2.0 Project Description

San Diego Gas & Electric Company (SDG&E) and Southern California Gas Company (SoCalGas) (the applicants) proposed the Pipeline Safety and Reliability Project New Natural Gas Line 3602 and De-rating Line 1600 (PSRP, or the proposed project). The proposed project would have included two components: (1) constructing the new San Diego Natural Gas Pipeline (Line 3602) and supporting facilities, and (2) de-rating the existing Line 1600 and modifications required to convert it from a transmission pipeline to a distribution pipeline (Distribution System Modifications).

2.1 Overview of the Proposed Project

2.1.1 Construction and Operation of Line 3602

The applicants proposed to construct, operate, and maintain a new 36-inch-diameter, 46.6-mile-long natural gas transmission pipeline (Line 3602). Approximately 1.1 miles of the 46.6-mile-long Line 3602 would be an existing pre-lay segment of pipeline, already in place. Line 3602 would start at the applicants' existing Rainbow Metering Station in Rainbow, California, then continue south through the cities of Escondido, Poway, and San Diego, as well as unincorporated communities of San Diego County, then terminate on a parcel of land within the boundaries of Marine Corps Air Station (MCAS) Miramar (see Figure 2.1-1). Approximately 39 miles of Line 3602 would be installed within existing roads and road rights-of-way (ROWs) (described as "urban areas" in typical drawings). For the purposes of this document, the term "right-of-way (ROW)" indicates an area to which the applicants have or would obtain legal access for construction and operation of the proposed utility facilities.[1] Approximately 40 miles (or 86 percent) of proposed new construction is in existing roadways where SDG&E has franchise agreements with cities and counties. The remaining approximately 6 miles would be installed in areas not adjacent to roads, which is referred to as "cross-country" in the text and typical drawings. Proposed facilities to support Line 3602 included:

- Ten mainline valves (MLVs);
- Rainbow Pressure-Limiting Station;
- Pipeline inspection launching and receiving equipment;
- Three cross-tie facilities[2] for existing Line 1600, Line 1601, and Line 2010;
- Cathodic protection system; and
- Intrusion and leak detection monitoring system.

2.1.2 De-rating Line 1600

The applicants proposed to de-rate, or lower the pressure of, approximately 45 miles of existing Line 1600 for use as a distribution rather than transmission pipeline. Line 1600 extends from the existing Rainbow Metering Station in the community of Rainbow, California, to the community of Mission Valley, San Diego, California. The portion of Line 1600 proposed for de-rating extends from the Rainbow

[1] The proposed project would require temporary workspace during construction, as well as permanent ROW during the operation and maintenance phase. The permanent ROW would be approximately 50 feet wide along the entire route of Line 3602.

[2] A cross-tie facility is an enclosed site where two or more underground pipelines connect.

Metering Station to the Kearny Villa Pressure-Limiting Station, located on MCAS Miramar (see Figure 2.1-1).

De-rating would include modifications at various locations along Line 1600. Proposed modifications included:

- Removal of eight existing regulator stations that would not be replaced with other facilities;
- Removal of two existing regulator stations that would be replaced with check valves;
- Removal of one existing regulator station that would be replaced with a new regulator station;
- Construction of three new regulator stations and connection pipelines;
- Construction of Mira Mesa Pipeline Extension (approximately 0.9-mile-long, 8-inch-diameter pipeline extension);
- Line 49-31B Replacement – replacement of a 0.7-mile-long segment of Line 49-31B with 6-inch-diameter pipe; and
- Line 49-31C Pre-lay Segment Replacement – installation of 1.1 miles of 8-inch-diameter replacement pipeline in a pre-lay segment in Pomerado Road (near Mileposts [MPs] 38 and 39).

These proposed modifications to Line 1600, collectively referred to as the Distribution System Modifications, are described in additional detail in Section 2.2.2, De-Rating Line 1600.

2.2 Description of the Proposed Project

2.2.1 Line 3602

2.2.1.1 Underground Facilities

The following underground facilities include facilities that are mostly located underground (e.g., the cathodic protection system is mostly located below ground, but contains test stations that would be located aboveground):

- Pipeline;
- Cathodic protection system; and
- Intrusion and leak detection monitoring system.

Pipeline

Line 3602 would include the construction of a 36-inch-diameter, 46.6-mile-long steel pipeline with a maximum allowable operating pressure (MAOP) of 800 pounds per square inch gauge (PSIG) and would have a minimum wall thickness of 0.625 inch. Approximately 1.1 miles of the 46.6-mile-long Line 3602 would be an existing pre-lay segment of pipeline, already in place. Line 3602 would be designed in accordance with American Petroleum Institute specification 5L; U.S. Department of Transportation (DOT) regulations in Title 49, Part 192 of the Code of Federal Regulations (CFR) Transportation of Natural and Other Gas by Pipeline, Minimum Federal Safety Standards; and California Public Utilities Commission (CPUC) standards under General Order 112-E and Pipeline Safety Enhancement Plan (PSEP) pursuant to CPUC Decision D.11-06-017.

The applicants' proposed route for Line 3602 is within existing roads and road ROWs for approximately 40 miles (see Table 2.2-1). Line 3602 would require an approximately 50-foot-wide permanent ROW

along the entire route for operation and maintenance of the pipeline. The proposed project would be installed pursuant to franchise agreements along roadways.

Table 2.2-1 Co-location within Existing Rights-of-Way

MP Segment (Begin–End)	Length (miles)	Within Road[a]	Within Road ROW[b]	Adjacent to Utility ROW[c]	Cross-Country[d]	Other
0.00–0.02	0.02				X	
0.02–1.46	1.44	X				
1.46–1.50	0.04		X			
1.50–3.28	1.78	X				
3.28–3.28	0.00		X			
3.28–3.79	0.51				X	
3.79–6.16	2.37	X				
6.16–6.18	0.02		X			
6.18–6.22	0.05				X	
6.22–6.24	0.01		X			
6.24–8.21	1.97	X				
8.21–8.21	0.01		X			
8.21–8.32	0.11					Park and Ride
8.32–8.34	0.02		X			
8.34–8.36	0.02	X				
8.36–8.99	0.64		X			
8.99–9.00	0.01	X				
9.00–9.22	0.22		X			
9.22–10.95	1.73	X				
10.95–10.99	0.04		X			
10.99–11.29	0.30	X				
11.29–12.67	1.38				X	
12.67–12.70	0.03		X			
12.70–12.71	0.01	X				
12.71–12.73	0.01		X			
12.73–12.73	0.01	X				
12.73–12.84	0.10		X			
12.84–15.64	2.80	X				
15.64–15.68	0.04		X			
15.68–19.02	3.34	X				
19.02–19.02	0.00				X	
19.02–20.15	1.13	X				
20.15–20.20	0.05		X			
20.20–22.27	2.07	X				
22.27–22.27	0.00		X			

Table 2.2-1 Co-location within Existing Rights-of-Way

MP Segment (Begin–End)	Length (miles)	Within Road[a]	Within Road ROW[b]	Adjacent to Utility ROW[c]	Cross-Country[d]	Other
22.27–22.28	0.00	X				
22.28–22.69	0.41		X			
22.69–24.87	2.18	X				
24.87–24.89	0.02		X			
24.89–27.47	2.58	X				
27.47–27.49	0.02		X			
27.49–29.54	2.04	X				
29.54–29.56	0.03		X			
29.56–30.01	0.45			X		
30.01–30.70	0.69				X	
30.70–30.70	0.00		X			
30.70–34.27	3.57	X				
34.27–34.32	0.05		X			
34.32–38.21	3.89	X				
38.21–38.21	0.00				X	
38.21 – 39.1[e]	1.10	X				
39.31–43.53	4.22	X				
43.53–43.54	0.01		X			
43.54–46.60	3.06				X	
Total Length:	46.60					

Notes:

[a] "Within Road" is defined as the area within the outer lined lanes of the road, or when lines were not present, the area within the paved portion of the road.

[b] "Within Road ROW" refers to areas within the existing road ROW, but outside of the road way itself. "Within Road ROW" includes the road shoulder and ROW adjacent to the road shoulder. "Road shoulder" is further defined as the area within the dedicated road ROW that is immediately adjacent to the paved road surface and is either denude of vegetation or has low-lying vegetation. The road shoulder can be paved or unpaved. An unpaved road shoulder is further defined as absent of trees or heavy vegetation that will otherwise prevent vehicle access.

[c] "Utility" includes existing pipeline and transmission line ROWs (not within road ROWs).

[d] "Cross-country" refers to areas where the pipeline is not co-located, or adjacent to an existing ROW. Cross-county may include private property.

[e] This represents Line 49-31C, the pre-lay segment.

Key:
Co-location = Placement of several entities in a single location
MP = Milepost
ROW = right-of-way

Cathodic Protection System

The applicants would install a cathodic protection system to prevent pipeline corrosion. This system would consist of cathodic protection rectifiers, buried anodes, and test stations installed along Line 3602. A rectifier is a device used to convert alternating current to direct current. A buried anode is a terminal from which current flows in a direct current electrical circuit. In a pipeline cathodic protection system, the anode is the sacrificial material, or electrode, having low electrolytic potential, causing flows away from the anode, causing it to corrode. Corrosion of the anode protects the pipeline from corroding. A test station is a facility installed at intervals along the pipeline to monitor the corrosion process by taking measurement of the electrical discharge from the pipeline. It is anticipated that the cathodic protection

system would consist of a rectifier and a deep-well anode bed at approximately three of the proposed MLV sites (one rectifier and one deep-well anode bed at each MLV site, for a total of three rectifiers and three deep-well anode beds). The location may change as design proceeds, but the applicants prefer to site them within the fenced area around the MLV. Each rectifier would be mounted on a utility pole supplied with electricity, and each pole would have an electric meter. A conducting wire would connect the rectifier to the pipeline. An anode bed capable of holding numerous buried anodes would be installed near the utility pole. The anode bed would be approximately 150 to 500 feet deep. Each anode in the bed would have a coated wire lead that connects to the rectifier, which connects to the pipeline to establish cathodic protection.

Cathodic protection test stations would be installed at approximately 2,000-foot intervals along Line 3602. Wires would connect Line 3602 to the surface through a 3-foot-high polyvinyl chloride (PVC) tube.

Intrusion and Leak Detection Monitoring System

Line 3602 would be equipped with an intrusion and leak detection monitoring system to provide early warning when digging, drilling, boring, cutting, compacting, or unplanned vehicle operations pose a threat to pipeline integrity. The system would be designed to continuously monitor ground movement and temperature gradients that, if detected, could be associated with a release of gas from the pipeline. The monitoring system may include installation of a fiber optic cable buried above and/or adjacent to the pipeline. If installed, the fiber optic cable would transmit information directly to system monitoring stations co-located with supervisory control and data acquisition (SCADA) equipment at MLV sites where the required 1 kilowatt of power could be obtained. In addition, a 48-inch-wide strip of mesh warning tape would be installed 1 foot below grade directly over Line 3602 to serve as a warning if uncovered. The warning tape would not be installed in areas where the pipeline is installed with trenchless technology (e.g., using horizontal directional drilling [HDD] or horizontal boring techniques). SDG&E and SoCalGas would continue to employ their existing practices to monitor for ground movement and intrusion. If a fiber optic intrusion system is not installed, the applicants would rely on existing practices, such as "dig alert," which requires that standby personnel would be deployed at all excavations near the pipeline, existing patrols, and the warning mesh.

The intrusion and leak detection monitoring system would be installed to further support the early detection and management of potential gas releases. As part of the system, gas detection sensors would be employed at certain locations along the pipeline route. These locations may include high consequence areas where the pipeline is in proximity to facilities that would require special considerations for evacuation (e.g., schools or hospitals) or that could sustain commerce impacts[3] in the event of a pipeline emergency. The system may include the installation of a fiber optic cable in high consequence areas that would immediately notify operations personnel if gas is detected in concentrations high enough to indicate the possible occurrence of a leak. If the fiber optics system cannot be installed as proposed, other communications technologies such as radio or cellular technologies will be used to transmit sensor data. Methane detectors may also be installed, and if so, would be co-located with MLVs to the extent practicable.

2.2.1.2 Aboveground Facilities

Aboveground facilities include facilities that are mostly located aboveground. Aboveground facilities associated with Line 3602 would include:

[3] Commerce impacts, as defined by the applicants on April 21, 2017, "refer to an event that results in significant economic disruption to the area."

- Rainbow Pressure-Limiting Station;
- Pipeline inspection tool launching and receiving equipment; [4]
- 10 MLVs;[4]
- Cross-ties connecting to existing Line 1601, Line 1600, and Line 2010; and
- Other minor appurtenances, such as pipeline markers.

With the exception of Line 1601, Line 1600, and Line 2010 cross-ties, all aboveground facilities would be located within a 50-foot permanent ROW associated with Line 3602, or on SDG&E-owned property.

Rainbow Pressure-Limiting Station

Natural gas would be supplied to Line 3602 via Lines 3010 and Line 1600, both of which originate at the existing Rainbow Metering Station and are fed by Lines 1027, 1028, and 6900. Line 3602 would be connected to Line 3010 via a 20-inch-diameter pipeline that would connect the existing Rainbow Metering Station to the proposed Rainbow Pressure-Limiting Station. The Rainbow Pressure-Limiting Station (see Figure 2.2-1) would be constructed to prevent over-pressurizing interconnected pipelines (Line 1600 and Line 3010) that currently operate at different pressures. The Rainbow Pressure-Limiting Station would consist of equipment that reduces or shuts off the supply of gas flowing into the pipeline system if necessary to prevent over-pressurizing. This allows the pipeline to be rapidly depressurized, a process known as "blowdown," from within the Pressure-Limiting Station, to facilitate maintenance or in the event of an emergency. A blowdown is accomplished by opening a valve and allowing the gas to escape well above ground level to the atmosphere through a vertical pipe, or "stack," which would protrude aboveground within the station. Sixteen-inch-diameter pressure-limiting valves would be installed underground, and valve controls would be installed aboveground, contained within a cabinet. The vertical pipe, or "stack," would consist of a 12-inch-diameter pipe approximately 3 feet tall.

The Pressure-Limiting Station would be located approximately 50 feet south of the existing Rainbow Metering Station, on a graveled parcel currently owned by SDG&E. The station would be approximately 100 by 100 feet, and a 6- to 8-foot-high concrete block wall would surround the perimeter of the site, accessible by two approximately 20-foot-wide swing gates and two approximately 4-foot-wide pedestrian gates. Access to the Pressure-Limiting Station would be obtained via an unpaved driveway from Old Highway 395 and a permanent, paved driveway to be constructed from Rainbow Valley Boulevard.

The Pressure-Limiting Station would be equipped with SCADA equipment. SCADA service would be provided via land line or satellite service. Power for the Pressure-Limiting Station would be obtained from a nearby SDG&E electrical distribution line. The antennae pole for the SCADA is approximately 12 inches in diameter and approximately 30 feet aboveground.

Pipeline Inspection Launching and Receiving Equipment

Pipeline inspection launching and receiving equipment would be constructed. Pipelines can be internally inspected through pipeline inspection tools, known as "pigs." A pig is a device that is placed inside a pipeline to remove unwanted debris from the inside of the pipeline. Pig launchers and receivers are installed on pipelines to launch and receive pigs. The launchers and receivers would be welded to the pipeline and extend above the ground surface so that they can be accessed during operation and maintenance activities. The pig launcher would be constructed at the Pressure-Limiting Station. The pig receiver would be constructed at the Line 2010 cross-tie, the proposed terminus of Line 3602.

[4] The majority of the valve mechanism is located below ground; however, the valve station is an aboveground facility

Mainline Valves

It was anticipated that 10 MLVs would be installed along Line 3602. The purpose of an MLV is to isolate pipeline segments and shut down the flow of gas during operation and maintenance activities or in the event of an emergency. MLVs would be spaced at approximately 5-mile intervals. See Table 2.2-2 for anticipated locations, and Figure 2.2-2 for a typical MLV.

Each MLV site, approximately 50 by 75 feet, would be located within the permanent ROW of Line 3602 and surrounded by an approximately 6-foot-high, concrete, earth-toned block wall for security. In addition to the valves, other components within the MLV site include actuators, control cabinets, a 30-foot-high antennae pole (and possibly solar panel), and a 3-foot-high blowoff valve and stack. In urban areas, MLV sites would be located adjacent to roads. Driveway access to the valve site would be developed, if needed.

The MLVs would be installed in accordance with DOT CFR Part 192 and CPUC General Order 112-F and would allow the applicants to meet or exceed their criteria for isolation and depressurization of designated sections of the pipeline in less than 30 minutes in the event of a pipeline emergency. The MLVs would be designed for remote operation by the applicants or automatic shut-off without operator intervention in the event of loss of pressure.

Table 2.2-2 Anticipated Mainline Valve Locations

Mainline Valve ID	Approximate MP	Location
1	1.5	Adjacent to and east of Old Highway 395 at the edge of an agricultural field
2	6.2	Within a cleared vacant lot adjacent to and east of Old Highway 395, between Canonita Drive and Tecalote Lane
3	11.0	Adjacent to and east of Old Highway 395 in a road pullout immediately south of the entrance to the Waterwise Botanicals nursery
4	15.7	Adjacent to and west of Old Highway 395/Champagne Boulevard, between Welk View Drive and Lawrence Welk Lane
5	20.2	Adjacent to and east of North Centre City Parkway, north of its intersection with Jesmond Drive, within a partially cleared area along the road
6	23.7	Within a landscaped roadway island bordered by South Pine Street to the west, Centre City Parkway to the east, and West 5th Avenue to the south
7	29.3	West side of Mule Hill Trail
8	34.3	Adjacent to and east of Pomerado Road in a vacant lot located immediately south of the Pomerado Christian Church driveway
9	39.1	In a landscaped area adjacent to Pomerado Road, just west of a sidewalk
10	42.8	South of Thurgood Marshall Middle School

Key:
ID = identification
MP = Milepost

Cross-Ties

Cross-tie facilities would be constructed where Line 3602 would interconnect with existing Line 1601, Line 1600, and Line 2010. The facilities would require a graveled site, 0.1-acre to 0.3-acre in size, and would be surrounded by a 6- to 8-foot-high concrete block wall. The cross-tie facilities would be accessible from access roads via 20-foot-wide swing gates and 4- to 6-foot-wide pedestrian gates. Communication equipment and valve controls for underground pressure-limiting valves would be installed aboveground within a cabinet. Communication equipment would be installed and powered by a solar panel at each of the cross-tie facilities.

Line 1601 Cross-Tie

The Line 1601 cross-tie would connect Line 3602 with the existing Line 1601 near the State Route (SR) 78 crossing (MP 23.4) in the city of Escondido. The majority of the cross-tie would be located on existing SDG&E property. A 16-inch, approximately 100-foot-long pipeline would extend from Line 3602 via horizontal bore beneath the SR-78 on-ramp and tie into Line 1601 via a 16-inch-diameter ball valve. Electricity would be obtained from a nearby SDG&E distribution line. The site would be surrounded by a 6- to 8-foot-high concrete block wall. Site access would be via an existing paved driveway off of Lincoln Avenue. See Figure 2.2-3.

Line 1600 Cross-Tie

The Line 1600 cross-tie would connect the existing Line 1600 with Line 3602, pressure-limiting equipment, and proposed MLV 7 within the proposed MLV 7 site near MP 29.3. This cross-tie would be located approximately 300 feet south of Bear Valley Parkway, along Mule Hill Trail (an unpaved road). Eight-inch pressure limiting valves and MLV 7 would be installed underground; associated valve controls and communication equipment would be installed aboveground and enclosed within cabinets. Communication equipment would be powered by a solar panel. The site would be surrounded by a 6- to 8-foot-high concrete block wall. Site access would be via Mule Hill Trail. See Figure 2.2-4.

Line 2010 Cross-Tie

The Line 2010 cross-tie would connect Line 3602 to the existing Line 2010 at the Line 3602 terminus on MCAS Miramar. Two 1,800-foot-long (0.34-mile), 20-inch-diameter pipelines would extend from the cross-tie facility to existing Line 2010. The cross-tie facility would contain a 42- by 36-inch pig receiver, valve control equipment, communication equipment, a solar panel for power, and a SCADA system mounted on a 20-foot pole. This site would be surrounded by a 6- to 8-foot-high concrete block wall. Access to the site would be obtained via a gravel driveway. See Figure 2.2-5.

2.2.2 De-Rating Line 1600

Line 1600 is an existing 16-inch-diameter transmission pipeline that extends 49.7 miles from the community of Rainbow, California, to the community of Mission Valley, California. The proposed project would involve reducing the pressure, or "de-rating," the approximately 45-mile-long portion of Line 1600 between Rainbow and the Kearny Villa Pressure-Limiting Station, located on MCAS Miramar. Line 1600 had an MAOP of 640 PSIG at the time that Application A.15-09-013 was filed in 2015. Line 1600 currently operates at 512 PSIG per CPUC Resolution SED-1 (July 2016).[5] In order to convert Line 1600 from a transmission pipeline to a distribution pipeline, the applicants propose to de-rate the pipeline to an MAOP of 320 PSIG.

The following Distribution System Modifications are required in order to de-rate Line 1600 and maintain regional distribution service:

- Removal of eight existing regulator stations that would not be replaced with other facilities;
- Removal of two existing regulator stations that would be replaced with check valves;
- Removal of one existing regulator station that would be replaced with a new regulator stations;

[5] Resolution SED-1 ordered SDG&E to reduce the operating pressure of Line 1600 to 512 PSIG, which represents a 20 percent reduction from the MAOP. The Resolution ratified a July 8, 2016, letter from CPUC Executive Director Tim Sullivan that directed the applicants to make this reduction. The applicants jointly responded that they complied with the CPUC Executive Director letter on July 9, 2016.

- Construction of three new regulator stations and connection pipelines;
- Construction of the Mira Mesa Pipeline Extension;
- Line 49-31B Replacement; and
- Line 49-31C Pre-Lay Segment Replacement.

These proposed project facilities are described in detail below.

2.2.2.1 Aboveground Facilities

Removal of Existing Regulator Stations

Regulator stations (see Figure 2.2-6 for a typical regulator station) control the pressure of the natural gas flowing through the system. Once the operating pressure of Line 1600 is reduced, eight of the existing regulator stations on the pipeline would no longer be needed (Table 2.2-3). The eight regulator stations would be taken out of service, and all aboveground and belowground equipment at each station location would be removed. The removal of this equipment would require a temporary workspace of 50 by 100 feet at each site. Once removed, the former regulator station locations would be backfilled and paved if within urban areas, or restored to match the surrounding conditions if within non-urban areas.

Construction of Check Valves

Check valves, which prevent the natural gas from reversing flow, would be installed at two locations where regulator stations would be removed (Regulator Station 1516 and Regulator Station 1500). The check valves would be installed underground, in place of the former regulator station. The check valves would be covered by steel vault covers. No permanent aboveground equipment or facilities would be required at the check valve locations.[6] See Figure 2.2-7 for a typical check valve.

Construction of New Regulator Stations

Four new regulator stations would be constructed as part of the Distribution System Modifications. Three new regulator stations would be located along Pomerado Road (Table 2.2-3 and Figure 2.1-1). One new regulator station would replace an old regulator station (Regulator Station 939) at the same location. The new regulator stations would be designed to operate at the Line 3602 MAOP of 800 PSIG.

Each regulator station would be underground within two concrete vaults that measure 7 by 7 feet, within SDG&E's existing ROW. No new driveways or access roads would be constructed. Some regulator stations would require installation of a short pipeline segment to connect to the high-pressure distribution system (see Table 2.2-3). The permanent footprint of each regulator station would be approximately 19 by 7 feet. No permanent aboveground facilities would be required at the new regulator stations, with the exception of a steel vault cover and Electronic Pressure Monitoring (EPM) System. The EPM System consists of an electronic pressure monitoring box mounted on a 6- to 10-foot-high, 2-inch-diameter steel pole. A solar panel mounted on the pole would provide power to the EPM System.

[6] The check valve itself would be located underground; however, access to the check valve would be aboveground, and the steel vault cover would not be buried.

Table 2.2-3 Proposed Regulator Station Modifications

Regulator Station Identifier	Milepost	Location	City	Status
Located on Line 3602[(a)]				
A	35.8	Pomerado Road near its intersection with Twin Peaks Road	City of Poway	New with 0.06-mile connecting pipeline
B	38.1	Pomerado Road between Poway Road and Oak Knoll Road	City of Poway	New with 0.01-mile connecting pipeline
C	43.5	Pomerado Road near its intersection with Willow Creek Road	City of San Diego	New
Located on Line 1600				
1316	26.8	San Pasqual Valley Road near its intersection with Bear Valley Parkway	Unincorporated San Diego County	Remove
939	31.6	Pomerado Road opposite Bernardo Trails Drive	City of San Diego	Remove; replace with proposed regulator station
1101	34.3	Intersection of Bernardo Heights Parkway and Avenida Vensuto	City of San Diego	Remove
1516	34.9	Camino Del Norte between I-15 and Carmel Mountain Road	City of San Diego	Remove; replace with proposed check valve
141	36.0	Off unnamed access road from Caminito Orense Este	City of San Diego	Remove
1500	38.6	Rancho Peñasquitos Boulevard between Calle De Las Rosas and Via Del Sud	City of San Diego	Remove; replace with proposed check valve
1248	38.7	Mercy Road off paved driveway near the intersection of Mercy Road and Branicole Lane	City of San Diego	Remove
1494	43.5	Mira Mesa Boulevard between Westview Parkway and I-15	City of San Diego	Remove
1051	43.5	North Campus Drive between the road and the parking lot	City of San Diego	Remove
1335	43.5	Carroll Centre Drive just west of the cul-de-sac	City of San Diego	Remove
982	45.8	Near the southbound on- and off-ramps to Kearny Villa Road from Harris Plant Road	City of San Diego	Remove

Note:

(a) New regulator stations A, B, and C would be located physically along Line 3602; however, the regulator stations would be needed to maintain distribution supply service following the de-rating of Line 1600, and are therefore considered components under De-Rating Line 1600.

Key:

I-15 = Interstate 15

2.2.2.2 Underground Facilities

Mira Mesa Pipeline Extension

The applicants would construct an approximately 0.9-mile-long, 8-inch-diameter, high-pressure extension pipeline between the west end of Line 49-31B and Line 49-125 in the city of San Diego. The Mira Mesa Pipeline Extension would maintain the high-pressure distribution system for the community of Mira Mesa after reduction of the pressure of Line 1600 (Figure 2.1-1 and Appendix B). The Mira Mesa Pipeline Extension would be constructed entirely within existing roads and road shoulders, and would be installed approximately 36 inches below the ground surface using conventional trenching methods for urban areas. The pipeline would operate at a MAOP of 400 PSIG. Any existing utilities that the pipeline will cross along its route, such as other natural gas pipelines, communications lines, aqueducts, sewers, and water pipelines, would be identified through jurisdictional consultation and avoided accordingly.

Line 49-31B Replacement

To maintain the existing capacity of Mira Mesa's current high-pressure system, approximately 0.7 mile of Line 49-31B, which currently consists of 4-inch-diameter pipe, would be replaced with 6-inch-diameter pipe. This would allow Line 49-31B to operate at an MAOP of 400 PSIG and maintain service to the Mira Mesa high pressure system, even after Line 1600's MAOP is lowered to 320 PSIG. This section is located in unincorporated San Diego County within a 0.7-mile-long segment of Pomerado Road between I-15 and Avenue of the Nations. The segment of replacement pipeline would have an MAOP of 400 PSIG and would be installed entirely within the existing road or road shoulder using conventional trenching techniques (see Figure 2.1-1).

Line 49-31C Pre-Lay Segment Replacement

In 1994, SDG&E installed Line 49-31, a 1.1-mile-long pre-lay segment of 36-inch-diameter pipeline with an operating pressure of 800 PSIG, in Pomerado Road in anticipation of future system upgrades.[7] Because no immediate system upgrades occurred, this pre-lay pipeline segment was connected into the existing 400 PSIG distribution system (including three 8-inch-diameter distribution pipelines) that connects the communities of Rancho Bernardo, Rancho Peñasquitos, and Scripps Ranch to the city of Poway.

Between Line 3602 MP 37.9 and MP 39.0, the applicants propose to connect Line 3602 to the Line 49-31C pre-lay segment in Pomerado Road. In order to replace the distribution capacity that Line 49-31C pre-lay segment provided, a new 1.1-mile-long, 8-inch-diameter distribution pipeline would be installed. The new segment of Line 49-31C would be installed parallel to the existing pre-lay segment in Pomerado Road between Poway Road and Scripps Poway Parkway (see Figure 2.1-1).

2.3 Land Requirements

This section describes the land requirements for the construction of Line 3602 and associated support facilities, as well as the facilities associated with de-rating Line 1600 (the Distribution System Modifications).

Construction of Line 3602 and the Distribution System Modifications would require approximately 284.1 acres of land for use as temporary workspace. Temporary workspace includes workspace, in addition to the permanent ROW, needed for the construction of Line 3602, aboveground facilities, access roads, and staging areas/laydown areas. Following construction completion, land used as temporary workspace would be restored and allowed to revert to its former use. Of this total, approximately 227.7 acres would be disturbed by temporary workspace needed to construct Line 3602, 13.2 acres would be disturbed by the pipeline extensions (Mira Mesa Pipeline Extension, Line 49-31B Replacement), 1.4 acres would be disturbed by aboveground facilities, 4.0 acres would be disturbed by access and patrol roads, and 37.8 acres would be disturbed by staging areas/laydown yards. As noted below, a substantial portion of this acreage is located within already disturbed areas.

For the purposes of the proposed project, the applicants are requesting an approximately 50-foot permanent linear ROW, centered on the pipeline, along the entire route for operation and maintenance of the pipeline. The purpose is to provide the pipeline owner/operator a controlled space on either side of the pipe to ensure the pipeline owner has access to the pipeline for operational maintenance and to protect the pipeline from third party activities that could threaten damaging the pipeline. Permanent ROW required for the operation of Line 3602 would be approximately 283.6 acres of land.

[7] Laying pipeline in anticipation of future system upgrades is known as a "pre-lay."

Permanent workspace required for aboveground facilities would be approximately 2.1 acres. Of this, 0.3 acre would be disturbed by the Rainbow Pressure-Limiting Station, 0.6 acre would be disturbed by cross-tie facilities, 1.0 acre would be disturbed by MLVs, and 0.2 acre would be disturbed by new permanent regulator stations

2.3.1 Pipeline

As stated above in Section 2.3, Land Requirements, construction of Line 3602 would require 227.7 acres of temporary workspace. Generally, temporary workspace required for construction would be limited to the road and road shoulder in urban areas, and would be up to 100 feet wide in cross-country areas. Additional temporary workspace would be required at HDD and horizontal boring sites. Operation of Line 3602 would require 283.6 acres of permanent ROW.

Of the 46.6 miles of Line 3602, approximately 40.3 miles (86 percent) would be constructed within roads, or road ROWs (see Table 2.2-1) pursuant to franchise agreements. Approximately 0.5 mile of Line 3602 would be constructed adjacent to an existing utility ROW corridor. The remaining 6.3 miles (14 percent) of the proposed pipeline would be constructed within newly created ROW.

Where the pipeline would be installed within the paved portion of roads or within road ROWs, the temporary workspace would be generally limited to the road and road shoulder, approximately 60 to 100 feet wide, with 50 feet retained as permanent ROW. In areas where the pipeline would be installed adjacent to utility ROWs, the temporary workspace would be about 110 feet wide, with 50 feet retained as permanent ROW. And, where the pipeline would not be co-located with existing ROW (i.e., cross-country), the temporary workspace would be up to 100 feet wide, with 50 feet retained as permanent ROW. See Figures 2.4-1, 2.4-2 and 2.4-3 for typical ROW cross-sections for the various ROWs that the applicants would use. The actual use of workspace (e.g., spoil storage, equipment travel lane) within the typical ROW (see Figures 2.4-1, 2.4-2, and 2.4-3) may vary within the total width of the temporary workspace.

2.3.2 Aboveground Facilities

The Rainbow Pressure-Limiting Station would require 0.3 acre of land adjacent to the existing Rainbow Metering Station. The pig launcher would be constructed at the Rainbow Pressure-Limiting Station site. The pig receiver would be located within the permanent ROW at the Line 2010 cross-tie. The MLVs would each require an area approximately 75 by 50 feet located entirely within the permanent ROW. The cross-ties would require an approximately 0.6 acre (100 by 150 feet) within and adjacent to the permanent ROW at the intersecting point of Line 3602 and Line 2010. See Table 2.3-1 for land required for the construction and operation of project facilities.

Table 2.3-1 Summary of Land Disturbance from Implementation of the Proposed Project

Facility	Temporary Workspace (acres)	Permanent ROW (acres)	Permanent Aboveground Facilities (acres)	Total (acres)
Pipeline				
Line 3602	227.7	283.6	N/A	511.3
Mira Mesa Extension	8.0	0.0	N/A	8.0
Line 49-31B Replacement	5.2	0.0	N/A	5.2
Line 49-31C Pre-Lay Segment Replacement[(a)]	0.0	0.0	N/A	0.0
Aboveground Facilities				
Rainbow Pressure-Limiting Station	0.0	N/A	0.3	0.3

Table 2.3-1 Summary of Land Disturbance from Implementation of the Proposed Project

Facility	Temporary Workspace (acres)	Permanent ROW (acres)	Permanent Aboveground Facilities (acres)	Total (acres)
Line 1601 Cross-Tie	0.0	N/A	0.1	0.1
Line 1600 Cross-Tie / MLV 7	0.0	N/A	0.1	0.1
Line 2010 Cross-Tie	0.0	N/A	0.4	0.4
Mainline Valves[a, b]	0.0	N/A	1.0	1.0
Removal of 8 Existing Regulator Stations	0.7	N/A	0.0	0.7
Removal of 1 Existing Regulator Station and Construction of 1 New Regulator Station	0.1	N/A	<0.1	0.2
Removal of 2 Regulator Stations and Construction of Two Check Valves	0.1	N/A	0.0	0.1
Construction of Three New Regulator Stations	0.4	N/A	0.1	0.5
Staging Areas/Laydown Yards	37.8	0.7[d]	N/A	38.5
Access and Patrol Roads[c]	4.1	0.6	N/A	4.7
TOTAL	284.1	284.9	2.1	571.1

[a] Disturbance accounted for under Line 3602
[b] Includes all MLVs with the exception of MLV 7
[c] Includes temporary use of one existing road for access purposes, two temporary access road, and one permanent patrol road
[d] Staging areas/laydown yards are temporary by nature; however, 0.7 acre of the staging areas/laydown yards is located within permanent ROW (Staging Area/Laydown Yard 1, 2, 3A, and 6); therefore, this 0.7 acre would be maintained as permanent ROW, while the remaining 37.8 acres of land used for as staging areas/laydown yards temporarily would be restored and allowed to revert to its former use

Key:
MLV = mainline valve
N/A = not applicable
ROW = right-of-way

2.3.3 Staging Areas/Laydown Yards

Pipe is anticipated to be shipped by rail, to either Burlington Northern Santa Fe, LLC Kaiser Yard (Fontana), Union Pacific (Colton) or a pipeline distributor located in the city of Adelanto, and shipped to staging areas or to the temporary workspace associated with Line 3602 until it is ready for use on the ROW. Staging areas/laydown yards would be used to facilitate construction activities by serving as an area for the construction contractor to meet, carpool, store equipment, house office trailers, and park and maintain equipment. Other activities that may occur in staging areas/laydown yards include pipe fabrication and testing, equipment maintenance and refueling, material handling and delivery (inbound/outbound), pre-testing pipe joints, and other work to support construction. Approximately 13 staging areas/laydown yards would be needed for construction activities. Each staging area/laydown yard would be located in previously disturbed areas directly accessible from an existing road, and would range from 1 to 5 acres in size. Existing applicant facilities may also be used as staging areas/laydown yards. See Table 2.3-2 for a description of the 13 currently proposed staging areas/laydown yards.

Table 2.3-2 Proposed Staging Areas/Laydown Areas

Staging Area/Laydown Area	Milepost	Location	Acreage	Improvements Required
#1 Rainbow Station Yard	0.0	Rainbow Valley Blvd and Rainbow Creek Road	1.1	Mowing/grubbing, minor grading, fencing, lighting, and installation of gravel for driveway
#1A Rainbow Creek Road Yard	0.7	Rainbow Valley Blvd and Rainbow Creek Road	3.3	Mowing/grubbing, minor grading, fencing, lighting, and installation of gravel for driveway

Table 2.3-2 Proposed Staging Areas/Laydown Areas

Staging Area/Laydown Area	Milepost	Location	Acreage	Improvements Required
#2 Rainbow Hills Road Yard	3.2	Old Highway 395 and Rainbow Valley Boulevard	2.2	Fencing
#3A 395 Stewart Canyon Yard	6.0	Old Highway 395 and Steward Canyon Drive	4.0	Mowing/grubbing, minor grading, fencing, lighting and installation of gravel for a driveway
#4 Boulder Knolls Road Yard	15.0	Champagne Boulevard and Boulder Knolls Road	4.7	Fencing, lighting, mowing/grubbing, light grading, graveling
#5 Nutmeg Street Yard	20.8	North Nutmeg Street and North Centre City Parkway	2.0	Fencing, light grading, graveling
#5A Montego Yard	21.8	Old Highway 395 and West Country Club Lane	5.2	Mowing/grubbing, minor grading, fencing, lighting and installation of gravel for a driveway
#6D Montiel Yard	23.7	Montiel Road and Kaylyn Way	3.3	No improvements needed
#5C Emmanuel Church Lot Yard	26.6	East 17th Avenue and Encino Drive	3.8	No improvements needed
#6 Lake Hodges West Yard	30.4	Pomerado Road and Highland Valley Road	5.0	Fencing and lighting
#6A Lake Hodges East Yard	30.7	Highland Valley Road	1.8	Mowing/grubbing, minor grading, fencing, lighting and installation of gravel for a driveway
#6B Arbolitos Field Yard	36.4	Pomerado Road and Ted Williams Parkway	0.6	Mowing/grubbing, minor grading, fencing. Lighting, and installation of gravel for a driveway
#6C Alliant Yard	43.0	Alliant University	1.4	Mowing/grubbing, minor grading, and installation of gravel for a driveway
		TOTAL ACREAGE	38.5	

2.3.4 Access/Patrol Roads

No new permanent access roads would be constructed as part of the proposed project. One existing road would be used temporarily to access the temporary workspace needed for Line 3602. This road is located between Rainbow Hills Road and Avo Drive in the community of Fallbrook and would be used as an access road during construction and operation. This road is 12 feet wide and approximately 2.1 miles long. Two additional temporary access roads would be utilized between MP 12 and MP 13. One permanent patrol road would be constructed from Pomerado Road to the University of California Regents property adjacent to MCAS Miramar to allow the applicants to conduct ROW patrols and truck-mounted leak detection inspections along the pipeline during operation and maintenance. The patrol road would follow Line 3602 and would be 12 feet wide and approximately 0.6 mile long.

2.4 Construction Procedures

2.4.1 General Pipeline Construction

This section describes the general procedures for the pipeline construction of Line 3602. Unless otherwise noted, construction of Distribution System Modifications associated with de-rating Line 1600 would involve the same construction procedures. The majority of the pipeline construction process would be accomplished using conventional trenching methods, which typically include the steps below. The

proposed methods for crossing wetlands and waterbodies, as well as other specialized construction procedures, are described in Section 2.4.2, Specialized Pipeline Construction Procedures. The general pipeline construction steps are:

- Mobilization and staging;
- Surveying, staking, flagging;
- Clearing and grading;
- Hauling and stringing the pipe;
- Trenching;
- Construction within roadways;
- Pipe bending, welding, and coating;
- Lowering-in, backfill, and compaction;
- Dust controls;
- Hydrostatic testing;
- Pigging;
- Erosion and sediment control and pollution prevention during construction; and
- Clean up and restoration.

2.4.1.1 Mobilization and Staging

Mobilization activities would include establishing temporary construction office trailers, installing security fencing at staging areas/laydown yards, and receiving construction materials and equipment deliveries. Temporary power would be supplied to the staging areas/laydown yards by portable generators or through connections to nearby electrical lines, if available. During mobilization, staging areas/laydown yards would be mowed, graded, and graveled, as necessary, and storm water pollution prevention practices would be put into place in accordance with applicable permits. Construction equipment would be parked at staging areas/laydown yards and along the route during construction.

2.4.1.2 Surveying, Staking, and Flagging

The pipeline centerline and edges of the temporary workspaces would be marked and flagged prior to construction. In addition, locations of existing underground utilities (i.e., vaults, culverts, municipal separate storm sewer systems, drop-inlet structures, etc.) would be identified, and substructures (i.e., human-made structures installed below the ground surface) would be exposed by potholing prior to excavation. Sensitive biological, cultural, paleontological, or hydrological resources would also be marked, where required, to prevent construction activities from entering sensitive areas. In urban areas where workspace limits extend beyond the road and road ROW, limits would be marked and flagged. In urban areas where workspace limits generally correspond with exiting road roads, workspace limits would generally not be marked.

2.4.1.3 Clearing and Grading

Since much of the temporary workspace and pipeline ROW would be within existing roads and road shoulders, clearing and grading would be limited. Tree trimming may occur in areas where branches or vegetation could be damaged by vehicles or equipment or could present a safety hazard. Additionally,

trees located in proximity to the centerline would be removed or trimmed to complete the trenching activities described in Section 2.4.1.5 Trenching. The proposed project is not anticipated to need substantial vegetation trimming, pruning, or removal during construction. Should this type of work become necessary, it would be carried out in compliance with mitigation measures and applicable regulations. Crews would avoid removing mature trees and landscaping unless necessary for safe equipment operations, or as specified in landowner agreements.

Where clearing is required, the removal of vegetation and brush would be windrowed (heaped in a line) along the ROW or disposed of in accordance with jurisdictional agencies and/or landowners. The topsoil would be windrowed along the edge of the construction area for potential reuse.

Clearing and grading would be limited for the Distribution System Modifications because temporary workspaces and facility footprints would generally be located within developed areas, and Line 1600 is currently operational.

2.4.1.4 Hauling and Stringing the Pipe

The pipe for Line 3602 would be shipped to staging areas or to the temporary workspace associated with Line 3602 until it is ready for use on the ROW. Cranes would load the pipe onto trucks to be delivered to the ROW. Once on the ROW, sideboom tractors would unload the joints of pipe, placing them along the trench line for line-up, welding, and installation. The pipe necessary to complete the Distribution System Modifications would be transported to the construction site immediately prior to installation. Additional staging areas/laydown yards would not be required for storage of pipe needed for the Distribution System Modifications.

2.4.1.5 Trenching

The typical trench would be 7 to 8 feet deep and 5 to 6 feet wide. At crossings of existing pipelines or other utilities/substructures, trenching would generally be deeper and wider, as necessary, to avoid damage.

The trench would be excavated using rubber-tired backhoes, ditching machines, and/or tracked excavators. In areas in close proximity to overhead power lines, tracked excavators and other equipment that move sections of pipe and/or lower pipe into the trench pose a risk for induction or direct contact due to the height of the equipment. In all instances where construction would take place under or near existing overhead power lines, the construction crews, as a standard practice, would install signs throughout the area to warn construction personnel of the presence of the power lines and the potential hazard of working near them. Spotters would be used to assist operators when working under or near overhead power lines. All construction personnel would be trained on the potential dangers and the procedures to ensure safety.

In areas where shallow bedrock is encountered and conventional trenching techniques are not feasible, blasting would be used. When blasting is used, construction contractors typically use controlled blasting and/or a trenching machine with a hydraulic hammering attachment to break up the rock into smaller pieces to allow removal from the trench line. If blasting is required, it would be completed by a licensed blasting contractor and in accordance with all applicable permit requirements.

With the exception of construction within existing paved roadways, excavated soils would typically be preserved and used as backfill at the site of origin. Spoil piles would be placed adjacent to the trench area from which they are excavated. Materials determined to be unsuitable for backfill would be tested as appropriate and disposed of off site in accordance with all applicable regulations. Where trenching occurs

within a paved roadway, the trench spoil would be hauled to an approved disposal facility and would not be used as backfill material.

See Figures 2.4-4 and 2.4-5 for typical trench cross sections in urban areas and cross country areas, respectively. See also Figures 2.4-6 and 2.4-7 for typical construction sequence for urban areas and cross-country, respectively.

2.4.1.6 Construction within Roadways

Line 3602 and associated facilities would be located within paved roadways, road shoulders, or ROWs adjacent to road shoulders. During construction within and adjacent to roadways, traffic control would be implemented in accordance with applicable ordinances, road encroachment permits, and any required traffic control measures. Surface preparation would include removing pavement with concrete saws and/or grinding equipment. The broken debris would be hauled off site to an approved facility for recycling or disposal. Trenching would follow (see Section 2.4.1.5, Trenching). The maximum length of a trench that would typically be open at a given time can be 1,200 feet or greater as allowed by the encroachment permit and contractor work plans. Crews would be working simultaneously within city streets and throughout portions of Line 3602. Limitations on trench length are typically dictated by permit conditions. Steel plates would be used to cover open trenches during construction in order to maintain driveway, lane, or road access. If lanes are permitted to remain closed during non-working hours, then K-rails (temporary concrete traffic barrier) or fencing may be used instead of installing plating. Plating will be utilized when trenching obstructs access to intersection roads, parking lots, or driveways that do not have any alternative access points.

The maximum width of temporary workspace for construction within roadways would be from the limit of the road shoulder on one side of the road to the limit of the road shoulder on the opposite side of the road, except where additional temporary workspace has been identified. See Figures 2.4-8 and 2.4-9 for typical lane and road closures that would occur during construction within roadways.

2.4.1.7 Pipe Bending, Welding, and Coating

Typically, at the coating yard,[8] the pipe would be double-jointed, two single pipeline segments welded together, into approximately 80-foot lengths, before transport to the ROW. Once on the ROW, the pipe would be placed next to the trench on the ROW and then bent in the field by utilizing track-mounted pipe-bending equipment. However, where bending in the field is not practical or feasible with pipe-bending machines, pipe bends would be fabricated off site (e.g., at the factory). Once the trench is excavated, any bends that are required—to avoid substructures or accommodate changes in the route—can be determined, measured, and completed for installation.

The pipe would then be welded into longer sections where topographical and/or existing conditions allow open trenches for prolonged periods. Sidebooms would be used to pick up each joint of pipe, align it with the adjacent joint, and weld the joints together. This process is repeated throughout the length of the pipeline. Welders follow the sidebooms to complete each weld. All field welding would be performed by qualified welders in accordance with the American Petroleum Institute Standard 1104 (Welding Pipe Lines and Related Facilities) and CFR Title 49, Part 192. In areas requiring crossing substructures, individual pipe lengths would vary to accommodate existing field conditions. All pipeline welds would be inspected both visually and radiographically (i.e., via X-ray) by certified weld inspectors.

[8] A coating yard is the factory where fusion bonded epoxy is applied to the pipe joints after it has been double-jointed.

The pipe would be coated prior to delivery to construction sites. However, all coated pipe has an uncoated area that is 3 to 6 inches from each end to prevent interference during welding. Following successful inspection of the welds, the pipe would be coated with an epoxy coating, such as fusion bonded epoxy or Protal 7200. Pipeline segments would then be inspected to locate and repair any faults or voids in the pipeline coating prior to being lowered into the trench.

2.4.1.8 Lowering-in, Backfill, and Compaction

The welded pipe segments and individual pipe segments would be lifted and lowered into the trench by sideboom tractors. Cradles with rubber rollers or padded slings would be used to allow the tractors to lower the pipe without damaging the pipe's protective coating. If rock conditions are encountered during trench excavation, the trench bottom would first be padded with a layer of imported rock-free sand. Imported sand would be used to pad the pipe where rocky soils are present and/or padding material cannot be sieved from the trench spoil.

To facilitate restoration, backfill would not be compacted. In areas with high clay content or with the potential to subside over the trench line, a slight crown may be left over the pipe to compensate for subsidence. However, this practice is not anticipated and would only be used in limited circumstances. In cross-country areas, native material excavated from the pipeline trench would be used to backfill the trench. In urban areas, concrete trucks would be used to backfill the trench with an engineered sand/slurry mixture. The slurry mixture and materials would come from a commercially available local source. Backfilling would be conducted in accordance with standard engineering practices and permit requirements. The pipeline would exceed the minimum depth of cover required by the DOT, which is typically 36 inches.

2.4.1.9 Trench Dewatering

Trench dewatering would be required if groundwater infiltrates the pipeline trench to a point where tie-in welds cannot be made. Potential discharge may include using the trench water as a means for dust control and fire prevention, discharging the trench water overland, or using a nearby sewer system with an agreement with the operator. All trench water would be discharged in accordance with applicable permits and in a manner to control the rate of discharge and minimize erosion.

2.4.1.10 Dust Control

During construction, water trucks would spray water on unpaved access roads, workspaces, trench spoil, and other areas of exposed soil to help suppress fugitive dust. The applicants have estimated that a total of 6 million gallons of water would be required in order to control fugitive dust during construction. If permitted, the applicants would reuse water collected during trench dewatering and use recycled water that has gone through tertiary treatment. If recycled or collected water is not available or permitted for use, the applicants would purchase potable water from local purveyors.

2.4.1.11 Hydrostatic Testing

Each pipeline segment would be hydrostatically tested in its entirety, in accordance with DOT standards. Water, either recycled or potable, would be pumped into each pipeline test section, pressurized, and maintained at that pressure for a minimum of 8 hours. The actual volume of water used will depend on the number of test sections and the test sequence, but a maximum of 4.7 million gallons would be used to test Line 3602. Once the test has been completed, the hydrostatic test water would be tested, treated (if necessary), and discharged or disposed of according to permit conditions.

The applicants estimated that approximately 33,206 gallons of water would be used to test the 2.7 miles of the Distribution System Modification pipeline segments. The proposed project would reuse water from hydrostatic testing Line 3602 to test the distribution pipeline segments.

2.4.1.12 Pigging

Pipeline pigs are devices that are inserted into and travel the length of the pipeline driven by product flow; they are used to inspect and clean the pipeline before operation. Two types of pigs would be used on Line 3602: smart pigs and utility pigs. Smart pigs, also called in-line inspection tools, use sensors to gather information about the pipeline's structural integrity and operating conditions, such as pipeline wall thickness. Utility pigs would be used to clean and dry the pipeline after hydrostatic testing and dewatering. All residual water or material removed during the pigging process would be collected in a tank and disposed of in accordance with state and local dewatering requirements.

2.4.1.13 Erosion and Sediment Control and Pollution Prevention during Construction

To minimize the risk of erosion and sedimentation in both urban and cross-country areas, temporary erosion and sediment control devices, such as sand bags, straw wattles, and silt fencing, would be installed in accordance with SDG&E's Water Quality Construction Best Management Practices Manual and the Storm Water Pollution Prevention Plan. The potential for erosion and subsequent sedimentation is low in urban areas because the majority of work would occur on pavement, but in the cross-country areas, approximately 73 acres of affected land could pose erosion and sedimentation concerns.

During cleanup and restoration, permanent erosion control measures such as surface recontouring, slope breakers, and revegetation would be implemented to ensure long-term stabilization of the ROW. Restoration is described in more detail in Section 2.4.1.14, Cleanup and Restoration.

Construction activities within wetlands and waterbodies would be limited to those required to complete the crossing and would be conducted in accordance with any required permits. Impacts on soil and vegetation would be minimized by matting the designated travel lane to prevent rutting from vehicles. Sediment control devices would be installed around wetland or waterbody boundaries to prevent the infiltration of upland soils into the wetland or waterbody.

2.4.1.14 Cleanup and Restoration

Along roadways, cleanup and restoration would commence within a few days of trench backfilling. All construction materials and debris would be removed from work areas and disposed of at appropriate landfills or recycled when feasible. In urban areas, crews would restore lawns and landscaping immediately following cleanup to pre-construction conditions, or as specified in landowner agreements. In cross-county areas, the ROW and temporary workspaces would be decompacted, recontoured, and seeded according to landowner agreements or applicable permits. Stockpiled topsoil would be redistributed to facilitate vegetation growth. Additional erosion and sediment control devices may be installed to stabilize these areas until vegetation becomes established.

The pipeline route within unpaved portions of the roadway shoulder or private ROW would be permanently marked with approximately 5-foot-high line markers placed at 5- to 1,000-foot intervals at all angle points, road crossings, and drain and canal crossings that are not in the roadway.

2.4.2 Specialized Pipeline Construction Procedures

2.4.2.1 Residential Construction

In residential areas, the following additional procedures would be implemented when trenching would occur within 50 feet of a residence:

- The edge of the construction area would be fenced for up to 100 feet on either side of the residence;
- Mature trees and landscaping would not be removed within the temporary workspace unless removal would be necessary for safe operation of construction equipment, or as specified in landowner agreements; and
- All lawn areas and landscaping would be restored immediately following cleanup operations, or as specified in landowner agreements.

If temporary lane or road closures are required in residential areas, flaggers and markers would be used to safely direct traffic in addition to all stipulations in encroachment permits and the Traffic Management Plan. The construction contractor would lay steel plates across open trenches to maintain access to driveways.

2.4.2.2 Horizontal Directional Drilling

HDD is a trenchless pipeline installation method used to avoid surface impacts. The applicants propose to use HDD to cross San Luis Rey River (approximately MP 8.8 to MP 9.0), and Lake Hodges (approximately MP 30.1 to MP 30.5). See Figure 2.4-10 for a typical layout of a horizontal directional drill operation.

Drilling a Pilot Hole

For HDD operations, a pilot hole is drilled from an entry point using a relatively small cutting head. Successive drill stem sections are added and welded together to extend the length of pipe as the operator directs the drill head toward the exit pit.

Opening or Reaming the Pilot Hole

Once the pilot hole is completed, a series of successively larger cutting heads and reamers (rotary cutting tool used to enlarge the size of a previously formed hole) would be pulled and pushed through until the drilled tunnel, or bore hole, would fit the proposed pipeline diameter.

Pull Back of the Pipe

A number of sections, or joints, of pipe needed to span the crossing distance would be delivered to a staging area/laydown yard near the exit point of the HDD. The pipe joints would be welded together into a section of pipe matching the length of the HDD, X-ray tested, coated with a protective epoxy, and hydrostatically tested prior to pulling. A pulling head, or a pulling eye used to connect to a pipe in order to pull the pipe, would be welded onto the end of the pipeline section and the pipe would be pulled into and through the bore hole until it reaches the entry point. Once the full length of the drill section is installed underground, it would be welded to the pipeline behind and in front of the HDD segment.

Horizontal Directional Drill Fluids

Lubrication containing water, bentonite clay, and additives—referred to as “drilling mud”—would be used to aid the drilling, coat the walls of the bore hole, and keep the hole open. A total of approximately 1.2 million gallons of water would be required for drilling mud at the HDDs. During the bore, drilling

mud would be pumped under high pressure through the drill stem (rotating rod or cylinder) to rotate the cutting head (structure attached to the drill stem used to reduce material being drilled so it can be removed from the bore hole) and return the soil cuttings (material removed from the bore hole). A pit (approximately 10 by 10 feet wide and 7 to 8 feet deep) is sometimes used to catch the drilling mud during the pipe pull back. Aboveground containment such as a Baker tank may be used as an alternative to a pit. The use of a pit would be at the discretion of the contractor. No additives considered to be hazardous according to federal and state laws would be used during the HDD process. The drilling mud would be received in a pit at both the entry and exit points. The drilling mud that is returned back through the drill hole would be pumped from the entry and exit pits to a processing/shaker unit where the soil cuttings are removed, allowing the drilling mud to be reused. The soil cuttings would be dried on site, then hauled off site to an appropriate disposal facility. It is anticipated that the majority of the drilling mud would be hauled off site after construction for potential reuse where feasible. Where it cannot be reused, excess drilling mud would be disposed of at an appropriate waste facility.

Generally, the HDD entry site would be 400 by 200 feet wide, and the HDD exit site would be 200 by 100 feet wide, plus a 50-foot-wide area long enough to accommodate the entire length of the pullback pipe. Once the HDD section of pipe is installed, the drill pits would be backfilled and restored.

2.4.2.3 Horizontal Boring

Horizontal boring is used for short, level crossings, such as beneath stream channels or roads; typically, the jack-and-bore or slick bore method would be used. See Figures 2.4-11 and 2.4-12 for a typical horizontal bore. Horizontal boring would be completed using either the jack-and-bore or slick bore method. An estimated 11 horizontal bores would be required during installation of the proposed project based on preliminary design and reconnaissance-level surveys

Jack-and-Bore

The jack-and-bore method employs a boring machine set up within a bore pit to push pipeline joints through a hole behind a drilling auger. Each pipeline joint would be welded to the preceding section until the pipeline runs from an entry pit to an exit pit. Entry pits would measure approximately 15 by 40 feet wide, and exit pits measure approximately 10 by 15 feet wide. Bore pits are anticipated to be approximately 10 feet deep. The entry bore pit, is typically leveled and graveled in order to accommodate and stabilize the boring machine, which is mounted on tracks and generates thrust by pushing against the back wall of the bore pit.

Slick Bore

The slick bore method employs a horizontal boring machine that pushes an auger ahead of a section of temporary pipe from an entry pit toward an exit pit. Entry pits and exit pits would be constructed using the same jack-and-bore method described above. With slick bore methodology, the temporary pipe section serves as a protective casing; if the natural gas pipeline joints were to be pushed through the ground themselves, they could be damaged. The temporary carrier pipe is replaced with the natural gas pipe once the boring is complete.

If groundwater is encountered during either method of horizontal boring, it would be pumped into a holding tank, treated (if necessary), and discharged or hauled away according to permit conditions. Drilling spoils would be used to backfill the entry and exit pits or hauled off site for disposal.

2.4.2.4 Wetland and Waterbody Crossing Procedures

Line 3602 would cross several drainages and creeks, many of which are culverted beneath roads. Culverted waters would typically be crossed by digging under or over the culvert, but in some cases they

would be crossed using horizontal boring techniques. The San Luis Rey River and Lake Hodges would be crossed via HDD (see Section 2.4.2.3, Horizontal Boring). Drainages and creeks that are not culverted would be crossed using traditional, open-cut trenching techniques and according to applicable permit conditions.

Conventional Open-Cut Crossing Method

The conventional open-cut method would be used when the waterbodies are dry or at low flow, and in accordance with the applicable U.S. Army Corps of Engineers and California Department of Fish and Wildlife permits. It is anticipated that all of the waterbodies that are not planned for HDD or do not have existing culverted crossings would be dry or have low flow at the time of construction. If this is not the case, crossing methods could involve dry crossing techniques, such as a dam and pump or flume crossing. The open-cut construction method would involve excavating the pipeline trench across the waterbody, installing a prefabricated segment of pipeline, and backfilling the trench with native material. Depending on the width of the crossing and the reach of the excavating equipment, excavating and backfilling the trench would generally be accomplished using backhoes or other excavation equipment operating from one or both banks of the waterbody. Excavated material from the trench would be placed on the bank, above the bank high water mark for use as backfill. A pipe segment of sufficient length to span the waterbody would be weighted, as necessary, to provide negative buoyancy. Typical backfill cover requirements would be met, contours would be restored within the waterbody, and the banks would be stabilized via seeding and/or installing erosion-control matting.

2.4.2.5 Night-time Construction

Several construction scenarios exist that may dictate night work, including but not limited to, the following:

- Working during non-peak hours to avoid traffic impacts or disruption to businesses;
- Tie-ins and/or other welding activities that cannot stop once they are started;
- HDD, which typically operates continuously or at a minimum of 12 hours per day; and
- Hydrostatic testing.

Night work is expected to occur in limited circumstances and would require lighting. Construction activities would be planned to avoid tie-ins during evening hours to the extent possible; however, tie-ins may extend beyond typical working hours on occasion.

2.4.3 Aboveground Facility Construction

Aboveground facilities including the Rainbow Pressure-Limiting Station, MLVs, cathodic protection test stations (cathodic protection system is mostly underground; test stations are installed aboveground), and cross-tie facilities would be constructed in accordance with all applicable regulations.

2.4.3.1 Rainbow Pressure Limiting Station

The Rainbow Pressure-Limiting Station would be constructed within approved workspaces (see Section 2.4.2, Specialized Pipeline Construction Procedures). First, the workspace would be cleared and graded (see to Section 2.4.1.3, Clearing and Grading). A concrete foundation and gravel would be employed at the site. Equipment would be installed in a similar manner as described in Sections 2.4.1.7, Pipe Bending, Welding and Coating and 2.4.1.8, Lowering-in, Backfill, and Compaction. Once the facilities are constructed, masonry block would be constructed by hand crews around the perimeter of each site.

Barbed wire would be installed along the top of the masonry wall. Swing gates that measure approximately 20 feet wide would be installed for vehicle access, and 4- to 6-foot-wide swing gates would be installed for pedestrian access.

2.4.3.2 Mainline Valves

Installation of the new MLVs would be conducted in accordance with DOT regulations Title 49, Part 192 of the CFR and General Order 112-E. At each of the MLV sites along the pipeline route, clearing and grading would be accomplished as part of pipeline construction. A concrete foundation would be constructed as described for the Rainbow Pressure-Limiting Station. The pipeline construction crew would connect the MLVs to the proposed pipeline using the welding and testing procedures described for pipeline construction (see Section 2.4.1.4, Hauling and Stringing the Pipe). After the valves are installed, masonry block walls, barbed wire, and swing gates would be installed as described for the pressure-limiting station (see Section 2.4.3.1, Rainbow Pressure Limiting Station).

2.4.3.3 Cathodic Protection Test Stations

Cathodic protection test stations would be installed at approximately 2,000-foot intervals along the pipeline. Wires would be connected to the pipeline and brought to the surface to an approximately 3-foot-high above-grade PVC cylinder within the ROW. In urban areas, a street surface access road cover[9] would be used.

2.4.3.4 Cross-Ties

The applicants would construct tie-ins with Line 1601, Line 1600, and Line 2010 using the cold tie-in method. The cold tie-in method involves isolating and depressurizing (or blowing down) a section of the existing pipeline, so the section is free of natural gas, or "cold," during the tie-in. Pressure-control fittings and bypass piping may be used to connect the tie-in. Once the pipeline section is depressurized and the tie-in location is excavated, the existing line would be cut and a tee, a t-shaped three-way outlet that connects two pipelines, would be welded into place. A connector pipeline would be installed from the tee to the cross-tie facility via trenching or horizontal boring. The tie-in location would then be backfilled, cleaned up, and restored.

The release of natural gas (blowdown) from the existing line in preparation of tie-in would occur at the existing valves or pressure-control fittings on the existing pipelines in accordance with CFR Title 49, Part 192. The volume of gas released during a blowdown would depend on the pressure, size, and length of the pipeline.

2.4.3.5 Regulator Stations and Check Valves

See Section 2.2.2.1, Removal of Existing Regulator Stations for a description of the removal on regulator stations, construction of new regulator stations, and construction of check valves.

[9] An access road cover is a cast-iron cover that is rated for traffic loading conditions and measures 8 to 12 inches in diameter and 6 to 8 inches thick.

2.5 Construction Workforce and Schedule

The applicants anticipated that construction would have begun in the third quarter of 2019 and would take 15 to 24 months to complete. The size of the workforce required for construction would depend on the applicants' choice of contractor and the number of crews[10] assigned to work during construction at any given time. The construction of Line 3602 was anticipated to include four crews over three segments. Prior to the completion of Line 3602, one of the four crews would begin work on the Distribution System Modifications. The applicants estimate a maximum of approximately 600 personnel working on the proposed project at one time. Construction crews would work 10 to 12 hours per day and up to six days per week, as dictated by local ordinances and permit conditions. HDD, horizontal boring, hydrostatic testing, final tie-ins, and X-ray activities may require extended construction hours, up to 24 hours per day.

2.6 Operation, Maintenance, and Emergency Response

2.6.1 Line 3602

The proposed project would be operated and maintained according to CFR Title 49, Part 192, which sets minimum federal safety standards for transportation of natural gas via pipelines. In accordance with the applicants' operation and maintenance procedures, the applicants' existing staff would operate and maintain the pipeline; perform routine maintenance of the pipeline, valves, and pressure-limiting and metering equipment; and respond to emergency situations. These operation and maintenance procedures—including emergency planning, on-call response, and incident reporting—would provide for prompt and effective responses to significant, irregular conditions detected along the pipeline. Typical testing and inspection procedures conducted by the applicants, including the periodic pigging of the line, annual aerial patrol with a helicopter and/or through ground patrols, would be in compliance with federal and state regulations. Existing personnel would conduct these routine operation and maintenance activities in the same manner as the activities currently conducted for existing pipelines in the vicinity. Table 2.6-1 describes the proposed maintenance activities and frequency.

Vegetation would be managed within the permanent ROW to maintain access. Shrubs up to 6 feet high would be permitted to reestablish within the permanent ROW, in areas that had shrubbery prior to construction. Allowing trees to grow within the ROW conflicts with SDG&E's Transmission Pipeline Encroachment Procedures. Therefore, except in limited circumstances, it would not be permissible for trees to be growing in the permanent ROW. In the few areas that require a permanent pipeline patrol road, the road would be maintained to 12 feet wide and kept free of vegetation. Permanent aboveground facilities would be maintained free of vegetation.

Table 2.6-1 Line 3602 Maintenance Activities

Activity	Frequency
Inspection of all valves	Annually
Inspection of pressure-limiting equipment	Annually
Inspection of pneumatic and electronic auto-closure equipment associated with the MLVs	Twice annually
Inspection of electronic equipment not associated with the mainline valves	Annually
Pipeline patrol and leak surveys of the entire line	Twice annually
Patrols of the highway and railroad crossings	Four times per year

[10] The applicants' reference to crews represents the grouping of personnel required to complete a main construction spread

Table 2.6-1 Line 3602 Maintenance Activities

Activity	Frequency
Patrol for the class location survey	Annually
Cathodic protection surveys	Annually
Readings taken from rectifiers provided cathodic protection	Six times annually
Inspections of above-ground facilities for atmospheric corrosion	Once every three years
Pigging or in-line inspection	Once every seven years
Exposing various portions of the pipeline to verify pigging results	Once every seven years
Providing locate-and-mark services (e.g., DigAlert or 8-1-1)	Varied based on requests by third parties
Providing surveillance of entities excavating over the pipeline	Varies (estimated 12 times per year)

2.6.2 Distribution System Modifications

In accordance with the applicants' operation and maintenance procedures, the applicants' existing staff would operate and maintain the distribution pipelines and regulator stations; perform routine maintenance of the pipeline including annual aerial patrol with a helicopter and/or through ground patrols, check valves, and regulator stations; and respond to emergency situations. These operation and maintenance procedures also included emergency planning, on-call response, and incident reporting, and thus would provide for prompt and effective responses to significant, irregular conditions detected along the pipeline. Operation and maintenance activities would comply with federal and state regulations. Table 2.6-2 describes proposed maintenance activities and frequency.

Vegetation would be managed in the distribution system modification facilities similarly to Line 3602.

Table 2.6-2 Distribution System Modifications Maintenance Activities

Activity	Frequency
Inspection of all regulator stations and check valves	Annually
Inspection of EPM Systems	Annually
Pipeline patrol and leak surveys at Class III locations	Annually
Cathodic protection reads for rectifier and test points	Bimonthly/annually
Locate-and-mark services (i.e., DigAlert or 8-1-1)	Varied based on requests by third parties
Surveillance of entities excavating over the pipeline	Varies (estimated 12 times per year)

Notes:
"Class location" refers to a regulatory designation for natural gas transmission pipelines that indicated the level of human population within a certain distance on either side of the pipeline. Class location is a factor in determining the maximum allowable operating pressure of a pipeline.
"Class III" refers to an area where a pipeline lies within 100 yards (91 meters) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theatre, or other public assembly place) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in a 12-month period.
Key:
EPM = Electronic Pressure Modeling

2.7 Potential Permitting and Consultation Requirements

Table 2-7-1 lists the federal, state, and local permits and consultations that may be required for construction and operation of the proposed project.

Table 2.7-1 Federal, State, and Local Permits and Consultations

Agency/Group	Jurisdiction/Trigger	Consultation or Permit
Federal		
Department of the Navy, MCAS Miramar	Authorization for pipeline facilities in and across MCAS Miramar-managed land	Land and Airspace Management Policy Tier 1 Application
	NEPA review for project facilities under DoD jurisdiction	NEPA compliance may be required if the project approved by the CPUC would be located on DoD land
U.S. Army Corps of Engineers	Work within waters of the U.S., including wetlands	Clean Water Act Section 404
U.S. Fish and Wildlife Service	Activities that may affect federally listed species or their habitats	Endangered Species Act Section 7 or 10 consultation and take authorization (if required)
Advisory Council on Historic Preservation	Federal action (i.e., crossing MCAS Miramar) that may affect cultural or historic resources	National Historic Preservation Act Section 106 Review
State		
California Public Utilities Commission	Construction of a new, intrastate, 36-inch-diameter natural gas pipeline and Distribution System Modifications	Certificate of Public Convenience and Necessity
	CEQA compliance required for issuance of a discretionary permit	Certification of CEQA environmental document
State Water Resources Control Board	Stormwater discharges associated with construction activities disturbing 1 or more acre of land	National Pollutant Discharge Elimination System – Construction Stormwater Permit
	Discharge of trench water or hydrostatic test water that may affect a water of the Sate	Waste Discharge Requirements
California Department of Fish and Wildlife	Activities that will disturb the bed or bank of a jurisdictional waterbody	California Fish and Game Code Section 1600 Streambed Alteration Agreement
	Activities that may affect state listed species	California Endangered Species Act Section 2081 Incidental Take Permit
Regional Water Quality Control Board	Activities authorized by federal agencies that may affect state water quality	Clean Water Act Section 401 Water Quality Certification
State Historic Preservation Officer	Activities that may affect cultural or historic resources	SHPO Consultation
Caltrans	Encroachment Permit	Construction of facilities within, under, or over state highway ROWs
Native American		
Advisory Council on Historic Preservation	Federal undertaking that may affect historic properties	Section 106 of the National Historic Preservation Act – Review and Consultation
State Historic Preservation Officer	Activities that may affect cultural resources	SHPO Consultation under CEQA
American Indian Tribes		
California Native American Tribe[a]	A project in a tribe's area of traditional and cultural affiliation	Assembly Bill 52 and CEQA–consultation and consideration of tribal cultural resources
Federally Recognized American Indian Tribes	Federal undertaking that may affect historic properties	Section 106 of the National Historic Preservation Act –Consultation

Table 2.7-1 Federal, State, and Local Permits and Consultations

Agency/Group	Jurisdiction/Trigger	Consultation or Permit
Regional/Local		
County of San Diego	Construction of facilities within, under, or over road ROWs	Encroachment Permit
City of San Diego		
City of Poway		
City of Escondido		

Notes:
[a] The CPUC has initiated Assembly Bill 52 consultation with California Native American tribes. Information regarding consultation is provided in Section 3.5, Cultural, Paleontological, and Tribal Cultural Resources.
Key:
CEQA = California Environmental Quality Act
CPUC = California Public Utilities Commission
DoD = Department of Defense
MCAS = Marine Corps Air Station
NEPA = National Environmental Policy Act
ROW = right-of-way
SHPO = State Historic Preservation Officer

2.8 Draft Analytical Figures

Existing Rainbow Metering Station
Rainbow Pressure-Limiting Station & Pipeline Inspection Launching Facility
RIVERSIDE COUNTY
SAN DIEGO COUNTY
MLV 1
Rainbow
Fallbrook
MLV 2
L1600
10
MLV 3
Bonsall
Bonsall
Pauma
Unincorporated San Diego County
MLV 4
Hidden Meadows West
Hidden Meadows East
Valley Center North
Valley Center South
Oceanside
Vista
North County Metro - North
20
MLV 5
San Marcos
Escondido
Line 1601 Cross-tie Facility
Carlsbad
North County Metro - South
MLV 6
Harmony Grove
North County Metro - East
1316
L1600
Line 1600 Cross-tie Facility / MLV 7 with Pressure Limiting Equipment
30
939
Encinitas
San Dieguito West
San Dieguito East
Ramona
MLV 8
1101
1516
Solana Beach
Poway
141
L1600
Regulator Station A
Del Mar
1500
Regulator Station B
1248
San Diego
Line 49-31C Pre-Lay Segment Replacement
MLV 9
40
1494
Mira Mesa Pipeline Extension
1051
Regulator Station C
1335
Line 49-31B Replacement
MLV 10
Marine Corps Air Station (MCAS) Miramar
L1600
982
Kearny Villa Pressure-Limiting Station
Santee
Lakeside
Line 2010 Cross-tie Facility & Pipeline Inspection Receiving Facility
El Cajon
Crest Rural Village

Overview
NV
CA
AZ
SAN DIEGO COUNTY
Pacific Ocean
MEXICO

- Milepost
- Rainbow Pressure-Limiting Station
- Cross-Tie Facility
- Mainline Valve (MLV)
- Regulator Station Removal
- Regulator Station Removal, Replace with Proposed Check Valve
- Regulator Station Removal, Replace with a Proposed New Regulator Station
- Proposed Regulator Station with Connecting Pipeline
- Line 3602
- Tie-Ins & Extensions

Existing Infrastructure
- Kearny Villa Pressure-Limiting Station
- Line 1600
- Line 1600 (Not part of the proposed project)

Land Administration
- Miramar
- Community Boundary
- San Diego County Municipal Boundary
- County Boundary

0 2.5 5 Miles

Figure 2.1-1
Project Overview
Pipeline Safety and Reliability Project - New Natural Gas Line 3602 and De-rating Line 1600
San Diego County, CA

Sources: ESRI 2012, 2018; SanGIS 2016; SDG&E 2017; USMC 2017

VICINITY MAP

SCALE: N.T.S.

SDGE A Sempra Energy utility™ SoCalGas A Sempra Energy utility SPEC SERVICES

Figure 2.2-1: Rainbow Pressure-Limiting Station Site Plan

SDG&E and SoCalGas 2015

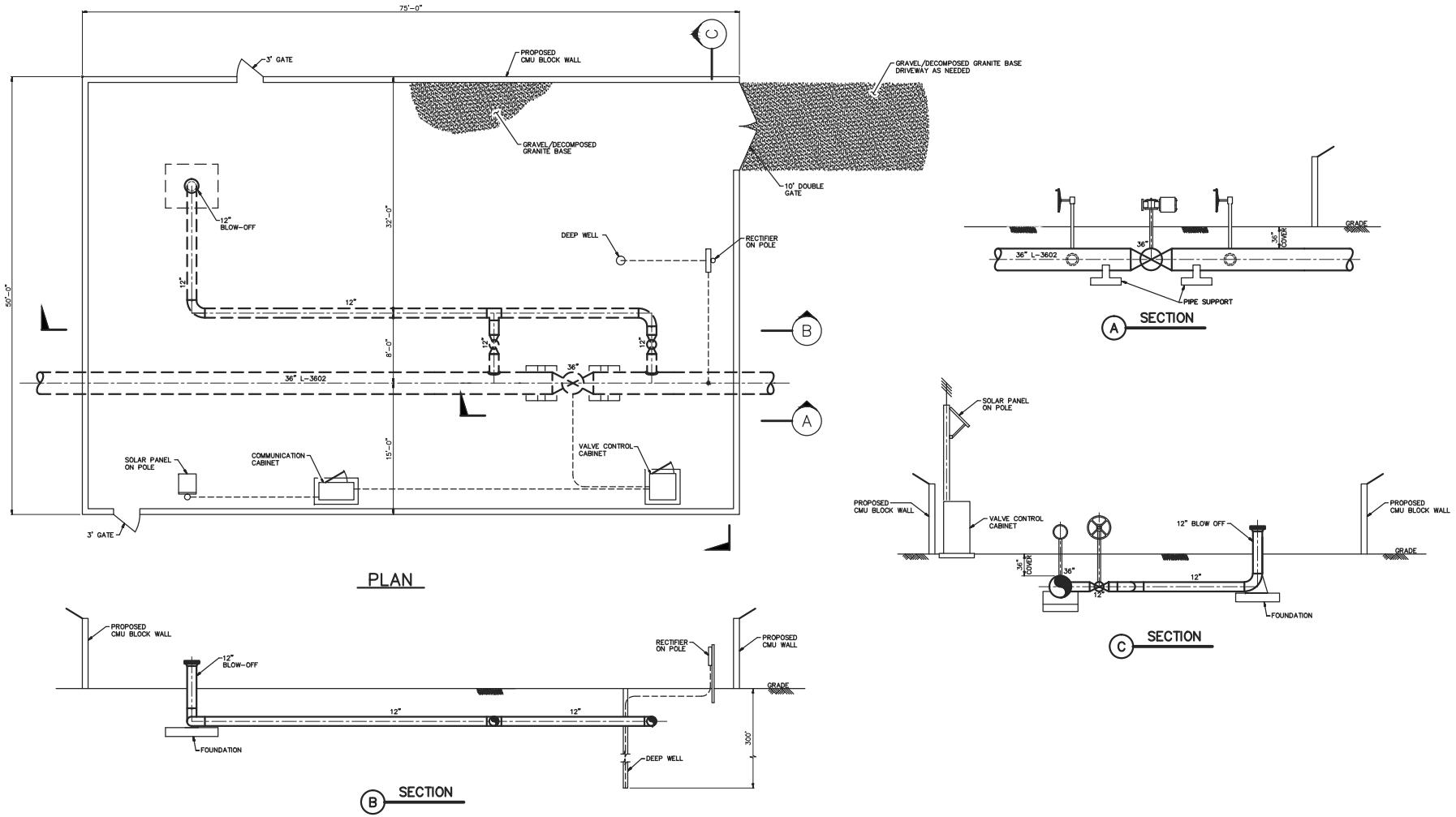
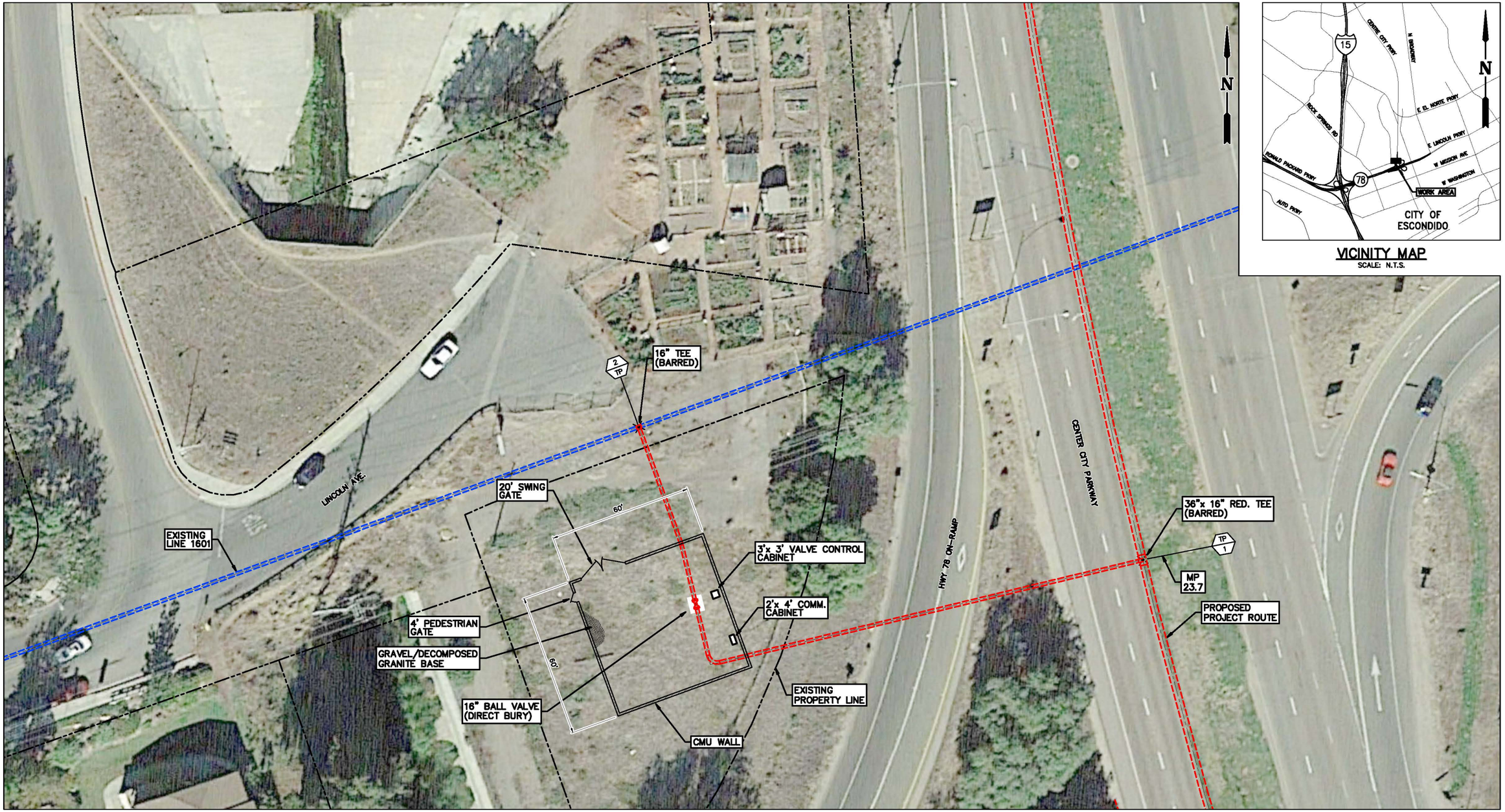


Figure 2.2-2: Typical Mainline Valve



VICINITY MAP
SCALE: N.T.S.

Figure 2.2-3: Line 1601 Cross-tie Site Plan

SDG&E and SoCalGas 2016

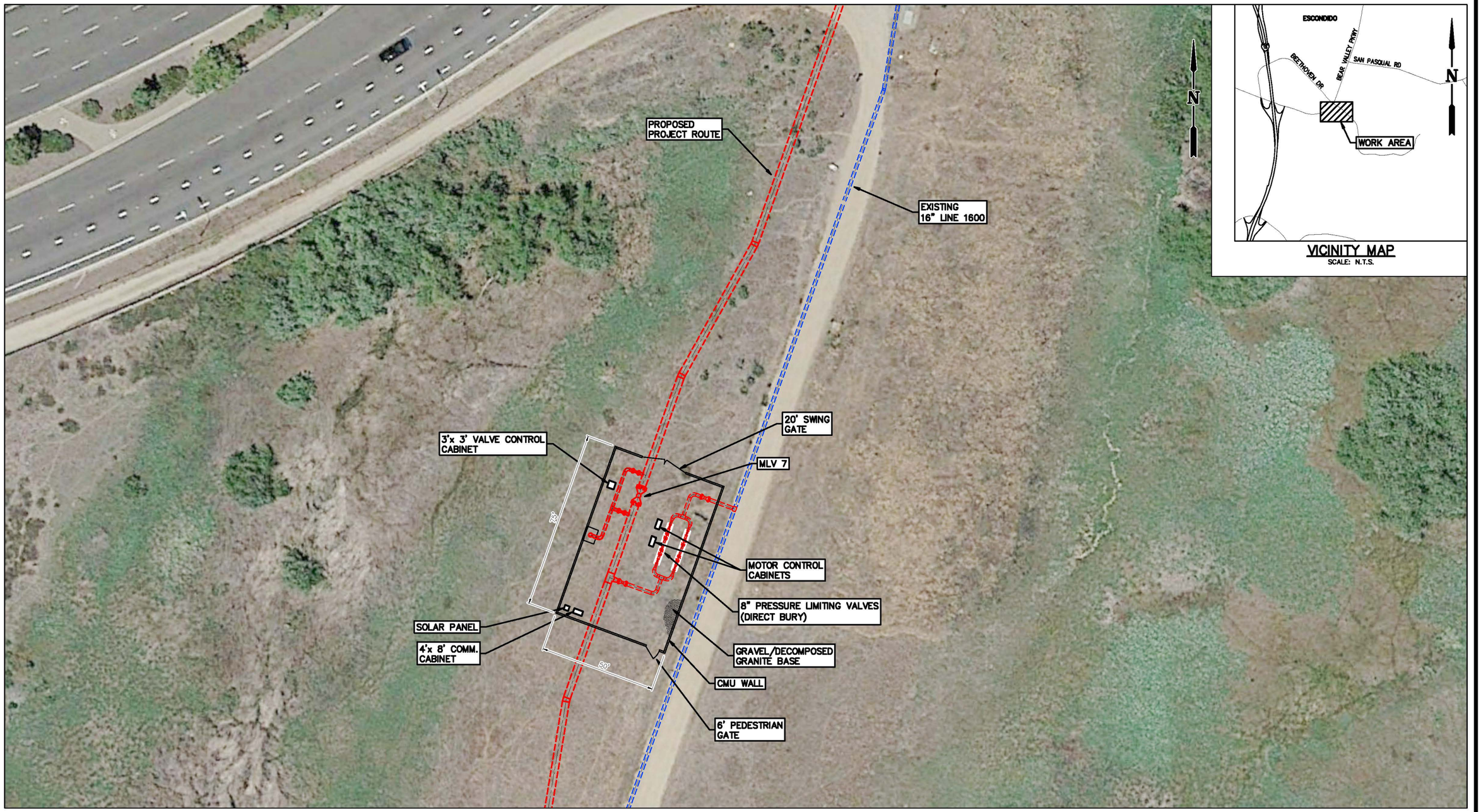


Figure 2.2-4: Line 1600 Cross-tie Site Plan

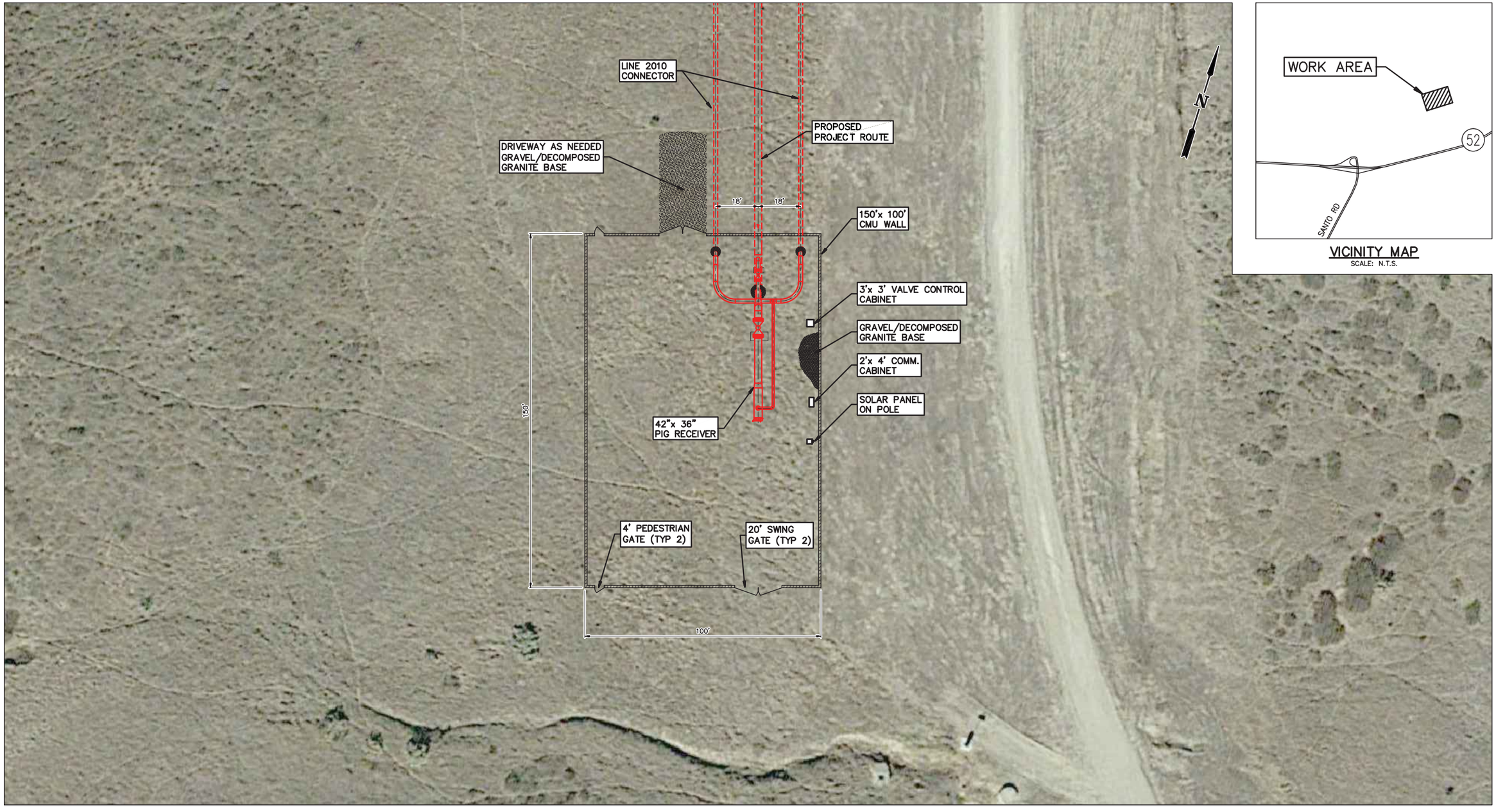


Figure 2.2-5: Line 2010 Cross-tie Site Plan

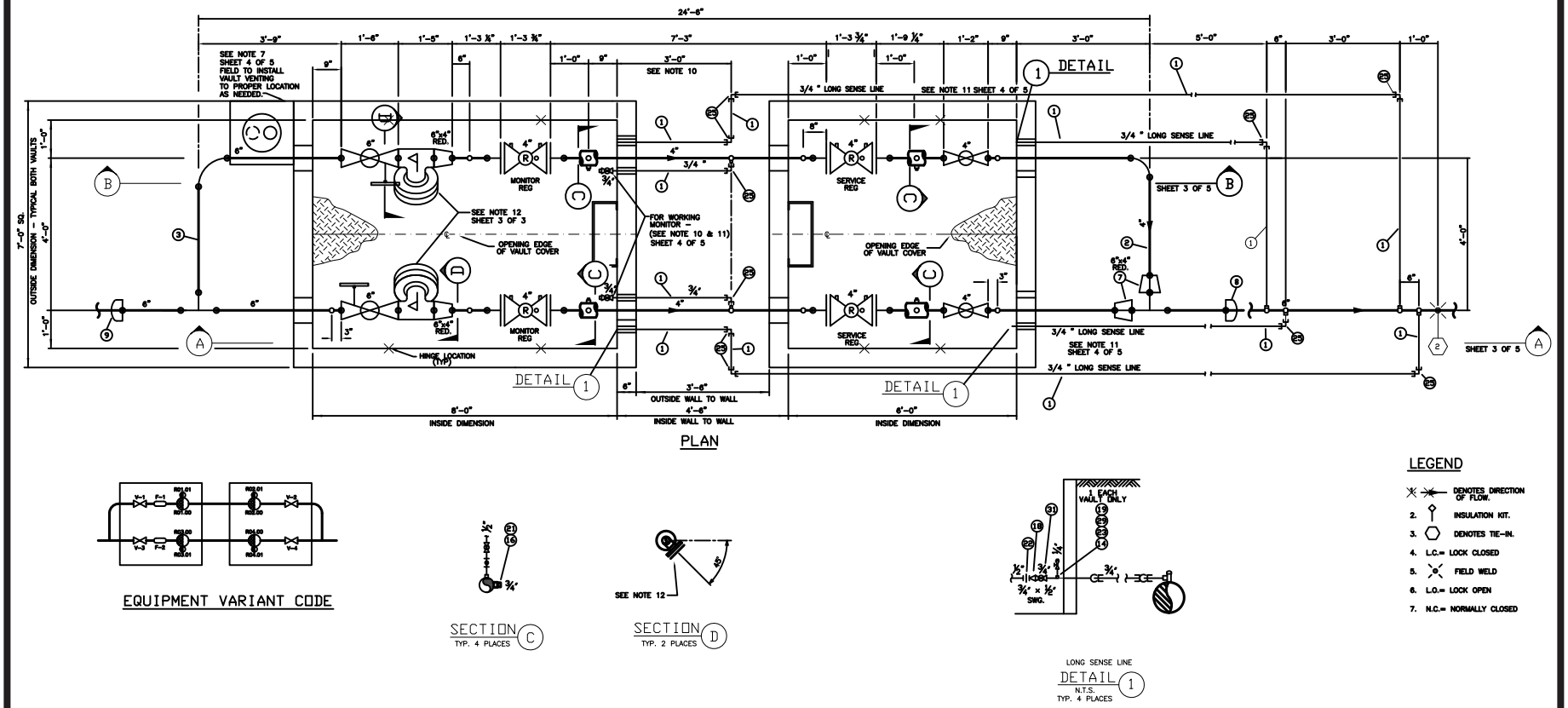
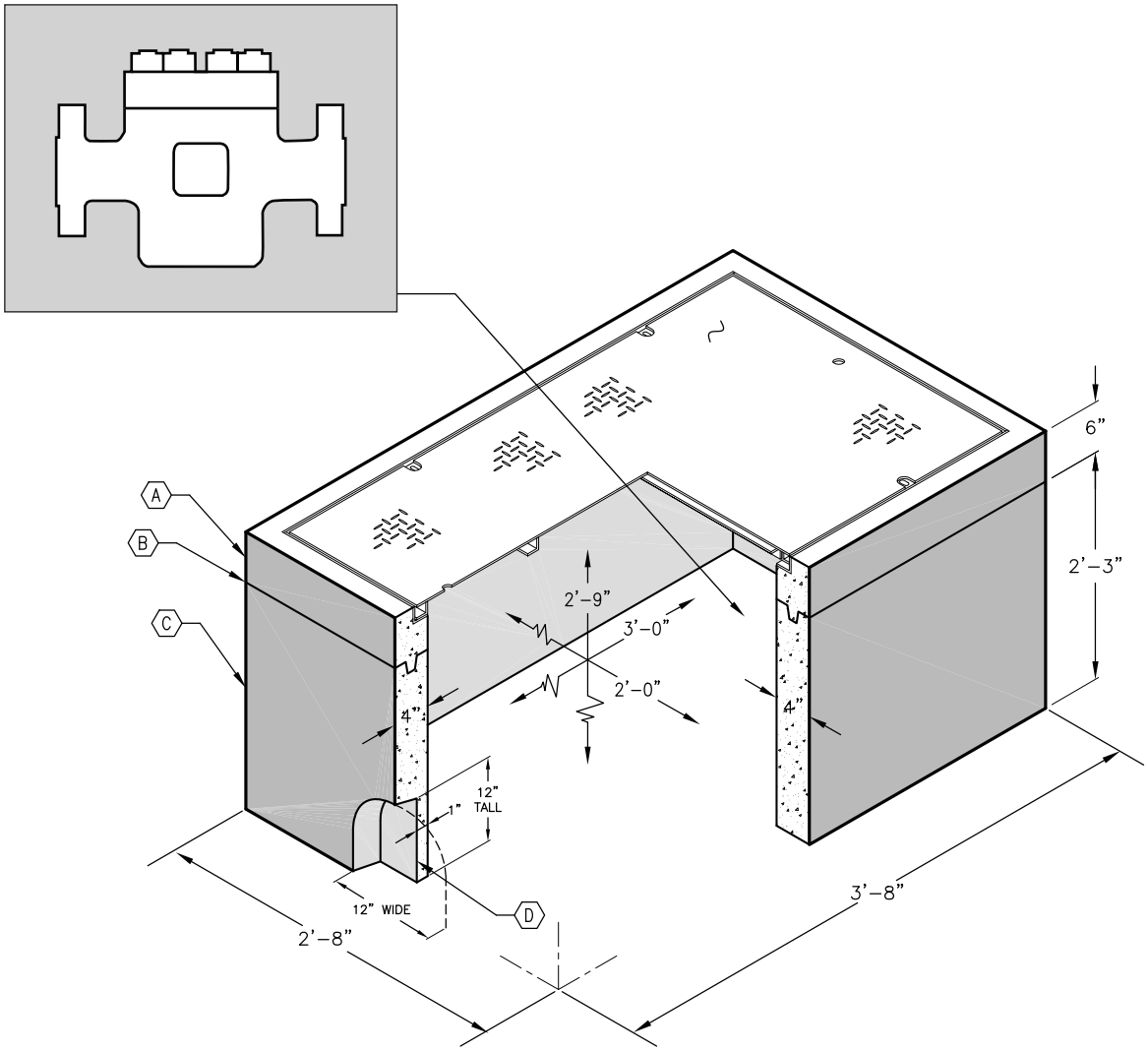


Figure 2.2-6: Typical Regulator Station



■ ILLUSTRATION IS TYPICAL ONLY OF GENERAL SERIES CONFIGURATION.

MINIMUM EXCAVATION SIZE:
3’-2” x 4’-2” DEPTH REQUIRED

Ⓐ 6” TOP SECTION WT. = 200 Lbs.

Ⓑ 6” OR 12” EXTENSION SECTIONS AVAILABLE

Ⓒ BOTTOM SECTION WT. = 1,200 Lbs.

Ⓓ 10” WIDE X 10” TALL PIPE KNOCKOUT ON EACH END WALL

Source: Jensen Precast W-2436 Series

SDGE A Sempra Energy utility SoCalGas A Sempra Energy utility

Figure 2.2-7: Check Valve Typical Drawing

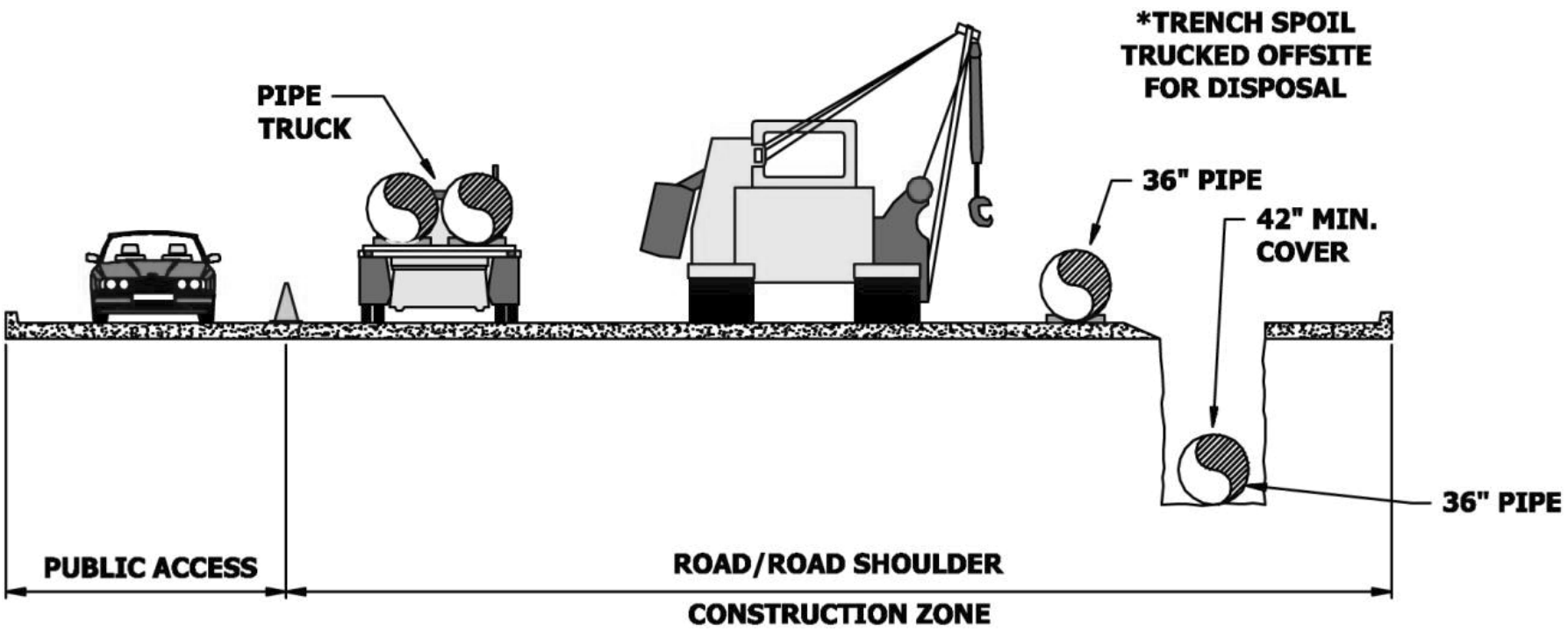


Figure 2.4-1: Typical Urban ROW Cross-Section, Option 1

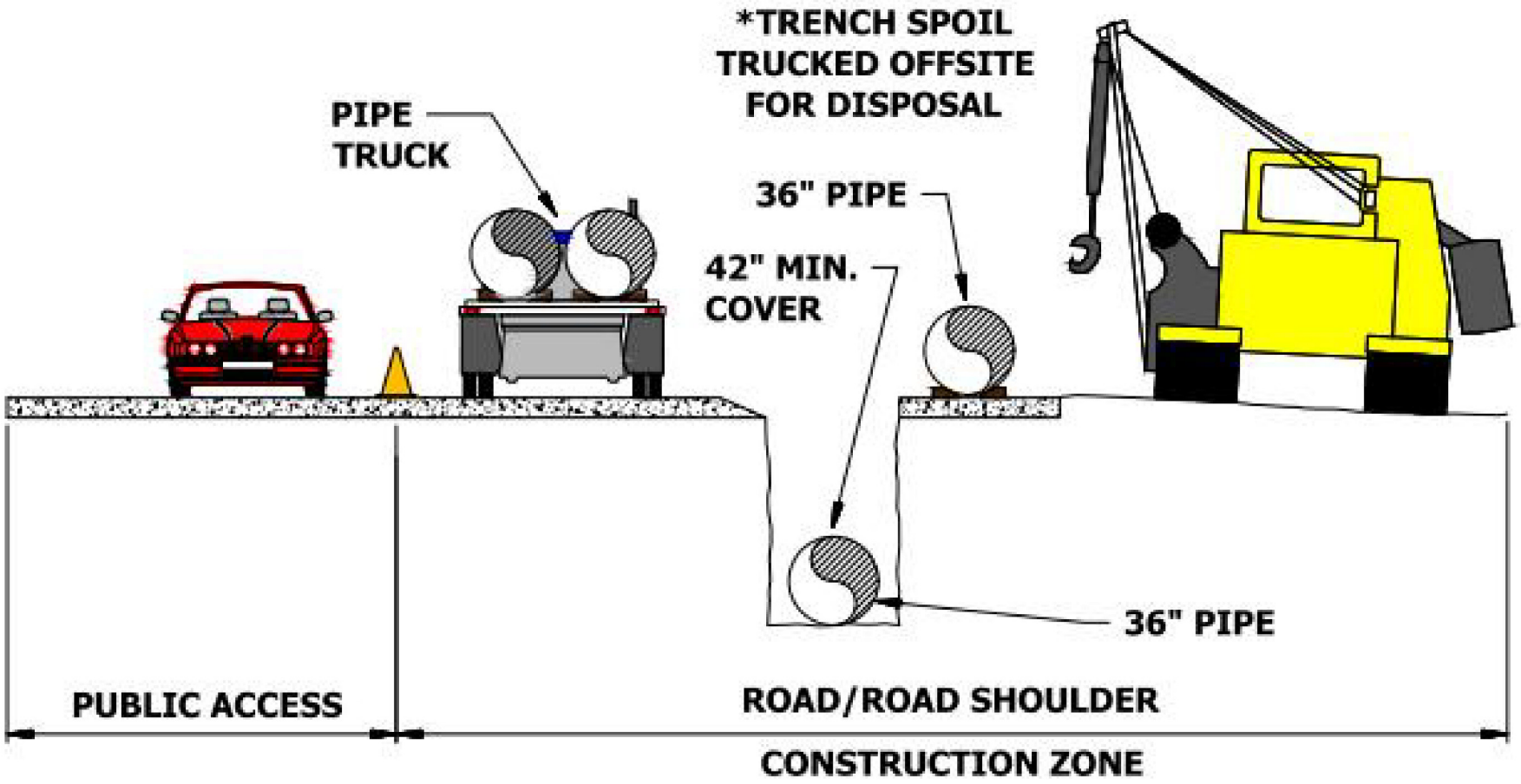


Figure 2.4-2: Typical Urban ROW Cross-Section, Option 2

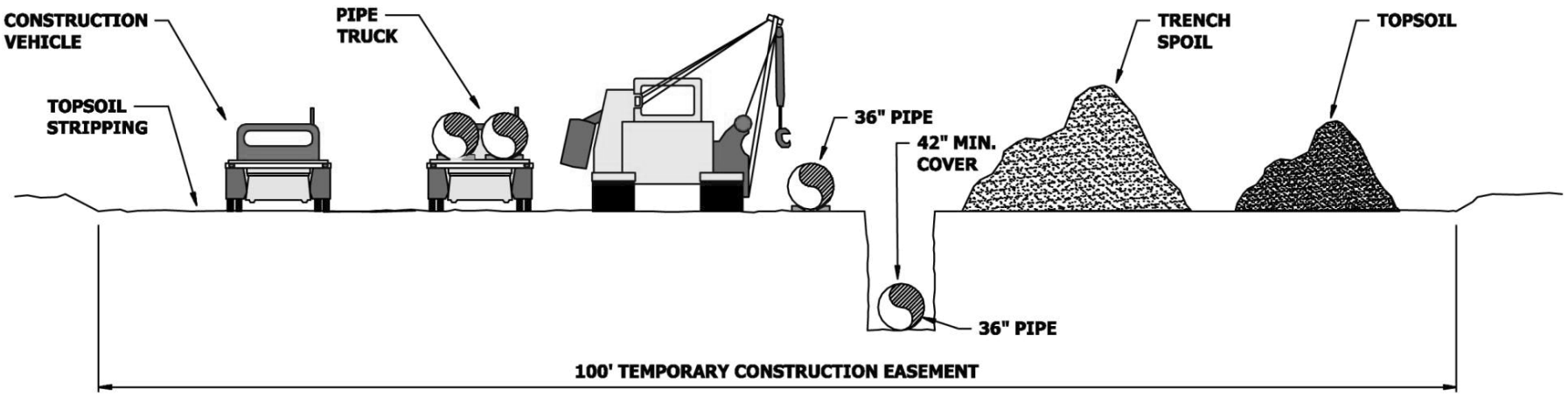


Figure 2.4-3: Typical Cross-Country ROW Cross-Section

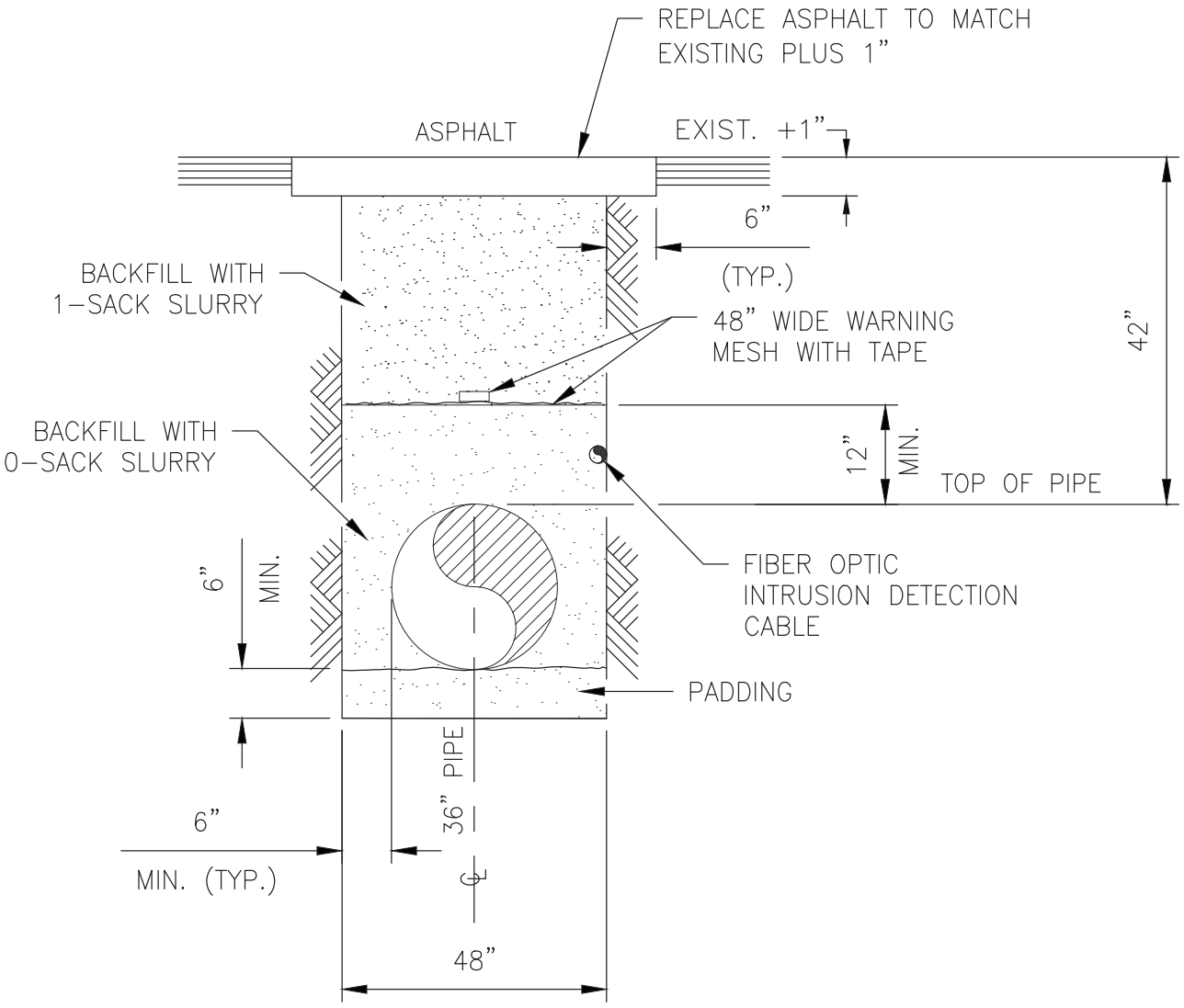


Figure 2.4-4: Typical Trench Cross Section – Urban

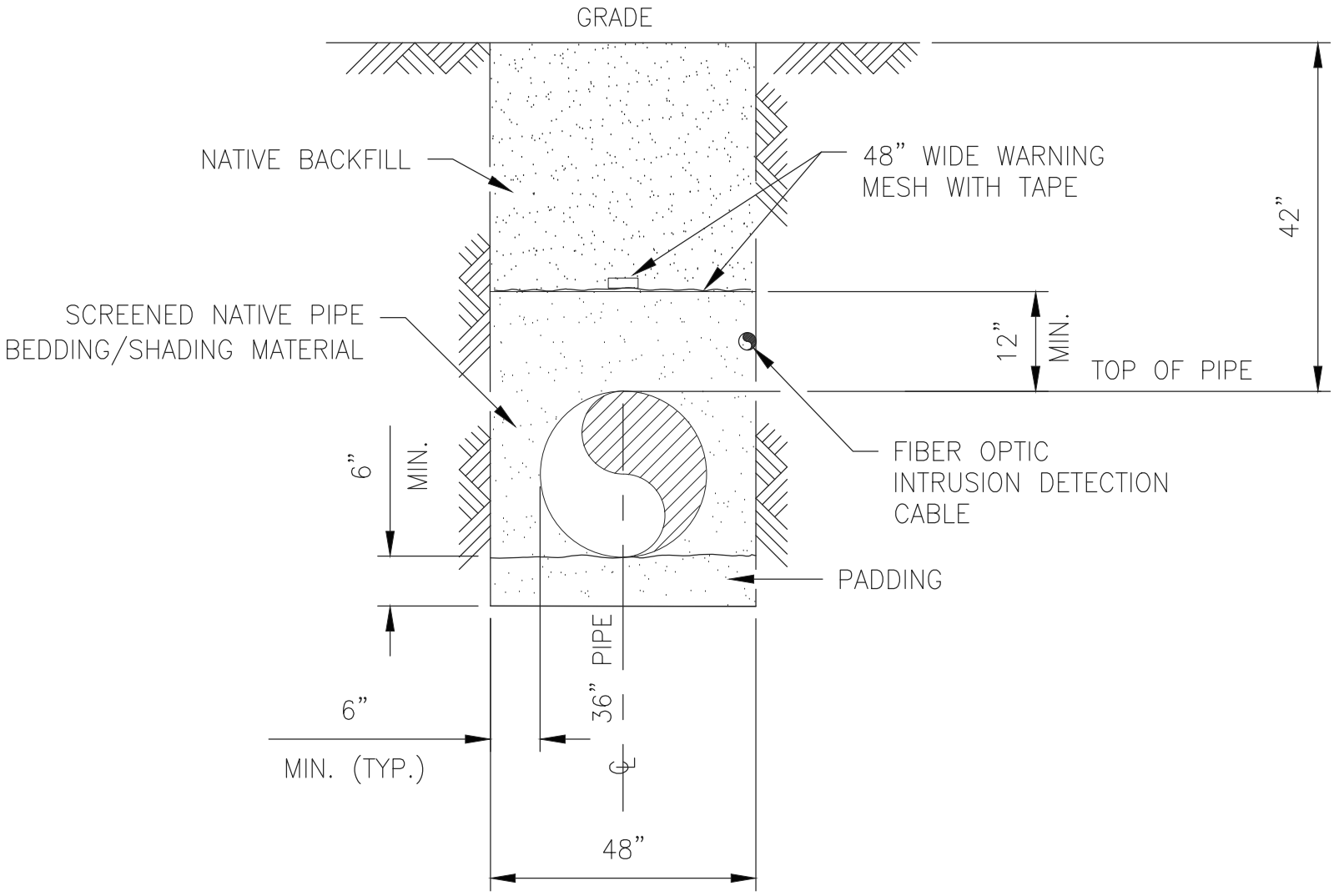


Figure 2.4-5: Typical Trench Cross-Section – Cross-Country

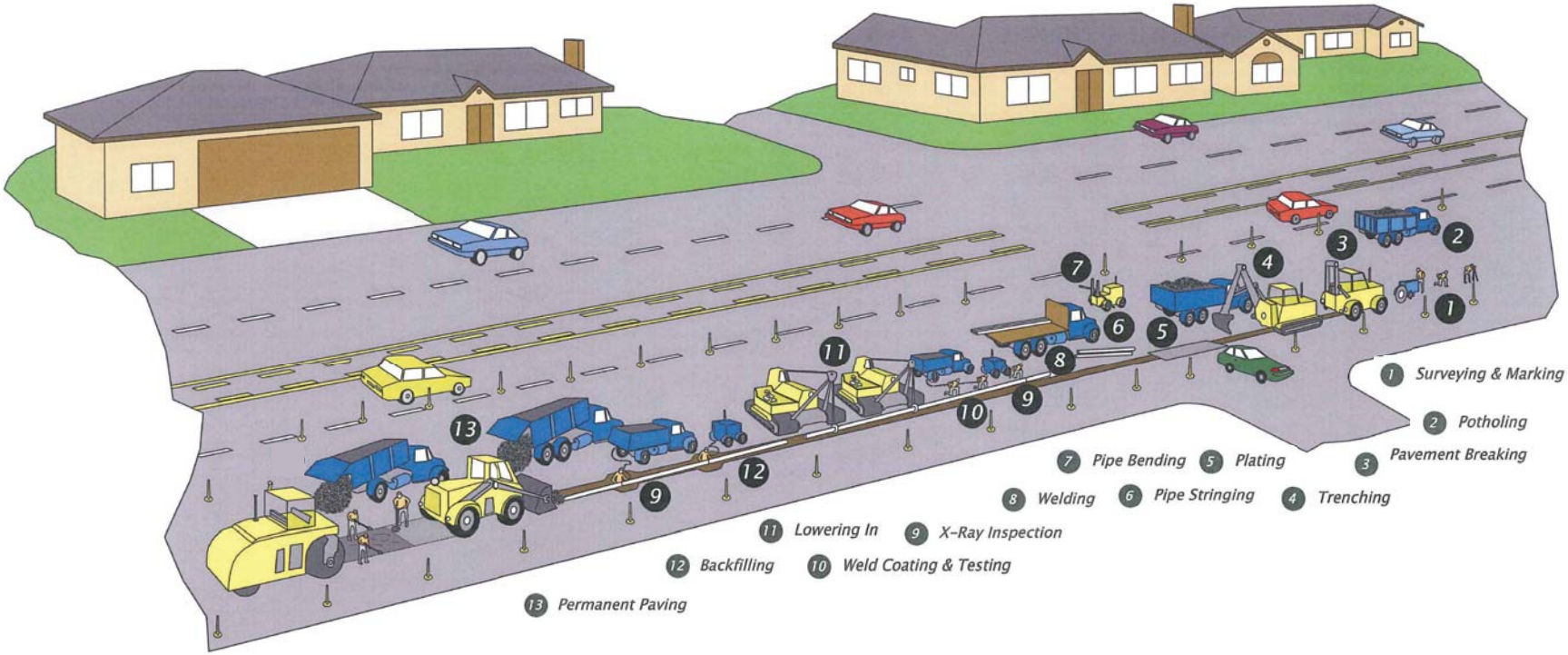


Figure 2.4-6: Typical Urban Construction Sequence

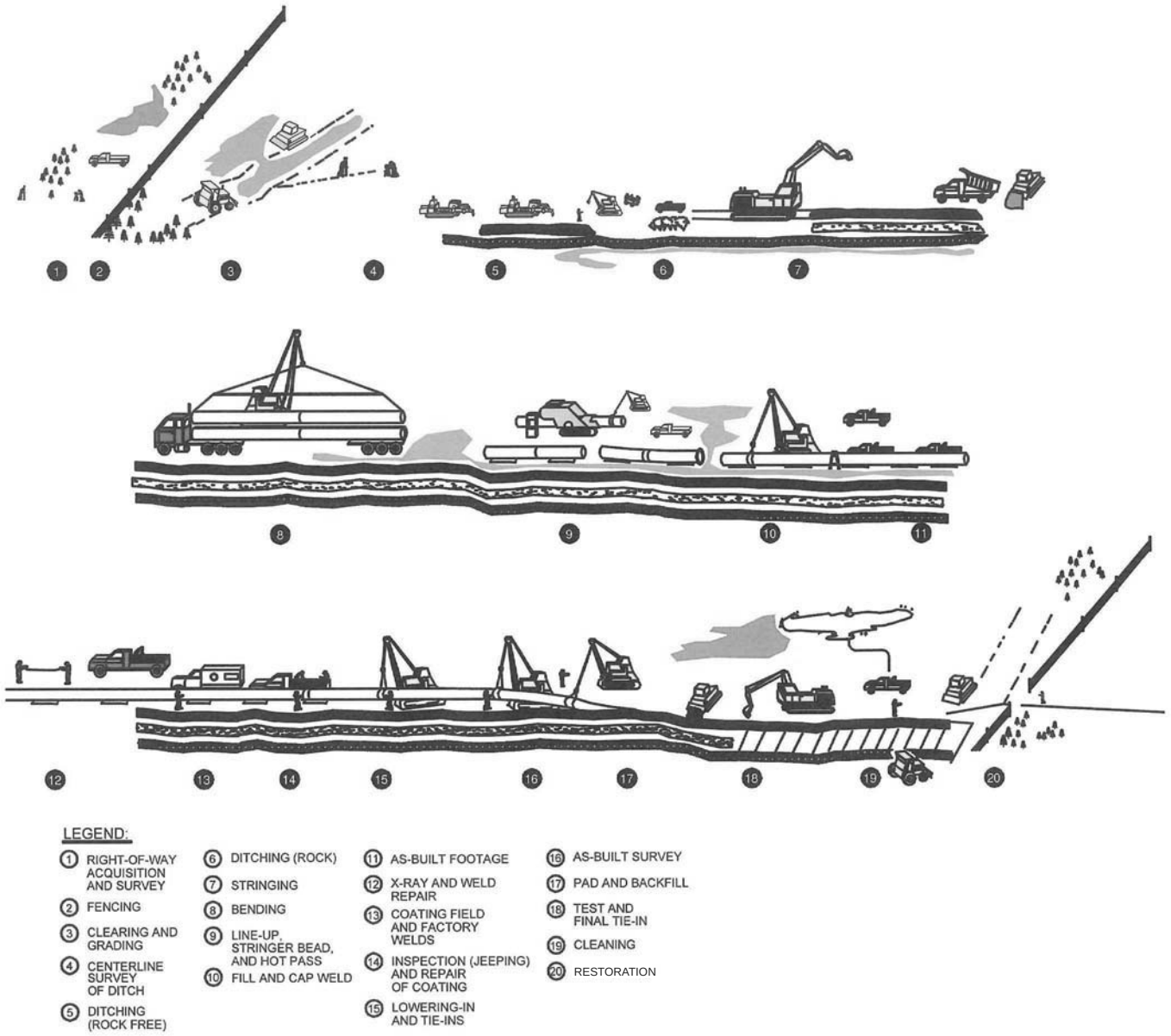


Figure 2.4-7: Typical Cross-Country Construction Sequence

Figure 2.4-8: Typical Residential Construction – Temporary Lane Closure

Figure 2.4-9: Typical Residential Construction – Temporary Road Closure

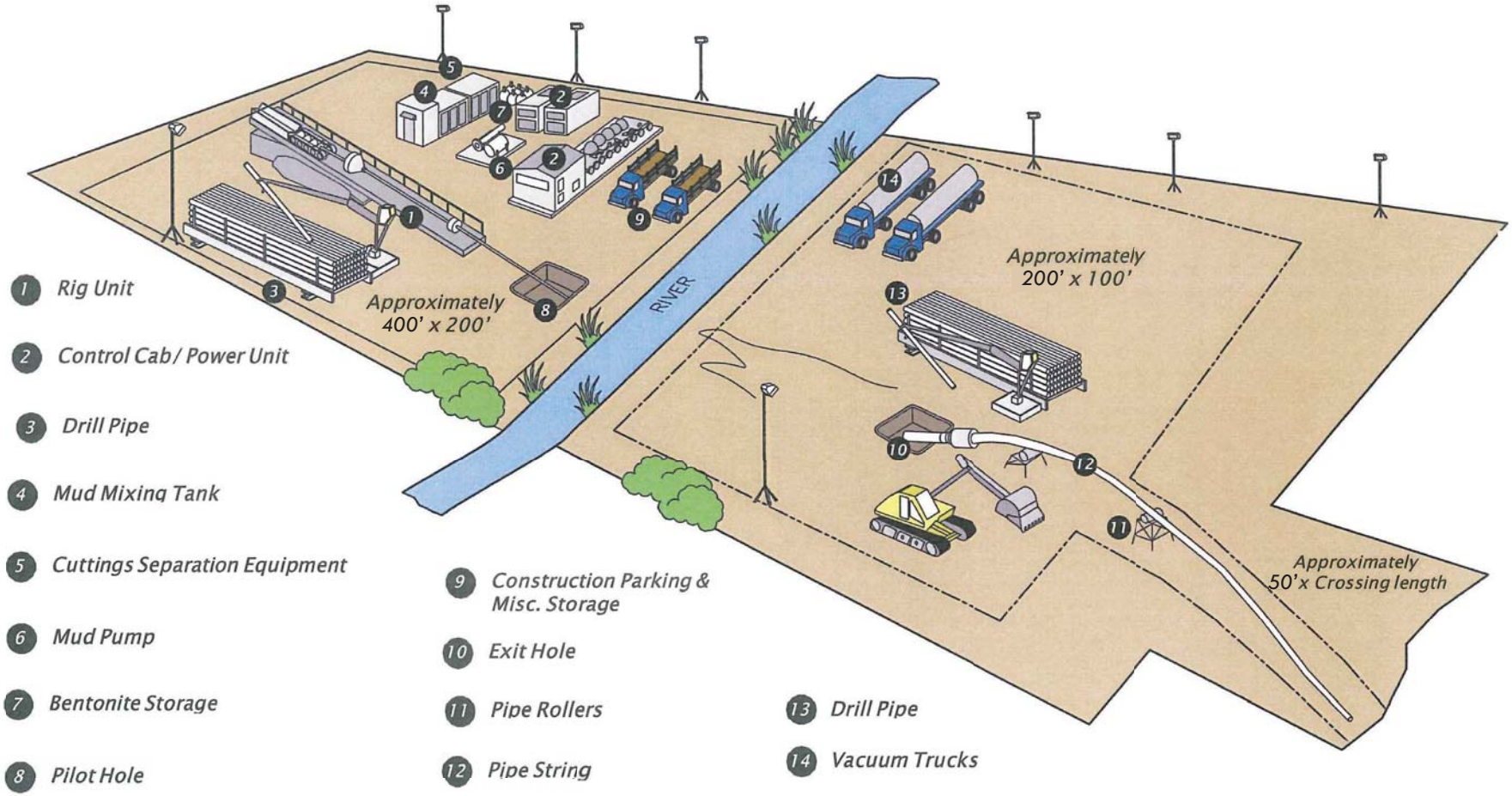
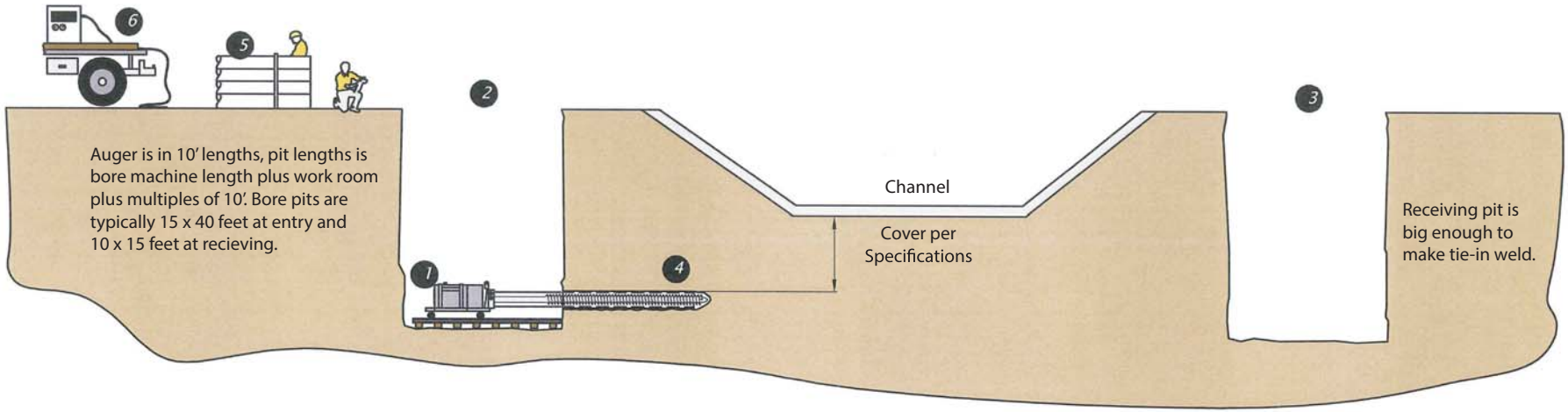


Figure 2.4-10: Typical Horizontal Directional Drill



1 Bore Machine
2 Entry Pipe
3 Receiving Pit
4 Carrier Pipe
5 Carrier Stock Pipe
6 Welding Machine

Figure 2.4-11: Typical Horizontal Bore – Channel

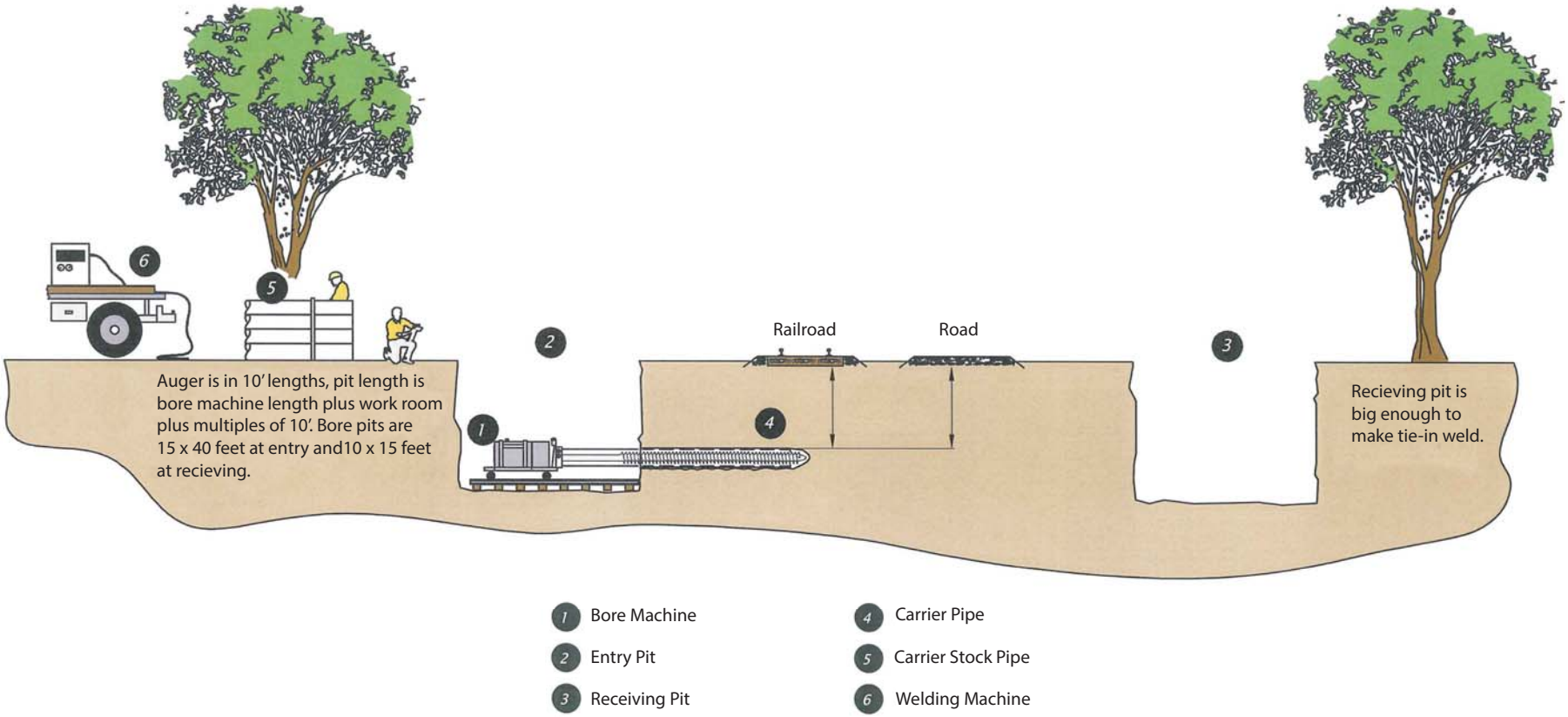


Figure 2.4-12: Typical Horizontal Bore - Road

2.9 References

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