

## Section 8 Technical Reports

### 8.d Traffic Impact Study

This section addresses *Larimer County Procedural Guide for 1041 Permits*, Item 8.d, and the criteria and standards described in LUC Sections 8.1, 14.10.D.6, 14.10.D.8, 14.10.D.9, and 14.10.D.11.

#### General Transportation Information

The TWP corridor ranges from 500-feet to ¼-mile wide to accommodate the water pipeline and appurtenances. The final water pipeline alignment will be developed during final design. Typically a 50-foot permanent easement for the water pipeline and a 40-foot temporary construction easement will be purchased from property owners. The TWP corridor width varies to allow for flexibility when developing the final water pipeline alignment and location of appurtenances as described in Section 2: Project Description.

Where the corridor parallels Douglas Road and County Road 56, the water pipeline is proposed to be located in the Larimer County ROW where feasible and as approved by Larimer County. However, in the event that the location of the water pipeline cannot be accommodated in Douglas Road or County Road 56 ROW, easements will be purchased from property owners to locate the water pipeline on private property.

Thornton understands that, if the TWP is located parallel to and within the Larimer County ROW other than as specifically approved in a 1041 permit, then use of that ROW will require Larimer County approval. Other Larimer County municipalities have variously indicated preferences both for the TWP to be located inside and outside of ROW within their municipal boundaries. Thornton will coordinate with these municipalities and Larimer County as appropriate.

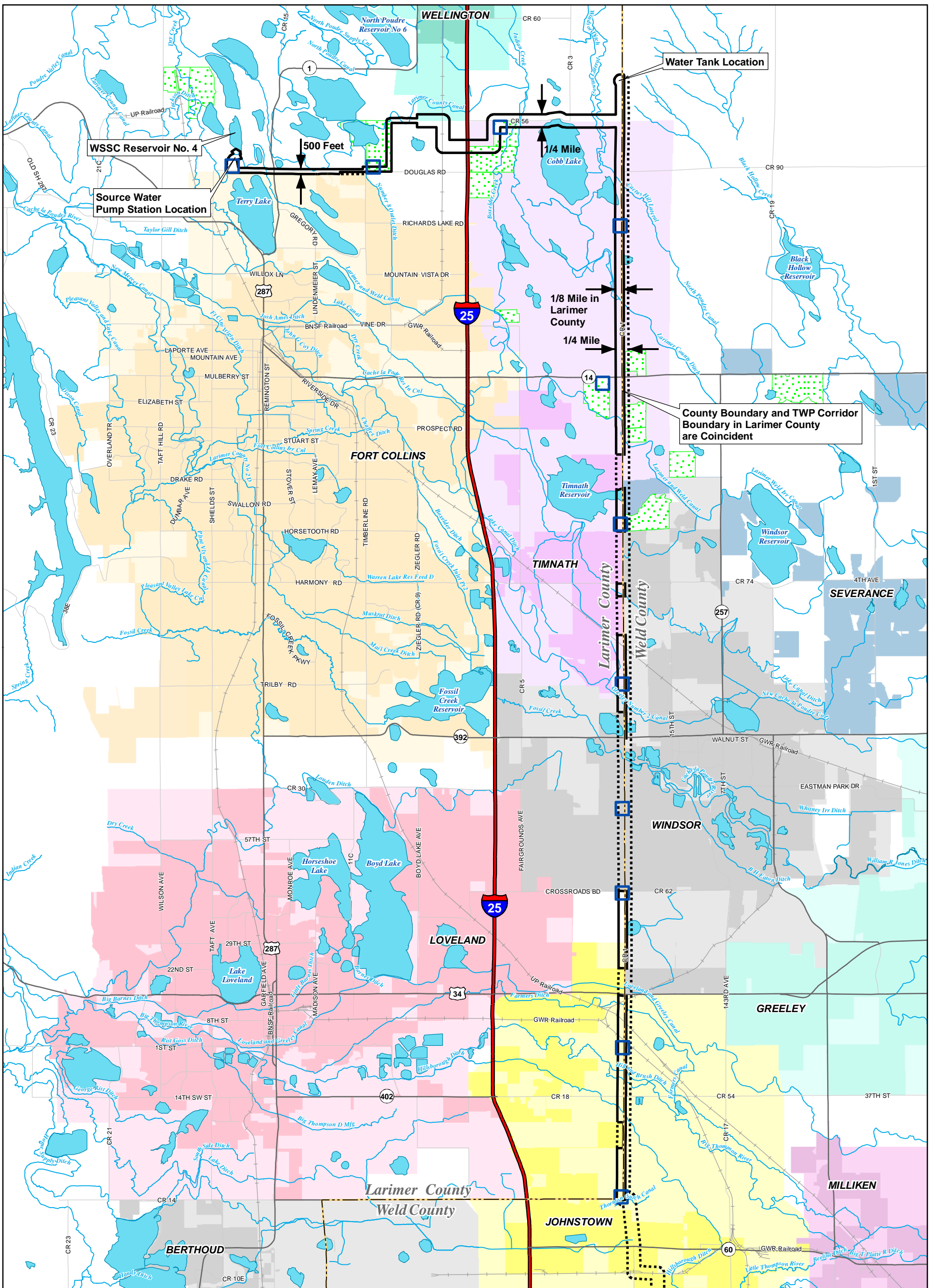
The TWP corridor, shown in **Figure 8.d-1**, includes a section that generally runs in an east/west direction and a section that generally runs in a north/south direction.


The east/west section of the TWP corridor is approximately 10 miles long, extending east in unincorporated Larimer County north of Fort Collins from WSSC Reservoir No. 4, then across Interstate 25 to Larimer County Road 1. The TWP corridor is approximately 500-foot wide along Douglas Road to County Road 9. The TWP corridor is ¼-mile wide east of County Road 9 and generally follows roads and property lines.

The section of the TWP corridor that generally runs north/south in unincorporated Larimer County is ½-mile wide and approximately 16 miles long. Portions of the TWP corridor include approximately 10 miles are in incorporated areas of Fort Collins, Johnstown, Timnath, or Windsor, including roads that have been annexed by local governments and 6 miles are in unincorporated Larimer County. The TWP corridor follows County Road 1 from just south of County Road 58 to County Road 14. County Road 1 is the Larimer County/Weld County line and the full ¼-mile wide TWP corridor is centered on the County line, encroaching ½-mile into each county. The TWP corridor continues south of County Road 14 into Weld County and then into Adams County where it terminates at the Thornton water treatment plants.

The TWP corridor within Larimer County crosses the municipal boundaries of Fort Collins, Johnstown, Timnath, and Windsor, and the established Growth Management Areas (GMA) of Fort Collins, Johnstown, Timnath, Wellington, and Windsor.

# Thornton Water Project






**CITY OF THORNTON  
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12450 WASHINGTON ST  
THORNTON, CO 80241-2405

12/29/2017



1 inch = 1.8 miles

0 0.9 1.8 Miles

<ul style="list-style-type: none"> <li><span style="border: 1px solid black; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> TWP Corridor in Unincorporated Larimer County</li> <li><span style="border: 1px dashed black; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> TWP Corridor outside Unincorporated Larimer County</li> <li><span style="border-bottom: 1px solid black; width: 15px; margin-right: 5px;"></span> Railroad</li> <li><span style="border: 1px solid black; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Thornton Farm</li> <li><span style="border-bottom: 1px solid black; width: 15px; margin-right: 5px;"></span> County Boundary</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightblue; margin-right: 5px;"></span> Lake/Reservoir</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightblue; border: 1px solid black; margin-right: 5px;"></span> River/Stream/Canal/Ditch</li> <li><span style="border: 1px solid black; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Potential Staging Area</li> </ul>	<p><b>Boundaries Crossed by the Proposed Corridor</b></p> <p><b>Corporate Boundary</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #f9cb9c; margin-right: 5px;"></span> Fort Collins</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #ffffcc; margin-right: 5px;"></span> Johnstown</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #fce4d6; margin-right: 5px;"></span> Loveland</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #f4cccc; margin-right: 5px;"></span> Timnath</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #cfe2f3; margin-right: 5px;"></span> Wellington</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #d9ead3; margin-right: 5px;"></span> Windsor</li> </ul> <p><b>GMA Boundary</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #f9cb9c; margin-right: 5px;"></span> Fort Collins</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #ffffcc; margin-right: 5px;"></span> Johnstown</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #fce4d6; margin-right: 5px;"></span> Loveland</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #f4cccc; margin-right: 5px;"></span> Timnath</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #cfe2f3; margin-right: 5px;"></span> Wellington</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #d9ead3; margin-right: 5px;"></span> Windsor</li> </ul>
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**Figure 8.d-1  
TWP Corridor Map**

Sources: NHD, USGS, CDWR, Larimer and Weld Counties, CDOT, City of Thornton

**Table 8.d-1** presents the multiple roads within the TWP corridor and the ADT of those roads. The basis for the ADT data was developed using the Traffic Section ADT asset layer from the *Larimer County Road Information Maps, 2014-2016* and Colorado Department of Transportation Online Transportation Information System as applicable.

**TABLE 8.d-1**  
Roadway Classifications and ADT

Roadway	Limits	Classification	ADT	Impact
Starlite Drive	WSSC Reservoir No. 4 to Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, owned by public/general, gravel)	Not applicable	Is parallel to TWP corridor
State Highway 1	At Douglas Road	Minor Arterial/State Highway (Not maintained by Larimer County, not a mainline road, not a regional road, owned by Colorado Department of Transportation (CDOT))	5,600	Intersects TWP corridor
Eagle Lakes	At Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, owned by private)	Not Applicable	Intersects TWP corridor
County Road 13	At Douglas Road	Minor Collector (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	230-275	Intersects TWP corridor
Bay Shore Road	At Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, owned by public/general, paved)	Not Applicable	Intersects TWP corridor
Turnberry Road	At Douglas Road	Minor Collector (Road system: secondary, mainline road, not a regional road, owned by Larimer County, gravel)	100	Intersects TWP corridor
Swan Lake	At Douglas Road	Local (Road system: secondary, not a mainline road, not a regional road, owned by Larimer County, paved)	Not Applicable	Intersects TWP corridor
Point Drive	At Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, owned by private)	Not Applicable	Intersects TWP corridor
Harbor Way	At Douglas Road	Local (Road system: non-chargeable, not a mainline road, not a regional road, owned by public/general, paved)	Not Applicable	Intersects TWP corridor
Terry Ridge Road	At Douglas Road	Local (Road system: not a mainline road, not a regional road, owned by Larimer County, paved)	Not Applicable	Intersects TWP corridor
Woodridge Road	At Douglas Road	Local (Road system: not a mainline road, not a regional road, owned by Larimer County, paved)	Not Applicable	Intersects TWP corridor

**TABLE 8.d-1**  
Roadway Classifications and ADT

Roadway	Limits	Classification	ADT	Impact
La Mesa Drive	At Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, owned by private)	Not Applicable	Intersects TWP corridor
S Bar G Lane	At Douglas Road	Not Applicable (Road system: not maintained by County, not a mainline road, not a regional road, owned by unknown)	Not Applicable	Intersects TWP corridor
Clyde Street	At Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, owned by general/public, bladed)	Not Applicable	Intersects TWP corridor
Highland Drive	At Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, general/public, bladed)	Not Applicable	Intersects TWP corridor
Kenyon Drive	At Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, general/public, bladed)	Not Applicable	Intersects TWP corridor
Trouble Trail	At Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, private)	Not Applicable	Intersects TWP corridor
Juanita Road	At Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, general/public, bladed)	Not Applicable	Intersects TWP corridor
Twilight Lane	At Douglas Road	Not Applicable (Road system: non-chargeable, not a mainline road, not a regional road, private)	Not Applicable	Intersects TWP corridor
Douglas Road	North Shields Street (County Road 17 to Turnberry Road)	Minor Arterial (Road system: primary, mainline road, not a regional road, owned by Larimer County)	2,500-3,600	Is parallel to TWP corridor
County Road 54	At County Road 1	Local (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	40	Intersects TWP corridor
County Road 56	County Road 11 to County Road 3	Minor Collector (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	45-300	Is parallel to TWP corridor
County Road 56	Interstate 25 East Frontage Road to County Road 1	Major Collector (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	75-300	Is parallel to TWP corridor
Giddings Road (County Road 9)	At County Road 56	Major Collector (Road system: primary, mainline road, not a regional road, owned by Larimer County)	2,100-2,300	Intersects TWP corridor

**TABLE 8.d-1**  
Roadway Classifications and ADT

Roadway	Limits	Classification	ADT	Impact
Interstate 25	County Road 56 to County Road 54	Major Arterial/Interstate Highway (Not maintained by Larimer County, not a mainline road, not a regional road, owned by CDOT)	31,000	Intersects TWP corridor
County Road 3	At County Road 56	Major Collector (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	120	Intersects TWP corridor
County Road 1	County Road 58 to State Highway 14 (Larimer/Weld County line)	Major Collector (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	60-375	Is parallel to TWP corridor
County Road 1	State Highway 14 to East County Road 14 (Larimer/Weld County line)	Minor Arterial (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	325-2,100	Is parallel to TWP corridor
County Road 52	At County Road 1	Major Collector (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	275	Intersects TWP corridor
County Road 48	At County Road 1	Major Collector (Road system: primary, mainline road, not a regional road, owned by Larimer County)	1,600	Intersects TWP corridor
State Highway 14 (Mulberry Street)	At County Road 1	Major Arterial (Not maintained by Larimer County, not a mainline road, not a regional road, owned by CDOT)	10,000	Intersects TWP corridor
Prospect Road	At County Road 1	Major Collector (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	1,200	Intersects TWP corridor
County Road 40	At County Road 1	Local (Road system: secondary, mainline road, not a regional road, owned by Timnath)	Not applicable	Intersects TWP corridor
Harmony Road	At County Road 1	Minor Arterial (Road system: primary, mainline road, not a regional road, owned by Timnath)	13,000	Intersects TWP corridor
County Road 36	At County Road 1	Local (Road system: secondary, mainline road, not a regional road, owned by Timnath)	Not applicable	Intersects TWP corridor
County Road 32E	At County Road 1	Major Collector (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	2,900	Intersects TWP corridor

**TABLE 8.d-1**  
Roadway Classifications and ADT

Roadway	Limits	Classification	ADT	Impact
State Highway 392	At County Road 1	Minor Arterial (Not maintained by County, not a mainline road, not a regional road, owned by CDOT)	19,000	Intersects TWP corridor
Crossroads Boulevard	At County Road 1	Minor Arterial (Road system: secondary, mainline road, regional road, owned by Larimer County)	9,500	Intersects TWP corridor
US 34	At County Road 1	Major Arterial (Not maintained by Larimer County, not a mainline road, not a regional road, owned by CDOT)	45,000-46,000	Intersects TWP corridor
County Road 20C	At County Road 1	Local (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	110	Intersects TWP corridor
County Road 18/ State Highway 402	At County Road 1	Minor Arterial (Road system: primary, mainline road, regional road, owned by Larimer County)	3,500	Intersects TWP corridor
County Road 16 (Chapman Road)	At County Road 1	Major Collector (Road system: secondary, mainline road, not a regional road, owned by Johnstown)	450	Intersects TWP corridor
County Road 14/ Weld County Road 50	At County Road 1	Minor Collector (Road system: secondary, mainline road, not a regional road, owned by Larimer County)	Not applicable	Intersects TWP corridor

Multiple locations within the TWP corridor require railroad crossings. Railroad crossings will be coordinated with the applicable railroad operator and required license agreements will be obtained from the appropriate railroad company. **Table 8.d-2** presents a description of the railroads within the TWP corridor; **Figure 8.d-2** shows the locations of the railroads.

**TABLE 8.d-2**  
Railroads within TWP Corridor

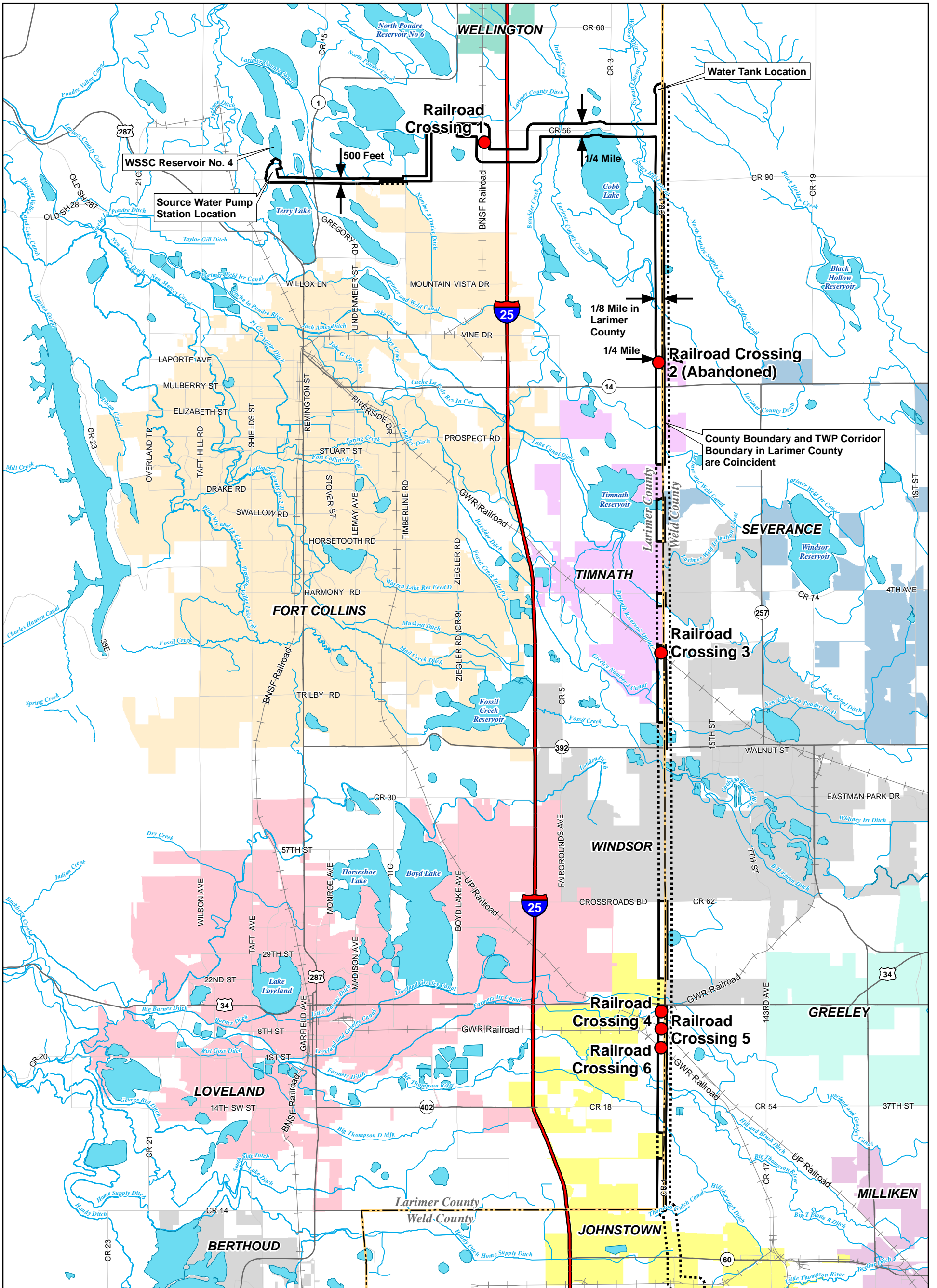
Crossing No.	Location	Class	Operator
1	West of Interstate 25 between County Road 56 and Douglas Road	Class 1	BNSF Railway
2	Is parallel to/crosses County Road 1 north and south of State Highway 14	Abandoned	This railway is abandoned and it is unclear whether remnants of track remain.
3	Crosses County Road 1 between Twin Bridge Drive and County Road 32E	Class 3	Great Western Railway
4	Crosses County Road 1 just south of US 34	Class 3	Great Western Railway

**TABLE 8.d-2**  
Railroads within TWP Corridor

<b>Crossing No.</b>	<b>Location</b>	<b>Class</b>	<b>Operator</b>
5	Crosses County Road 1 approximately 2,500 feet south of Crossing 4	Class 1	Union Pacific Railroad
6	Crosses County Road 1 approximately 2,000 feet south of Crossing 5	Class 3	Great Western Railway



# Thornton Water Project



Water Tank Location

Railroad Crossing 1

WSSC Reservoir No. 4

Source Water Pump Station Location

500 Feet

1/4 Mile

1/8 Mile in Larimer County

1/4 Mile

Railroad Crossing 2 (Abandoned)

County Boundary and TWP Corridor Boundary in Larimer County are Coincident

FORT COLLINS

Railroad Crossing 3

Railroad Crossing 4

Railroad Crossing 5

Railroad Crossing 6

GREELEY

LOVELAND

JOHNSTOWN

MILLIKEN



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12450 WASHINGTON ST  
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12/29/2017



1 in = 1.8 miles  
0 0.9 1.8 Miles

- TWP Corridor in Unincorporated Larimer County
- TWP Corridor outside Unincorporated Larimer County
- County Boundary
- Railroad
- Lake/Reservoir
- River/Stream/Canal/Ditch
- Railroad Crossing

**Figure 8.d-2  
Railroad Crossings**

Sources: NHD, USGS, CDWR, Larimer and Weld Counties, CDOT



## **Larimer County Transportation Master Plan**

The TWP was reviewed in conjunction with the area goals and transportation improvement plans outlined in the *Larimer County Transportation Master Plan*, adopted in July 2017. The *Larimer County Transportation Master Plan* identifies multiple road improvement projects within the area along the TWP corridor. Thornton will coordinate design efforts with Larimer County improvement projects to minimize conflicts with future plans. If Larimer County's improvement projects occur within the timeframe of the construction of the TWP, Thornton will work with Larimer County and other involved parties to coordinate construction and minimize disruption. The *Larimer County Transportation Master Plan* includes planned improvements for Douglas Road within the TWP corridor. To the extent feasible, Thornton will coordinate TWP construction activities with Larimer County's planned improvements for Douglas Road.

Short-range transportation improvement projects identified in the *Larimer County Transportation Master Plan* that overlap the TWP corridor include the following:

- Pave County Road 1 from County Road 14 to Surface Change South of County Road 18
- Pave County Road 1 from County Road 32E to County Road 36

Long-range transportation improvement projects that overlap the TWP corridor as described in the *Larimer County Transportation Master Plan* include the following:

- Widen to 3 lanes County Road 1 from County Road 14 to US 34
- Widen to 3 lanes County Road 1 from End Johnstown CL to Crossroads Boulevard
- Reconstruct County Road 1 from State Highway 392 to County Road 32E
- Widen to 3 lanes County Road 1 from 32E to County Road 36
- Pave County Road 1 from End Timnath CL to Prospect Road
- Pave County Road 1 from State Highway 14 to County Road 62
- Pave County Road 3 from County Road 56 to County Road 58
- Pave County Road 13 from County Road 52H to Douglas Road
- Widen to 3 lanes County Road 18 from County Road 3 to County Road 1
- Pave County Road 52 from County Road 3 to County Road 1
- Reconstruct Douglas Road (County Road 54) from County Road 17 to State Highway 1
- Reconstruct intersection Douglas Road and State Highway 1 (CDOT Region 4 Priority Ranking 21)
- Pave County Road 56 from I-25 East Frontage Road to Surface Change
- Pave County Road 56 Surface Change to County Road 1

## **Other Considerations**

Traffic impacts due to construction and post-construction operation of the water pipeline and appurtenances have been considered. Thornton places a high priority on safety during construction. TWP contractors will implement traffic management plans based upon local traffic control requirements and general safe operating practices. Any areas impacted during construction will be restored to pre-construction conditions upon completion of the TWP. Traffic impacts after completion of the construction of the TWP are expected to be limited as the facilities will be unmanned and operations will require minimal traffic. Therefore, no level-of-service calculations or traffic modeling have been performed; however, the following elements are discussed in this section:

- Trip Generation
- Project Access
- Possible Delivery and Commuting Routes
- Material Storage
- Parking and Vehicle Storage
- Construction in ROW
- Permits

***Trip Generation***

During the construction phase of the TWP, trip generation will be primarily related to construction activities, including delivery of materials and equipment, worker transport, and water pipeline and appurtenances installation. Types of construction vehicles accessing the construction area will likely include those presented in **Table 8.d-3**.

**TABLE 8.d-3**  
 Anticipated Construction Vehicles

<b>Construction Phase</b>	<b>Vehicle</b>
Preparing the TWP Easements for Construction	Equipment Transport Truck
	Dump Truck
	Loader
	Trackhoe
	Motor Grader
	Crew Truck
	Service Truck
Pipeline Trenching and Installation	Inspection Vehicle
	Pipe/Material Hauling Truck
	Equipment Transport Truck
	Pipe Installation Crew Truck
	Inspection Truck
	Concrete Truck
	Trackhoe
	Loader
	Dump Truck
	Welding Truck
	Water Truck
Backfilling	Equipment Transport Truck
	Dump Truck
	Loader
	Trackhoe
	Crew Truck
	Inspection Truck
	Concrete Truck
	Water Truck
Compaction Equipment	

**TABLE 8.d-3**  
 Anticipated Construction Vehicles

Construction Phase	Vehicle
Re-grading/Reseeding	Equipment Transport Truck
	Motor Grader
	Reclamation Vehicle
	Crew Truck
	Inspection Vehicle
	Water Truck

Construction activities are proposed to begin in 2018, and are expected to last approximately 5 to 7 years with operation of the TWP scheduled to begin in 2025. Construction of multiple water pipeline construction packages, trenchless water pipeline packages, source water pump station, and water tank may occur concurrently along the TWP corridor. Depending on the size and scope of individual construction packages, the timeframe to complete construction of a package could be multiple years. Construction of each water pipeline mile is expected to last between 4 and 10 weeks not including revegetation or ROW restoration activities.

Trip generation will vary according to the phase and location of construction. On average, five to ten trips per day to the site are expected for each type of vehicle: pickup trucks, welding trucks, pipe/material hauling trucks, water trucks, and equipment transport trucks for each construction package. Construction work hours will typically be from 7 a.m. to 7 p.m. Monday through Saturday unless otherwise approved by Larimer County. Construction may extend beyond these hours on an as-required and case-by-case basis. For example, some construction activities, such as hydrostatic testing, require 24/7 operation, and shift work may be required.

Construction of multiple water pipeline construction packages, trenchless water pipeline packages, source water pump station, and water tank may occur concurrently with multiple crews of 10 to 55 workers each. At the peak of construction approximately 80 to 100 workers total could be required at various sites along the TWP.

Post-construction trip generation will be primarily related to the operation and maintenance of the TWP. Normal operations and maintenance activities could include TWP operators periodically traveling in a pickup truck to the source water pump station or water tank location, and along the water pipeline route for a visual inspection. To the extent practicable, visual inspections could be from public roads to minimize impacts to property owners.

**Project Access**

Access along the final water pipeline alignment will be along roadways, at existing access locations when practicable, or via properties owned by Thornton that are within the construction work limits. New access locations are anticipated to be required for temporary and permanent use. Thornton will obtain individual Larimer County, CDOT, and other municipal access permits for any necessary temporary and permanent access locations as applicable. If access is needed using private roads or drives, Thornton will negotiate use with owners. Stabilized construction entrances/exits will be installed, as necessary, at the intersections of the TWP temporary access roads with paved roads. Permanent access locations will be designed per municipal standards based on location of access. Temporary access will be unpaved and used primarily for transport of materials and construction

workers. Temporary and permanent access locations will be closed to the public. Temporary access locations could include warning signs, flaggers, and controlled access, as necessary. Additionally, gates or other approved barriers on temporary access roads may be utilized when construction workers are not present to control unauthorized access. Temporary access locations will be restored to pre-construction conditions upon the completion of construction.

It is anticipated that access to the final water pipeline alignment will be required along Interstate 25 frontage roads, Douglas Road, County Road 56, and County Road 1. Other potential access locations, depending on the final water pipeline alignment, could be required along other local roads. Starlite Drive could provide access for construction vehicles during construction of the water pipeline, connection to WSSC Reservoir No. 4, and for future maintenance as necessary. Starlite Drive is a private gravel road and, if used, use of this road will be negotiated with the owner.

Access to the water tank location will be along County Road 1. A new permanent gravel access will be built onto the parcel from County Road 1. This access will serve as the access for vehicles during construction as well as future maintenance. Future access requirements will be minimal as the water tank is anticipated to be unmanned with limited maintenance requirements.

Access to the source water pump station will be determined after the final site location has been determined. Access to the source water pump station is anticipated to be from Douglas Road but is dependent on the final location. The access and parking areas are anticipated to be gravel. Future access requirements will be minimal as this is anticipated to be an unmanned facility with limited maintenance requirements. Site access will be submitted for review to Larimer County with the Site Plan Review Permit application.

**Possible Delivery and Commuting Routes**

Truck haul routes for material deliveries from off-site locations will be chosen to facilitate safe and expedient delivery while minimizing traffic impacts. It is expected that the daily commuting route for construction workers would also follow the same roads as the truck haul routes to the construction site or temporary staging areas for parking. The major roads and highways within unincorporated Larimer County that could be utilized depending on the final water pipeline alignment and location of appurtenances for delivery of construction materials and construction worker trips as part of construction operations are presented in **Table 8.d-4**.

**TABLE 8.d-4**  
 Possible Delivery and Commuting Routes

Route Area	County or Major Roads	State Highways	Federal Highways
East/West Section	County Road 1, Giddings Road, Mountain Vista Drive, County Road 56, County Road 58, Douglas Road, Starlite Drive	State Highway 1	Interstate 25, Interstate 25 Northeast Frontage Road
North/South Section	County Road 1, County Road 52, County Road 18, East County Road 16, County Road 14, County Road 56, County Road 58, Prospect Road, Harmony Road, Crossroads Boulevard	State Highway 14 (Mulberry Street), State Highway 392	Interstate 25, Interstate 25 Northeast Frontage Road, US 34

Anticipated delivery and commuting routes are shown in **Figure 8.d-3**. It is not expected that any road improvements or closures would be required to facilitate the transport of materials. In the event that a closure is necessary, the duration of the closure will be minimized, and Larimer County standards and procedures will be followed.

### ***Material Storage***

The water pipeline and other materials are expected to be transported via truck haul routes to the temporary and permanent easement or temporary staging areas. Preliminary anticipated staging locations in and outside of unincorporated Larimer County are shown on **Figure 8.d-3**. Additional information on staging areas is described in Section 2, Project Description. When possible, Thornton plans to off-load and string water pipeline along the easements as it is delivered to reduce the number of trips required for material delivery. Thornton will comply with Larimer County regulations regarding material storage, transport, and land use.

### ***Parking and Vehicle Storage***

Parking and vehicle storage during construction will be primarily on property within the permanent or temporary easement or at temporary staging areas. Thornton owns multiple properties in the area that can be utilized for parking and staging, and additional staging areas could be obtained. When additional parking is required, Thornton will negotiate with property owners and commercial businesses to provide additional parking to avoid parking in the public ROW. Temporary staging areas and worker buses or shuttles may also be implemented to reduce traffic when practicable. Construction workers will be instructed to abide by applicable laws and regulations both while commuting to and working at the TWP sites.

The source water pump station and water tank locations are anticipated to have unpaved parking areas on-site for use during regular maintenance activities. Post-construction maintenance and regular use is not expected to require extended vehicle parking or storage at either location.

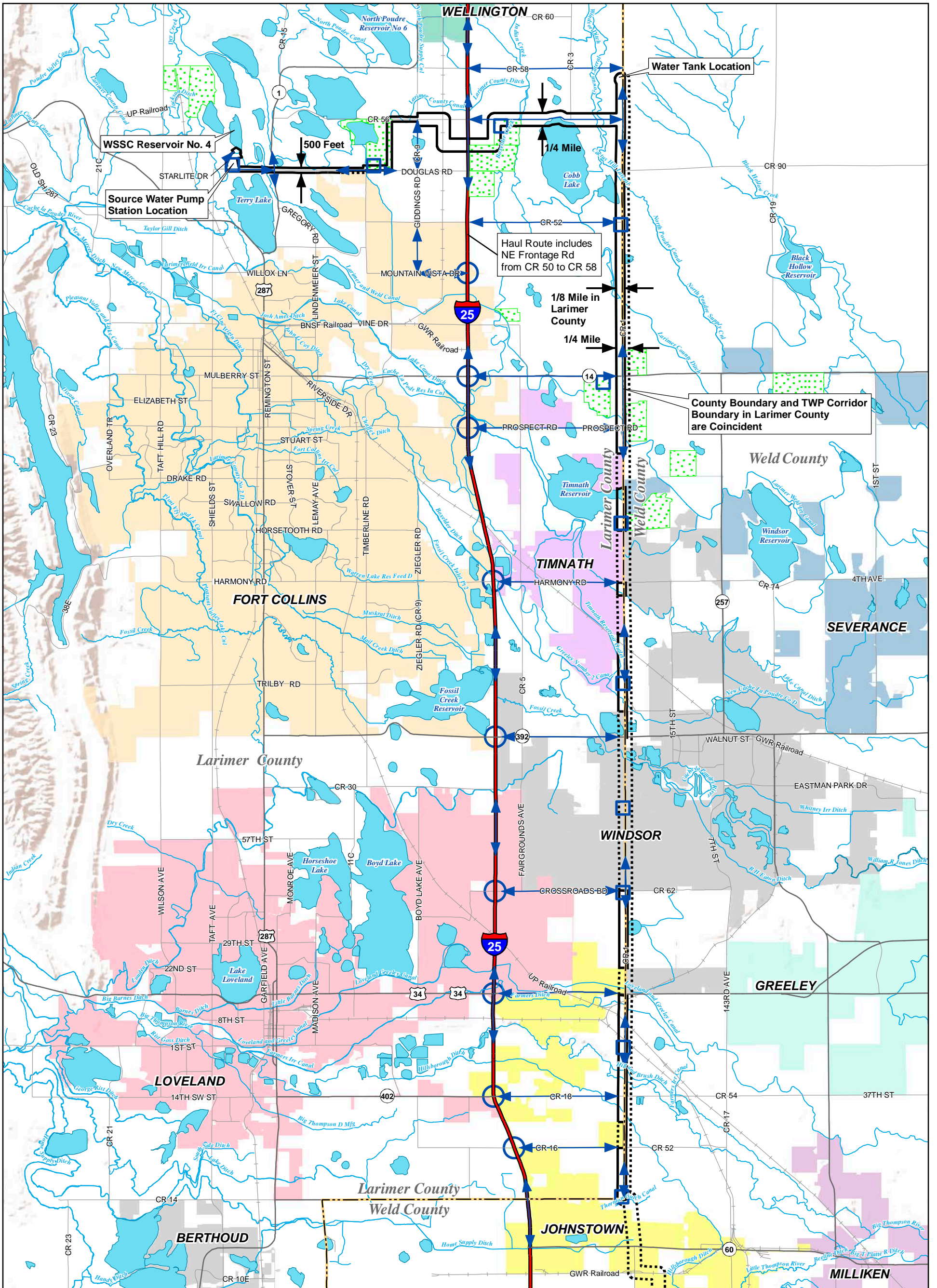
### ***Construction in ROW***


#### ***Road Crossings***

Unless required otherwise by Larimer County, water pipeline road crossings including the appurtenant buried fiber optic cable in unincorporated Larimer County will be constructed using open-cut construction. Road closures with detour routes or partial road closures could be required. Larimer County standards will be followed, and permits will be obtained for any required closures. ROW will be restored to pre-construction conditions and in accordance with Larimer County standards.

The TWP construction will utilize trenchless construction methods to cross Larimer County roads where required by Larimer County. Where the corridor parallels Douglas Road and County Road 56, the water pipeline is proposed to be located in the Larimer County ROW where feasible and as approved by Larimer County, and the water pipeline is anticipated to be installed utilizing open-cut construction methods. Additional temporary construction easements could be required to accommodate trenchless construction methods. Where trenchless construction methods are used, shafts will be located on either side of the road for launching and receiving the water pipeline and the fiber optic cable. These shafts are expected to be located outside the ROW, if feasible. Equipment, pipe/materials, and temporarily stockpiled excavated material from the trenchless installation operation are expected to be stored on either side of the road. Larimer County standards will be followed, and permits will be obtained as required. Shafts will be backfilled and compacted, and affected areas will be restored to pre-construction conditions.

# Thornton Water Project






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COLORADO**

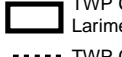
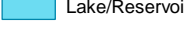
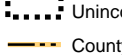
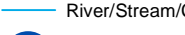


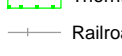
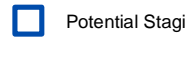

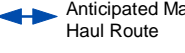
12450 WASHINGTON ST  
THORNTON, CO 80241-2405

12/29/2017



1 in = 1.8 miles

0 0.9 1.8 Miles

	TWP Corridor in Unincorporated Larimer County		Lake/Reservoir
	TWP Corridor outside Unincorporated Larimer County		River/Stream/Canal/Ditch
	County Boundary		Interstate 25 Exit
	Thornton Farm		Potential Staging Area
	Railroad		Anticipated Major Haul Route

**Figure 8.d-3  
Possible Delivery  
and Commuting  
Routes**



### *Pipeline Installation within ROW*

Where the corridor parallels Douglas Road and County Road 56, the water pipeline and fiber optic cable are proposed to be located in the Larimer County ROW where feasible and as approved by Larimer County. However, in the event that the location of the water pipeline and fiber optic cable cannot be accommodated in Douglas Road or County Road 56 ROW, easements will be purchased from property owners to locate the water pipeline and fiber optic cable on private property within the TWP corridor. Full or partial road closures will be required for TWP installation in Larimer County ROW. Thornton will coordinate with Larimer County on road closures and required permits will be obtained. Restoration requirements within ROW will be coordinated with Larimer County during design development.

Outside of Douglas Road and County Road 56 the criteria for developing the final water pipeline alignment will include locating the water pipeline and appurtenances outside existing and future Larimer County ROW unless otherwise approved by Larimer County. Efforts to locate the TWP outside of environmentally sensitive areas or minimize disturbance to existing structures, such as homes, may require locating the water pipeline and fiber optic cable in Larimer County ROW for short distances. Thornton understands that, if the water pipeline and fiber optic cable are required to be located parallel to and within Larimer County ROW other than as specifically approved in a 1041 permit, then use of that ROW will require Larimer County approval. Full or partial road closures could be required for TWP installation in Larimer County ROW. Larimer County standards will be followed and permits will be obtained for any required closures. ROW will be restored to pre-construction conditions and in accordance with Larimer County standards.

### **Permits**

Required access permits from Larimer County will be obtained for access from any Larimer County road prior to start of construction. Access permit application(s) will be submitted to the Public Works Department (Engineering). The TWP will abide by the Larimer County Access Policy (*Urban Area Street Standards* or *Rural Area Road Standards*) as applicable. Larimer County ROW permits will be obtained for road crossings and to construct the TWP within Larimer County ROW. Requirements and stipulations of the permits will be followed.

As part of the permit applications mentioned above, Thornton and/or the TWP contractors will develop detailed traffic control plans that include adequate levels of service and safety measures for construction. Sample road closure types that may be implemented, as required, are shown in **Figure 8.d-4**. Access will be maintained to local area residents. Emergency vehicle access needs will be maintained and construction activities coordinated with local fire departments, police departments, ambulance services, and other emergency responders as necessary. **Figure 8.d-4** sample road closures show closures that could be implemented at water pipeline road crossings to maintain access to local area residents and emergency responders. Water pipeline could be constructed with full road closure and construction of a temporary diversion or partial closures (with or within diversion) with pipeline construction occurring in one lane at a time.

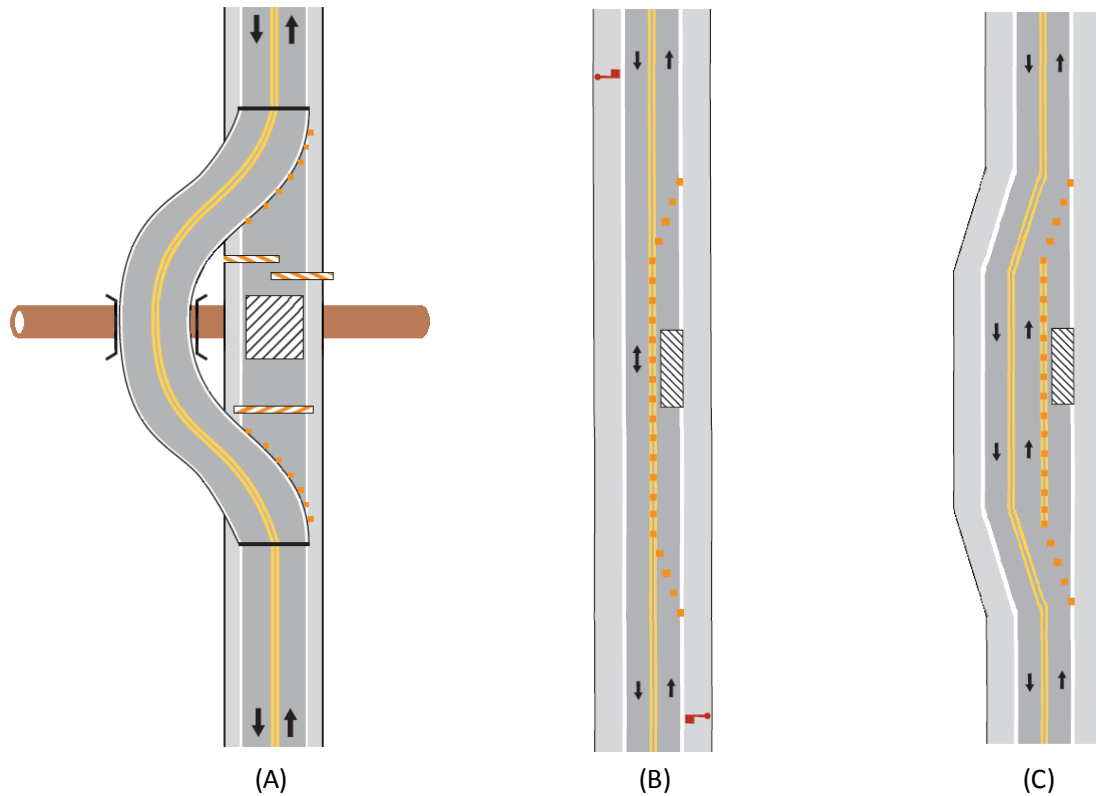


FIGURE 8.d-4

(A) Road Closure with Diversion, (B) Partial Road Closure with Flaggers, (C) Road Closure with Diversion

**Mitigation Measures**

Thornton and/or the TWP contractors will implement traffic strategies to minimize or mitigate traffic disruption from construction activities that could include the following:

- To minimize impacts to public roads or bridges directly affected by the TWP, Thornton may provide maintenance as needed.
- To minimize conflicts between TWP traffic and local traffic, transport of materials could occur during off-peak hours when practicable. Movements of normal heavy trucks (not oversized) could also be minimized during peak hours to the extent possible. Delivery truck personnel and construction workers may be notified of potential height restrictions and overhead obstructions. Vehicles used for material transport will comply with *Larimer County Code of Ordinances Sec. 58-105* regarding the height, width, and length of vehicles, when practicable. If at any time vehicles of excess size or weight are required on Larimer County roads or bridges, permits will be obtained per the guidance of *the Larimer County Code of Ordinances*. Moving of any heavy equipment across railroad lines will comply with *Larimer County Code of Ordinances Sec. 58-53*. Further detailed delivery routes and concerns will be addressed during the detailed design phase of the TWP, including verification that bridge crossings on the delivery route have adequate strength and capacity.

- Traffic on County Road 1 may be controlled by a flagger or temporary traffic control signal to facilitate construction vehicles entering and exiting the road if sight distance is limited due to the existing topography of the roadway.
- Thornton will adhere to Larimer County limitations on road closures and construction during peak traffic hours, requirements regarding end-of-day conditions, and mandatory inspections. Whenever possible, the existing number of lanes will be maintained during construction. Temporary road closures or traffic control flaggers will be coordinated with Larimer County and local law enforcement. If speed limit reduction is required, such reduction will be in accordance with CDOT Form 586, *Authorization and Declaration of Temporary Speed Limits*. Traffic control measures such as traffic control flaggers, warning signs, lights, and/or barriers will be implemented to provide safety and efficient progression of traffic. Particular emphasis will be given to construction site access locations along Larimer County Road 1 near the water tank site where there is a large amount of existing truck traffic in the area and possibly a reduced sight distance at the access location.
- To minimize the impacts of construction on the local community, Thornton will coordinate with Poudre School District and Weld RE-4 School District regarding construction and haul routes and school bus traffic. However, the only buses operating along the TWP corridor are demand service responsive and are not anticipated to be adversely affected by the TWP construction.
- Construction within Larimer County ROW will conform to the *Larimer County Right-of-Way Permit Application and Construction Guidelines*.
- TWP contractors will use water trucks to control dust as necessary and will implement required dust control mitigation treatments. Post-construction, disturbed areas will be restored to their pre-construction condition and further dust control mitigation is not expected to be necessary.
- Stabilized construction entrances/exits will be installed, as necessary, at the intersections of the TWP temporary access roads with paved roads. Significant soil transferred onto paved roads will be removed as necessary to maintain the quality of county roads and state highways.
- Access will be maintained to local area residents. Emergency vehicle access needs will be maintained and construction activities coordinated with local fire departments, police departments, ambulance services, and other emergency responders as necessary.