Chapter 2 Project Description

The proposed project consists of the operation of a natural gas storage facility, the Florin Gas Field, which would require the construction of natural gas wells, a compressor station, metering and gas conditioning equipment, and approximately 2 miles of pipeline connections between the wells and compressor station and between the compressor station and existing SMUD and PG&E natural gas pipelines. The project would provide storage service in which SNGS would inject natural gas into and withdraw gas from the Florin Gas Field according to the storage needs of its customers.

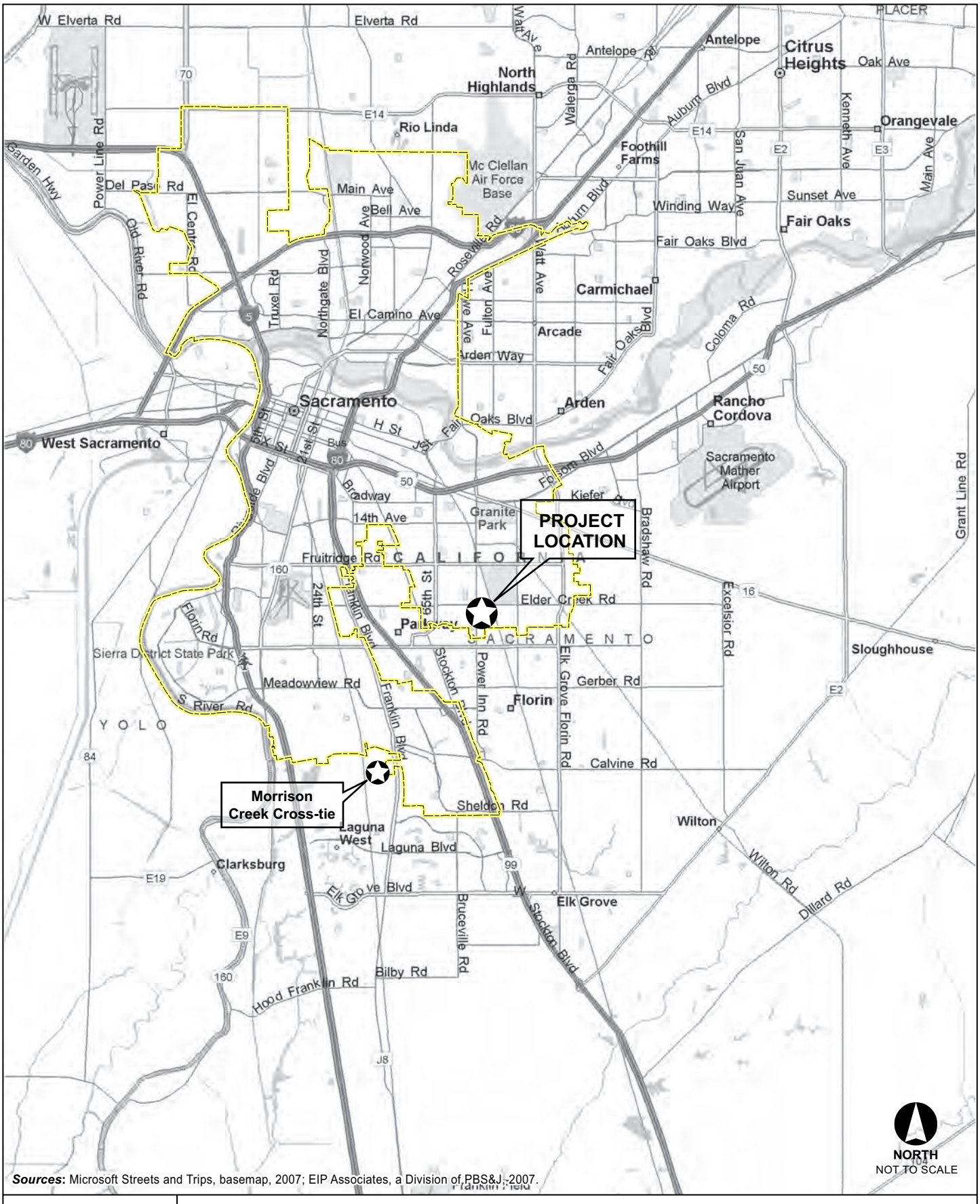
This chapter describes the project area, project background, pipeline route selection and evaluation process, project components, construction methods, operations and maintenance program, and required permits and approvals anticipated for the proposed project.

2.1 Site Description

The proposed project would be situated mainly in the southeast portion of the City of Sacramento (see Figure 2-1) with metering and gas conditioning equipment in the unincorporated portion of Sacramento County. The project components would extend from the wellhead site, at the northeast corner of the intersection of Junipero Street and Power Inn Road, north to the compressor station site on the historic Sacramento Army Depot that is now a business park called Depot Park (see Figure 2-2). Pipeline components would connect from the wellhead site to the compressor station and from the compressor station to existing SMUD and PG&E pipelines located beneath Fruitridge Road. Additionally, metering and gas conditioning equipment would be located at the Morrison Creek Cross-Tie, an existing natural gas station where SMUD and PG&E lines connect. The Cross-Tie is located on the Sacramento Regional County Sanitation District (SRCSD) Bufferlands site, which is included in the Stone Lakes National Wildlife Refuge boundary, between Franklin Road and I-5 in the southwest portion of Sacramento County. SNGS is proposing to lease capacity in SMUD's Line 700 to provide the interconnection between the SNGS storage facility and PG&E Line 108 and between the SNGS storage facility and PG&E Line 400/401.

The proposed project would store natural gas in the depleted Florin Gas Field reservoir, which is approximately 3,800 feet underground (see Figure 2-3). A dome-shaped layer of hard shale caps the reservoir and would keep the stored gas trapped. The field is centered under Danny Nunn Park (formerly Reservoir Park), at the corner of Power Inn Road and 53rd Avenue. About three-fourths of the field is in the City of Sacramento, and one quarter is in Sacramento County. In addition to the park, 695 residential parcels, 40 industrial and commercial parcels, and 10 parcels owned by the City of Sacramento are located above the field.

The wellhead site and compressor station site contain predominately non-native annual grassland habitat, surrounded by residential and commercial development. There are no trees or buildings on either site, but a concrete pad is located at the compressor station site. There are no wetlands on the wellhead site, but they do occur along the pipeline alignment and to the south of the southern boundary



***Sources*:** Microsoft Streets and Trips, basemap, 2007; EIP Associates, a Division of PBS&J, 2007.

EIP ASSOCIATES

A division of PBS&J

FIGURE **2-1**

General Project Location

D41288.00

Sacramento Natural Gas Storage Project PEA

12181 | JCS | 06

Source: EIP Associates, a Division of PBS&J, 2007.

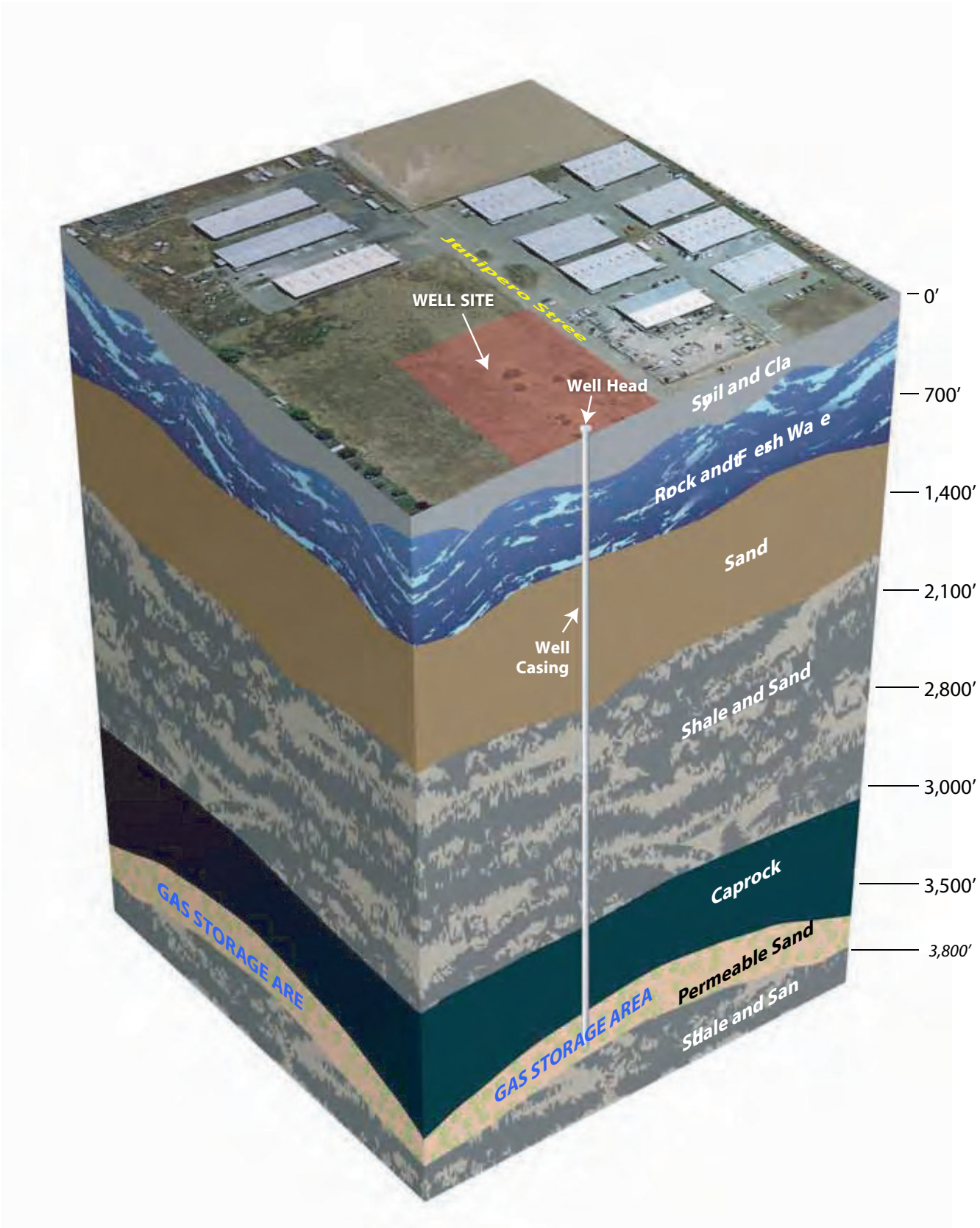
EIP ASSOCIATES
A division of PBS&J

FIGURE **2-2**
Project Area

D41288.00

Sacramento Natural Gas Storage Project PEA

12181 | JCS | 06



***Source*:** The Hoyt Company, 2007.

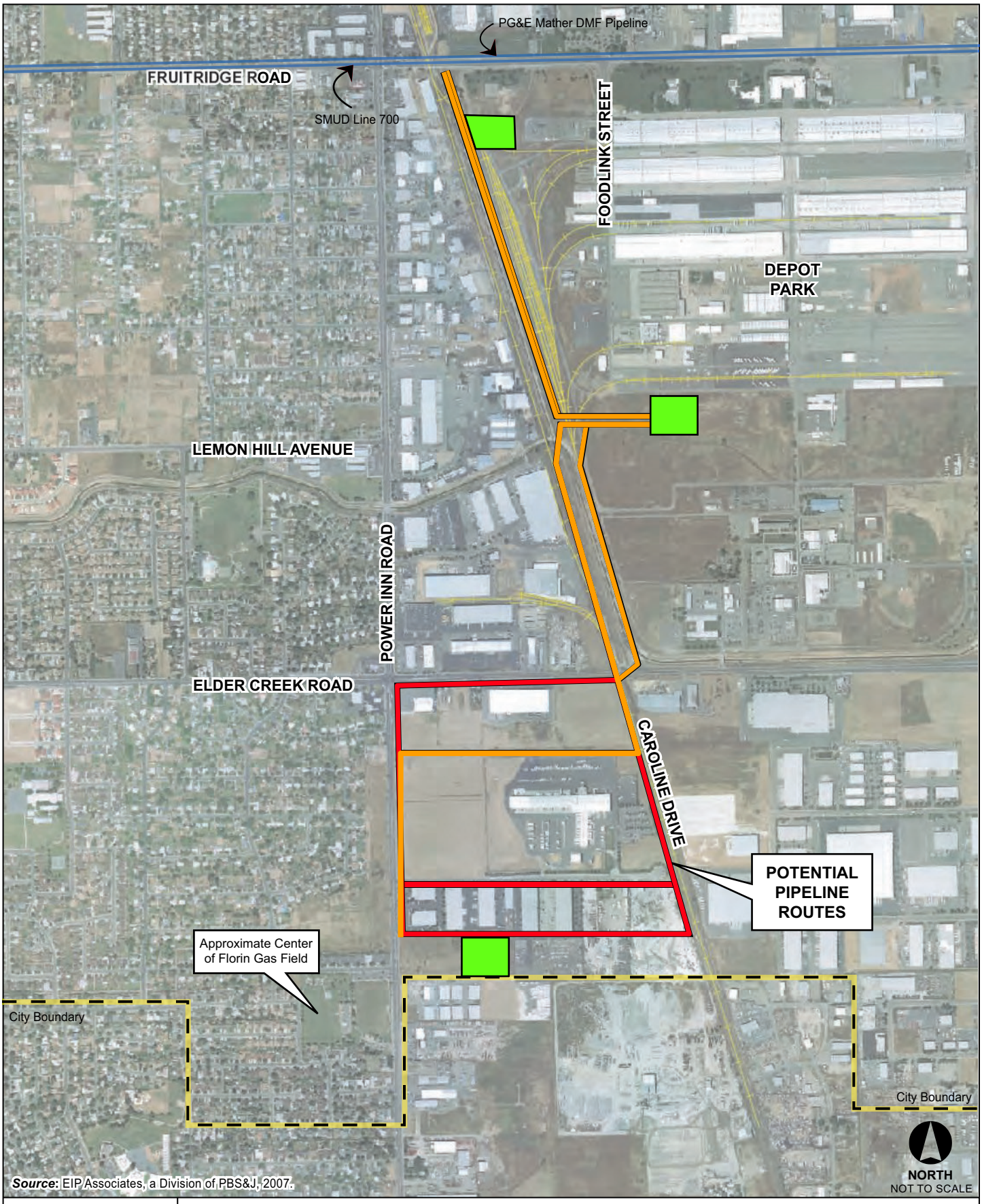
EIP ASSOCIATES

A division of PBS&J

FIGURE **2-3**

Subsurface Diagram

12181 | JCS | 06



Source: EIP Associates, a Division of PBS&J, 2007.

EIP ASSOCIATES

A division of PBS&J

FIGURE **2-4**

Compressor Station and Pipeline Alignment Alternatives

D41288.00

Sacramento Natural Gas Storage Project PEA

12181 | JCS | 06

of the compressor station site. The Morrison Creek Cross-Tie site, where metering and gas conditioning equipment would be installed, is an existing gravel pad with other pipeline and station components.

Existing uses surrounding the wellhead site are industrial and commercial to the north, south, and east of the site, and residential to the west of the site, on the west side of Power Inn Road. The compressor station site is surrounded by industrial uses, with some open space to the south and west. A Union Pacific Railroad (UPRR) right-of-way forms the western boundary of Depot Park.

2.2 Project Background

California relies on out-of-state production for about 80 percent of its natural gas requirements. In 2003, California customers received 42 percent of their natural gas supply from basins located in the southwest, 26 percent from Canada, and 14 percent from the Rocky Mountains.[1] These sources rely on a limited transportation capacity that can meet California's needs most of the time. However, during extreme weather in the winter and summer, the requirements for natural gas exceed existing pipeline capacity. Storage facilities, such as the proposed project, assist in meeting the needs on those days when there is a transmission pipeline capacity shortfall. Additionally, the price of gas, as with all other commodities, fluctuates widely as a result of weather problems in various parts of the country. Utilities and large industrial customers can purchase and store gas when it is inexpensive, withdrawing it when prices rise.

Natural gas was extracted from the Florin Gas Field up until approximately 1987. Proctor and Gamble, Vendada National, TXO Production Corporation, and Union Oil Company drilled eight wells into the field, and five were successful. Total natural gas production from the gas field was approximately 8.3 billion cubic feet (Bcf). All of the wells were appropriately capped and abandoned, in accordance with the Division of Oil, Gas and Geothermal Resources (DOGGR) when they were no longer productive.[2,3,4,5,6,7,8,9] No wells, pipelines, or meters currently exist on or connect to the gas field.

The proposed project will be interconnected with the PG&E natural gas pipeline system at three locations: Line 400/401 (via capacity to be leased by SNGS on the existing SMUD Line 700, a 20-inch diameter pipeline that connects to Line 400/401 along County Road 29 near County Road 88 in Winters, California); Line 108 (at the existing Morrison Creek Cross-Tie via capacity to be leased by SNGS on the existing SMUD Line 700); and PG&E's 10-inch diameter Mather Distribution Feeder Main (DFM) line in Fruitridge Road. The Line 400/401 and Mather DFM interconnections will be

---

1 California Public Utilities Commission website, "Natural Gas and California," accessed January 18, 2007.
2 Reid, Robert A. Letter to Agnes V. List at Procter & Gamble Manufacturing Company, August 20, 1990.
3 Guerard, William F. Jr. Letter to Ronald L. Leineke, at Venada National, January 8, 1993.
4 Sullivan, John C. Letter to Ronald L. Leineke, at Venada National. March 13, 1981.
5 Reid, Robert A. Letter to Agnes V. List at Procter & Gamble Manufacturing Company, August 20, 1990.
6 Reid, Robert A. Letter to Bradley Govreau, at Union Oil Company of California, July 31, 1989.
7 Reid, Robert A. Letter to Robert M. Hinkel, at Union Oil Company of California, September 20, 1994.
8 Reid, Robert A. Letter to Robert M Hinkel, at Union Oil Company of California, April 23, 1993.
9 Sullivan, John C. Letter to Tommy L. Knowles, at TXO Production Corporation, March 5, 1985.

utilized for deliveries to and from the proposed project. The Line 108 interconnection will be used only for deliveries of gas to customers on the PG&E local transmission and distribution system.

The pipeline interconnection between the compressor station and SMUD Line 700, at a location in Fruitridge Road, will also serve as a direct customer connection allowing SNGS to receive shipments for storage directly from, and to make deliveries directly to, SMUD.

2.3 Facility and Route Selection and Evaluation Process

CEQA requires that decision makers consider reasonable alternatives when the proposed project could result in significant and unavoidable environmental effects. The proposed project would not result in significant impacts after mitigation (see Guidelines Sec, 15126.6, subd. (a) and (f)(2)(A)). However, for information purposes, a discussion of alternatives reviewed by SNGS is briefly described below and in greater detail in Chapter 4 for CPUC's review.

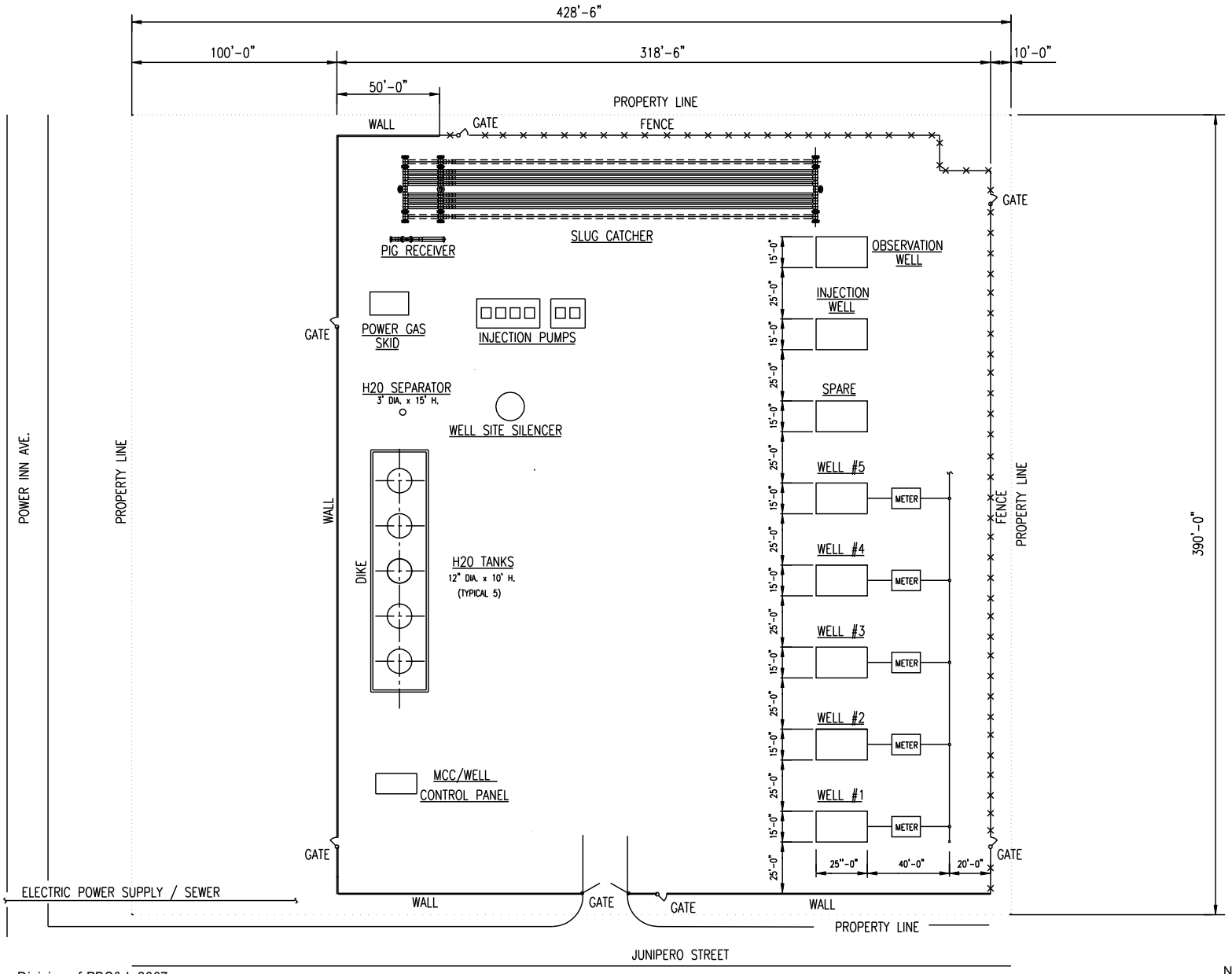
The location of the storage field and the development that has occurred above the field limits possible alternative locations for the wellhead site. However, SNGS identified three alternative compressor station sites and several potential pipeline alignment alternatives during the planning phase of this project (see Figure 2-4). The alternatives were surveyed to identify potential sensitive resource issues and constraints. EIP/PBS&J and the project engineering team conceptually evaluated each of the pipeline alternatives in order to develop a project that minimized potential adverse impacts on local traffic and environmental resources and was cost-effective. The alternative pipeline alignments shown in Figure 2-4 were eliminated from further consideration because of landowner issues and sensitive biological resource issues (primarily wetlands and special-status species habitat). The proposed project, shown in Figure 2-2, was determined to be the best project layout because it avoids or reduces to less than significant levels the potential effects of the proposed project. The proposed pipeline alignment and facility locations avoid and minimize resource impacts, and meet the various landowners' needs and restrictions.

2.4 Project Components

The proposed project is comprised of the following four primary components:

a) Wellhead site (Injection/withdrawal wells);
b) Compressor station;
c) Pipeline connections; and
d) Morrison Creek Cross-Tie metering and gas conditioning equipment.

Each project component is described below, as well as the proposed construction methods, schedule, and operations and maintenance program. Figure 2-2 provides a general overview of the major project components. Figures 2-5, 2-6, 2-7, and 2-8 show more detailed layouts of the project components and associated facilities. All project components will be constructed and operated in accordance with federal Department of Transportation (DOT) guidelines described under 49 CFR 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards." Further, the proposed project would be subject to CPUC standards as embodied under General Order 112-E.



***Source*:** EIP Associates, a Division of PBS&J, 2007.

EIP ASSOCIATES

A division of PBS&J

FIGURE **2-5**

Wellhead Site Schematic

D41288.00

Sacramento Natural Gas Storage Project PEA

12181 | JCS | 06

***Source*:** Amec Paragon, 2006.

EIP ASSOCIATES

A division of PBS&J

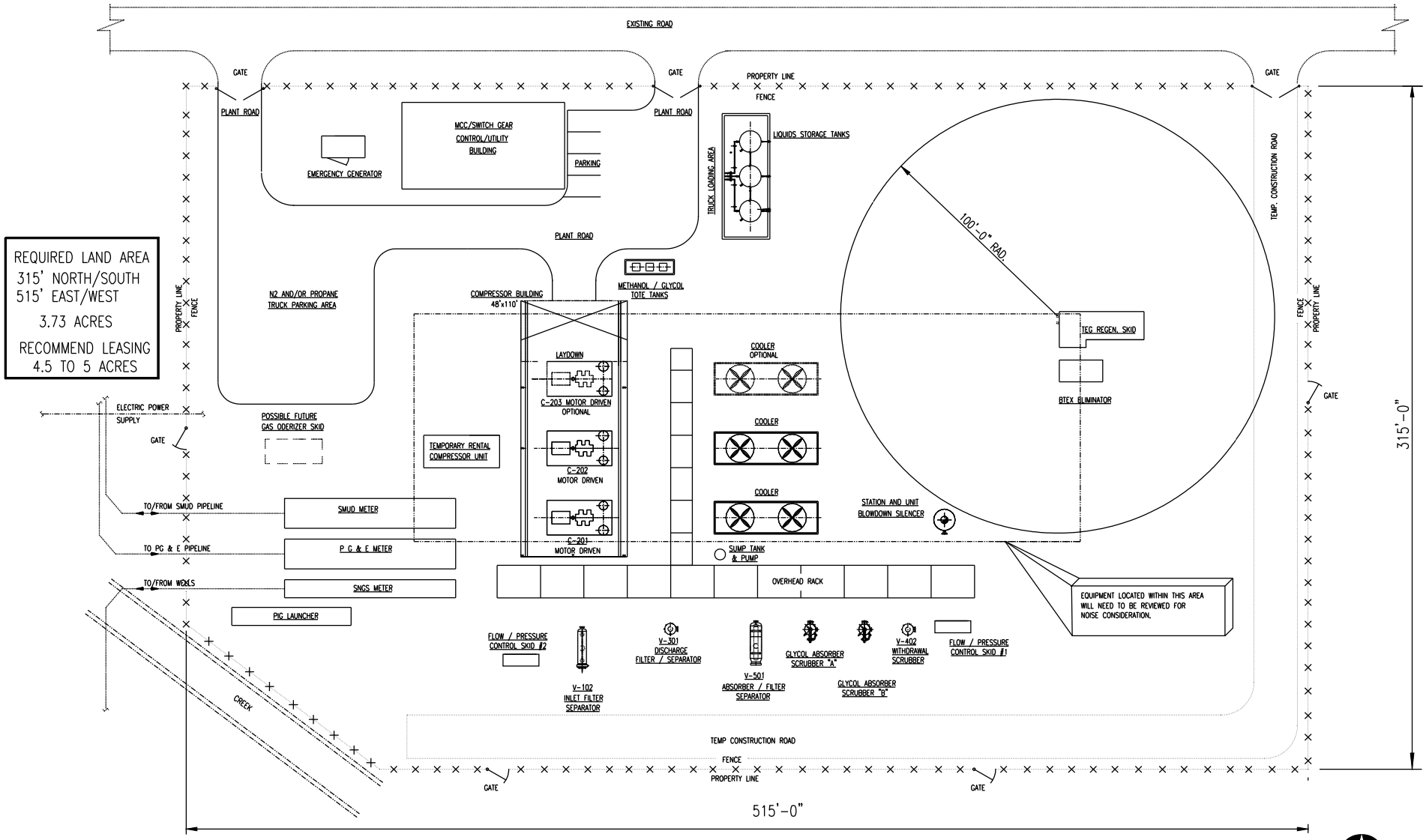
FIGURE **2-6**

Wellhead Site Rendering, Power Inn Road and Junipero Street

D41288.00

Sacramento Natural Gas Storage Project PEA

12181 | JCS | 06



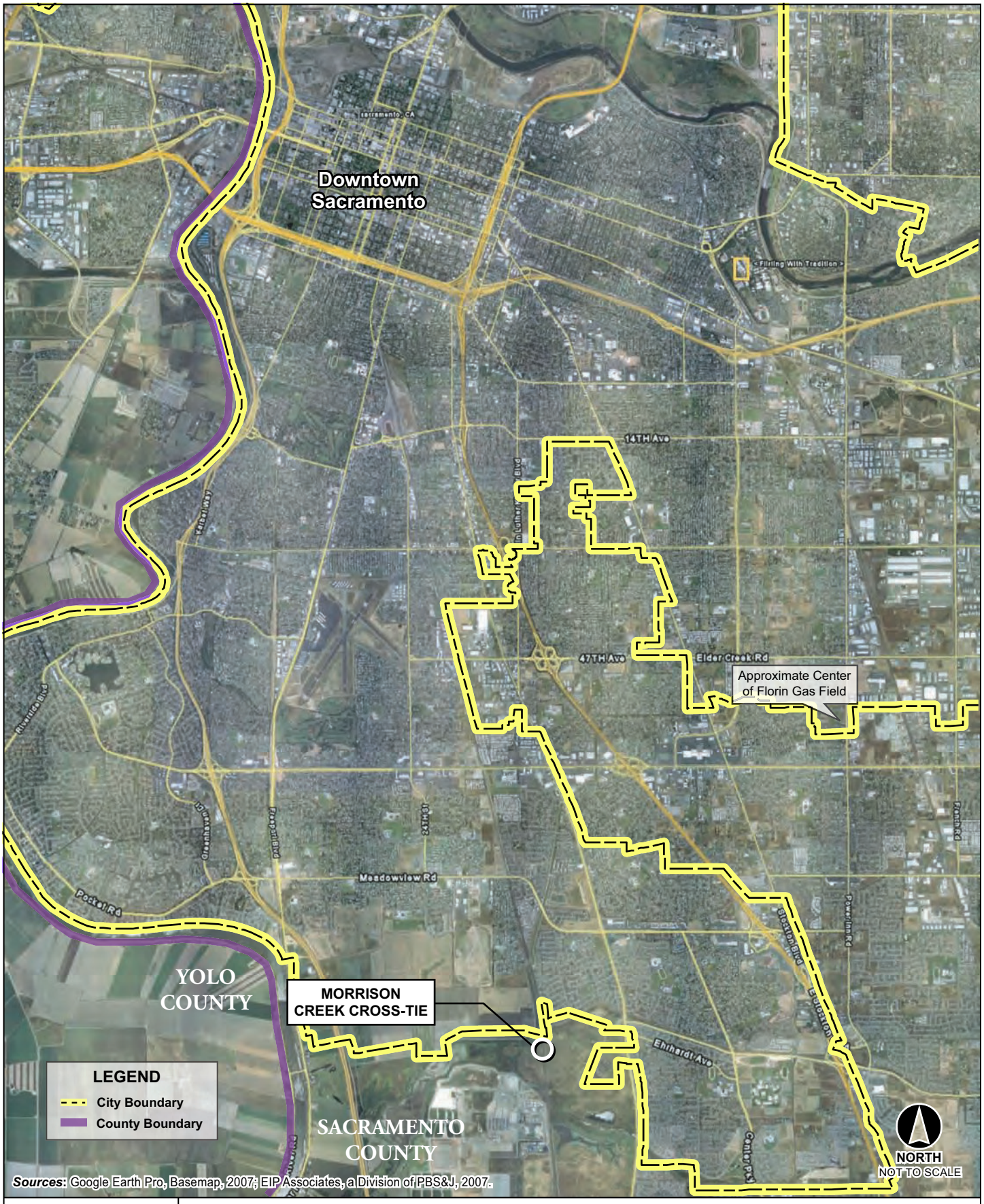
***Source*:** Amec Paragon, 2006.

EIP ASSOCIATES

A division of PBS&J

FIGURE **2-7**

Compressor Station Schematic



Sources: Google Earth Pro, Basemap, 2007; EIP Associates, a Division of PBS&J, 2007.

EIP ASSOCIATES

A division of PBS&J

FIGURE **2-8**

Morrison Creek Cross-tie Metering Station

12181 | JCS | 06

SNGS is initially proposing to inject up to 8 Bcf of natural gas into the Florin Gas Field, of which approximately 0.5 Bcf will be used for cushion gas and the remainder will be used as working gas.

2.4.1 Wellhead Site

Up to six new injection/withdrawal wells, one water disposal well, and one observation well would be drilled and constructed on a 4-acre parcel at the intersection of Power Inn Road and Junipero Street (see Figure 2-5). This site is currently undeveloped and contains non-native grassland. There is an approximately 100-foot-wide power easement along the western edge of the property. An 8-foot-tall masonry wall would be constructed along the west and south side of the property and for approximately 50 feet along the north side (a chain-link fence would be on the east and remaining portion of the north side). Access to the site would be through a gate on Junipero Street (see Figure 2-6). The portion of the site within the wall and fencing would be covered with crushed rock.

The wellheads would project approximately 6 feet above ground level. A standard 2-phase, high-efficiency horizontal vessel water separator, approximately 8 feet by 20 feet in size, would be installed on the site to separate water and other free liquids from the natural gas that is withdrawn from the wells. The water would be temporarily stored in a water tank and then be injected back into the gas field, through a disposal well. An observation well would also be installed on the wellhead site to monitor for any changes in conditions within and above the reservoir.

2.4.2 Compressor Station

The compressor station would be located on an approximately 5-acre site on a mostly undeveloped portion of Depot Park (see Figure 2-7). The site currently contains a concrete pad, and non-native annual grassland. It is bounded on the south by the remnant Morrison Creek channel and open space to the south, by other industrial uses to the north, and by open space to the west and east.

The compressor station would include two electric drive compressors, each paired with a 3,500 horsepower (hp) electric motor. A back-up compressor with up to a 3,500 hp electric motor may also be installed. Electric power to the site would be provided by SMUD and would require 4,160 volts of electricity. The compressors would be housed in a building approximately 50 feet by 110 feet and approximately 24 feet high. The walls would start at 5 feet off of the ground, to provide ventilation. A 6-foot high chain link security fence would surround the compressor station and the lot would be covered with crushed rock.

A portable electric drive compressor would be brought onto the compressor station site two to three months before the system is active. It would be used temporarily to inject natural gas into the storage field, thus "priming" it for use, pending the construction of the permanent compressor station.

The compressor station would have a maximum injection capability of 100 million cubic feet (mcf) and maximum withdrawal capacity of 200 mcf of natural gas per day. The compressors would provide sufficient pressure to inject the natural gas into the Florin Gas Field. The compressors and valving

would also adjust the pressure in the interconnect pipelines that would connect to the existing SMUD and PG&E pipelines.

Metering equipment would be located at the compressor station site, for the SMUD and PG&E pipeline interconnections. The metering equipment would be used to accurately measure the amount of natural gas withdrawn from and returned to the storage field. The compressor station site would also have gas odorization equipment, to add the odorization agent, methyl mercaptan. To the extent necessary to compensate for reduction in the concentration of this odorizing agent in the storage field, additional methyl mercaptan will be added to the natural gas at the compressor station prior to the injection of the gas into the storage field. This would ensure that gas withdrawn from the storage field meets the federal and state odorization standards.

2.4.3 Pipeline Connections

An 18-inch diameter pipeline connection would run from the compressor station to the wellhead site. This bidirectional pipeline would be approximately 1.5 miles long and would be installed at a minimum depth of 6 feet below grade.

Starting at the wellhead site, the pipeline alignment would run north along Power Inn Road, within an existing power easement (see Figure 2-2). Continuing along the easement, the pipeline would turn east approximately 500 feet south of Elder Creek Road. The pipeline would then parallel the UPRR north to Elder Creek Road. The exact route from Elder Creek Road to the compressor station will be determined pending easement acquisition from the land owners. The pipeline would either cross Elder Creek in one horizontal directional drill (HDD), parallel the west side of the UPRR tracks and then cross the UPRR tracks and Morrison Creek in a second HDD; or, cross Elder Creek, the UPRR tracks, and Morrison Creek in one HDD and run up the west side of Depot Park, along a levee road. The pipeline would then cross Depot Park to connect to the compressor station.

This pipeline would convey natural gas delivered for storage from the compressor station to the wellhead site for injection into the gas field and gas withdrawn from storage to the compressor station where it will be measured prior to injection into the SMUD or PG&E pipeline. The pipeline would be "pig-able" which would allow an inspection tool to check the interior of the pipeline. Pipeline markers would be installed over the pipeline, in accordance with federal DOT guidelines.

SMUD/PG&E Interconnections

Two additional pipelines would be installed to connect the compressor station to the existing SMUD Line 700 and the PG&E Mather DMF pipelines. The interconnection pipeline to SMUD and PG&E would be 16 inches in diameter. The pipelines would parallel each other, buried a minimum of 6 feet below grade, with approximately 6 feet of separation between the pipes. The pipeline route would lie between the UPRR tracks and railroad spurs on the Depot Park site.

2.4.4 Morrison Creek Cross-Tie Metering Equipment

The Morrison Creek Cross-Tie metering equipment would be located at an existing connection between SMUD and PG&E's natural gas pipelines. The metering equipment would be attached to an existing flowline and used to measure the amount of natural gas that SNGS delivers into PG&E Line 108 from the storage field. SNGS would also install gas conditioning equipment (including a portable tank) at the Morrison Creek Cross-Tie to allow the introduction of inert gas as necessary into the pipeline to reduce the heat rating of gas delivered into PG&E Line 108. SNGS would lease capacity on the SMUD Line 700 to provide the connection to PG&E Line 108.

2.5 Construction Methods

2.5.1 Wellhead Construction

The wellhead site would be prepared for development as follows. Water and sewer lines would be installed along the south side of the site to the adjacent parcel on the east. The water line would be tapped to provide a water hydrant and water meter on the wellhead site. The site would be fenced with either a masonry wall or chain-link fence (as described above). Curbs, gutters, and sidewalks would be installed along Power Inn Road and Junipero Road, in accordance with the City of Sacramento Design Guidelines. The portion of the property outside of the fence would then be landscaped.

Well pad sites would be cleared of surface materials and vegetation and then leveled, graded and rocked to accommodate drilling equipment. The pad sites would be graded flat, with drainage and runoff contoured to a collection point in order to control stormwater discharge.

Once the site is prepared and contoured, a mobile drilling rig and associated equipment and tanks would be driven to the pad. The type of drilling rig to be used is self-contained and would be relocated and used to construct each well. Typical equipment includes driller's quarters, a "doghouse" and tool pusher trailer, and power pack. The drilling rig would operate 24 hours per day, seven days a week while each well is drilled and completed. It is anticipated that each well will take 8 days to drill. After the drilling of a well is complete, the drilling rig would be relocated to the next well position. Equipment and materials typically would be delivered during daylight hours.

Drilling activities typically involve the use of the rig's rotary table to turn the drill bit and attached drill pipe. As the bit advances deeper into the subsurface, additional pipe is added to the "drill string." Lengths of pipe are taken up from the pipe rack and held in place until the "driller" is ready to attach the new lengths. After conducting safety checks, the rotary table is stopped, the drill string is unscrewed, and a new length is added. The system is repressurized and drilling continues. Drilling mud is used to lubricate the bit, bring drill cuttings back to the surface, and control pressures within the hole. All fluids used in or for the drilling operation would be contained in temporary mobile tanks or 55-gallon drums stored within a containment area. Fluid and mud circulation systems are based on closed-loop designs, which result in no discharge. Once the well is in place, ancillary valving, piping, and monitoring equipment is installed and tested.

The wells would be drilled to a depth of approximately 3,800 feet. The wellheads would project about 6 feet in height above ground level and would be connected to a section of aboveground pipeline containing the valve, flow control valve, flow meter, and pressure gauge. A pipeline would connect the wellheads to the compressor station. Construction of the wellhead site would take approximately 3 months.

2.5.2 Compressor Station Construction

Construction activities for the compressor station would involve clearing, grading and rocking of the site; constructing equipment and building foundations, and installing the perimeter fencing; erecting structures to house the compressors and associated facilities; installing equipment and piping; and cleaning the site. Construction of the compressor station is estimated to take 6 to 8 months and would occur between 7:00 a.m. and 6:00 p.m., Monday through Saturday, with the possibility of some construction activities being undertaken on Sundays. The site for the compressor station would be cleared of vegetation and graded as necessary to create a level surface for the movement of construction vehicles and to prepare the area for constructing foundations. Construction activities and storage of construction material and equipment would be confined to the 5-acre compressor station site.

Excavating required for the foundations would be performed as needed, and all backfill would be compacted in place. Any excess soil would be used on site. Compressor building construction would begin after the compressor engines are installed on concrete foundations. Typically, the steel frame of the building is erected, followed by installation of the roof and exterior casing. The compressor station would be designed to comply with the noise restrictions established in the City of Sacramento's General Plan and Noise Ordinance.

Equipment consisting of the glycol dehydration units, reboilers, and coolers would be installed on pads. Pig launchers and receivers ("pigs" are devices used to inspect and clean the pipeline) and the slug catcher would be installed on pads with concrete containment. The aboveground storage tanks would be installed within diked areas or other secondary containment. Prior to placing the compressor station in service, the gas piping system (both above and below ground) would be hydrostatically tested. Controls and safety devices, such as the emergency shutdown system, relief valves, gas and fire detection facilities, and other protection and safety devices, would be checked and tested.

2.5.3 Pipeline Construction Methods

The following section describes the methods that SNGS would use to install the gas pipelines in upland areas. The pipelines would be installed along both roads and in undisturbed areas. SNGS is planning to use HDD technology to cross beneath Morrison Creek, the adjacent UPRR right-of-way and Elder Creek Road. Horizontal boring methods are described toward the end of this section.

Surveying Right-of-Way

The pipeline alignment would be identified and surveyed prior to beginning construction activity. Alignment identification would include staking the centerline of the pipeline, identifying foreign line crossings, and marking the limits of the construction work area. SNGS would work with the City of

Sacramento Public Works Department and the Underground Service Alert (USA) to identify any existing subsurface utilities or pipelines. As part of this phase, any identified environmentally sensitive areas (e.g., wetlands and special-status species habitat) also would be marked and temporarily fenced.

Grading Right-of-Way

The non-native annual grassland portions of the pipeline right-of-way would be graded with a bulldozer or similar equipment as necessary to create a safe and level work surface. As described below under "Best Management Practices," sediment control devices such as silt fences and straw bales would be installed as necessary around waterbodies, roads, and other areas during clearing and grading.

Pipeline Trenching Methods

Trenching involves excavating a ditch for the pipelines and would be accomplished with backhoes or trenching machines. The trench would be excavated to a depth sufficient to provide the appropriate amount of cover, which would be a minimum of 6 feet over all pipelines. Trench spoil would be deposited on the spoil storage portion of the right-of-way. The trench width for the pipelines would be approximately 6 feet; however, the trench may be wider in areas to allow for unstable soils and a sloped trench wall. Based on the known geologic conditions in the project area, blasting would not be required. Except along the railroads and in areas that support sensitive resources (e.g., seasonal wetlands), the construction easement would be 70 feet wide with a permanent easement width of 30 feet. In areas that contain sensitive biological resources, the construction and permanent easements would be reduced to avoid direct and indirect effects on adjacent sensitive resources.

The trench would typically not remain open for more than 72 hours in one area and any open trench would either be fenced or otherwise delineated during non-working hours. At the conclusion of each day's trenching activity, the end of the trench will be left ramped at an approximate 2 to 1 slope to allow any wildlife falling into the trench to escape.

Pipe Delivery, Stringing, and Welding

The pipe would be temporarily stockpiled at the Depot Park site and then delivered to the pipeline right-of-way. Once along the right-of-way, individual pipe sections would be aligned and welded together into long strings. All pipeline sections would be "butt-welded" – welded together without the ends overlapping. All welds would be x-rayed to ensure structural integrity and compliance with applicable federal DOT regulations and American Petroleum Institute 1104 specifications; welds not meeting such standards would be repaired or removed. Once the welds are approved, the welded joints would be covered with a protective coating and the entire pipeline would be electronically and visually inspected for any faults, scratches, or other damage. Any pipe damage would be repaired before lowering-in.

Lowering-In, Tie-In, and Backfilling

The pipeline would be lowered into the trench with two or more backhoes or sideboom tractors, spaced such that the unsupported pipe between them and between the pipe and ground surface would not

overstress or yield the pipe to cause buckling. Tie-in welds, made in the trench at the final elevation, would be used: (1) where the line is obstructed by utilities crossing the trench; (2) at the ends of HDD; and (3) at the ends of lowered strings. The welds would be checked using x-ray technology and the entire pipeline would then be checked by caliper for geometrical integrity prior to final tie-in where necessary. Trench barriers or breakers would be installed before backfilling at specified intervals to prevent water movement along the pipeline. The trench would be backfilled using select excavated subsoils, and topsoil would then be replaced and restored to its original condition using either tracked construction equipment or water to minimize future settling. Although not anticipated, if rock conditions exist in the excavated materials, a layer of rock-free soil would be placed over the pipe to protect the coating, and then the backfill operation would be completed. A small amount of excess soil may need to be removed from the pipeline route and disposed of at an existing permitted site; the amount and location of disposal is not known at this time. A moderate level of compaction (85 percent of the ASTM D-1557 test procedure) would be used to reduce the risk of uplift. Areas under paved surfaces would be compacted to 95 percent (or greater as specified by permitting entities).

Horizontal Directional Drilling Method

The pipeline would be installed beneath Morrison Creek, Elder Creek Road and the UPRR using the HDD technique. This technique uses a hydraulically-powered horizontal drilling rig supported by a drilling mud tank and a power unit for the hydraulic pumps and mud pumps. The variable-angle drilling unit would be adjusted to the proper design angle for the particular bore, 8 to 15 degrees for the proposed project. The first and smallest of the cutting heads begins the pilot bore at the surveyed entry point in a small pit on the surface. The first section of drill stem has an articulating joint near the drill cutting head that can be controlled by the bore operator. Successive drill stem sections are added as the drill head progresses. The drill head is articulated slightly by the operator to follow a designed path toward the exit point. Once the pilot hole is completed, a succession of larger cutting heads and reamers are pulled and pushed through the bore hole until it is the appropriate size for the pipeline.

During a bore, drilling mud is pumped under high pressure through the drill stem to rotate the cutting head and return the soil cuttings to the small pit at the surface entry point. The mud is pumped from this pit to a processing unit where the soil cuttings are removed and the mud reused. Any excess drilling mud would be hauled away and disposed of at an approved location. As part of the bore design process, geotechnical surveys of the subsurface conditions would be conducted to determine the underlying geologic strata along the bore path. Infrequently, the geologic strata above the bore may be weaker than anticipated and/or unconsolidated and the high pressure of the drilling mud results in a fracture of these strata, allowing drilling mud to rise to the surface. The boring operation is stopped immediately when this occurs. This situation is termed a “frac-out” and is usually resolved by reducing the mud system pressure or increasing the mud viscosity.

While the bore is occurring, pipe sections to be pulled through the crossing would be strung on pipe supports in the temporary use areas. The pipe sections would be welded together, x-rayed, and a protective epoxy applied to the joints. After the bore hole is the correct diameter, a pulling head would be welded on the end of this pipeline section, and the pipe would be pulled through the bore until it surfaces on the other side. Bulldozers with side booms and slings or roller cradles would support the

pipe as it would slowly be pulled through the bore hole. The completed bored crossing would then be connected to the existing pipeline and the entry and exit points would be backfilled.

SNGS' contractor would prepare a bore plan for the horizontal directional drills that includes a detailed description of the drilling unit, hole diameter, depth of cover, directional survey and control plan, mud system, additives, and mud pumping pressures.

As part of the bore plan, the contractor would develop a frac-out contingency plan. The plan would focus on minimizing the potential for a frac-out associated with tunneling activities; providing for the timely detection of frac-outs; and ensuring an organized, timely, and "minimum-impact" response in the event of a frac-out and release of drilling lubricant (bentonite). While bentonite is a non-toxic substance, its release into waterways could adversely impact aquatic species, potentially smothering benthic invertebrates, aquatic plants and fish and their eggs, with the fine bentonite particles. The plan would contain the following or equally effective measures:

- A full-time monitor would be onsite during drilling to look for observable frac-out conditions or the noticeable loss of drilling fluids in the bore pit.
- If a frac-out is identified, all work would stop, including the recycling of drilling fluid. The location and extent of the frac-out would be determined, and, if on uplands, the frac-out would be monitored for four hours to determine whether the drilling lubricant congeals (bentonite would usually harden, effectively sealing the frac-out location).
- If the drilling lubricant congeals, no other actions would be taken that would potentially suspend sediments in the water column.
- Surface releases of bentonite would be allowed to harden and then would be removed.
- The contingency plan would identify additional measures to be taken to contain or remove the drilling lubricant if it does not congeal or if the frac-out occurs in Morrison Creek or seasonal wetlands. This could include the use of straw wattles or silt fencing for containment and vacuum trucks to remove the drilling lubricant.

Pipeline Testing

After construction and prior to placing the pipelines in service, the completed pipelines would be hydrostatically tested. Hydrostatic testing would be conducted in accordance with the requirements of DOT pipeline safety regulations 49 CFR Part 192, SNGS testing specifications, and applicable permits. The pipelines would be tested independently. Approximately 44,000 gallons of water would be used for hydrostatic testing. This water would be obtained from existing public water supplies, via a water hydrant. Following the hydrostatic testing, the water would be tested for water quality standards and discharged into the storm drain system. If necessary, the water would be filtered prior to discharge in the storm drain system. All hydrostatic testing water would be discharged so as to meet the standards set forth under the terms and conditions of the General Order for Dewatering and Other Low Threat Discharges to Surface Waters, issued by the Central Valley Regional Water Quality Control Board (CVRWQCB). If conditions of the General Order cannot be met, then SNGS would apply for a report of waste discharge.

2.5.4 Morrison Creek Cross-Tie Metering Equipment Construction

Construction activities associated with the Morrison Creek Cross-Tie metering and gas conditioning equipment would last approximately two weeks. No ground disturbance is expected to occur as the metering and gas conditioning equipment would be located on an existing flow line.

2.5.5 Workforce

SNGS would retain a construction contractor to install all the components of the project. Between 150 and 200 total employees would be required over the duration of the construction period, of which 70 percent is expected to be local.

2.5.6 Construction Equipment

Construction of the proposed project would use standard construction equipment, including, but not limited to drill rigs, bulldozers, backhoes, pickup trucks, and excavators. Table 2-1 identifies the equipment anticipated to be used to construct the proposed project.

Table 2-1
Construction Equipment

Water Trucks	Roller/Compactor
Backhoe	Cranes
Dump Trucks	Flatbed trucks
Forklifts	Pickup trucks
Boring Rig	Side boom
Grader	Vacuum trucks
Dump Trucks	Flatbed trucks

Source: Sacramento Natural Gas Storage, LLC, 2007.

2.5.7 Best Management Practices

As part of the proposed project, SNGS would implement a number of measures to avoid and minimize short and long-term effects on environmental resources within and adjacent to the proposed project facilities. SNGS would prepare a variety of plans before construction activities are initiated. These plans are described in this section and are referenced in the various impact analyses in Chapter 3.

Designate Work Zones

SNGS would identify work areas and would ensure that:

- Construction activities, equipment, and associated activities (e.g., staging areas) are confined to the designated work zones, and
- Areas supporting sensitive resources (e.g., nearby seasonal wetlands and special status species habitat) are avoided.

Construction equipment would be confined to a designated work zone in the project area. Before ground-disturbing activities are initiated, the work zone would be clearly staked and flagged. Where feasible, all adjacent waters and wetlands would be avoided and would be designated as exclusion zones during the preconstruction phase.

Air Quality Protection Measures

The following applicable measures would be implemented as part of the proposed project to minimize dust emissions and to be consistent with Sacramento Metropolitan Air Quality Management District (SMAQMD) "Level 1" guidelines for reducing construction impacts to a less-than-significant level.

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.

SNGS would provide the CPUC with a copy of its final Authority to Construct/Permit to Operate permit from the SMAQMD.

Above-ground piping would be maintained to minimize leakage of odorized gas. SNGS would provide incident, quarterly and annual reports to the CPUC in accordance with CPUC Rule 112-E, Subpart B.

Conduct Worker Environmental Awareness Training for Construction Crews

SNGS would conduct Worker Environmental Awareness Program (WEAP) training for construction crews before construction activities begin. The WEAP training would include a brief review of the special status species and other sensitive resources that could occur in the proposed project area (including their life history and habitat requirements and what portions of the proposed project area they may be found in) and their legal status and protection. The program would also cover all mitigation measures, environmental permits and proposed project plans, such as the Best Management Practices (BMPs), erosion control and sediment plan, and any other required plans. During WEAP training, construction personnel would be informed of the importance of avoiding ground-disturbing activities outside of the designated work area. The designated Environmental Inspector would be responsible for ensuring that construction personnel adhere to the guidelines and restrictions. WEAP training sessions would be conducted as needed for new personnel brought onto the job during the construction period (relative to the area in which the employee would be working and the tasks said employee would be completing).

Prepare an Injection Plan

The DOGGR is responsible for wells drilled into an underground gas storage facility. SNGS would complete engineering and geology studies and an injection plan and submit them to DOGGR for approval. These studies would describe the well drilling and abandonment plans; reservoir characteristics; all geologic units, aquifers, and oil and gas zones; and the monitoring system to ensure that injected gas is confined to the intended zone. SNGS would be required to post a bond with DOGGR to ensure proper completion or abandonment of any well drilled. Additionally, DOGGR

would be responsible for approving a water injection plan that would allow SNGS to inject water that is extracted from the gas field back into the gas field.

Seismic-Resistant Design Measures

The proposed project would be designed to meet the seismic safety standards of the California Uniform Building Code. Specific design measures may include, but are not limited to, special foundation design, additional bracing and support of upright facilities (e.g., tanks, exhaust stacks), and weighting the pipeline in areas of potential liquefaction. In addition, automated leak detection, isolation, and shutdown controls would limit the secondary effects of equipment damage. Project facilities and foundations would be designed to withstand changes in soil density. When the detailed engineering design of the project is completed, it would be submitted to the CPUC, DOT Office of Pipeline Safety (which provides oversight of pipeline construction, operation, and safety) and the DOGGR (which provides oversight of design, installation, and operation of gas wells) for their review and approval.

Paleontological Resources Measures

A paleontological resources discovery and management plan would be developed prior to construction and implemented as part of the proposed project to avoid potential impacts on these resources. The plan would contain the following elements:

- Paleontological Mitigation Plan - Prior to the start of construction, a qualified paleontologist shall be retained to design a paleontological resource mitigation and monitoring program and to implement said program during earth-moving activities. The mitigation and monitoring program shall include the following
  - Preconstruction coordination
  - Construction monitoring procedures that include the use of qualified paleontological resources monitors in sensitive areas
  - Procedures to be followed if a previously unidentified paleontological resource is discovered during construction that include halting all ground-disturbing activity in the vicinity of the discovery; notification of the City of Sacramento Community Development Department or the County of Sacramento, as appropriate; and specimen or data recovery as determined adequate by a qualified paleontologist and that are consistent with the Society of Vertebrate Paleontology guidelines.
  - Sampling and data recovery procedures (if necessary)
  - Museum storage coordination for any specimen and data recovered
  - Report of findings
- Field Survey - Prior to the start of construction, the paleontologist shall conduct a field survey of exposures of sensitive stratigraphic units within the construction area that will be disturbed.
- Construction Personnel Education - Prior to the start of construction activities, construction personnel involved with earth-moving activities will be informed of the possibility of encountering fossils, the appearance of fossils and the types of fossils likely to be seen during construction activities, and proper notification procedures should fossils be encountered. This worker training will be prepared and presented by a qualified paleontologist.
- Paleontological Monitoring - The paleontologist shall monitor earth-moving construction activities where this activity will disturb previously undisturbed sediment. Monitoring will not take place in areas underlain by artificial fill, or in areas where exposed sediment will be buried, but not otherwise disturbed.

Equipment Maintenance and Refueling Restrictions

The equipment used for the proposed project would require periodic maintenance and refueling. To reduce the potential of contamination by spills, no refueling, storage, servicing, or maintenance of equipment would be performed within 100 feet of sensitive environmental resources (e.g., seasonal wetlands and Morrison Creek). Additionally, all refueling or servicing would be done with absorbent material or drip pans underneath equipment to contain spilled fuel or fluids. Any fluids drained from the machinery during servicing would be collected in leakproof containers and taken to an appropriate disposal or recycling facility. If such activities result in spillage or accumulation of a product on the soil, the contaminated soil would be assessed and disposed of properly. Under no circumstances would contaminated soils be added to a spoils pile.

Mobile refueling trucks likely would be used for onsite refueling of stationary construction equipment, such as the drilling rig. The refueling trucks would be independently licensed and regulated to haul and dispense fuels and to ensure that the appropriate spill prevention techniques are implemented. All maintenance materials (i.e., oils, grease, lubricants, antifreeze, and similar materials) would be stored in a designated storage area, away from site activities and more than 100 feet from sensitive resources. During construction, all vehicles and equipment required on site would be parked or stored at least 100 feet from waterbodies, wetlands, and other sensitive resource areas. These areas would be identified on the construction drawings, as appropriate. All wash-down activities would be conducted at least 100 feet from sensitive environmental resources.

Hazardous Materials Measures

The following measures would be incorporated into the construction contract specifications to address hazardous materials generated from construction-related activities.

- Diesel fuel and petroleum-based lubricants shall be stored only at designated staging areas.
- All hazardous material spills or threatened releases, including petroleum products such as gasoline, diesel, and hydraulic fluid—regardless of the quantity spilled—must be immediately reported if the spill has entered or threatens to enter a water of the State of California or the United States, or has caused injury to a person or threatens injury to public health.

SNGS would prepare a Hazardous Materials Contingency Plan that would be implemented if a spill occurs or if any hazardous materials are encountered during construction. Provisions outlined in this plan would include phone numbers of city, county, state, and federal agencies and primary, secondary, and final cleanup procedures. In addition, SNGS would require the project contractor to prepare a Health and Safety Plan (HSP) to minimize environmental impacts in the event that hazardous soils or other materials are encountered during construction of the project. The HSP would include elements that establish worker training, engineering controls, and monitoring. The HSP also would establish security measures to prevent unauthorized entry to cleanup sites and to reduce hazards outside the investigation/cleanup area.

Emergency Response Plan

SNGS would prepare an Emergency Response Plan, for use in response to a pipeline-related emergency (e.g. gas leak, earthquake, accidental release of hazardous materials or waste, fire, and/or pipeline or facility damage). Included in this plan would be measures for fire prevention. The plan would be designed in accordance with State and Federal regulations, including 49 CFR 192, Health and Safety Code (Chapter 6.95), and Titles 19, 22, and 27 of the California Code of Regulations.

Construction Traffic Safety Measures

SNGS would prepare a traffic control plan to minimize short-term construction-related impacts on local traffic. The plan would be submitted for review and approval by either the City of Sacramento Director of Public Works or Director of Utilities and would include the following:

- A diagram showing the location of the proposed work area;
- A diagram showing the locations of areas where public right-of-way may be closed or obstructed;
- A diagram showing the placement of traffic control devices;
- The proposed phasing of traffic control;
- Times when traffic control would be in effect;
- Times when demolition/construction activities would prohibit access to private property from a public right-of-way;
- A statement that the applicant shall comply with the City's noise ordinance during the performance of all work; and
- A statement that the applicant understands that the plan may be modified by the director at any time in order to eliminate or avoid traffic conditions that are hazardous to the safety of the public.

The plan would clearly define the location, timing, and types of interferences that could potentially block public right-of-way and emergency access. The plan also allows the Director of Public Works or Director of Utilities to modify, suspend, or stop the plan if a potential public safety hazard would result. Due to the limited work required for the Morrison Creek Cross-Tie metering and gas conditioning equipment in Sacramento County, coordination with the County Public Works Director would not be necessary.

Site Reclamation Measures

Following installation of the pipeline, the right-of-way would be graded to preconstruction grades and contours and would be seeded with an appropriate seed mix. The seed mix would be composed of the appropriate mix of species and be acceptable to the landowner. All disturbed areas of paved road ways would be repaved.

SNGS would also prepare an erosion and sediment control plan and a postconstruction erosion and sediment control plan that describes when, where, and how the site reclamation BMPs would be implemented. The City of Sacramento would review and approve these plans prior to construction.

2.5.8 Construction Schedule

Construction activities associated with project components generally would occur Monday through Saturday between 7:00 a.m. and 6:00 p.m. The exception to this would be during the drilling of the wells and during the HDD activities when the pipe is pulled through the drill hole, which would occur 24 hours a day. Pending the receipt of necessary project approvals, SNGS intends to begin construction in Spring 2008 and complete construction in late Fall 2008. Construction is anticipated to last between 6 and 9 months. BMPs described above would be implemented throughout all construction phases.

2.5.9 Landowner Coordination and Easement Acquisition

SNGS is in the process of receiving easement options from all private landowners for a construction right-of-way of 70 feet and a post-construction easement of 30 feet for the gas pipeline. As required by the CPUC, a list of "the names and mailing addresses of all owners of land over, under or on which the project, or any part of the project, may be located, and owners of land adjacent thereto" is contained in Appendix A of this PEA.

2.6 Operation and Maintenance Program

Operation and maintenance of the proposed facility would be performed by the SNGS operations and maintenance personnel. The compressor station would be staffed 24 hours a day, seven days a week. The wellhead site and Morrison Creek Tie-In metering and gas conditioning equipment would be remotely monitored and controlled at all times from the Depot Park compressor station.

As part of the proposed operation and maintenance program, above-ground piping components would be maintained to minimize leakage of odorized gas. The facility valves, flanges, and other piping components would be monitored for leaks by operations personnel as part of the day-to-day operation of the facility. In the event that a leak occurs, releasing odorized gas into the atmosphere, the leak would be repaired as soon as practical. In the event SNGS receives notification from a third party concerning the smell of odorant in the vicinity of the proposed facility, SNGS operations personnel would investigate the source of the odor, and repair any leaks contributing to the odor as soon as practical. A log of all third party notifications regarding gas odors would be kept. The date of the notification, the cause of the odor, and the date of the repair of any corresponding odorant leaks would be recorded in the log. A copy of the described log would be submitted to the CPUC quarterly.

2.7 Required Permits and Approvals

Construction, operation, and maintenance of the proposed project would be in accordance with all applicable federal, state, and local regulatory requirements, which may include, but are not limited to, those outlined below.

2.7.1 Federal Agencies

- U.S. Army Corps of Engineers – Clean Water Act, Section 404 fill permit for construction activities that would occur in jurisdictional wetlands or other "Waters of the U.S."[10]
- U.S. Fish and Wildlife Service – Biological Opinion for impacts to federally-listed species.[11]

Additionally, SNGS would prepare an Operation and Maintenance Plan, Damage Prevention Plan, and Emergency Response Plan for pipeline construction, operation, and safety in compliance with U.S. DOT pipeline safety standards.

2.7.2 State Agencies

SNGS would obtain the following state agency approvals for the proposed project:

- CPUC – Certificate of Public Convenience and Necessity.
- California Department of Conservation, Division of Oil, Gas and Geothermal Resources – Permit to Operate Florin Field as a Storage Field; Permit to Conduct Well Operations and Authorization to Inject Produced Waters.

2.7.3 Regional and Local Agencies

SNGS would obtain the following regional and local agency approvals for the proposed project:

- Central Valley Regional Water Quality Control Board (CVRWQCB) — General Order for Dewatering and Other Low Threat Discharges to Surface Waters for discharge of hydrotest water.
- Central Valley Regional Water Quality Control Board – Clean Water Act Section 401 water quality certification for construction activities that occur in jurisdictional wetlands or other "Waters of the U.S."[12]
- SMAQMD Permits – The SMAQMD requires any business or person to obtain an Authority to Construct/Permit to Operate before installing or operating new equipment or processes that may release air pollutants to ensure that all SMAQMD rules and regulations are considered.
- City of Sacramento Department of Transportation – encroachment and transportation permits may be obtained for construction within the public right-of-way and for hauling any loads that exceed legal limits.
- City of Sacramento Special Use Permit.
- City of Sacramento Grading Permit.

---

[10] Final determination as to the potential applicability of Section 404 will be made after the wetland delineation is completed.

[11] A Biological Opinion will only be needed if the Section 404 permit requirement is determined to be applicable.

[12] A Section 401 water quality certification will only be needed if the Section 404 permit requirement is determined to be applicable.