULD BE PLACED IS FROZEN.

   No brush, roots, sod, or other perishable or unsuitable materials shall be placed in the embankment.

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In any separate portion of dam embankment being constructed, each layer of each zone shall be constructed continuously and approximately horizontal for the width and length of such portion at the elevation of the layer.

The Contractor shall maintain the embankment in an approved manner, including maintaining surfaces free of weeds or other vegetation, until final completion and acceptance of all the work.

3. **Moisture and Density Control**.

(a) **General**. Each layer of the material on the embankment shall be compacted. During compaction, the placement moisture content and dry density of the earthfill shall be maintained within control limits specified below.

To determine that the moisture content and dry density requirements of the compacted earthfill are being met, field and laboratory tests will be made at frequent intervals on samples taken at embankment locations determined by the Engineer. The results of all completed earthwork tests will be available to the Contractor.

Materials not meeting the specified moisture content and dry density requirements, as determined by the tests, shall be reworked until approved results are obtained. Reworking may include removal, rehandling, reconditioning, rerolling, or combinations of these procedures.

(b) **Moisture Control**. The standard optimum moisture content is defined as "That moisture content which will result in a maximum dry unit weight of the soil when subjected to ASTM D-698, Method B, Compaction Test." The maximum dry weight, in pounds per cubic foot, obtained by the above procedure is the Proctor maximum dry density.

The Engineer will inform the Contractor when the placement moisture content is near or exceeds the limits of uniformity, and the Contractor shall immediately make adjustments in procedures as necessary to maintain moisture content within specified limits.

As far as practicable, the material shall be brought to the proper moisture content in the borrow site before excavation. Supplementary water, if required, shall be added to the material by sprinkling on the earthfill and each layer of earthfill shall be conditioned so that the moisture is uniform throughout the layer.

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(c) **Density Control**. Density control of compacted earthfill shall be such that the dry density of the compacted material, as determined by tests performed by the Engineer, shall conform to the following limits.

Material represented by samples having a dry density of less than 95 percent of its Proctor maximum dry density will be rejected. Such rejected material shall be rerolled until a dry density equal to or greater than 95 percent of its Proctor maximum dry density is obtained.

The Engineer will inform the Contractor when the dry density is near or exceeds the limits of uniformity specified above, and the Contractor shall immediately make adjustments in procedures as necessary to maintain the dry density within the specified limits.

4. **Placing**. The distribution and gradation of the materials throughout the earthfill shall be such that the fills will be free from lenses, pockets, streaks, or layers of material differing substantially in texture, gradation, or moisture from the surrounding material. The combined excavation and operations shall be such that the materials when compacted in the earthfill will be blended sufficiently to secure the best practicable degree of compaction and stability. Successive loads of material shall be dumped on the earthfill so as to produce the best practicable distribution of the material, subject to the approval of the Engineer and for this purpose the Engineer may designate the locations in the earthfill where the individual loads shall be deposited, to the end that the most impervious materials shall be placed in the central portion of the earthfill and the more pervious materials shall be placed so that the permeability of the fill will be gradually increased toward the upstream and downstream slopes of the earthfill.

If, in the opinion of the Engineer, the surface of the prepared foundation on the compacted surface of any layer of earthfill is too dry or smooth to bond properly with the layer of material to be placed thereon, it shall be moistened and/or worked with harrow, scarifier, or other suitable equipment, in an approved manner, to a sufficient depth to provide a satisfactory bonding surface before the next succeeding layer of earthfill material is placed. If, in the opinion of the Engineer, the compacted surface of any layer of the earthfill in place is too wet for proper compaction of the layer of earthfill material to be placed thereon, it shall be removed and allowed to dry or be worked with harrow, scarifier, or other suitable equipment to reduce the moisture content to the required amount; and then it shall be recompacted before the next succeeding layer of earthfill material is placed.

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5. **Compaction**. When each layer of material has been conditioned to have the specified moisture, it shall be compacted. It is the intent of this specification to achieve the desired compaction as specified above. The Contractor may use a sheepsfoot roller with a foot contact area of 5 to 12 square feet and a foot contact pressure of 250 to 500 p.s.i. with 4 to 6 passes. When compacted, the density shall be essentially uniform throughout each layer as specified above. If the uncompacted earthfill material is too wet for proper compaction, the earthfill material shall be worked with harrow, scarifier, or other suitable equipment to reduce the moisture content to the amount specified; shall be allowed to dry until such time as the material contains only the optimum moisture content; or the material shall be removed from the embankment. Compacted earth material having a moisture content or dry density that does not meet the criteria specified shall be reworked and rerolled, as directed by the Engineer, to obtain the specified moisture content and dry density of embankment in place.

B. EMBANKMENT CONSTRUCTION, CORE

The core embankment includes the select native material that is bentonite conditioned and located directly under the crest of the dam. This core material will be utilized to construct the keyway fill. At the base of the dam the core is 30 feet wide tapering to 8 feet in width at elevation 2,337.0.

1. **General.** The select core material must utilize native on-site soil mixed with bentonite at a 12:1 ratio (by volume). This mixing can be accomplished by spreading a thin layer (1 foot) of the native material on a prepared surface. The bentonite (1 inch) can then be added by volume measurement and the two materials can then be mixed utilizing either a tiller or disking methods.

2. **Moisture and Density Control.**

   (a) **Moisture Control.** The moisture content of the select bentonite conditioned select native material prior to and during compaction shall be disturbed uniformly throughout each layer of the material. The optimum moisture content of this bentonite conditioned material is estimated at approximately 20 percent. The moisture range for the compacted select core material shall be between –1 to +5 percent of the optimum moisture content.

   (b) **Density Control.** Core embankment material must be compacted at 95 percent of optimum Proctor dry density.

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3. **Placing.** The distribution and gradation of the bentonite conditioned select native material throughout the core section shall be such that the fill will be free from lenses, pockets, streaks, or layers of material differing substantially in texture, gradation, or moisture from the surrounding material. This material may be placed concurrently with the shell fill utilized in the upstream and downstream shells but must be fully constructed to the dimensions shown on the plans. The material shall be placed in the core in continuous, approximately horizontal layers not more than 6 inches in thickness after being compacted.

C. EMBANKMENT CONSTRUCTION, SHELL

For purposes of this section, the term "shell embankment" includes those portions of the dam embankment not contained within the select core area.

1. **General.** Material utilized for the shell embankment shall consist of random native material with no rocks greater than 8 inches in the largest dimension. Rock content should comprise no more than 20 percent of fill material and must be uniformly disturbed throughout.

2. **Moisture and Density Control.**

   (a) **Moisture Control.** The moisture content of the shell material prior to and during compaction shall be disturbed uniformly throughout each layer of the material. The optimum moisture content of this soil to meet maximum compaction is 17.4 percent. Moisture range for compacted fill shall be between –1 to +3 percent of the optimum moisture content.

   (b) **Density Control.** Shell embankment material must be compacted at 95 percent of optimum Proctor dry density.

3. **Placing.** The shell material shall be placed in the dam in continuous, approximately horizontal layers not more than 8 inches in thickness after being compacted.

D. EMBANKMENT CONSTRUCTION, FILTER

For purposes of this specification, the term "filter" includes the chimney drain and filter blanket on the downstream side of the dam core area. The filter shall be constructed in accordance with this section. The completed filter shall be to the lines and grades shown on the drawings.

1. **Material Preparation.** The filter chimney and blanket shall be constructed utilizing the 1-1/2"– 0" drain rock as identified in the filter gradation chart table in the drawings.

2. **Moisture and Density Control.**

   (a) **General.** Each layer of the filter material within the embankment shall be compacted. During compaction, the placement moisture content and dry density of the filter material shall be similar to the select core and shell material being placed in conjunction. Due to its size and consistency, the filter material will not be subject to moisture and density testing as outlined within the embankment section, but will instead be visually identified in the field by the Engineer as either adequate or inadequate compaction. Materials not meeting the necessary moisture content or dry density requirements, as determined by the Engineer, shall be reworked until approved results are obtained.

E. TOPSOIL FOR SEEDING

Topsoil for seeding consists of loading, hauling, placing, spreading, and rolling selected topsoil material. The topsoil shall be placed on the downstream slope of the dam embankment at locations shown on the drawings or designated by the Engineer. All operations involved in the placing, spreading, and rolling of the topsoil shall be subject to the approval of the Engineer. Selected topsoil shall be obtained from excavation for dam embankment foundation or from stripping from borrow areas, or from other approved sources. The material shall contain the most fertile loam available from approved sources and shall be free from excessive quantities of sticks, stones, or other objectionable materials. Areas to receive topsoil shall be brought to within one foot (1') of the prescribed final cross-section at all points and finished smooth and uniform before the topsoil is applied. Topsoil shall be evenly placed and spread over the graded area and compacted. Topsoil shall not be placed when the subgrade is frozen or in a condition otherwise detrimental to proper grading and seeding as determined by the Engineer.

F. SEEDING

1. **General**. Seeding shall consist of ground preparation, furnishing and planting approved seed, furnishing and placing mulch, and furnishing and spreading approved commercial fertilizer. Except for placing, spreading, and rolling topsoil, all seeding operations shall be performed in accordance with provisions of this section.

   All dike slopes and top of dike shall be seeded.

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The limits to which the above described surfaces are to be seeded shall be as prescribed by the Engineer.

If directed, areas within the right-of-way lines shall be seeded where construction operations have removed the existing grass cover, where such areas have otherwise been denuded of grass cover, or where due to other reasons grass seeding is determined to be necessary.

The Contractor shall maintain the seeded areas until final acceptance thereof and any damage caused to the seeded areas by the Contractor's operations shall be repaired by and at the expense of the Contractor.

2. **Seeds**. Seed and seeding mixtures shall be free of all prohibited noxious weed seeds and shall not contain more than 0.5 percent by weight of restricted noxious weed seeds. Prohibited and restricted noxious weeds shall be those as classified by the State Seed Department.

All seed containers must be sealed and labeled to comply with existing Oregon seed laws and regulations or in accordance with the U.S. Department of Agriculture rules and regulations under the Federal Seed Act, if shipped in interstate commerce. All different grass species specified shall be separately packaged and labeled and shall be uniformly and thoroughly mixed after they are received on the job.

The Contractor shall furnish and sow a uniform seed mixture composed of the seeds listed in the following table.

SEED REQUIRED FOR ONE ACRE	
Kind of Seed	**Pounds Pure Live Seed/Acre**
Creeping Red Fescue	11
Chewing Fescue	8
Newport Blue Grass	5
Perennial Rye Grass	3
Dutch White Clover	3

3. **Sowing Periods**. Seeding shall be done at such times of the year when climatic conditions of temperature and moisture are most adaptable for growth.

4. **Sowing Seed**. The mixture specified herein shall be sown by drilling with either an approved disc or shoe-type grass drill, or by mechanical or hand broadcasting.

   Immediately after broadcasting by hand or mechanical means, the seed shall be properly covered with soil to the depths prescribed above by means of a spike tooth harrow, rotary hoe, Dunham packer, or other acceptable implements. Covering broadcast seed by dragging a log chain or similar device will not be permitted.

5. **Fertilizer**. The Contractor shall furnish and apply commercial fertilizer at the minimum rate per acre of 450 pounds. The fertilizer shall be packaged and labeled showing the guaranteed analysis and net weight per bag when received on the job.

   Fertilizer may be applied prior to seeding by suitable mechanical spreaders, blowers, or hydraulic equipment.

G. **DRAINAGE, GENERAL**

All drains shall be constructed at the locations shown on the drawings or as directed. Care shall be taken to avoid clogging the drains during the progress of the work, and should any drain become clogged or obstructed from any cause before final acceptance of the work, it shall be cleaned out in a manner approved by the Engineer or replaced by and at the expense of the Contractor. No pipe which has been damaged shall be used in the work. Travel over drainpipe will not be permitted until the pipe has been covered to a depth sufficient to prevent damage to or breakage of the pipe.

H. **DAM EMBANKMENT DRAINAGE AND OVERFLOW SYSTEM**

1. **General**. The dam embankment drainage and overflow system shall consists of a concrete open channel spillway and/or pipework as shown on the drawings.

   The pipe shall be laid to lines and grades as shown on the drawing or as directed by the Engineer. No portion of the drain system shall be placed with adverse slopes.

2. **Materials**.

   (a) **Seamless Steel Pipe**. Seamless mild steel pipe shall be 3/8" wall with welded joints as required.

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(b) **HDPE Pipe**. HDPE pipe shall be ADS N-12 HC with Pro Link WT watertight couplers.

(c) **Butterfly Valves**. Butterfly valves shall have mechanical restraint joints, meeting AWWA Standard C504-87 Class 75B with rubber seats as manufactured by Mueller or Pacific States Cast Iron Company.

(d) **Valve Box Cover**. Valve box cover shall be six inch (6") diameter PVC 160 psi casing around the valve stem from the ground surface to the body of the valve, a two inch (2") square rod shall extend from the valve stem to within one foot (1') of the ground surface. A PVC cap shall be placed over the end when not in use to keep all materials out of the valve box. The rod shall be secured to the valve stem.

(e) **Screen, Couplings, and Fittings**. Screen, couplings, and fittings shall be suitable for use with the specified pipe. The screen shall be of one inch (1") mesh.

(f) **Bedding and Backfill Material**. Bedding shall be Class "A" low grade concrete with a minimum compressive strength of 1500 psi in 28 days (see page 16). Backfill material shall be the material excavated from the trenches for the pipe drains or material from borrow area, as approved by the Engineer.

(g) **Cut-Off Collars**. Cut-off collars shall be 3/16" thick, A-36 carbon steel plate, welded to the steel pipe, and sized as per plans. Care shall be taken during embankment that the collar is not bent.

3. **Constructing Drains**. The pipe trench shall be kept free of water which might impair construction of the drainage system.

As each unit of pipe is laid, it shall be welded together and supported by concrete block to allow a minimum of 6 inches of Class "A" (low-grade concrete) bedding to be placed under the pipe and up to the spring line. Sufficient backfill material shall then be placed about the pipe to hold it rigidly in place. After the bedding is completed, the backfilling shall be completed.

(The backfill shall be compacted in accordance with the "Embankment" section of these Technical Provisions.)

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CONCRETE

A. CONCRETE, Cast-in-Place

1. **General**. This section covers all work necessary in concrete, complete. All cast-in-place concrete, concrete work materials, and related information shall conform to the Uniform Building Code, ACI standards, and ASTM standards, or as modified here.

2. **Materials**.

   (a) **Form Materials**. Form materials for surfaces exposed to view in the finished work shall be of new plywood, hard plastic, finished plywood, or steel as approved by the Engineer, to produce acceptable surfaces. Used plywood will be permitted only if the condition is acceptable to the Engineer. Form material for surfaces not exposed to view in the finished work may be any of the above mentioned materials or new tongue-and-groove or shiplap boards free from loose knots or other defects.

   (b) **Coarse Aggregate**. Coarse aggregate for concrete shall consist of rock, gravel, or other inert material of similar characteristics having clean, strong, and durable particles graded from three-quarter inch (3/4") to No. 4 sieve size, reasonably free from all deleterious materials. Aggregates up to one and one-half inch (1-1/2") may be used for walls and footings if approved by the Engineer.

   (c) **Water**. Water used in mixing Portland cement concrete shall be clean and free of oil, salt, acid, alkali, sugar, vegetable matter, or other deleterious substances and shall conform to the requirements of AASHTO T-26. Water of approved potable quality may be used without test.

   (d) **Admixtures**. Admixtures shall not be used without the express direction and approval of the Engineer. Entrained air shall be five (5) percent, plus or minus one (1) percent, for all exposed concrete. Air-entraining admixtures shall conform to the requirements of ASTM C-260; water-reducing, retarding, and accelerating admixtures shall conform to the requirements of ASTM 0-494. In no case shall the chloride content of any admixture exceed 0.5 percent by weight and shall be used only for unreinforced concrete work.

   (e) **Reinforcing Bars**. Reinforcing bars shall be deformed billet-steel conforming to the requirements of ASTM A-615, Grade 60. Welded

wire fabric shall conform to the requirements of ASTM A-185 or ASTM A-496, with minimum yield strength of 80,000 psi.

(f) **Water-Cement Ratio**. Water-cement ratio shall be less than or equal to 0.48 for exposed flatwork and 0.50 for other.

(g) **Slump**. Slump shall be less than or equal to four inch (4") for flatwork and five inch (5") for other. It shall not be less than zero inch (0") for all work, and preferably at least two inch (2").

(h) **Cement Factor**. The cement factor shall be a minimum of 5.5 sack for exposed flatwork and 5.0 sack for other.

(i) **Concrete**. Concrete shall develop a minimum 28-day compressive strength of 2,500 psi. The Engineer requires that a certified copy of the proposed mix design be submitted for approval prior to construction. Concrete cylinders are to be taken by the Engineer as he deems necessary and laboratory tested for strength.

(j) **Expansion Joint Fillers**. Expansion joint fillers shall be preformed fiber-board type, one-half inch (1/2") thick, and treated so as to be rot and vermin proof.

(k) **Curing Materials**. Curing materials shall conform to the requirements of AASHTO M-171 for white polyethylene or burlap-polyethylene sheets or waterproof paper, AASHTO M-148 for liquid membrane-forming compounds, or AASHTO M-182 burlap cloth.

3. **Workmanship**.

(a) **Forms**. Forms shall be properly constructed and braced to maintain tolerances required for all components of the structure, but not to exceed tolerances of ACI 347. The contact surface of forms shall be coated before steel reinforcing is placed, if possible, with a colorless non-staining mineral oil or other approved substance to permit satisfactory removal of forms. No forms shall be removed until the concrete has attained sufficient strength to prevent cracking or chipping when the forms are removed.

(b) **Mix Design and Requirements**. The Contractor shall provide a concrete mix design acceptable to the Engineer, to meet the requirements stated herein. Concrete and aggregates shall be in conformance to ASTM C-94, CG-83, C-39, C-172, C-31, C-192, C-143, C-277, D-75, C-127, C-136, C-233 as applicable, or any other standard needed to determine the suitability of the concrete (as

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determined by the Engineer) for its intended use. Requirements for ready-mix concrete shall conform to ASTM C-93 unless otherwise specified herein. Variations in the mix ingredients and proportions thereof shall not be permitted unless approved by the Engineer. All ingredients except water shall be measured by weight. No volumetric measurements will be permitted. Water may be measured by either weight or volume. Scales for weighing ingredients and aggregate lines shall be suitably designed and constructed. The batching plant shall be adequate capacity and acceptable to the Engineer. Measuring of the ingredients shall be within the following limits of accuracy: Water - 1%; cement - 1%; aggregate - 2%. The air-entraining admixture shall be introduced with the water unless otherwise specified. Water reducing admixture, when used, shall be introduced and mixed in accordance with the manufacturer's directions. Field strength as specified herein shall be assumed as equal to 85% of the strength of laboratory-cured cylinders.

CONCRETE MIX DESIGN REQUIREMENTS

	Cast-In-Place	Low-Grade
28-day Minimum Compressive	2,500 psi	1,500 psi
Minimum Cement Factor	5 sacks/c.y.	2 sacks/c.y.
Water Reducing Agent	As recommended by manufacturer	As recommended by manufacturer
Water (low alkalinity only)	Minimum potable standards	Minimum potable standards
Water-Cement Ratio	0.48 maximum	0.54 maximum
Slump	4" + 0 - 1-1/2	4" + 0 - 1-1/2
Entrained Air	4% minimum 6% maximum	4% minimum 6% maximum
Cement Type	I, IA, II, or IIA	I, IA, II, or IIA
Maximum Size of Coarse Aggregate	1-1/2"	1-1/2"
Aggregate for Non-Shrinking Ground	As specified in ASTM C-144	As specified in ASTM C-144

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(c) **Mixing**. Truck mixers shall be of the revolving drum type. After all ingredients are in the drum, mixing shall be continued for not less than 50 revolutions. The mixing speed shall be a minimum of 4 rpm and a maximum such that the peripheral velocity of the drum does not exceed 225 feet per minute. A total of not more than 150 revolutions shall be at a speed greater than 6 rpm. Mixing shall begin within thirty (30) minutes after the cement has been added to either the water or aggregate. If a truck mixer is used for transportation, mixing at the batch plant shall be a minimum of thirty (30) seconds with the mixing completed in the truck mixer. Concrete transported in a truck mixer shall be discharged at the job within one and one-half (1-1/2) hours after cement has been added to the water or aggregates, except for high early-strength concrete mixes which shall be forty-five (45) minutes.

(d) **Admixtures**. Where used, admixtures shall be added to the mixer at the time of mixing to insure thorough distribution.

(e) **Placing**. All handling and placing of concrete shall be in a manner acceptable to the Engineer. Fill material under walls or slabs shall be thoroughly wet prior to concrete placement. No water shall be permitted in the area where concrete is being placed. Slabs shall be placed in one lift unless otherwise approved. Total depth of vertical lifts shall be as shown on the plans or as approved by the Engineer. Concrete shall be placed in such a manner as to prevent segregation of ingredients. Placing shall be as specified in ACI (614) unless modified herein or as otherwise directed by the Engineer. Chutes shall be of wood or steel with a slope not less than one vertical to two horizontal. A baffle plate shall be placed at the discharge end of the chute to prevent segregation. If the operation is intermittent, the chute shall discharge into a hopper and the chute shall be cleaned before each run.

Compaction shall be by internal mechanical vibrators with a minimum frequency of 7,000 vpm or by hand with the use of a "jitterbug" for slabs only, unless otherwise specified. The type of vibrators shall be subject to the approval of the Engineer.

Vibration shall not be applied through the reinforcement or to layers of partially hardened concrete. Amount and spacing of vibration shall be as directed by the Engineer.

Concrete shall be placed so no planes or seams of weakness are formed in any section. No concrete shall be placed on any layer of partially hardened concrete.

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Concrete poured in cold weather shall be placed and protected in accordance with ACI 64 or as specified by the Engineer.

Heaters shall be vented so carbon dioxide does not combine with the concrete surface to produce dust. No salts or chemical shall be used to accelerate setting time without the approval of the Engineer.

(f) **Patching**. Defects in any concrete surface shall be chipped out to solid concrete and patched in an acceptable manner. Where pull-out type ties are used, the holes shall be filled as recommended by the manufacturer of the ties. Patches shall be cured as specified for curing concrete.

(g) **Finishing**. Concrete surfaces shall be finished as specified herein or as directed by the Engineer.

(h) **Curing**. Concrete shall be cured by keeping the surface continuously wet for seven days when temperatures are above 50° F. when Portland Type I or II is used, for three (3) days where high-early-strength cement is used. Subject to approval of the Engineer, a curing compound, of approved type, shall be applied immediately after removal of the forms. During times temperatures are low, the concrete must be protected from freezing in a manner acceptable to the Engineer.

(i) **Testing**. During construction, the Owner or his representative will retain the right to make tests to determine if the concrete meets the required specifications. Testing specimen will be made and cured to conform to ASTM C 31 and tested in accordance with ASTM C 39. The Contractor shall assist and cooperate in the making of these tests if the Owner or his representative elect to take tests.

The Contractor, if he desires, may have other tests or additional tests made, at his own expense, to determine the acceptance of the concrete.

(j) **Cold Joints.** All cold joints are to be constructed with a continuous formed key a minimum of 1-1/2" wide by 1-1/2" deep.

B. REINFORCING STEEL

1. **General**. This section covers the work required for reinforcing steel and welded wire fabric.

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2. **Materials**.

(a) **Reinforcing Steel and Accessories**. Reinforcing steel shall be deformed, billet-steel bars conforming to ASTM A 615, Grade 60, unless otherwise shown.

Tie wire shall be 16-gauge or heavier, black, soft-annealed wire or approved. Bar supports conform to ACI 315 or as approved by the Engineer. Unless otherwise shown or approved, welding of reinforcement bars will not be permitted. All bars shall be cold bent. Bars may be mill or field bent. No bars partially embedded in concrete shall be field bent unless shown on the plans or approved by the Engineer. All hooks or bends shall conform to ACI 318.

Details of reinforcement shall conform to the reinforcement section of ACI 318, unless otherwise specified herein or approved by the Engineer.

(b) **Fabric Reinforcement**. Welded wire fabric and cold drawn steel wire shall conform to ASTM 185 and A82, respectively.

3. **Workmanship**.

(a) **Fabrication**. Reinforcing bars shall be fabricated in accordance with the dimensions on the plans and the reviewed bending and placement drawings. Forming and cutting tolerances shall be in accordance with the current *Manual of Standard Practice for Reinforced Concrete Construction*. Bars shall all be bent cold. Deviation from the sizes on the plans shall not be permitted without written approval of the Engineer. Wire mesh shall be supported off floor, form, or ground by steel chains or dobies.

(b) **Placement, Positioning, and Protection**. Placement of reinforcing steel shall be in conformance with the approved placement drawings and applicable parts of the *WORSI Manual for Placing Reinforcing Bars*. Bars shall be secured against displacement by tying at intersections with tie wire or clips, or by welding. Support bars by concrete, metal hangers, or metal support. Concrete support blocks must be of the same strength and density as required for structural concrete. Tolerances for placement of reinforcing shall be as follows:

R-88072

LOCATION	TOLERANCE FROM LOCATION ON THE PLAN
Height on top and bottom bars in beams and slabs	+/- 1/4 inch
Lengthwise location and spacing space in slabs	+/- 2 inches

(c) **Splicing**. When necessary to splice reinforcement other than shown on the plans, the requirements shall be determined by the Engineer. All splices shall be accomplished by placing the bars in direct contact and wiring together. Splices shall be as shown on the plans, but at least twenty-four (24) bar diameters and never less than twenty-four inches (24"). Splices in adjacent bars shall be staggered.

(d) **Tying Reinforcing**. Tie all reinforcing in conformance with CRSI recommended practice for placing reinforcing bars.

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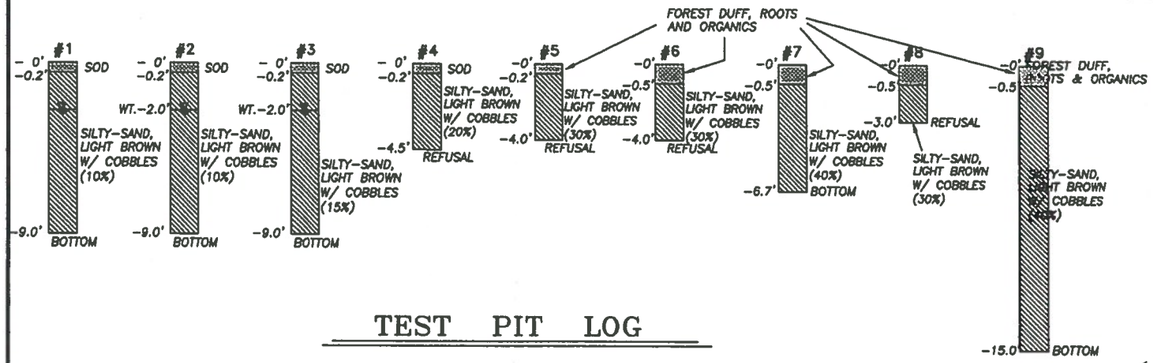
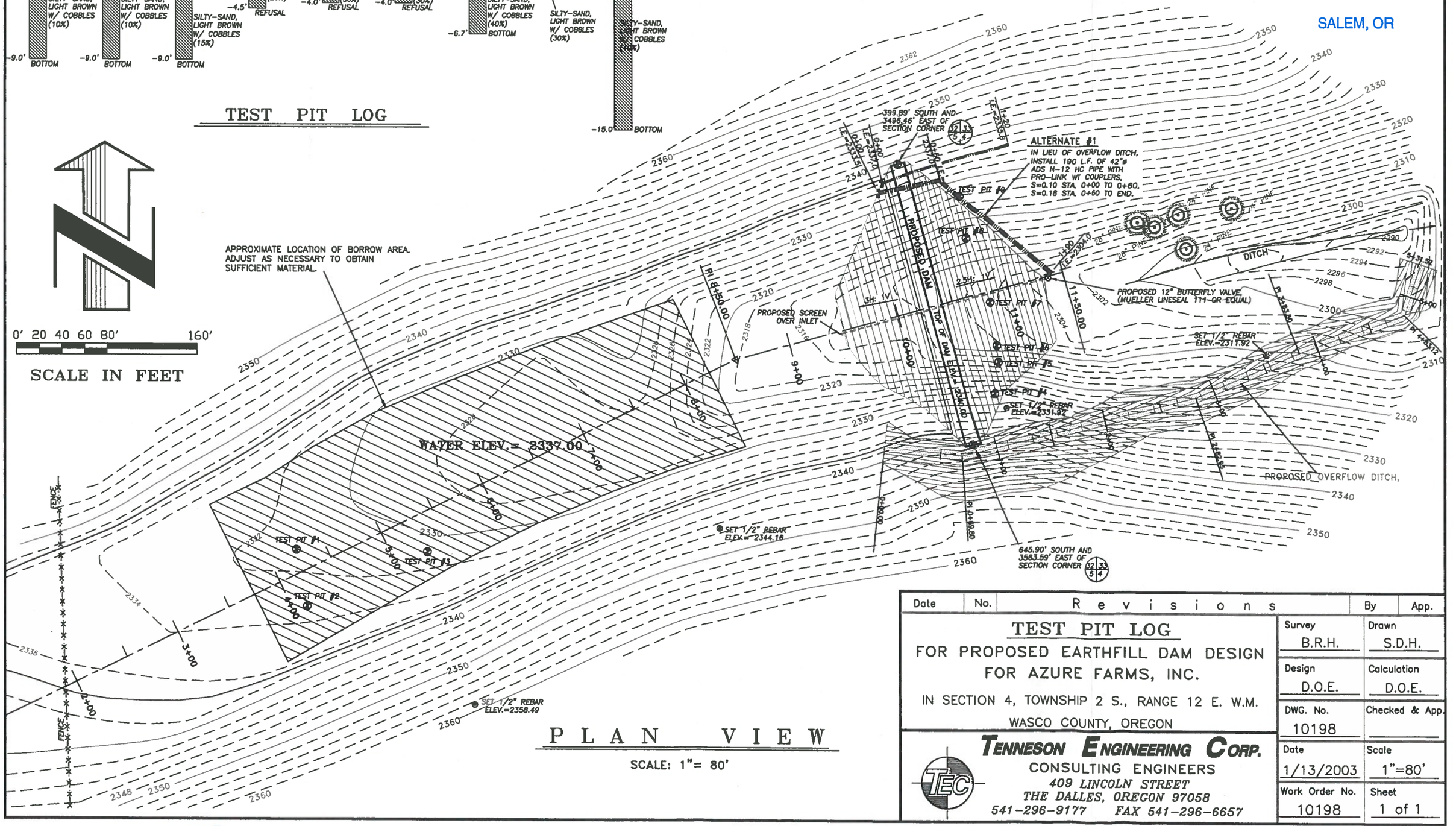


TEST PIT LOG

SCALE IN FEET



PLAN VIEW

SCALE: 1"= 80'

Date	No.	Revisions	By	App.

TEST PIT LOG

FOR PROPOSED EARTHFILL DAM DESIGN
FOR AZURE FARMS, INC.

IN SECTION 4, TOWNSHIP 2 S., RANGE 12 E. W.M.
WASCO COUNTY, OREGON

TENNESON ENGINEERING CORP.
CONSULTING ENGINEERS
409 LINCOLN STREET
THE DALLES, OREGON 97058
541-296-9177 FAX 541-296-6657

Survey: B.R.H.	Drawn: S.D.H.
Design: D.O.E.	Calculation: D.O.E.
DWG. No.: 10198	Checked & App.
Date: 1/13/2003	Scale: 1"=80'
Work Order No.: 10198	Sheet: 1 of 1

R-88072

APPENDIX "A"

Soil Test Results

R-88072

Carlson Testing, Inc.

Main Office
P.O. Box 23814
Tigard, Oregon 97281
Phone (503) 684-3460
FAX (503) 684-0954

Salem Office
4060 Hudson Ave., NE
Salem, OR 97301
Phone (503) 589-1252
FAX (503) 589-1309

Bend Office
P.O. Box 7918
Bend, OR 97708
Phone (541) 330-9155
FAX (541) 330-9163

October 2, 2001
T-01-08036.CTI

Tenneson Engineering Corp
409 Lincoln Street
The Dalles, Oregon 97058

Re: Stelzer Dam
Sieve Analysis and Atterberg Limits Testing

Gentlemen:

Following are results of a sieve analysis and atterberg limits test conducted on a sample of light brown clayey silt material sampled by your representative on September 12, 2001. Testing was completed on September 17, 2001. The project specifications were applied as per your representative. Following is the test results:

SIEVE ANALYSIS - ASTM C117 & C136:			
SIEVE SIZE		PERCENT PASSING	PROJECT SPECIFICATIONS
12.5mm	1/2"	100.0	
9.5mm	3/8"	100.0	
6.3mm	1/4"	98.0	
4.75mm	#4	96.0	
2.36mm	#8	91.0	
1.18mm	#16	86.0	
.600mm	#30	79.0	
.300mm	#50	69.0	
.150mm	#100	56.0	
.075mm	#200	***(46.1)***	0-5

This samples fails the project specifications on the #200 sieve.

Atterberg Limits - ASTM D4318:

Plastic Limit - NP
Liquid Limit - 20.1
Plasticity Index - NA

If there are any further questions regarding this matter, please do not hesitate to contact this office.

Respectfully submitted,
CARLSON TESTING, INC.

Ty Toller
Laboratory Manager
kk
word/lab/labrpt/sieve/T01080361ablog#9662

R-8872

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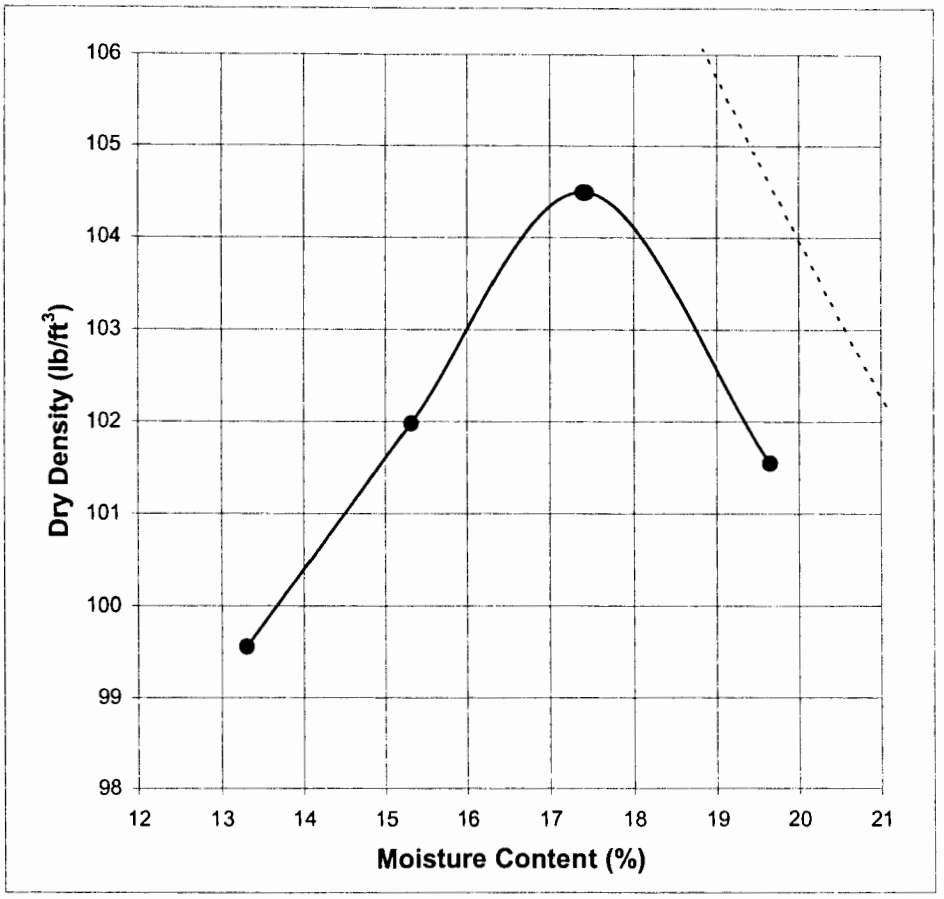
Bend, OR 97708
Phone (541) 330-9155
FAX (541) 330-9163

Moisture - Density Relationship

Client: Tenneson Engineering Corp — 10/01/01
Project: Stelzer Dam — **Job Number:** T0108036
Material Type: Native Light Brown Clayey Silt — **Location:** On-Site

Test Method:	ASTM D-698 B, C-136, D-2216	**Date Sampled:**	09/12/01
Sample Method:	ASTM D-75	**Date Tested:**	09/17/01
Preparation Method:	Moist	**Oversized Material:**	Removed
Compacting Method:	Manual	**Hammer Type:**	Circular



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APR 09 2015
SALEM, OR

Zero Air Voids Line = 2.500

Optimum Moisture: 17.4% **Max. Dry Density:** 104.5 lbs/ft³

Percent Passing 3/8" Sieve: 98.8%

cc:

Reviewed By:

R-88672

APPENDIX "B"

Valve Specifications

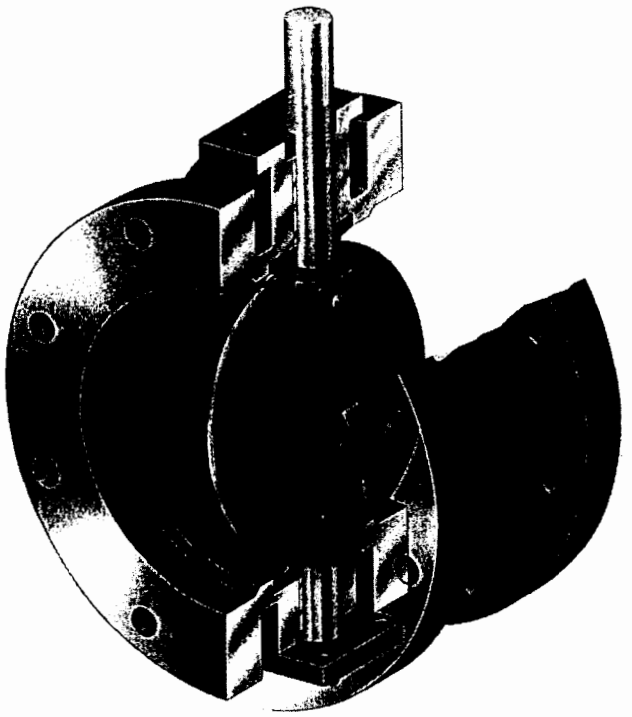
MUELLER® LINESEAL III® BUTTERFLY VALVES 4"-20" DESIGN

MUELLER LINESEAL III Butterfly Valve Features

- CHEVRON V-TYPE PACKING--
  is self-adjusting, long lasting and should never need replacement because quarter-turn valve operation causes little or no wear. Packing bears on turned, ground and polished stainless steel.

- CORROSION RESISTANT SHAFT--
  is constucted of type 304, 18-8 stainless steel. Shaft is one-piece, through-shaft construction sized to meet or exceed requirements of AWWA Standard C504 for Class 150B service.

- HEAVY DUTY CAST IRON BODY--
  is extra heavy with flanges fully faced and drilled per ANSI B16.1 Class 125 Standard for cast-iron flanges. Other ends available include integrally cast mechanical joint, slip-on (for DI and PVC C900), and grooved style. Operator mounting trunnion is machined and drilled for four-bolt connection.



- TAMPER-PROOF DISC CENTERING--
  provided by precision molded flats in the bonded seat at the body trunnion mate with machined flats on the disc to provide tamperproof centering of the disc in the body. Positive disc alignment, without play, assures long seat life.

- SELF-LUBRICATING BEARINGS--
  are liberally sized, chemically inert nylon bearings that are self-lubricating and should outlast the life of the pipeline.

- STREAMLINED DISC--
  has lens-shaped design to minimize pressure drop and turbulence. Full open valve creates no more friction loss than a 45 elbow. Disc is secured to the shaft by stainless steel pins sized to transmit torques required and withstand stresses imposed under severe operating conditions. Disc is cast iron ASTM A-126 Class B with 316 stainless steel disc edge.

- ELASTOMERIC BODY SEAT--
  is made of a special rubber compound (Buna N) that is bonded to the body by a patented process. The seat cannot be torn from the body under normal pipeline conditions. The precision molding process also ensures that the disc-seat indentation cannot cause excessive wear or abrasion upon closing.

FOR ORDERING INSTRUCTIONS SEE PAGES 11.14 THROUGH 11.16

L-8807

MUELLER® LINESEAL III® BUTTERFLY VALVES 4" - 48"*

Mueller Co.

11.3

Rev. 12-01

- Catalog number--
  3211-6 Flanged Ends
  3211-20 Mechanical joint ends
  (with mechanical joint unassembled accessories)
  3211-23 Mechanical joint ends
  (without mechanical joint accessories)
  Sizes--4", 6", 8", 10", 12", 14", 16", 18", 20", 24", 30", 36", 42", 48", 54"-72"*
  3211-16 Flanged by mechanical joint ends
  (with mechanical joint unassembled accessories)
  3211-19 Flanged by mechanical joint ends
  (without mechanical joint unassembled accessories)
  Sizes--6", 8", 10", 12", 14", 16"
  3211-41 Flanged by slip-on
  Sizes--4", 6", 8", 10", 12"
  3211-38 Slip-on by slip-on
  Sizes--4", 6", 8", 10", 12", 16Ó

- Meets or exceeds all applicable requirements of ANSI/AWWA C504 Standard Class 150B; NSF 61 certified
- Buried service valves: I.D. and O.D. coated with 5 mils Asphalt Varnish
- Above ground valves (ordered with either a handwheel, position indicator on the actuator, or lever): coated with 3 mils Tnemec Series 140F Pota-Pox Plus primeron the valve O.D. and 5 mils Asphalt Varnish on the I.D. as standard; meets AWWA C-504 standards.

- Seat-in-body design reduces seat failure due to corrosive buildup in the valve and pipeline
- Through-disc pinning provides a tight disc-to-shaft pin connection, greatly reducing the possibility of loosening through vibration
- Disc edge is 316 Stainless Steel
- Symetrical lens-shaped disc for higher Cv and lower head loss
- Nonmetallic bearings prevent galvanic corrosion and provides lower coefficient of friction
- Cheveron "V" type packing is self-adjusting to last the life of the valve

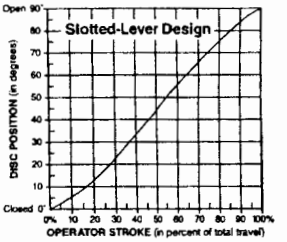
Options

- MDT Actuatorwith handwheel or chainwheel and position indicator
- MDT Actuator with cylinder actuator (also available with manual override, handjack and 4-way solenoid valve)
- Hand lever for 4"-10" valves
- 200 psi test
- Extension stems (see page 10.71)
- Expoxy interior and/or exterior
- Holiday testing
- Mueller ground position indicator

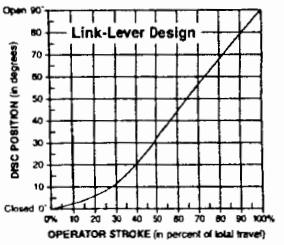
Standard Buried Service Actuators

Valve size	Actuator	Number of turns
4" - 12"	MDT-2	32
14" - 20"	MDT-3	30
16" - 24"	MDT-4	40
20" - 30"	MDT-5	136
30" - 36"	MDT-5S	136
36" - 48"	MDT-6	215
36" - 48"	MDT-7	492

Slotted-Lever (4"-12")



Link-Lever (14"-48")



* Contact your Mueller representative for valve sizes larger than 48".

FOR ORDERING INSTRUCTIONS SEE PAGES 11.14 THROUGH 11.16

R-88272