

Springville Area Irrigation and Drainage Group

Application Packet

Guide for Application, Review, and Approval Process with
Springville Area Irrigation and Drainage Group
For Encroachment upon Easements

Springville Irrigation Company
Wood Springs Irrigation Company
Coffman Springs Irrigation Company
Matson Springs Irrigation Company
Big Hollow Irrigation Company
Mill Pond Irrigation Company
Wash Creek Irrigation Company
Springville Drainage District

Springville Area Irrigation and Drainage Group General Instructions

There are seven irrigation companies and one drainage district that have come together to form the Springville Area Irrigation and Drainage Group (SIDG), consisting of:

- Springville Irrigation Company
- Wood Springs Irrigation Company
- Coffman Springs Irrigation Company
- Matson Springs Irrigation Company
- Big Hollow Irrigation Company
- Mill Pond Irrigation Company
- Wash Creek Irrigation Company
- Springville Drainage District

This packet is intended to assist Applicants in working with SIDG. All Applicants are required to obtain permission from SIDG to do work affecting SIDG facilities. SIDG facilities include: canals, irrigation ditches, land drain lines, drainage ditches, and some storm drains. Besides having many irrigation ditches throughout the area that are affected with development, the irrigation companies also have an agreement with Springville City to convey storm drainage through irrigation company facilities. This tie between Springville City and SIDG is part of the reason why there is so much involvement and coordination by SIDG in the Development Review Committee (DRC) process.

Any desired development that will affect SIDG facilities must go through the Application, Review, and Approval Process. This includes any time that work is done within SIDG easements. Franson Civil Engineers (FCE) is the engineering firm for SIDG. FCE will review all plans that affect SIDG facilities. This review process is in-depth and may be lengthy depending on the quality of the plans submitted for review. The following is a guideline for the Application, Review, and Approval Process affecting SIDG facilities:

- The Applicant meets with Springville City for pre-DRC meetings. The Applicant contacts FCE to receive the application packet.
- The Applicant uses the guidelines in the application packet to design the affected facilities to SIDG standards and will coordinate with FCE on ditch capacities and site specific design elements.
- The development drawings are finalized for the Springville City DRC with all SIDG facilities designed and ready for final review.
- FCE receives the **application**, **application fees**, and **drawings**. The application and fees have to be submitted to FCE before the final drawings are submitted for the Springville City DRC. Otherwise, no review of the drawings will be completed by SIDG and no review comments will be submitted to DRC. This will delay the approval of the development.
- FCE will **review** the drawings, including the plat map. A meeting will be held with FCE, SIDG, and the Applicant (if desired) to discuss the development. Review comments will be sent to the Springville City DRC with a checklist of items that must be addressed prior to approval (generally 2-3 weeks for each review). Subsequent reviews will take place with

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coordination directly between FCE/SIDG and the Applicant. The reviews will repeat as explained above until all items from the checklist have been addressed and plans are to SIDG standards. This typically takes 2-3 reviews. **If the standards in the packet are strictly adhered to, and the improvements to the facilities are well designed, the time involved in this review process can be greatly reduced.**

- **Bonding** is required by SIDG. When the drawings are acceptable, the Applicant will provide a cost estimate to FCE for the construction of SIDG facilities so the bonding amount can be determined. Once the bonding amount has been determined, reviewed and accepted by SIDG, the Applicant will be notified of the amount. An example of a bond letter which outlines the bonding requirements is included in this packet. Once the bonding amount is set, the Applicant should have their bank prepare the bond.
- **Easements** for SIDG facilities must be recorded with the Utah County Recorder. Easements shall be shown on the Plat Map for the subdivision. A signed statement from the landowner stating that the easement will be recorded must be submitted if the easement has not been recorded at this point in the process. Proof of record for the irrigation easements or the signed statement must be submitted to FCE before the Encroachment Agreement will be prepared. Easements shall be in the name(s) of the individual SIDG company, not SIDG.
- An **Encroachment Agreement** will be prepared between the Applicant and the individual SIDG company (or companies) once all of the above mentioned items have been completed. Four copies of the agreement will be sent to each applicable SIDG company for signature. The Applicant will then be contacted to sign the agreement at the SIDG office in Springville.
 - A draft of the Encroachment Agreement will be sent to the Applicant and each applicable SIDG company for review when the drawing review is completed. The agreement stays the same for most projects, so it can save time by reviewing the example agreement that is included in the Instruction Packet.
 - Springville Drainage District will only review and approve agreements to be signed at their monthly board meeting, which is generally held on the fourth Wednesday of the month.
- Once the Encroachment Agreement has been signed by the Applicant and the individual SIDG company (or companies), permission has been granted to the Applicant to begin the construction phase in accordance with the agreement(s).
- The Applicant is required to notify SIDG and FCE at least 24 hours in advance of beginning construction on irrigation facilities, as outlined in the agreement.
- A representative from SIDG will make occasional site visits for construction review of the facilities to ensure they are completed in accordance with the agreement.
- After construction is complete, a **final walkthrough** will be done by FCE and SIDG to identify any final items that need to be completed before work is accepted by SIDG. A **punch list** will be prepared and sent to the Applicant listing items required, as applicable.
- Recording of easement(s) through the Utah County Recorder's Office should be completed (if not already done so) once construction is complete. If construction changes

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altered where SIDG facilities were installed and the easement was already recorded, an updated easement document will need to be recorded prior to acceptance by SIDG.

- When all these items are complete, SIDG will send a **letter of acceptance** to the Applicant and Springville City stating the irrigation company facilities are complete.

Enclosed in this packet are:

- Large Subdivisions and General Encroachment Application
- Small Subdivisions Application
- Development Design Checklist (to assist the Applicant's engineer in designing plans to SIDG standards)
- Bond Letter Example
- Encroachment Agreement Example

SPRINGVILLE AREA IRRIGATION AND DRAINAGE GROUP

LARGE SUBDIVISIONS AND GENERAL ENCROACHMENT

Application for Agreement to Encroach and Construct within
Springville Area Irrigation and Drainage Group (SIDG) Right-of-Way or Easement
(for developments greater than 2.5 acres)

1. Applicant for Encroachment Agreement (Applicant): _____

Mailing Address: _____
Contact Person: _____
Telephone Number: _____
Email: _____

2. Contact Person (if different than #1): _____
Mailing Address: _____
Telephone Number: _____
Email: _____

3. Engineering Company: _____
Mailing Address: _____
Telephone Number: _____
Contact Person: _____
Email: _____

4. Brief Description of Proposed Construction (include location and subdivision name, if applicable): _____

5. Attach two (2) 11x17 copies of plans/design drawings for the proposed construction. Also, email a digital plan set to Todd Adams. Plans shall be drawn to SIDG standards. A Design Checklist has been prepared to assist engineers in designing to SIDG standards.

6. Attach a check for \$12,000 for the application and review fee. The application fee will be used by SIDG for purposes of administration, coordination, engineer review, preparation of agreements, construction review, legal guidance, and any other expenses it incurs related to this application. If fees incurred by SIDG are greater than the application fee, the Applicant will be responsible to reimburse SIDG for the remainder of the expenses.

Please make all checks payable to: **Springville Irrigation Company.**

7. Send application, plans, and application fee by mail or email to:
Franson Civil Engineers
Attn: Todd Adams
1276 South 820 East, Suite 100
American Fork, UT 84003
Telephone: (801) 756-0309
Email: tadams@fransoncivil.com

8. The following persons are available for consultation:

Marlin Boyer	(801) 361-8075	SIDG Coordinator
Albert Harmer	(801) 310-2344	SIDG Coordinator
Todd Adams	(801) 756-0309	Franson Civil Engineers

NOTES:

1. The SIDG bonding requirements are as follows: Bonding will equal the total cost of irrigation and drainage facilities. Eighty percent of the bond will be released upon completion of construction, approval by SIDG, and successful delivery of water through the system for a full irrigation season. Twenty percent of the bond will be released two years after the project has been accepted and approved by SIDG, pending no problems with the facilities. All bond releases are subject to approval by SIDG.
2. Easements for SIDG must be recorded with the Utah County Recorder. The recorded document, or a signed statement stating the easement will be recorded, must be provided to FCE prior to the encroachment agreement being released for signatures.
3. Starting construction without prior written approval in the form of an encroachment agreement from SIDG may result in an additional fee assessment of \$5,000. This fee may be taken from the bond if the Applicant does not pay within 30 days upon receipt of a written invoice.
4. If review costs exceed the fees paid with this application, additional costs will be the responsibility of the Applicant. Additional costs may be taken from the bond if the Applicant does not pay within 30 days upon receipt of a written invoice.
5. The review process will not begin until the application fee is paid.
6. This application is valid for six months from the date it is submitted. The encroachment agreement must be signed within this six month period. Once the encroachment agreement is signed, the Applicant has one year to complete work on irrigation and drainage facilities.
7. This application cannot be sold to other parties. If the Applicant chooses to sell the property associated with this application, the application is voided and the new owner is required to begin the application process again.

I have read, understood, and agree to the terms of this application.

Signature of Applicant

Printed

Date

SPRINGVILLE AREA IRRIGATION AND DRAINAGE GROUP

SMALL SUBDIVISIONS

Application for Agreement to Encroach and Construct within
Springville Area Irrigation and Drainage Group (SIDG) Right-of-Way or Easement
(for developments 2.49 acres or smaller)

1. Applicant for Encroachment Agreement (Applicant): _____

Mailing Address: _____
Contact Person: _____
Telephone Number: _____
Email: _____

2. Contact Person (if different than #1): _____
Mailing Address: _____
Telephone Number: _____
Email: _____

3. Engineering Company: _____
Mailing Address: _____
Telephone Number: _____
Contact Person: _____
Email: _____

4. Brief Description of Proposed Construction (include location and subdivision name, if applicable): _____

5. Attach two (2) 11x17 copies of plans/design drawings for the proposed construction. Also, email a digital plan set to Todd Adams. Plans shall be drawn to SIDG standards. A Design Checklist has been prepared to assist engineers in designing to SIDG standards.

6. Attach a check for \$5,000 for the application and review fee. The application fee will be used by SIDG for purposes of administration, coordination, engineer review, preparation of agreements, construction review, legal guidance, and any other expenses it incurs related to this application. If fees incurred by SIDG are greater than the application fee, the Applicant will be responsible to reimburse SIDG for the remainder of the expenses.

Please make all checks payable to: **Springville Irrigation Company.**

7. Send application, plans, and application fee by mail or email to:

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1. The SIDG bonding requirements are as follows: Bonding will equal the total cost of irrigation and drainage facilities. Eighty percent of the bond will be released upon completion of construction, approval by SIDG, and successful delivery of water through the system for a full irrigation season. Twenty percent of the bond will be released two years after the project has been accepted and approved by SIDG, pending no problems with the facilities. All bond releases are subject to approval by SIDG.
2. Easements for SIDG must be recorded with the Utah County Recorder. The recorded document, or a signed statement stating the easement will be recorded, must be provided to FCE prior to the encroachment agreement being released for signatures.
3. Starting construction without prior written approval in the form of an encroachment agreement from SIDG may result in an additional fee assessment of \$5,000. This fee may be taken from the bond if the Applicant does not pay within 30 days upon receipt of a written invoice.
4. If review costs exceed the fees paid with this application, additional costs will be the responsibility of the Applicant. Additional costs may be taken from the bond if the Applicant does not pay within 30 days upon receipt of a written invoice.
5. The review process will not begin until the application fee is paid.
6. This application is valid for six months from the date it is submitted. The encroachment agreement must be signed within this six month period. Once the encroachment agreement is signed, the Applicant has one year to complete work on irrigation and drainage facilities.
7. This application cannot be sold to other parties. If the Applicant chooses to sell the property associated with this application, the application is voided and the new owner is required to begin the application process again.

I have read, understood, and agree to the terms of this application.

Signature of Applicant

Printed

Date

Project: _____

Engineer: _____

Date: _____

DEVELOPMENT DESIGN CHECKLIST

This checklist is intended to assist engineers in designing projects to Springville Irrigation and Drainage Group (SIDG) standards. All projects seeking acceptance by SIDG 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 SIDG nor Franson Civil Engineers (FCE) will have responsibility for design or construction of Applicant's facilities. It is the responsibility of the Applicant and their engineer to design the project to SIDG standards. No approval or acquiescence by SIDG or FCE will operate as a waiver or modification of SIDG standards.

SIDG Standard Drawings (Standard Drawings) are available for reference and are to be used as design examples. Standard Drawings, being design examples, do not represent an actual site specific design and are not to be directly included in the drawings. Final development drawings must be designed and prepared by a licensed Professional Engineer.

The Applicant will install the facilities that are constructed through the application process with no interruption of SIDG operations.

Note: This checklist is updated when standards are amended. Checking for the latest version of this checklist at www.fransonicivil.com/SIDG will ensure the most up-to-date information. SIDG reserves the right to make exceptions to the standards or impose other requirements, depending on the Applicant's project.

GENERAL

- Appropriate application must be filled out and all application fees submitted.
- All drawings must be stamped, signed, and dated by a licensed Professional Engineer, which can be completed after all drawing reviews by SIDG and FCE.
- Show all existing irrigation ditches and drain lines affected by development, including storm drain discharge locations. The exact location of drain lines is not always known. Potholing is required to locate the drains before the design is started.
- If any SIDG facilities are located during construction that are not identified on the drawings, Applicant shall work with SIDG through drawing reviews and then shall perform what work is required to cause the SIDG facilities to remain functional for use by SIDG. All work shall be to SIDG standards. All costs are the responsibility of the Applicant.
- Show new location of all ditches and drain lines. All open channel ditches must be piped.
- All storm drainage must route through an orifice and oil/water separator before entering SIDG facilities.
- Submit Plat Map; all SIDG facilities must have recorded easements (see Easements section).

- Before submitting drawings to FCE, verify all notes, references, labels, and streets are clearly labeled.
- Bonding is required on all SIDG facility improvements. After drawings have been deemed acceptable by FCE, please submit a detailed cost estimate of construction (materials and labor) of SIDG facilities. Once this has been checked, the bond amount will be set.

ADD THE FOLLOWING NOTES TO DRAWINGS UNDER HEADING “SPRINGVILLE IRRIGATION & DRAINAGE GROUP NOTES”

- Contractor must notify Franson Civil Engineers at least 24 hours before construction on Springville Irrigation and Drainage Group facilities. Call Todd Adams with Franson Civil Engineers at 801-756-0309. Failure to do so may result in a \$5,000 fine.
- Springville Irrigation and Drainage Group contact during construction: Tom Stetser, Water Master, 801-427-2240.
- All construction must be done to Springville Irrigation and Drainage Group Standards.
- Contractor must document all new pipes by video camera after installation and backfill. Any problems with joints, levels, slopes, etc. discovered by the video technicians must be repaired. A digital copy of the video must be submitted to Todd Adams of Franson Civil Engineers.
- Prior to backfilling of pipes, the contractor must notify Todd Adams of Franson Civil Engineers so a GPS survey of the location and elevation of the installed pipelines can be performed.
- Fences disturbed during construction activities must be replaced and returned to pre-construction conditions, or better.
- All backfill materials shall be compacted to a minimum of 95% standard Proctor density.
- 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.

PIPES

- All existing and new pipes on all drawings must be specifically labeled for pipe type and size (i.e. 24-inch RCP). Any pipe replacing a ditch shall have a minimum inside diameter of 18 inches.
- SIDG requires all new pipes to be RCP, except as noted in the following bullet item.
- Pipe placed in planting strips or areas where plants, other than grass, will be placed in the easement must be fused HDPE pipe. Specify inside diameter, pressure rating, etc. A DR Rating of 32.5 is required for all HDPE pipe. HDPE shall be specified using the inside diameter.
- All pipe sizes must be designed to carry sufficient flow for irrigation and 25-year storm water events according to Springville City’s Storm Water Master Plan. Also, an additional 20% capacity must be available in the pipe for future expansion and storm drain capacities. Coordinate with FCE for flow requirements before beginning design of irrigation facilities.
- Plan and profile view of each pipe is required.

- Trench detail is required showing bedding detail. SIDG standards require bedding 6 inches below pipe up to the springline, using a minimum of 1-inch clean crushed rock unless specified otherwise by the manufacturer.
- Metallic warning tape (labeled, “Caution: Buried Irrigation Line Below”) must be installed a minimum of 1 foot above the pipe. In some circumstances, a locating wire may be required.
- All new pipes must be documented by video camera after installation and backfill. Any problems with joints, levels, slopes, etc. discovered by the video technicians must be repaired. A digital copy of the video is to be submitted to FCE.
- Pipes or other utilities running parallel to the irrigation pipe in a shared easement shall be placed a minimum of 5 feet horizontally distanced from the irrigation pipe.
- Pipes crossing perpendicularly over or under the irrigation pipe shall have a minimum 1-foot vertical clearance.
- Before backfilling the pipes, the contractor must notify Todd Adams of Franson Civil Engineers so a GPS survey of the location and elevation of the installed pipelines can be performed.

Irrigation/Cleanout Boxes

- Detail drawings are required for irrigation boxes.
- Irrigation cleanout boxes are required a minimum of every 500 feet, at all alignment changes, on each side of a road crossing, and where two pipes of a different type come together.
- All boxes must be labeled showing inside and outside dimensions. Boxes shall be a minimum of 3 feet by 3 feet inside.
- Boxes must show all pipes entering and exiting. There shall be a minimum of 6 inches on each side of the pipe to the edge of the box. Boxes must be labeled to show distance between pipe and bottom of box (minimum 6 inches).
- Boxes must show all gates with gate detail or specifics as to gate type, size, flow direction, etc. Waterman C-10 canal gates are required.
- Lid/grate detail required:
 - Solid lids marked “IRRIGATION” are required when debris and soil can enter.
 - Grates should be used on diversion boxes with gates and where debris will not enter.
- An overflow box is required on irrigation lines that carry storm water to allow high storm flows to bypass the gates.
- Notes to add to plans under header, “Springville Irrigation & Drainage Notes”
 - Knock out boxes are not allowed. All boxes shall be pre-cast with cored openings for the pipes or shall be cast-in-place.
 - Pipes entering boxes should be concreted on the outside and grouted on the inside.
 - Irrigation boxes shall not be buried. They shall extend to the surface of the final grade. Any existing boxes that will not extend to the final grade surface shall be extended to match the final grade.

Inlet and Outlet Structures

- Flared end sections are required (pre-fabricated or cast-in-place) where a pipe will connect to a soil-lined ditch. Where a pipe will connect to a concrete-lined ditch, cast-in-place concrete shall be used and formed as a gradual transition from the pipe to the ditch. SIDG standard is a concrete flared end section.
- On small turnouts that enter an open ditch for a single field, a flared end is not required. Instead, a 6-foot-long pipe shall be connected to the pipe, and native soil material can be used as a transition from the pipe to the ditch.
- Trash racks are needed for all inlets from open ditches showing:
 - Spacing details: 4-inch spacing for most inlets, 8-inch spacing for pipes over 36 inches in size
 - Slope 2:1 (H:V) or flatter
 - Mounting details
- If transitioning to or from a soil-lined ditch, the detail should show riprap appropriately designed to protect the structure:
 - Riprap sized for velocities, and
 - Appropriate length and location for riprap.

DRAIN LINES (Underground Land Drains)

- All existing drain lines shall be potholed at the development boundaries and shown on the plans. Label each location where the drain lines were potholed. Also, show the approximate location of existing drain lines by viewing the SIDG map. A map in the area of your subdivision can be requested from FCE.
- All existing land drains on the developed property, and under roads to be improved around the property, are required to be improved to current standards. Show proposed drain line locations. The new drain line shall connect with the existing drain line on adjacent properties.
- Pipe size should match the existing size of the underground land drain lines, but shall have a minimum diameter of 8 inches.
- Pipe should be ADS N-12 with manufactured perforations.
- A trench detail of the proposed land drain is required.
- The soil is predominantly clay in the area. Backfill the perforated pipe with at least 1 foot of 1-inch crushed clean gravel around the pipe.
- A geotextile fabric of Mirifi 140 N series or equivalent should be wrapped around the 1-inch crushed clean gravel. Any equivalent geotextile fabric must be approved by the SIDG engineer prior to approval of the drawings.
- In areas with high clay content in the soil, SIDG will perform a test on the proposed fabric. If clay plugs the fabric, it will only be required on the top of the gravel.

- Metallic warning tape (labeled, “Caution: Buried Irrigation Line Below”) must be installed a minimum of 1 foot above the pipe. In some circumstances, a locating wire may be required.
- Manhole lids must be marked as “DRAIN” only. Sewer, Water, Storm Drain etc. is not acceptable.
- Drain line cleanout boxes are required every 500 feet, minimum, and at all alignment changes. Boxes are also required on each side of road crossings.
- An easement for all drain lines must be recorded (see Easements section).
- Notes to add to plans under header, “Springville Irrigation & Drainage Notes”
 - Clay cutoffs are required every 250 feet on sewer and other lines that are deeper than drain lines to prevent water from following the pipe trench. Clay cutoffs must be 2 feet long, keyed into the trench walls 1 foot, surrounding the pipe, and as high as the drain lines.
 - Pipes or other utilities running parallel to the drain lines in a shared easement shall be placed a minimum of 5 feet horizontally distanced from the drain lines.
 - Pipes crossing perpendicularly over or under the drain lines shall have a minimum 1-foot vertical clearance.

EASEMENTS

- Easements are required to be recorded with the Utah County Recorder for all SIDG facilities:
 - Plat Maps are best to have these easements recorded.
 - If the plat has already been recorded, the owner can grant the easement with a legal description and have this recorded.
 - Proof of the record must be submitted to FCE.
- Easements are 20 feet wide minimum, centered over the pipe. Any changes in the easement width will need to be reviewed by SIDG. Ditch easements should be in the name of the specific irrigation company. Drain line easements should be in the name of the Springville Drainage District.
- If Applicant does not provide proper easements in a timely manner, SIDG may use the bond for any costs associated with procuring the easements necessary for their facilities.
- Note to be added to the Plat Map: “No trees, shrubs, telephone boxes, or power boxes are allowed in Irrigation Company or Springville Drainage District easements.”

STORM WATER AND DETENTION BASIN

- Detention basins must be above the top of the discharge irrigation pipe to prevent backflow into the detention basin. Show elevations of the detention basin.
- All storm drainage must route through an orifice and oil/water separator before entering SIDG facilities.

- Orifice plate must be galvanized steel or aluminum and sized correctly. The acceptable flow rate into SIDG facilities is 0.15 cfs per acre of land. State the acreage of the development.
- Trash rack or grate is required on outlet of pond.

BOX AND PIPE CULVERTS – For road crossings of Dry Creek and large canals

- If extending an existing box culvert, SIDG 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 system, 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 SIDG easement.
- Show the elevation and location of the top of the banks, bottom of the banks, and the channel prism, as well as new structures including box culvert and wing walls.
- 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 45-degree angle then a 90-degree angle into the channel banks, a minimum of 2 feet perpendicular to the channel 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 channel.
- Wing walls shall be tied into the channel banks in a manner that provides a smooth transition from the channel into the culvert, and back out of the culvert on the outlet side.
- If using a pre-cast wing wall/end section, the wing walls, apron, and cutoff wall must be one piece.
- If cast-in-place concrete is placed next to pre-cast concrete, Waterstop RX or an approved equivalent shall be placed to prevent seepage between the surfaces.
- 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 2 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 channel. The Applicant is responsible for verifying maximum flows and designing appropriately. The culvert cannot cause water to backup further upstream. Neither SIDG nor FCE has flow

data available. The typical minimum culvert size is 6 feet tall. However, site conditions may determine that this dimension be altered.

- Detail should show riprap, appropriately designed to protect the banks and structure:
 - Riprap sized for velocities.
 - Appropriate length and location for riprap. Riprap not generally required on inlet.
 - Riprap shall be placed up to the high water mark in the channel.
 - Top of riprap to be level with top of concrete apron.
- 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 head walls and in an open canal channel 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 approval by SIDG and FCE.
- Access to the 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.
- Casing pipes shall be continuous under the box culvert and shall be either fused HDPE or welded steel, depending on the site and soil conditions.
- In locations where steel casing pipe is used, soil tests for resistivity shall be done and submitted to FCE. 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 2 feet between the top of the casing and the bottom of the box culvert.
- Casings shall extend outside the channel easement.
- The carrier pipe must have adequate steel-banded skids.
- 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.
- Identify existing conduits and utilities under the channel.
- Identify each new conduit being placed under the channel.
 - If the conduit owner/occupier is known, label as such.

- If the conduit is to remain empty, label as such.
- Notes to add to plans under header, “Springville Irrigation & Drainage Group Notes”
 - Channel 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 to meet manufacturer requirements or a minimum of 92% modified Proctor density.
 - Channel embankment shall be shaped to match the existing channel prism.
 - Compaction test results must be submitted to Franson Civil Engineers. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
 - Open-cut trenches shall be cut at a minimum of 2-horizontal to 1-vertical so that backfill can be properly compacted.
 - Trench plugs are to be placed at each end of casings.
 - 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.
 - PVC water stop, or equivalent, is required in all joints of cast-in-place concrete.
 - 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 the Springville Irrigation and Drainage Group.
 - Signs must be placed at each entrance to the operation and maintenance road that state:
 - No Trespassing. Warning: Channel Maintenance Road, Authorized Personnel Only. No Swimming or Tubing.

BORING – For pipe crossings of Dry Creek and large canals

- All facilities (utilities, pipes, etc.) installed under the canal (even under box culverts) must be encased in a welded steel, fused HDPE solid wall, or fused PVC casing. Minimum casing thickness can be found on the standard drawings. 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 FCE. 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 2 feet between the top of the casing and the bottom of the box culvert or concrete-lined canal, and 4 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.
- Bore pits must be located outside the canal corridor.
- The carrier pipe must have adequate steel-banded skids.
- Waterline pipes inside the casings shall have restraining joints.
- Adequate thrust blocks are required on all bends for DIP, PVC or PIP waterlines.
- Notes to add to plans under header "Springville Irrigation & Drainage Group Notes"
 - Contractor to notify Todd Adams of Franson Civil Engineers when trench plugs are installed. Verification of trench plug completion must be performed by Franson Civil Engineers before backfilling. Todd can be reached at 801-756-0309.
 - 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.
 - Compaction test results must be submitted to Franson Civil Engineers. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.