

# UTAH LAKE DISTRIBUTING COMPANY STANDARDS CHECKLIST

## SARATOGA CANAL

The Utah Lake Distributing Company's (ULDC) Saratoga Canal begins below and near Camp Williams Military Base and flows south, eventually terminating at Tickville Gulch in the City of Saratoga Springs, Utah. The canal was designed and constructed by the U.S. Bureau of Reclamation (Reclamation) as a part of the Provo River Project in the early 1950s. Reclamation held an easement under the authority of the Act of August 30, 1890 (26 Stat. 371), commonly known as the Canal Act. The Canal Act essentially says that every patent to land west of the 100th meridian has an easement reserved to the U.S. and its contractors for ditches and canals that may be constructed in the future. All the lands under the Saratoga Canal were patented after the date of the Canal Act. On March 24, 2021, ownership of the Saratoga Canal was transferred from Reclamation to ULDC which makes ULDC solely responsible to authorize encroachments to the canal. The principal requirement is that encroachments not adversely impact the use, operation, or maintenance of the Saratoga Canal.

This checklist is intended to assist engineers in designing projects to ULDC standards. All projects seeking acceptance by ULDC must be designed to these standards. When used correctly, this checklist will expedite the review and encroachment agreement process. Not all items on this checklist will be applicable to every project.

Neither ULDC nor Franson Civil Engineers (Franson Civil) will have responsibility for design, construction, or maintenance of the Applicant's facilities. It is the responsibility of the Applicant and its engineer to design the project to ULDC standards. No approval or acquiescence by ULDC or Franson Civil will operate as a waiver or modification of ULDC standards.

In most instances, the Applicant will install, operate, maintain, inspect, repair, and replace the facilities that are constructed through the application process with no interruption of ULDC delivery of water or operation, maintenance, repair or replacement of ULDC facilities.

Note: This checklist is updated when standards are amended. Checking for the latest version of this checklist at [www.fransonicivil.com/canal-applications](http://www.fransonicivil.com/canal-applications) will ensure the most up-to-date information. Standard drawings are also available on the website. ULDC reserves the right to make exceptions to the standards or impose other requirements, depending on the Applicant's project.

## **GENERAL INFORMATION AND REQUIREMENTS**

- Submit an “Application for Encroachment Agreement” and all application fees.
- ULDC maintains their irrigation facilities by burning weeds prior to each irrigation season and as needed. This should be considered while designing your project. ULDC only accepts concrete structures or pipes to be installed in their easement so they will not be damaged due to maintenance.
  - ULDC requests that the types of fencing installed adjacent to their property be fire-resistant. During maintenance of the canals it is possible that open flames will border the canal easement.
- Pipes, conduits, or other similar facilities are not allowed to be installed over the canal channel. Irrigation boxes, trees, or other facilities are not allowed to be installed in ULDC corridors. Turnouts, overhead power lines, etc. can be exceptions.
- All drawings must be stamped, signed, and dated by a licensed professional engineer. This can be completed after the project meets ULDC standards and is ready for the encroachment agreement.
- Before submitting drawings to Franson Civil for review, please verify that all notes, references, and labels are correct and accurate.
- Neither ULDC nor Franson Civil can verify the locations of underground facilities. Blue Stakes should always be called before digging (1-800-662-4111).

### **ALL SUBMITALS SHALL:**

- Show the plan and profile view of the proposed facilities.
- Show all existing facilities in and around the project (i.e. canal O&M road, turnouts, pipes, box culverts, pipe outlets, etc.).
- Provide the location map and, if applicable, the plat map.
- Show the ULDC canal corridor on the drawing, which is generally 16.5 feet on the uphill side and 33 feet on the downhill side, measured from the center of the canal (Standard Easement).
  - Applicant is responsible for checking surrounding property and labeling ULDC corridor as owned by ULDC or as an easement. If the land is owned, the actual ownership boundaries should be shown.

- Provide proposed dates for start and completion of construction. The start date should reflect adequate time to complete the application process and secure an encroachment agreement.

**ADD THE FOLLOWING TO PLANS UNDER HEADING “ULDC CANAL NOTES”**

- Notification must be given at least 24 hours prior to the beginning of construction work and re-notification of re-commencement of work following any cessation of work for more than 4 (four) days. Call Kyle DeVaney and the canal water master. Failure to do so may result in a \$5,000 fine.
- Contact information for Franson Civil and ULDC:
  - Kyle DeVaney, P.E., Franson Civil Engineers, 801-756-0309
  - Vince Hogge, P.E., Franson Civil Engineers, 801-756-0309
  - Scott Holbrook, President, Utah Lake Distributing Company, 801-376-3566
  - Eric Chamberlain, Water Master, ULDC Saratoga Canal, 801-360-4117
- Any changes in design drawings after the encroachment agreement has been executed must be reviewed and accepted by Franson Civil and ULDC.
- Work cannot interfere with delivery of water. Construction within canal corridors that impacts the canal or operation & maintenance road (O&M road) must be completed between October 15 and April 1.
- All construction within the canal corridor must be completed to ULDC standards.
- If disturbed, the canal O&M road must be returned to pre-construction state or better following construction. O&M road must be available for use by ULDC personnel no later than April 1.
  - The O&M road shall be graded at a 2% slope away from the canal.
  - After placing and compacting native material, place a minimum of two inches of compacted roadbase on road surface. Compaction shall be 92% modified Proctor density.
- Stormwater runoff enters the canal during storm events or at other unexpected times. It is the responsibility of the Contractor to protect the work site. Any damage to the canal corridor caused by construction activities will be the responsibility of the Contractor.

## **BORING**

For the purpose of this application packet, boring refers to the installation of a casing under the canal without excavating the canal itself. Also see the “Directional Drilling/Boring” section to see if your project qualifies for that section.

- All facilities (utilities, pipes, etc.) installed under the canal (even under box culverts) must be encased in a steel, fusible HDPE, or fusible PVC casing. Minimum steel casing thickness can be found on the standard drawings. Minimum HDPE casing thickness shall be DR 32.5. Verification that the minimum thickness is sufficient is the responsibility of the Applicant.
- In locations where steel casing pipe is used, soil tests for resistivity shall be completed by the Applicant and at the Applicant’s expense. Test results shall be submitted to Franson Civil. Soils with a soil resistivity (ohm cm) of 2,500 or less shall have cathodic protection with a 25-year life or have cellular concrete placed in the annular space between the carrier pipe and casing pipe.
- Casings must have a minimum of two feet between the top of the casing and the bottom of the box culvert or concrete-lined canal, and four feet between the top of the casing and the earthen canal bottom. In areas with sand or cobbles, this distance may need to be increased. The actual safe depth is to be determined by the Applicant’s engineer.
- The casing shall extend outside the canal corridor.
- A concrete-liner on the floor and banks, extending ten feet on either side of casing is required. See standard drawing “Concrete Liner Details” for more information.
- Silt collects at the bottom of the canal. The installation of the concrete liner shall match the bottom of the canal and not the current silt layer.
- Bore pits must be located outside the canal corridor.
- Bore pit compaction shall be 92% modified Proctor density.
- Trench plugs are to be placed at each end of the casing.
- Trench plugs are to extend the width of trench, 12 inches above and below casing pipes, and with a thickness of 24 inches.
- Trench plugs shall be 10% bentonite and 90% clay mixture. At least 40% of the backfill material must pass a No. 200 U.S. standard sieve prior to adding bentonite powder. The backfill material shall then be amended by adding and thoroughly mixing commercial bentonite powder with the backfill material at a ratio of one part bentonite to nine parts backfill material. Impermeable flowable fill is an acceptable alternative.

- The carrier pipe shall have adequate casing spacers.
- Waterline pipes inside the casings shall have restraining joints.
- Adequate thrust blocks are required on all bends for DIP, PVC or PIP waterlines.
- See the “Canal Boring Details” standard drawing for additional requirements.

Add the following notes to plans under heading “ULDC Canal Notes”

- Contractor to notify Kyle DeVaney of Franson Civil when trench plugs are installed. Verification of trench plug completion must be performed by Franson Civil before backfilling. Kyle can be reached at 801-756-0309.
- Rebar for the canal liner shall be a minimum of #4 bar at 12 inches on center.
- A two-foot-deep concrete cutoff wall is required on both ends of the concrete liner.

### **DIRECTIONAL DRILLING/BORING**

For the purpose of this application packet, directional drilling refers to the installation of a smaller casing for a utility (usually under six inches in diameter) installed by directional drilling.

- Label the conduit material and thickness. Verification that the conduit specifications are sufficient is the responsibility of the Applicant.
- Conduit must have a minimum of two feet between the top of the conduit and the bottom of a box culvert or concrete-lined canal, and four feet between the top of the conduit and the earthen canal bottom. In areas with sand or cobbles, this distance may need to be increased. The actual safe depth is to be determined by the Applicant’s engineer.
- The conduit shall extend outside the canal corridor.
- Bore pits must be located outside the canal corridor.
- Fill bore pits with a mixture of native material and 10% bentonite powder to create a seal that will prevent water from following the new conduit.
- Bore pit compaction shall be 92% modified Proctor density.
- See the “Directional Drilling Details” standard drawing for additional requirements.

### **OCCUPYING EXISTING BLANK CONDUIT/CASING**

This section is used when an existing blank conduit is in place under the canal and the Applicant wishes to occupy the conduit. It is common for conduits to be installed at the same time as a box culvert; however, the placement of these conduits does **not** give permission for the utility to be installed in the conduit. An application, drawings, and fee need to be submitted and an

encroachment agreement signed before the conduit is occupied. Drawings from the original conduit placement can be used if the Applicant can provide them.

- Show the plan and profile view of the existing blank conduit.
- Specify the existing conduit material and thickness.
- Show or note the details of the utility to be installed in the blank conduit.
- Show where and how the conduit will be accessed to install the utility.
- Show the canal corridor.

#### **OPEN CUT OF CANAL CHANNEL**

- All facilities (utilities, pipes, etc.) installed under the canal must be encased in a steel, fusible HDPE solid wall, or fusible PVC casing. Minimum steel casing thickness can be found on the standard drawings. Minimum HDPE casing thickness shall be DR 32.5. Verification that the minimum thickness is sufficient is the responsibility of the Applicant.
- In locations where steel casing pipe is used, soil tests for resistivity shall be done and submitted to Franson Civil. Soils with a soil resistivity (ohm cm) of 2,500 or less shall have cathodic protection with a 25-year life or have cellular concrete placed in the annular space between the carrier pipe and casing pipe.
- Casings must have a minimum of two feet between the top of the casing and the bottom of the box culvert or concrete-lined canal, and four feet between the top of the casing and the earthen canal bottom. In areas with sand or cobbles, this distance may need to be increased. The actual safe depth is to be determined by the Applicant's engineer.
- The casing shall extend outside the canal corridor.
- Trench plugs are to be placed at each end of the casing.
- Trench plugs are to extend the width of trench, 12 inches above and below casing pipes, and with a thickness of 24 inches.
- Trench plugs shall be a 10% bentonite and 90% clay mixture. At least 40% of the backfill material must pass a No. 200 U.S. standard sieve prior to adding bentonite powder. The backfill material shall then be amended by adding and thoroughly mixing commercial bentonite powder with the backfill material at a ratio of one part bentonite to nine parts backfill material. Impermeable flowable fill is an acceptable alternative.
- The carrier pipe must have adequate casing spacers.
- Waterline pipes inside the casings shall have restraining joints.
- Adequate thrust blocks are required on all bends for DIP, PVC or PIP waterlines.

- Bedding material must be shown, as appropriate for the design.
- A concrete-liner on the floor and banks, extending ten feet on either side of casing is required. See standard drawing “Concrete Liner Details” for more information.
- Silt collects at the bottom of the canal. The installation of the concrete liner shall match the bottom of the canal and not the current silt layer.
- See the “Open-Cut Trench Cross-Section” standard drawing for additional requirements.

Add the following notes to plans under heading “ULDC Canal Notes” if canal is earthen

- The canal floor and embankment material removed for excavation (excluding under concrete liner) shall be replaced with a 12-inch minimum thickness of  $10^{-6}$  cm/sec permeability clay material, in 6-inch maximum lifts.
- All replaced materials shall be compacted to 92% modified Proctor density.
- Canal embankment shall be shaped to match the existing canal prism.
- Compaction test results must be submitted to Franson Civil. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- The trench through the canal may be cut as little as  $\frac{1}{4}$  horizontal to 1 vertical.
- Contractor must notify Kyle DeVaney of Franson Civil when trench plugs are installed. Verification of trench plug completion must be performed by Franson Civil before backfilling. Kyle can be reached at 801-756-0309.

Add the following notes to plans under heading “ULDC Canal Notes” if canal is concrete-lined

- The existing concrete section must be sawcut to give a clean edge for the replacement section.
- The trench through the canal may be cut as little as  $\frac{1}{4}$  horizontal to 1 vertical to minimize the amount of concrete liner that needs to be removed. It is the responsibility of the Contractor to verify that compaction will not be affected.
- Embankment material shall be compacted to a minimum of 92% modified Proctor density. Native material may be used.
- Compaction test results must be submitted to Franson Civil. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- Canal embankment shall be shaped to match the existing canal prism.
- Rebar shall be a minimum of #4 bar at 12 inches on center.

- Contractor must notify Kyle DeVaney of Franson Civil when trench plugs are installed. Verification of trench plug completion must be performed by Franson Civil before backfilling. Kyle can be reached at 801-756-0309.

## **BOX AND PIPE CULVERTS**

- If extending an existing box culvert, ULDC recommends that the Applicant perform a reasonable inspection of the existing culvert to make a determination of whether it should be replaced instead of extended.
- Applicant is responsible to verify that culvert design will not negatively impact the hydraulics of the canal, including other existing structures in the area.
- A plan view is required of the culvert showing the centerline of the canal, the top of banks, and the ULDC corridor boundaries.
  - Show the elevation and location of the top of the banks, bottom of the banks, and the canal prism, as well as new structures including box culverts and wing walls.
  - Silt collects at the bottom of the canal. The invert of the culvert is to match the bottom of the canal, not the top of the current silt layer.
- Trench detail is required showing bedding, backfill material, and compaction requirements.
- The dimensions and type of culvert must be labeled.
- Label the culvert with loading information and rebar details. Loading shall be determined by the Applicant.
- The culvert wing walls should flare at a 30 to 45-degree angle then a 90-degree angle into the canal banks, a minimum of two feet perpendicular to the canal banks. Placement of the wing walls cannot interfere with the O&M road. The top of the wing walls shall be a minimum of 12 inches above the high-water mark in the canal.
- Wing walls shall be tied into the canal banks in a manner that provides a smooth transition from the canal into the culvert, and back out of the culvert on the outlet side.
- If using a precast wing wall/end section, the wing walls, apron, and cutoff wall shall be one piece.
- If cast-in-place concrete is placed next to pre-cast concrete, Waterstop RX, Swellstop, or an approved equivalent shall be placed to prevent seepage between the surfaces.
- PVC water stop, or equivalent, is required in all joints of cast-in-place concrete.

- If extending an existing box culvert, Waterstop RX, Swellstop, or an approved equivalent, shall be placed between the old culvert and the new culvert to prevent seepage. Mastic is not acceptable.
- A concrete apron shall be between the wing walls.
- Concrete cut-off walls are required on the inlet and outlet, a minimum of two feet below the bottom of the concrete slab (apron). These cutoffs are required to extend into the banks to the ends of the wing walls.
- The structure must be able to handle the maximum flow capacity of the canal. The Applicant is responsible for verifying maximum flows and designing appropriately. The culvert cannot cause water to backup further upstream. Neither ULDC nor Franson Civil have flow data available for the canal. The typical minimum culvert size is 6 feet tall by 12 feet wide. However, site conditions may determine that this dimension be altered.
- No riprap is allowed in the canal.
- State on the plans the backfill material and methods for filling and compacting around the box and wing walls. Backfill around the box culvert shall meet manufacturer's specifications for compaction and materials or a minimum of 92% modified Proctor density.
- Place a minimum of 24 inches of clay material behind wing walls, compacted to a minimum of 92% modified Proctor density.
- All other backfill material around headwalls and in open canal channels to be compacted to a minimum of 92% modified Proctor density.
- A 6-foot chain-link fence or 4-foot parapet wall is required on all box culverts that carry pedestrian traffic. Exceptions may occur where local ordinances note otherwise, and upon agreement by ULDC and Franson Civil.
- Access to the canal O&M road shall be installed with curb cuts at drive approaches and thickened concrete at sidewalks.
- Casings under the culvert must be shown on the plan and profile view. (See "Open Cut of Canal Channel" for information on standards for casing installation.)
- Identify existing conduits and utilities under the canal.
- Identify each new conduit being placed under the canal.
  - If the conduit owner/occupier is known, label as such.
  - If the conduit is to remain empty, label as such.
- See the "Box Culvert Details" standard drawing for additional requirements.

Add the following notes to plans under heading “ULDC Canal Notes”

- All concrete used in construction shall have a minimum compressive strength of 4,000 psi. The concrete mix shall include between 5% and 7% air entrainment.
- Canal floor and embankment material removed for excavation (between apron and undisturbed canal) shall be replaced with a 12-inch minimum thickness of  $10^{-6}$  cm/sec permeability clay material in 6-inch maximum lifts.
- Compaction around the box culverts must meet manufacturer requirements or a minimum of 92% modified Proctor density.
- All materials placed in the canal corridor shall be compacted to 92% modified Proctor density.
- Canal embankment shall be shaped to match the existing canal prism.
- Compaction test results must be submitted to Franson Civil. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- Open-cut trenches for the cutoff walls shall be cut at a minimum of 2 horizontal to 1 vertical so that backfill can be properly compacted.
- Conduits shown on these drawings do not give permission for the conduit to be occupied by an entity other than the original Applicant. Each entity crossing the canal must apply for and receive an encroachment agreement from ULDC.
- Signs must be placed at each entrance to the canal O&M road that state:
  - No Trespassing. Warning: Canal Maintenance Road, Authorized Personnel Only.  
No Swimming or Tubing.

## **TURNOUT/WEIR**

The turnout/weir structure being proposed shall at all times be subject to rights reserved by ULDC to reasonably use, operate, maintain, inspect, repair, replace, and improve the canal. The turnout/weir structure to be built by the Applicant pursuant to the encroachment agreement shall be the sole responsibility of the Applicant for purposes of ongoing maintenance and repair, but the canal shall continue to be used exclusively by ULDC for its ongoing delivery of water to its shareholders. Any future repairs, excavation, removal, or other work on the turnout/weir structure shall be subject to advanced review and approval by Franson Civil.

- Submit an “Application for Encroachment Agreement” and “Application for Turnout/Weir.”

- See “Weir Turnout Gate,” “Check Structure and Turnout,” and “3-foot Cipoletti Weir” standard drawings for additional requirements.
- A check structure is required to be designed and constructed at the same time as the turnout, even if a check structure may not be necessary at the time.
- If the turnout/weir is being built by another entity other than the shareholders that will use the turnout/weir, it is the responsibility of the Applicant to coordinate a meeting with the shareholders, canal water master, and Franson Civil to verify the required flows and any special conditions of the turnout/weir.
- Provide the cross-section showing the elevation and location of the turnout gate, weir, and any permanent structures in relation to the canal. Show the toe of the canal embankment, and the elevation of the existing canal invert.
  - Silt collects at the bottom of the canal. The placement of the turnout structure shall match the bottom of the canal, not the top of the current silt layer.
- If vacating an old weir, it is the responsibility of the Applicant to remove the existing structure(s) and return the canal to proper functioning condition.
- Show compaction as appropriate for the design of weir boxes placed outside the canal corridor.
- If cast-in-place concrete is placed next to pre-cast concrete, Waterstop RX, Swellstop, or an approved equivalent shall be placed to prevent seepage between the surfaces.
- PVC water stop, or equivalent, is required in all joints of cast-in-place concrete.

#### Turnout Gate & Headwall

- Provide specifications for the turnout gate. A water-tight Waterman gate, or equivalent, is required.
- Canal banks shall be tied into the wing walls in a manner that provides a smooth transition around the headwall.
- The headwall should be placed in a manner so that the structure does not extend into the canal or the O&M road.
- The inlet structure shall be placed on undisturbed soils.
- The bottom of the pipe opening should be a minimum of two inches off the bottom of the canal floor.
- Rebar details are required on the submitted drawings. The rebar design must be appropriate for the proposed site and conditions.

### Pipe from Turnout to Weir

- Open-cut trenches shall be cut at a minimum of 2 horizontal to 1 vertical so that the backfill can be properly compacted. See “Open-Cut Trench Cross-Section” standard drawing for additional requirements.
- Bedding material must be shown, as appropriate for the design.
- Pipe shall be reinforced concrete pipe through the canal corridor. Specify the pipe size and class.

### Weir (Measurement Structure)

- Provide specifications for the weir type.
  - The 3-foot Cipoletti Weir is shown as an example on the standard drawings. This exact weir type and/or size may not be optimal for your design.
- Show the details of the grate.
- Weir or transition boxes are not allowed in the canal corridor. The weir shall be placed outside the canal corridor, but in a convenient location for the canal water master to have access to verify and monitor the amount of water being taken by the shareholder(s).
- Box not to be placed in driveways, roads, or other traffic areas.
- All pipes into boxes shall be grouted and water tight.

### Add the following notes to plans under heading “ULDC Canal Notes”

- All concrete used in the construction shall have a minimum compressive strength of 4,000 psi. The concrete mix shall include between 5% and 7% air entrainment.
- Compaction of all replaced embankment material shall be impermeable material, meeting a modified Proctor density of 92%.
- Compaction test results must be submitted to Franson Civil. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- A trench plug is required behind the headwall. Trench plug to be placed in location shown for width of trench, 12 inches above and below the pipe, and a thickness of 24 inches.
- Trench plugs shall be a 10% bentonite and 90% clay mixture. At least 40% of the backfill material must pass a No. 200 U.S. standard sieve prior to adding bentonite powder. The backfill material shall then be amended by adding and thoroughly mixing commercial bentonite powder with the backfill material at a ratio of one-part bentonite to nine parts backfill material. Impermeable flowable fill is an acceptable alternative.

## **OVERHEAD CROSSING**

- Provide a cross-section showing the elevation of overhead crossing and the elevation of the canal invert and banks.
- Show the location of power poles and any permanent structures in relation to the canal and toe of the canal embankment.
- Structures shall be located outside of the ULDC easement, 16.5 feet on the uphill side and 33 feet on the downhill side, measured from the center of the canal. In some instances, prescriptive rights of ULDC will extend past the 50 feet.

## **PIPING LATERAL DITCHES**

- All pipes on all the drawings must be specifically labeled for pipe type, class, and size. For maintenance purposes, ULDC only accepts RCP to be installed in their corridor.
- All pipe sizes must be verified by the Applicant's engineer to carry sufficient flow.
- A plan and profile view of each pipe is required. Show the flow line profile and provide calculations.
- Trench detail is required, including showing bedding detail. ULDC standards require bedding to be six inches below the pipe, up to the springline minimum of ¾-inch crushed rock, unless otherwise specified by the manufacturer and accepted by Franson Civil. Compact all backfill materials to 92% of the modified Proctor density.
- At minimum, irrigation cleanout boxes are required every 500 feet, on either side of roads/driveways, and at all alignment changes.
- Prior to any easements being recorded that affect ULDC, the legal description must be submitted to and reviewed by Franson Civil. Also, the entire document will be reviewed by ULDC's attorney.
- Easements are required to be recorded with the County Recorder for all ULDC facilities.
  - Proof that the easement was recorded must be submitted to Franson Civil.
- ULDC Saratoga Canal lateral corridors are typically 25 feet, centered over the lateral. Easements should be in the name of the Utah Lake Distributing Company.
- Title insurance may be required.
- Add a note to the drawings, stating: "No foliage, structures, or other unauthorized improvements are allowed in Utah Lake Distributing Company corridors."