Clean Energy®

Park City Municipal Corporation
1053 Iron Horse Drive
Park City, Utah 84060

Compressed Natural Gas Station
Fueling Site Feasibility Analysis

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1. Project Understanding

On January 15, 2014, Clean Energy performed a site evaluation of Park City Municipal Corporation (City) transit maintenance facilities and transit fueling operations at 1053 Iron Horse Drive, Park City, Utah 84060. The purpose of the site visit was to determine the necessary modifications to safely store, maintain, and fuel Compressed Natural Gas (CNG) vehicles which are part of the City's transit fleet.

Clean Energy is pleased to provide the City with design recommendations that will meet the current fueling requirements as outlined in the Request for Qualifications (RFQ) as well as future CNG fleet growth. Clean Energy has provided several options to meet the demand, optimize construction costs, station function and fueling operations.

Our evaluation and recommendations are based on following design criteria:

- Minimum design pressure of 145 psig.
- Station must be designed to accommodate 8, 15 and 37 vehicles, in three phases of build out.
- The current average vehicle use is 47.3 gallons per bus. For the purpose of design, Clean Energy will assume 50 diesel gallon equivalents (DGE) per vehicle.
- Maximum length vehicle is a 35 foot transit bus.
- The station will include dual hose dispensers with light duty and transit hoses.
- The dispensers are for a private fleet and will tie into existing TOPS card reader for fleet management.
- The station will be designed to meet a single compressor noise level of 85 dBa. at 15 ft. from the compressor and include a CMU block wall for sound attenuation.

1.1. Existing Gas Supply

Presently, the City received gas supply from a 2-in. medium pressure (45 psig) distribution line. The current 2-in. medium pressure distribution line will not provide sufficient volume to fuel the full fleet at build out. In order to provide the required volume, the line will need to be upgraded to 4-in. dia. along with a new MSA. A high pressure (145 psig) gas line is located in close proximity to the site and can be used for supply and provide the required volume. A new connection will need to be trenched to the site and a new MSA will need to be installed for this high pressure connection option. Since the existing 2-in. line is not capable of providing the required volume and a new line would have to be trenched regardless of connection point, CE recommends CNG system operation.

1.2. Existing Power Supply

The existing transformer (located near fueling island) cannot handle the additional 400 amp load, which is the required load for a single 150 hp compressor, but can be upgraded to a larger transformer. A load study will need to be completed to determine if the upgrade will handle multiple compressors or future loads beyond 400 amps. The approximate cost for the upgrade is $15,000.00.

A new transformer located near the proposed compound, near Bonanza Drive, will cost approximately $45,000.00. This cost would not include any trenching, conduit, sanding, backfill, compaction, easements or concrete vault as required of such a line extension. A load study would need to be completed as part of the design to determine transformer size and exact cost however $45k can be used for budgetary purposes.

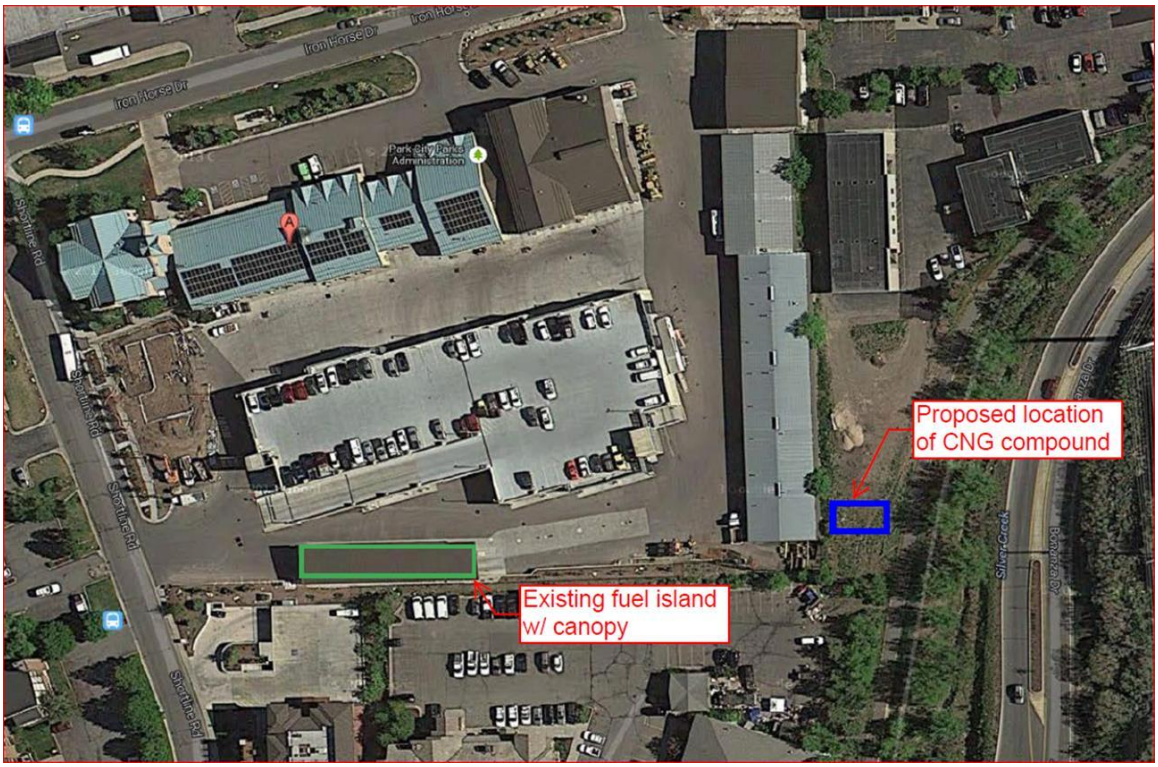


Figure 1. Proposed Location of CNG Compound

2. Proposed CNG Station Design - Scenario I, II, III

The City would like to evaluate three possible scenarios for conversion to CNG powered vehicles.

- Scenario I – a maximum of 8 CNG buses,
- Scenario II – a maximum of 15 CNG buses, and
- Scenario III – a maximum of 37 CNG buses (final build out).

CNG stations are inherently not easily scalable due to large upfront capital costs which require permanent installation of structural components and connections to utilities. As a result, certain mechanical components need to be sized for final build out, including dryers, piping and electrical gear. Compressors themselves are also not scalable however, as the station grows more can be added, provided that other structural components such as foundations, housekeeping pads, fencing and crash protection have been sized with that expansion in mind along with electrical gear and high pressure piping. Because of this scalability issue, the same components need to be in place to fuel 8 or 37 buses.

In Scenario I, the City would like to fuel up to 8 CNG buses. The smallest system currently available in the market place is a FuelMaker appliance. It is not a standard compressor, it is an appliance that can be used to fuel very small fleets. Because this appliance is not suitably geared for fast fill operations but rather time fill, it accepts up to 5 psig and has an output of approximately 10 scfm. At this rate, it dispenses about 4.3 DGE per hour. It would take approximately 11 hours to fill each bus. The Fuelmaker is not designed with a dryer or storage. It is also not scalable and if the City acquired more vehicles, it would simply need to be replaced by a full CNG station with no recovery of initial capital costs of the system. Due to the number of limiting factors of this type of appliance, Clean Energy does not recommend its use for transit fueling operations in Scenario I. Clean Energy recommends two different compressor options which will allow the City to grow the fleet in the most cost effective manner and one that best fits its operations. We propose two CNG station configurations using 150-hp compressors and 250-hp compressors.

2.1. Scenario I & II

For Scenario I, Clean Energy recommends a 150-hp COMPACT compressor capable of 411 scfm output at 145 psig inlet pressure. This design would also include a dryer and a single storage vessel. This single compressor can fill a 50 DGE bus in approximately 17 minutes. To fuel all 8 buses, it would take approximately 2.2 hours. Since there are only 8 vehicles in this Scenario, one dispenser is sufficient to fuel a fleet of this size.

For Scenario II, Clean Energy also recommends 150-hp COMPACT compressor capable of 411 scfm output at 145 psig inlet pressure. This design would include a dryer and a single storage vessel. To fuel all 15 buses, it would take approximately 4.2 hours. Since there are only 15 vehicles in this Scenario, one dispenser is still sufficient to fuel a fleet of this size.

If the City desires a faster fueling system, a 250-hp compressor would provide higher (732 scfm) output. A single 250-hp compressor can fuel 8 buses in 1.3 hours and 15 buses in 2.4 hours.

	SCENARIO I & II	SCENARIO III
COMPRESSOR	**1 - IMW COMPACT150-hp, 4 stage** 411 scfm max output @ 145 psig 3.0 DGE/minute minimum flow rate **OR** **1 - IMW 250-hp, 4 stage** 732 scfm max output @ 145 psig 5.3 DGE/minute minimum flow rate	**2 - IMW COMPACT150-hp, 4 stage** 822 scfm total @ 145 psig 6.0 DGE/minute minimum flow rate **OR** **2 - IMW 250-hp, 4 stage** 1464 scfm max output @ 145 psig 10.5 DGE/minute minimum flow rate
DRYER	1 - PSB model 10-3 Twin tower 1650 scfm rated @ 145 psig max pressure Manual regeneration by-pass valve / Digital Dew Point meter with sensor and alarm	
STORAGE	1 - ASME storage vessel 10,500 scf total capacity	3 - ASME storage vessel 10,500 scf total capacity
PRIORITY PANEL	1 - priority panel for fast-fill fueling operations	
TRANSIT DISPENSER	1 - Dual-hose transit/light duty dispensers OPW CT5000 and CT1000 nozzles Micro Motion CNG 50 flow meters MVD transmitter	2 - Dual-hose transit/light duty dispensers OPW CT5000 and CT1000 nozzles Micro Motion CNG 50 flow meters MVD transmitter
CANOPY	Fueling will take place within the footprint of the existing canopy and island. Upgrades will need to be made to explosion proof lighting under the canopy.	
CNG COMPOUND ENCLOSURE	The CNG compound will be enclosed with an 8 ft high CMU perimeter wall for sound attenuation.	

Table 1. Proposed CNG Equipment

2.2. Scenario III

For Scenario III, Clean Energy recommends two, 150-hp COMPACT compressors capable of 411 scfm each at 145 psig inlet pressure. This scenario would also include addition of two more storage vessels for a total of three vessels. Two compressors running simultaneously can fill a 50 DGE bus in approximately 8.5 minutes. To fuel all 37 buses, it would take approximately 5.2 hours. With a dual compressor design, the system is redundant. In the event that one compressor becomes inoperable, the other can still fuel the fleet in 10.4 hours. The number of dispensers would also increase to two in this scenario to make fueling operations and bus queuing efficient.

With two, 250-hp compressors, the fuel time would be 2.9 hours. In the event that one compressor becomes inoperable, the other can still fuel the fleet in 5.8 hours with 732 scfm output.

3. Proposed CNG Station Engineering Cost Estimate

Table 2 shows engineering cost estimates for each scenario and the two different horse power compressors. Please note that the costs presented in Scenario III are the incremental costs of station expansion with another compressor and not the initial capital costs of construction.

	SCENARIO I & II (SINGLE COMPRESSOR)	SCENARIO III (DUAL COMPRESSORS)
150-hp COMPACT compressor 411 scfm each @145 psig	Equipment - $383,756 Engineering/Design - $125,917 Construction - $797,309 **TOTAL – $1,306,982**	Equipment - $283,935 Engineering/Design - $34,328 Construction - $129,027 **TOTAL - $447,290**
250-hp Standard compressor 732 scfm each @145 psig	Equipment - $462,856 Engineering/Design - $131,130 Construction - $828,764 **TOTAL - $1,422,750**	Equipment - $362,048 Engineering/Design - $34,325 Construction - $132,984 **TOTAL - $529,357**

Table 2. Engineering Cost Estimate

Special provisions

- The proposed switchgear includes a Kirk Key for a diesel back-up generator. This is an important cost effective design feature to allow quick connection to a back-up power source in the event of main line power failure.
- The compressors include a cold weather enclosure.
- Provisions will be made for remote system monitoring and restart within acceptable OSHA safety regulations.
- Communication systems and software will be installed to allow for web-based remote accounting of daily/monthly fueling records, fleet summaries, and customized reports for the fast-fill system.
- All Equipment will meet FTA compliance provisions.
- Permit fees are not included.
- Utility connection fees are not included.

4. Construction

Clean Energy recommends an in-place and ready to operate CNG fueling station with associated appurtenances, utilities, concrete pavement, and all equipment. The station will include all equipment and piping necessary for transit fueling. The cost estimate assumes:

- Prevailing Wage
- Conduits and piping are located on top of the existing CMU wall
- No conduit/piping extensions between Phase I, II and III
- Compound sized to add a second compressor in the future
- FTA compliance for special provisions

Clean Energy station design is compliant with all relevant construction and safety codes, regulations, and guidelines including:

- Local State of Utah and federal construction codes and regulations,
- National Fire Protection Association (NFPA) codes 52 and 54,
- NFPA 70 - National Electric Code,
- Occupational Safety and Health Administration (OSHA) regulations,
- US Department of Transportation (DOT) regulations (where required),
- ANSI B31.3 - CNG Piping,
- ASME Section VIII - Boiler and Pressure Vessel Code, and
- SAE J1616 - Recommended Practice for Compressed Natural Gas Fuel.

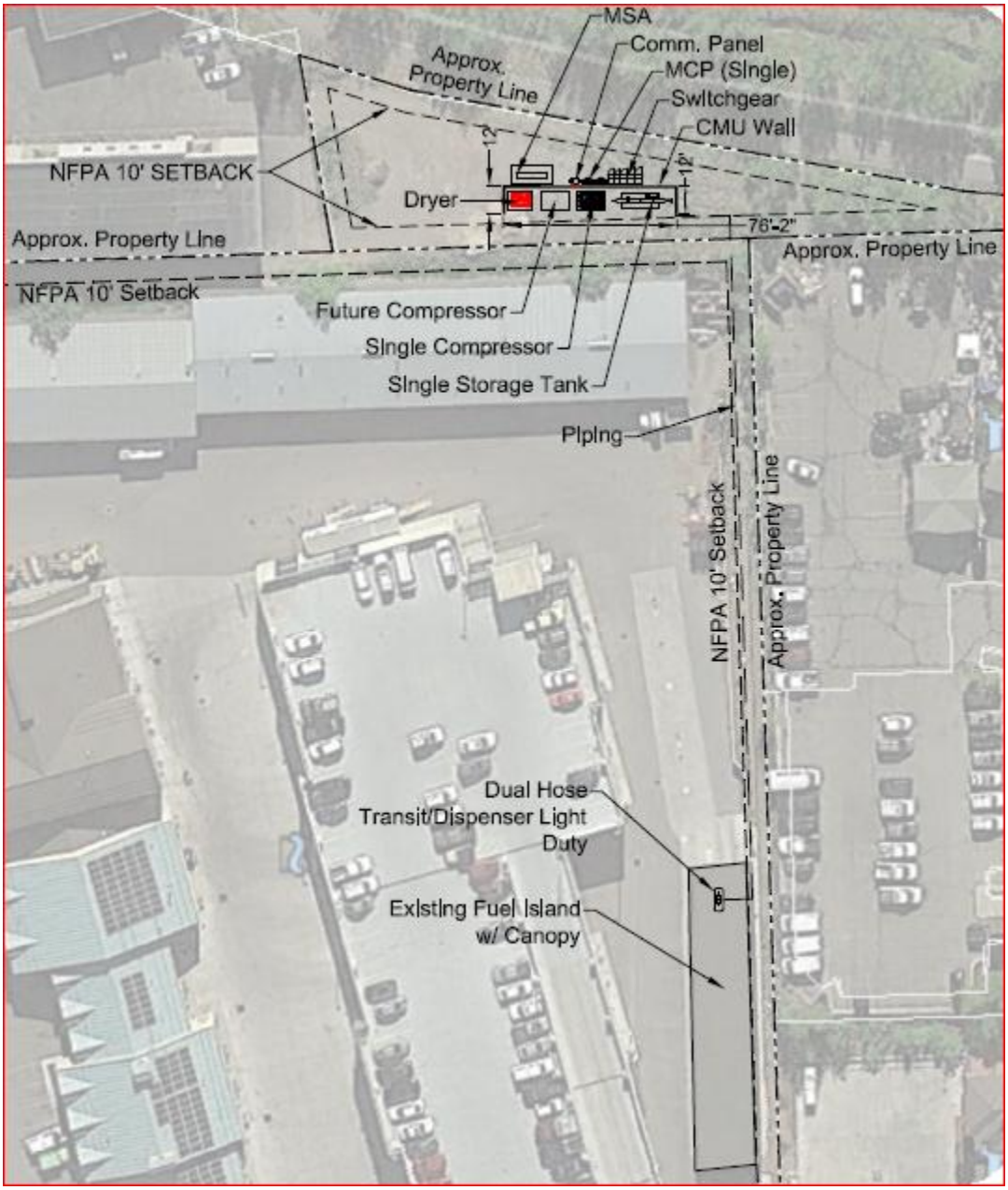


Figure 2. CNG Compound Layout.

5. Schedule Narrative

Typically, CNG projects require eight to twelve months to complete. A typical project schedule (Appendix A) has an approximate completion date of 10 months from Notice to Proceed (NTP). The schedule is dependent on the duration of the permitting process and may change once construction drawings are submitted for planning review.

6. Clean Fuel IMW CNG Compressors

The importance of clean fuel is critical to vehicle performance. Clean Energy recommends IMW Industries non-lubricated compressors. These compressors offer industry leading technology which provides state-of-the art operational efficiency, clean fuel delivery, and long term reliability with low cost of maintenance and operation. Key design advantages of IMW compressors include:

- **Cleaner Fuel** – Through the use of state-of-the-art Teflon® rod packings, IMW compressors have the lowest levels of oil carryover in the industry with less than 5 ppm. This design produces the cleanest possible downstream gas with overall lower system maintenance.

- **Reduced Maintenance Costs** – IMW compressors use single and double-acting piston configurations for optimum efficiency and long life. The pistons are designed to achieve excellent flow capacities while operating at slower speeds, dramatically increasing the life of piston and crankshaft components while substantially reducing noise and vibration. Compressor design incorporates an inlet filter (7.0 micron) and discharge filter (0.3 micron) at 99.95% efficiency.

- **Increased Station Uptime** – IMW compressors have an operational life of wear components ranging between 5,000 to 8,000 hours, significantly longer than competitor's components. This results in less maintenance cost and system down time.

- **Air Cooled** – IMW's cooling systems allow these compressors to operate efficiently in a variety of climates and temperatures ranging from -40º to 140ºF. IMW systems incorporate air-cooled cylinders and a high-efficiency air-to-gas interstage cooling system. This feature increases the gas flow rate, reduces fueling time and provides a more complete fill.

- **Reciprocating** – IMW reciprocating compressors are built in the W-configuration to keep them dynamically balanced, resulting in low vibration and noise levels with pulsation reduced through effective piping design. The W configuration saves space and allows easier maintenance

Figure 3. Single IMW (150 hp) skid with dryer, storage and dispenser

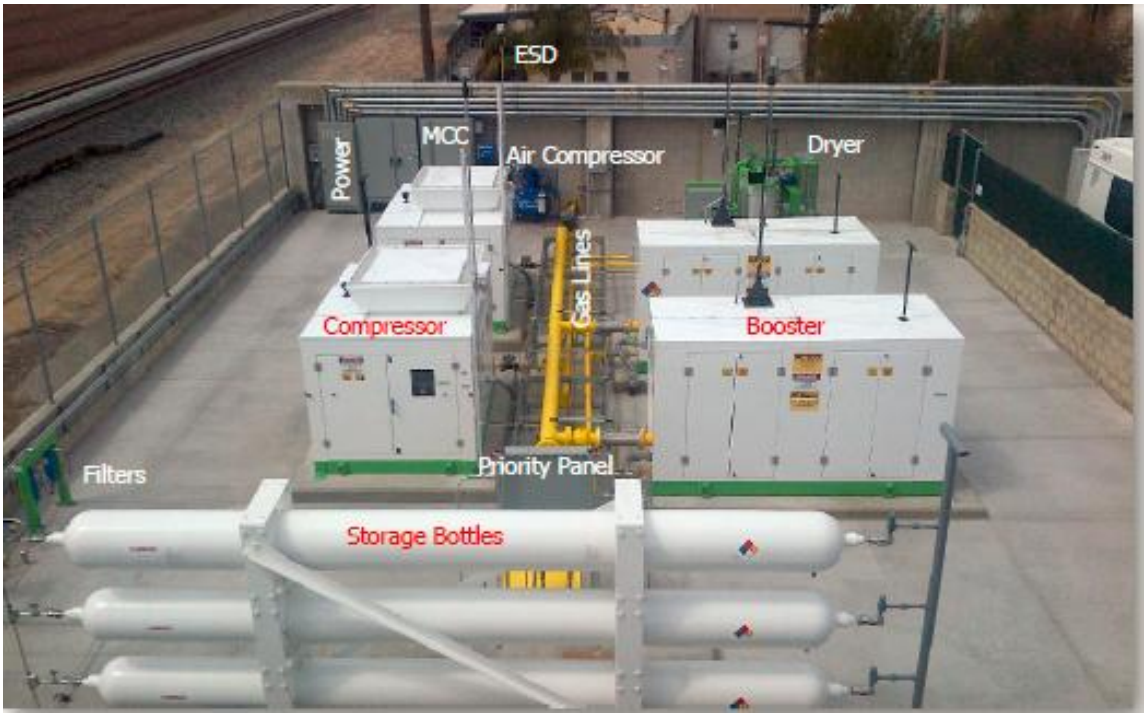


Figure 4. Typical CNG station design and configuration

7. Site Photos

Figure 5. Existing Fuel Island

Figure 6. Diesel and Unleaded Dispensers

Figure 7. Site Egress/Ingress (facing east)

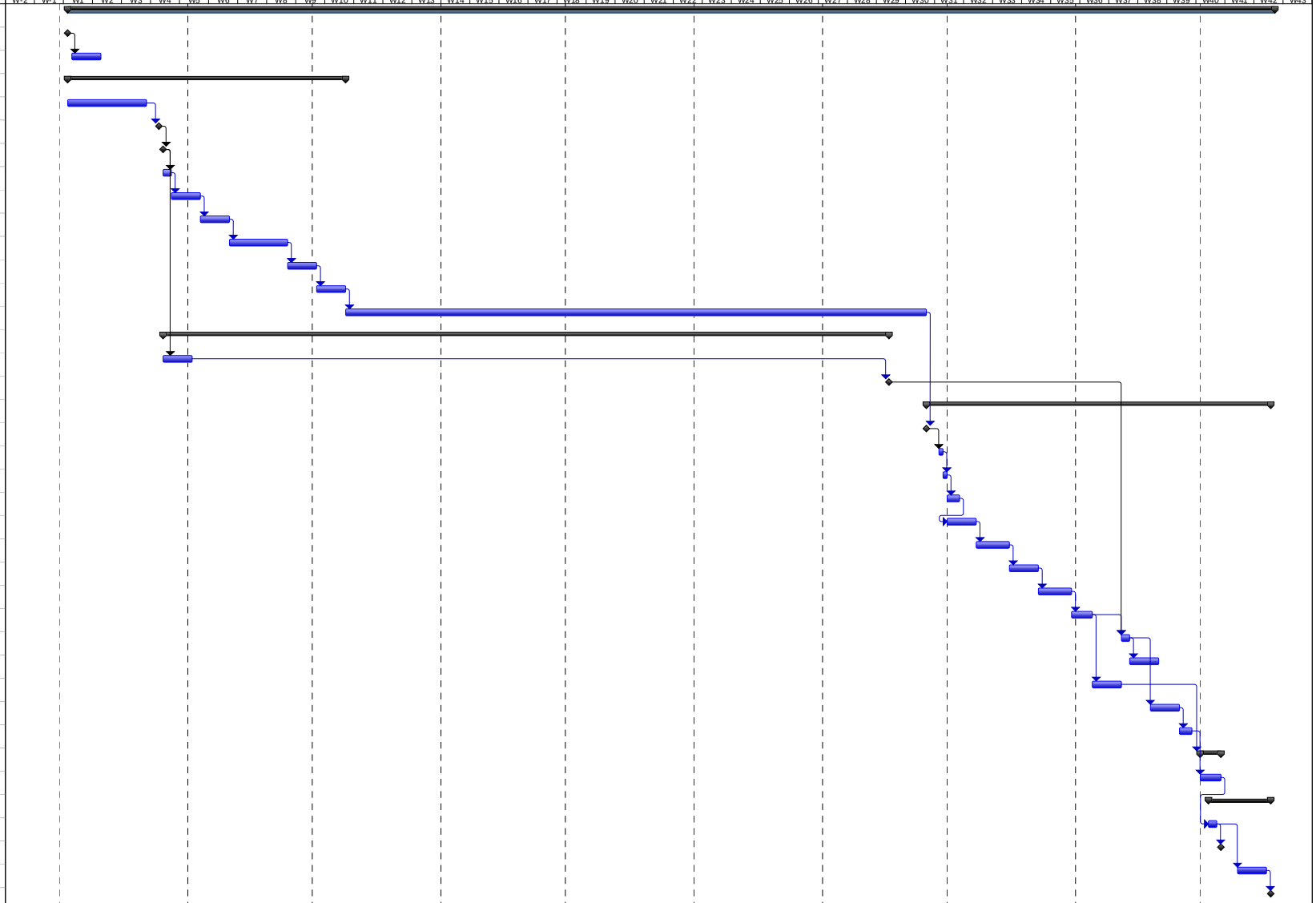
Figure 8. Existing Fuel Management System

Figure 9. Existing Underground Storage Tanks

Figure 10. Existing Fueling Canopy and Proposed Compound Location

Project Schedule

Project Tasks	Duration	Start	Finish
Contract Duration	209 days	Mon 3/3/14	Thu 12/18/14
Notice to Proceed	1 day	Mon 3/3/14	Mon 3/3/14
Prepare SIR Report	5 days	Tue 3/4/14	Mon 3/10/14
Design Phase	49 days	Mon 3/3/14	Thu 5/8/14
Develop Preliminary Design Drawings	15 days	Mon 3/3/14	Fri 3/21/14
Preliminary Review Meeting	1 day	Mon 3/24/14	Mon 3/24/14
Major Equipment submital for aproval	1 day	Tue 3/25/14	Tue 3/25/14
Customer Review	2 days	Wed 3/26/14	Thu 3/27/14
Submit 30% Design for Review	5 days	Fri 3/28/14	Thu 4/3/14
Customer Review	5 days	Fri 4/4/14	Thu 4/10/14
Submit 100% for Acceptance	10 days	Fri 4/11/14	Thu 4/24/14
Customer Review	5 days	Fri 4/25/14	Thu 5/1/14
Finalize Plans for Permitting	5 days	Fri 5/2/14	Thu 5/8/14
Permit Approval Process	100 days	Fri 5/9/14	Thu 9/25/14
Purchasing & Delivery (After Approval)	125 days	Wed 3/26/14	Tue 9/16/14
Order Major Equipment	5 days	Wed 3/26/14	Tue 4/1/14
Deliver Equipment to Site	120 days	Wed 4/2/14	Tue 9/16/14
CNG Station Construction	59 days	Fri 9/26/14	Wed 12/17/14
Pre Construction Meeting CNG Station	1 day	Fri 9/26/14	Fri 9/26/14
Layout CNG Site	1 day	Mon 9/29/14	Mon 9/29/14
Demolition	1 day	Tue 9/30/14	Tue 9/30/14
Forming Foundations	3 days	Wed 10/1/14	Fri 10/3/14
Excavation/Trenching Utilities	5 days	Wed 10/1/14	Tue 10/7/14
Install underground Utilities	6 days	Wed 10/8/14	Wed 10/15/14
Stubups in Foundations	5 days	Thu 10/16/14	Wed 10/22/14
Backfill and Pave	6 days	Thu 10/23/14	Thu 10/30/14
Pour Concrete Equip. Foundations	3 days	Fri 10/31/14	Tue 11/4/14
Set & Ancor Equipment	2 days	Wed 11/12/14	Thu 11/13/14
Above Ground Piping	5 days	Fri 11/14/14	Thu 11/20/14
Coordinate with Gas utility and set MSA	5 days	Wed 11/5/14	Tue 11/11/14
Pull Electrical Wiring to Equipment	5 days	Wed 11/19/14	Tue 11/25/14
Electrical Terminations	3 days	Wed 11/26/14	Fri 11/28/14
Startup	5 days	Mon 12/1/14	Fri 12/5/14
Commision the site	5 days	Mon 12/1/14	Fri 12/5/14
CNG Station	11 days	Wed 12/3/14	Wed 12/17/14
Training Customer staff	2 days	Wed 12/3/14	Thu 12/4/14
Operation Manuals:	1 day	Fri 12/5/14	Fri 12/5/14
As-Built Drawings	5 days	Wed 12/10/14	Tue 12/16/14
CNG Station Acceptance	1 day	Wed 12/17/14	Wed 12/17/14



Project:

Task | Split | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary | External Milestone | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | Progress | Deadline

2014

Park City Municipal Corporation
Park City, Utah
CNGV Facility Assessment

Clean Energy Fuels
4675 MacArthur Court, Suite 800
Newport Beach, California 92660
2/6/2014

1. Executive Summary

Park City Municipal Corporation is a political subdivision of the State of Utah, authorized and organized under the provisions of Utah law who has requested of Clean Energy Fuels Facility Modifications Services Group a Natural Gas Vehicle Facility Assessment of their Fleet Facilities located at 1053 Iron Horse Drive, Park City, UT 84060. The buildings being considered in this assessment are the Vehicle Maintenance Facility and the Bus Storage Facility. After evaluating the information gathered during the field investigation and reviewing the applicable codes, the following modifications are recommended to upgrade the Vehicle Maintenance Facility to be code compliant with Compressed Natural Gas, (CNG) repair garage operations and Bus Storage Facility to be code compliant with CNG parking garage operations:

Vehicle Maintenance Facility Recommendations:

- Installation of continuous methane gas detection monitoring and control system
- Installation of mechanical ventilation system necessary for exhausting methane in NGV repair garages
- Installation of electrical shunt-trip circuit breakers to de-energize non-life safety devices and non-classified equipment
- Installation of methane detection point type sensors, visual strobe and audible alarms
- Installation of operational and safety signage
- Installation of automatic notification system for trouble or emergency situations
- Installation of emergency lighting
- Removal of all non-compliant radiant infrared heaters
- Installation of new CNG repair garage compliant radiant infrared tube heaters
- Installation of vapor proof vinyl curtains to enclose designated spaces

Bus Storage Facility Recommendations:

- Installation of continuous methane gas detection monitoring and control system
- Integration with existing mechanical ventilation system necessary for exhausting methane in NGV parking garages
- Installation of electrical shunt-trip circuit breakers to de-energize existing heaters and lighting.
- Installation of open path methane detection sensors, visual strobe and audible alarms
- Installation of operational and safety signage to parking areas
- Installation of automatic notification system for trouble or emergency situations

Park City's Fleet Facilities consists primarily of two areas, the Vehicle Maintenance Facility and the Bus Storage Facility. Modifications are recommended for the Vehicle Maintenance Facility to be code compliant with repair garage operations and for the Bus Storage Facility to be compliant with parking garage operations. Clean Energy Fuels Facility Modifications Services Group has reviewed several design options and has selected the conceptual plan proposed in this assessment report as the optimal solution as it is the most cost effective method to achieve the necessary level of safety and provide CNG code compliant repair and parking facilities. The estimated costs of upgrades are as follows:

Vehicle Maintenance Facility Upgrade Cost:	$ 644,426
Vehicle Maintenance Facility Engineering Design and Permitting:	$ 61,370
Vehicle Maintenance Facility Total (USD):	$ 705,796
Bus Storage Facility Upgrade Cost:	$ 179,500
Bus Storage Facility Engineering Design and Permitting:	$ 18,640
Bus Storage Facility Total (USD):	$ 198,140

Clean Energy Fuels is a highly qualified and experienced Natural Gas solutions provider with the capability and capacity to deliver a seamless turnkey solution. Clean Energy Fuels' corporate headquarters is based in Newport Beach, California. Clean Energy operates in 40 states, the District of Columbia, and Canada. We employ over 1,000 team members from coast to coast and have regional offices located in Dallas, Texas; Denver, Colorado; Phoenix, Arizona; Concord, New Hampshire; and Vancouver BC, Canada.

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3. Introduction

The Park City Municipal Corporation Vehicle Maintenance Facility and Bus Storage Facility are located at 1053 Iron Horse Drive, Park City, UT 84060. National and local code requirements were evaluated to determine compliance issues that might impact the prospective expansion intended to permit service, maintenance, repair, and storage of compressed natural gas vehicles (CNGV). A site visit to conduct a visual assessment of the facilities by Clean Energy Fuels Facility Modification Services (FMS) staff occurred on January 15, 2014.

3.1. Background

Natural gas vehicles are significantly changing the landscape of opportunity for owners and operators of vehicle fleets by virtue of the fuel cost comparison between the petrol fueled vehicles and compressed natural gas vehicles. Clean Energy Fuels has dedicated expertise and experience in facility modifications to qualify for consideration as a resource for present and future customers.

In its original state, natural gas (methane) is odorless. As a safety measure, the gas is odorized with Mercaptan prior to distribution from the gas service provider or designed into fueling station capabilities, thus providing a ready means of leak detection. The average person can easily detect the smell of gas at a concentration as low as 0.3% by volume in air. That concentration is more than 16 times lower than the level which will support combustion, which will occur at a level between the concentrations of 5% to 15%. In its gaseous state, natural gas is less dense than air and will rise to the ceiling in the event of an indoor leak.

As Park City Municipal Corporation evaluates replacement of petrol fueled vehicles with compressed natural gas vehicles, consideration and evaluation must include the availability of code compliant vehicle repair and parking facilities for the future NGV fleet. Repair and parking garages are required to meet local and national building codes to operate and/or store natural gas vehicles.

3.2. Objective

The purpose of this Assessment Report is to present an evaluation of the facilities for applicability, identify any necessary modifications, and to provide an estimated cost of modifications for the expansion of the existing operations to include CNGV repair, maintenance, service, and storage. The assessment would be used to assist Park City Municipal Corporation in efforts to optimize the modifications and capital cost requirement for implementing these facility upgrades.

4. Code Overview and Basis of Design

The existing operations, which include vehicle repair, maintenance, and parking, are understood to be fully permitted and current with the existing fire suppression system is operable and permitted to code.

4.1. Permits and Regulatory Requirements

Park City Municipal Corporation will be the primary permitting and regulatory agency. The City Building Department has been conferred with and the State of Utah Codes, National Fire Protection Association (NFPA) Codes and the local Authority Having Jurisdiction (AHJ) requirements have been reviewed. The recommended facility modifications are based on the following codes:

- International Building Code 2009 edition
- International Mechanical Code 2009 edition
- International Plumbing Code 2009 edition
- International Fire Code 2009 Edition
- National Electrical Code 2009 edition
- NFPA 30 Code for Flammable and Combustible Liquids
- NFPA 30A Motor Code for Fuel Dispensing Facilities & Repair Garages
- NFPA 51B Fire Prevention During Welding, Cutting & Other Hot Works
- NFPA 52 Vehicular Gaseous Fuel System Code
- NFPA 70 Electrical Code
- NFPA 88A Standard for Parking Structures

This report only addresses the code requirements as they pertain to the servicing and storing of CNGVs and does not entail existing permitted operations or subjective interpretations the local Authority Having Jurisdiction (AHJ) may place on existing operations. In addition, review of the facility upgrades may prompt the AHJ to review other code upgrades to the facility even though these may not be related to CNGV operations.

4.2. Requirements for CNG Repair Facilities

NFPA codes consider major repair garages to be any garages where repairs beyond simple lubrication and tire service are performed. These repairs include, but are not limited to: engine repairs, painting, body, and fender work, and repairs that require drainage of the motor vehicle fuel tank. The following code requirements were used as the basis of design for the conceptual plan to upgrade the Park city Municipal

Corporation Vehicle Maintenance facility to be compliant with CNGV repair garage operations.

4.2.1. Separation

Spaces adjacent to the main repair garage must also meet requirements as a repair garage unless one of the following conditions are met: the space is mechanically ventilated at a rate of four or more air changes per hour, the space is designed with net positive air pressure, or the space is effectively cut off by vapor-tight walls or partitions.

4.2.2. Mechanical Ventilation

In major repair garages where vehicles that use lighter than air, flammable fuels such as CNG, the volume of space within 18 inches of the ceiling is designated as a Class 1 Division 2 hazardous—or classified—location. All electrical equipment installed in this classified zone must either be relocated out of the classified zone or be replaced with classified equipment. This requirement does not apply if a continuously running mechanical exhaust system provides a ventilation rate of no less than four air changes per hour. Standby mechanical ventilation must also be provided to activate in the event of a gas leak; the ventilation rate must be no less than 1 cubic foot per minute (CFM) per 12 cubic feet of room volume, which corresponds to approximately 5 air changes per hour.

4.2.3. Gas Detection and Fire Suppression

Any garage where repairs are performed on CNG vehicles requires a continuously monitoring methane detection system. The detection system will be designed to activate when the concentration of gasses reaches 25% and/or 50% of the lower flammable limit, (LFL). Upon detection, the gas detection system shall initiate distinct audible and visual alarms, deactivate all designated heat or spark producing equipment (heaters, welders, compressors, etc.), and activate the mechanical exhaust system.

If a failure of the gas detection system occurs, the mechanical ventilation system will be activated, all heat producing equipment will be deactivated, and a trouble signal will be sounded.

An automatic, fixed fire protection system is required for any major repair garage that is two or more stories in height where any one of the floor areas exceeds 10,000 ft², the major repair garage is single story and has a floor area greater than 12,000 ft², or the major repair garage is located in the basement of another building.

4.2.4. Heating Equipment

Open flame heaters or heating equipment having exposed surfaces with a temperature above 750°F are not permitted to be installed in garages where major repairs are performed on CNG vehicles. Heating equipment is permitted to be installed in rooms adjacent to the major repair garage space so long as the room is constructed to prevent the transmission of vapors, the walls have at least a 1 hour fire rating, and the walls have no openings that lead to a classified area within 8 ft. of the floor. 100% of the air used for combustion must come from outside the building. Heating equipment located outside the building satisfies requirements for separation.

4.2.5. Other Considerations

Domed skylights are considered to be pockets where gaseous methane could build up and present an explosion hazard. Domed skylights must be vented. Additionally, damaged ceiling insulation must be repaired as it could also act as a pocket for methane buildup and creates an explosion hazard. Operational signage must be posted throughout the building, which will assist in maintaining a safe atmosphere. Examples of designated operational signage can be found on the attached conceptual plans in Appendix A.2.

4.3. Requirements for Parking Facilities

NFPA codes consider a building, structure, or portion thereof used for parking, storage or both, of motor vehicles to be a parking structure. The following code requirements were used as the basis of design for the conceptual plan to upgrade the Park city Municipal Corporation Bus Storage Facility to be compliant with parking garage operations.

4.3.1. Mechanical Ventilation

All enclosed parking structures shall be ventilated by a mechanical system capable of providing a continuous ventilation rate of at least 1 cubic foot per minute (CFM) per square foot of floor area.

4.3.2. Heating Equipment

All flames associated with heating equipment shall be located a minimum of 18 inches below the floor-ceiling assembly or 18 inches above the floor. The above requirement does not apply if the heating equipment is located so as to be protected by a partition

not less than 18 inches above the floor. The use of improvised furnaces, construction heaters, and space heaters shall be prohibited.

5. Site Overview and Recommendations

The Park city Municipal Corporation Vehicle Maintenance Facility has an approximate total area of 25,000 ft² and is separated by solid concrete masonry unit (CMU) walls into several areas. The building slab is poured-in-place concrete with CMU exterior walls. The interior walls are lined with insulation. The roof is standing seam metal with interior blanket insulation. The Bus Storage Facility has an approximate total area of 36,000 ft². The building slab is poured-in-place concrete with exterior CMU walls and roof. The interior of the first level of the parking structure is lined with insulation. The second level is reinforced concrete outdoor parking area. Figure 5-1 shows an aerial photo of the Park City Municipal Corporation site with the locations of the Vehicle Maintenance Facility and the Bus Storage Facility.

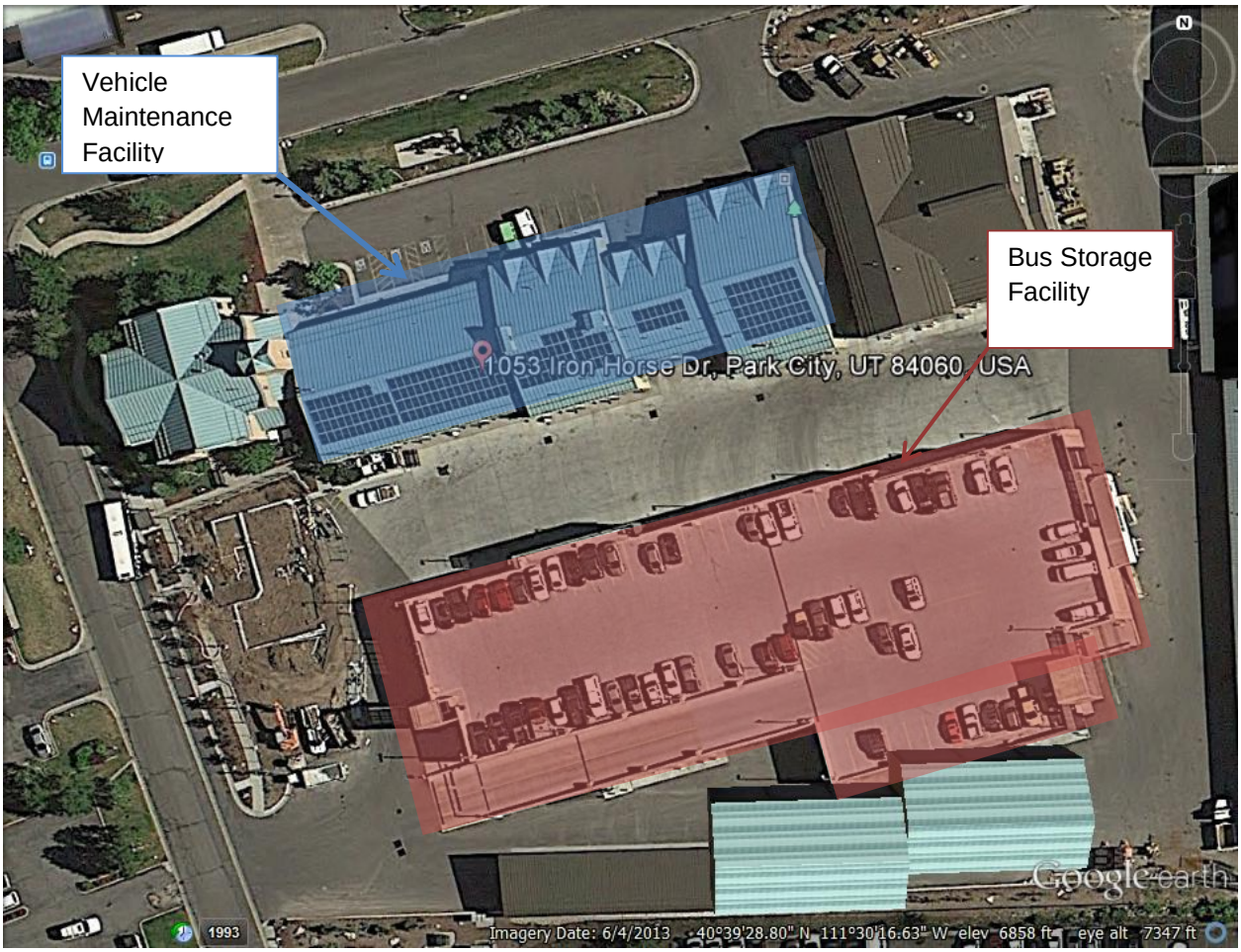


Figure 5-1: Site Overview with Vehicle Maintenance Facility and Bus Storage Facility Locations

5.1. Vehicle Maintenance Facility

A review of the facility's features was made to determine compatibility with the proposed CNGV operations. The following recommendations are based on code requirements and existing facility constraints. The proposed conceptual design plan to make the Vehicle Maintenance Facility compliant with service and repair of CNG vehicles can be found in Appendix A.1.

5.1.1. Building Features

The Vehicle Maintenance Facility is divided into several repair, storage, and office areas separated by CMU walls, not all of full height. The western part of the facility where vehicle repairs occur has a floor space of approximately 7,500 ft^2. The central part of the facility containing the Small Engine and Hose Fab Shop, Chassis Wash, and Mechanical Room has a floor space of approximately 2206 ft^2. The floor space of the eastern part of the facility where vehicle repairs occur is approximately 8,585 ft^2. There are various rooms adjacent to the repair areas that are accessed through man doors. Not all man doors have self-closing mechanisms installed. The repair bays are serviced by twenty-three (23) motorized roll up doors. All door motors are installed out of the 18-inches Code designated Class 1 Division 2, Zone.

Recommendations:

- Install vapor seals on the frames of all man doors leading to the repair areas.
- Replace all malfunctioning or missing self-closing mechanisms.
- Install vapor proof vinyl curtains to isolate designated areas to prevent the mitigation of gas plume to designated areas as shown in the conceptual plan.

5.1.2. Mechanical Ventilation

The Vehicle Maintenance Facility is serviced by seven (7) exhaust fans that provide a total ventilation rate of 37,740 CFM and three (3) makeup air units that provide a total ventilation rate of 49,880 CFM.

Recommendations:

- Installation of two (2) new 12,000 CFM inline type explosion proof exhaust fans in the west repair area of the Vehicle Maintenance Facility. Fans will activate during a gas leak event. Install exhaust ductwork and sidewall exhaust openings as designated in the conceptual plan.

- Installation of two (2) 11,000 CFM inline type explosion proof exhaust fans in the east repair area of the Vehicle Maintenance Facility. Fans will activate during a gas leak event. Install sidewall exhaust openings as designated in the conceptual plan.
- Installation of one (1) 4,000 CFM inline type explosion proof exhaust fan in the east repair area of the Vehicle Maintenance facility. Fan will activate during a gas leak event. Install roof exhaust opening as designated in the conceptual plan.
- Makeup air will be provided by opening seven (7) roll up doors during a gas leak event. Interlock existing roll up door motors with the gas detection system to open the designated roll up doors.

5.1.3. Gas Detection System

There is no methane detection system installed in the Vehicle Maintenance Facility. There is a CO and NO_2 gas detection system installed that appears to be interlocked with a number of the existing exhaust fans.

Recommendations:

- Installation of fifteen (15) infrared point-type methane detection sensors within 18-inches of the underside of ceiling.
- Installation of gas detection control system.
- Installation of audible and visual alarms both inside the repair garage and in the adjacent office and storage spaces
- Integrate alarm and ventilation systems with gas detection control panel to activate during a gas leak event.
- Install auto dialer for automatic notification to maintenance and first responders.

5.1.4. Heating System

The Vehicle Maintenance Facility is primarily serviced by eight (8) non-compliant radiant infrared tube heaters and by three (3) makeup air units as previously mentioned. Additionally, there appears to be one (1) open flame non-complaint unit heater servicing the repair area.

Recommendations:

- Removal of all non-compliant heaters.
- Installation of nine (9) 30 ft. long code compliant 75,000 BTUH radiant infrared tube heaters.

- Installation of five (5) 40 ft. long code compliant 75,000 BTUH radiant infrared tube heaters.

5.1.5. Electrical

The Vehicle Maintenance Facility is illuminated by a mixture of high bay metal halide fixture and fluorescent fixtures. There appears to be approximately twelve (12) florescent fixtures installed within the Class 1 Division 2 Zone. All conduit and junction boxes appear to be installed out of the Class 1 Division 2 Zone in the vehicle repair areas. There appears to be electrical panels in the facility that are assumed to have spare electrical circuit capacity that can be used for proposed building modification equipment.

Recommendations:

- Replace approximately twelve (12) florescent light fixtures located within the Class 1 Division 2 classified zone with explosion fixtures.
- Install shunt trip circuit breakers to de-energize the following equipment during a gas leak event:
    - New Infrared tube heaters
    - Hot works equipment such as welders and grinders
    - Existing exhaust fans
    - Makeup air units
    - Compressors
    - Lighting

5.2. Bus Storage Facility

A review of the Bus Storage Facility's features was made to determine compatibility with the proposed CNG parking operations. The following recommendations are based on code requirements and existing facility constraints. The proposed conceptual design plan to make the Bus Storage Facility compliant with CNG vehicle parking can be found in Appendix A.2.

5.2.1. Building Features

The Bus Storage Facility, shown in Figure 5-1, is completely separated from the Vehicle Maintenance Facility. Additionally, the facility is separated into several areas through the use of CMU walls, not all of full height. The area intended to be used for CNG vehicle parking is the first floor of the parking structure, which has a floor space of

approximately 28,821 ft^2. This area is accessed from the outside through eighteen (18) 24 ft. wide roll up motorized doors. The spaces adjacent to the parking area are accessed through fire rated man doors. There is a Bus Wash bay east of the parking area separated by a full height CMU wall with a floor space of approximately 2,105 ft^2.

Recommendations:

No modifications to the existing building structure are recommended.

5.2.2. Mechanical Ventilation

The areas enclosed by the Bus Storage Facility are serviced by thirty-three (33) motorized dampers, eleven (11) supply fans that provide a total ventilation rate of 40,005 CFM, and four (4) exhaust fans that provide a total ventilation rate of 3,340 CFM. The Bus Wash bay does not make use of mechanical ventilation

Recommendations:

- Provide continuous ventilation during normal working hours.
- Program ten (10) existing supply fans in the parking area to run continuously during normal operating hours.
- Provide emergency ventilation if a gas leak was to occur.
- Interlock twelve (12) motorized dampers with the supply fans in the parking area.
- Install one (1) wall mounted exhaust fan that provides a ventilation rate of 2,500 CFM in the Bus Wash area. Fan will be activated during a gas leak event.

5.2.3. Gas Detection System

There is no methane detection system installed in the Bus Storage Facility. There appears to be a CO gas detection system installed in the first floor of the structure. The Bus Wash bay appears to have a motion detection system installed.

Recommendations:

- Although it is not required by code, we believe it is good engineering practice to install methane detection systems in the first floor parking area and bus wash bay since CNG vehicles will be present.
  - Install three (3) open path type methane detectors in the first floor parking area.
  - Install one (1) point type methane detector in the first floor parking area.
  - Install one (1) point type methane detector in the bus wash area.
  - Install visual and audible alarms throughout the Bus Storage Facility.

- Install a gas detection control system that will activate visual and audible alarms and the exhaust fan in the bus wash bay during a gas leak event.
- Gas detection will be interlocked with ventilation system.

5.2.4. Heating System

The Bus Storage facility is serviced by five (5) hot water unit heaters and sixteen (16) radiant infrared tube heaters.

Recommendations:

- Verify that all heating equipment is located a minimum of 18 inches below the ceiling. If this is the case then no modifications are necessary to the existing equipment. Otherwise, the heating equipment will need to be relocated below 18 inches from the ceiling.

5.2.5. Electrical

The Bus Storage Facility is illuminated by fluorescent lighting fixtures. There appears to be an electrical room within the facility that is assumed to contain an electrical panel with spare circuits that can be used for building modifications.

Recommendations:

- Install five (5) emergency lights near the exits of the structure.
- Shunt trip circuit breakers to de-energize
  - Radiant infrared tube heaters
  - Hot water unit heaters
  - Existing exhaust fans, motorized dampers, and supply fans not designated to run continuously during operating hours
  - Lighting

6. Cost Estimates

The facility modification proposals presented below summarize the main components and recommended facility upgrades in order to expand operations for a CNGV code compliant repair and parking facilities. The following cost* estimates are valid for 90 days.

Table 7-1: Cost Estimate for Vehicle Maintenance Facility Upgrades

Park City Municipal Corporation Facility Modification Cost Estimate		
Engineering	$	64,370
Permit Fee (Estimated)	$	7,000
Concrete and Masonry	$	0
Doors, Windows, Partition Walls, and Vapor Proofing	$	21,665
Roof Modifications and Structural Supports	$	35,713
Fire Extinguishers, Safety Signage, and Specialties	$	6,861
Start-up, Rigging, Man-lifts, Scaffolding, Safety, and Miscellaneous Equipment	$	54,173
HVAC and Ventilation Upgrades	$	203,179
Gas Detection and Electrical Work	$	275,782
General Construction (Project, Construction, Insurance, Administrative Management)	$	47,053
Total Cost (USD)	**$**	**715,796**

Table 7-2: Cost Estimate for Bus Storage Facility Upgrades

Park City Municipal Corporation Facility Modification Cost Estimate		
Engineering	$	15,640
Permit Fee (Estimated)	$	3,000
Concrete and Masonry	$	0
Doors, Windows, Partition Walls, and Vapor Proofing	$	2,236
Roof Modifications and Structural Supports	$	4,394
Fire Extinguishers, Safety Signage, and Specialties	$	3,211
Start-up, Rigging, Man-lifts, Scaffolding, Safety, and Miscellaneous Equipment	$	10,201
HVAC and Ventilation Upgrades	$	17,703
Gas Detection and Electrical Work	$	128,546
General Construction (Project, Construction, Insurance, Administrative Management)	$	13,209
Total Cost (USD)	**$**	**198,140**

*Taxes not included

Warranty
Clean Energy will provide, upon Final Completion and acceptance of the Natural Gas Facility Modifications, a warranty period of one (1) year. Warranty shall cover materials and equipment which is furnished under the proposed modifications and include associated labor costs.

7. Appendix

Appendix A.1: Vehicle Maintenance Facility Conceptual Design

Appendix A.1: Bus Storage Facility Conceptual Design

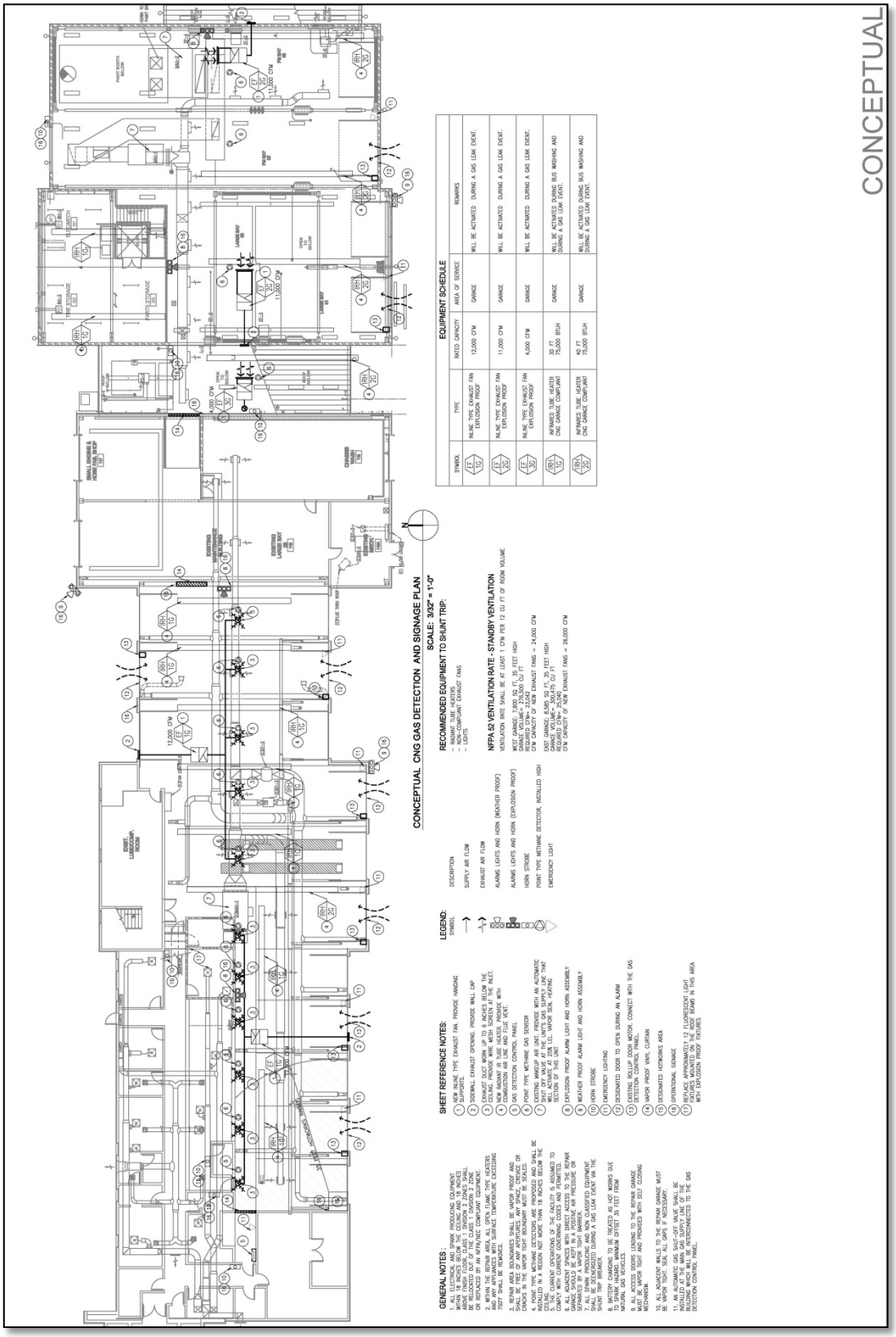
Appendix A.2: Typical Operational Signage, Specifications & Notes

Appendix A.3: Project Baseline Schedule

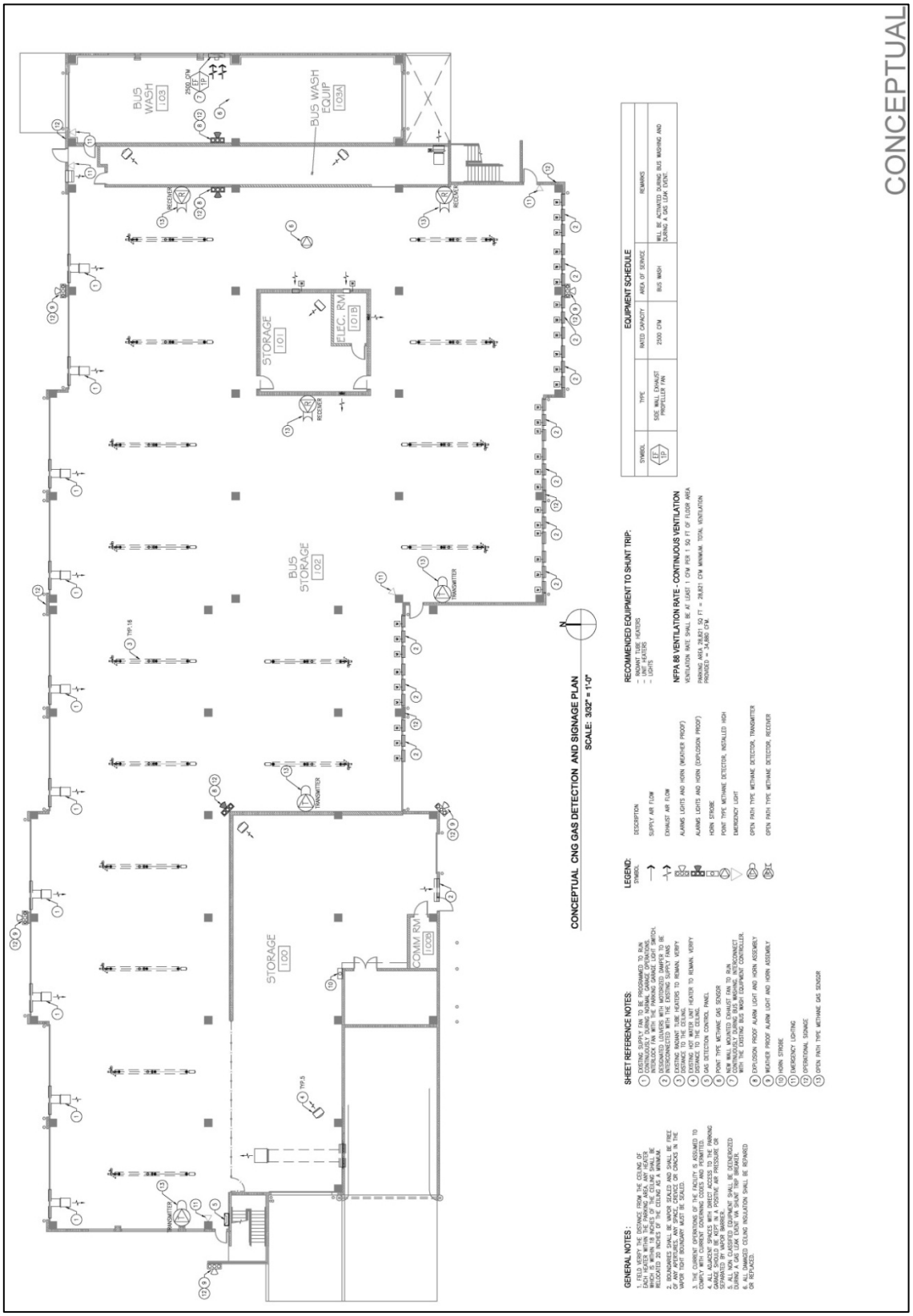
Appendix B.1: Job Site Photos

Appendix C.1: Contractor Submittals

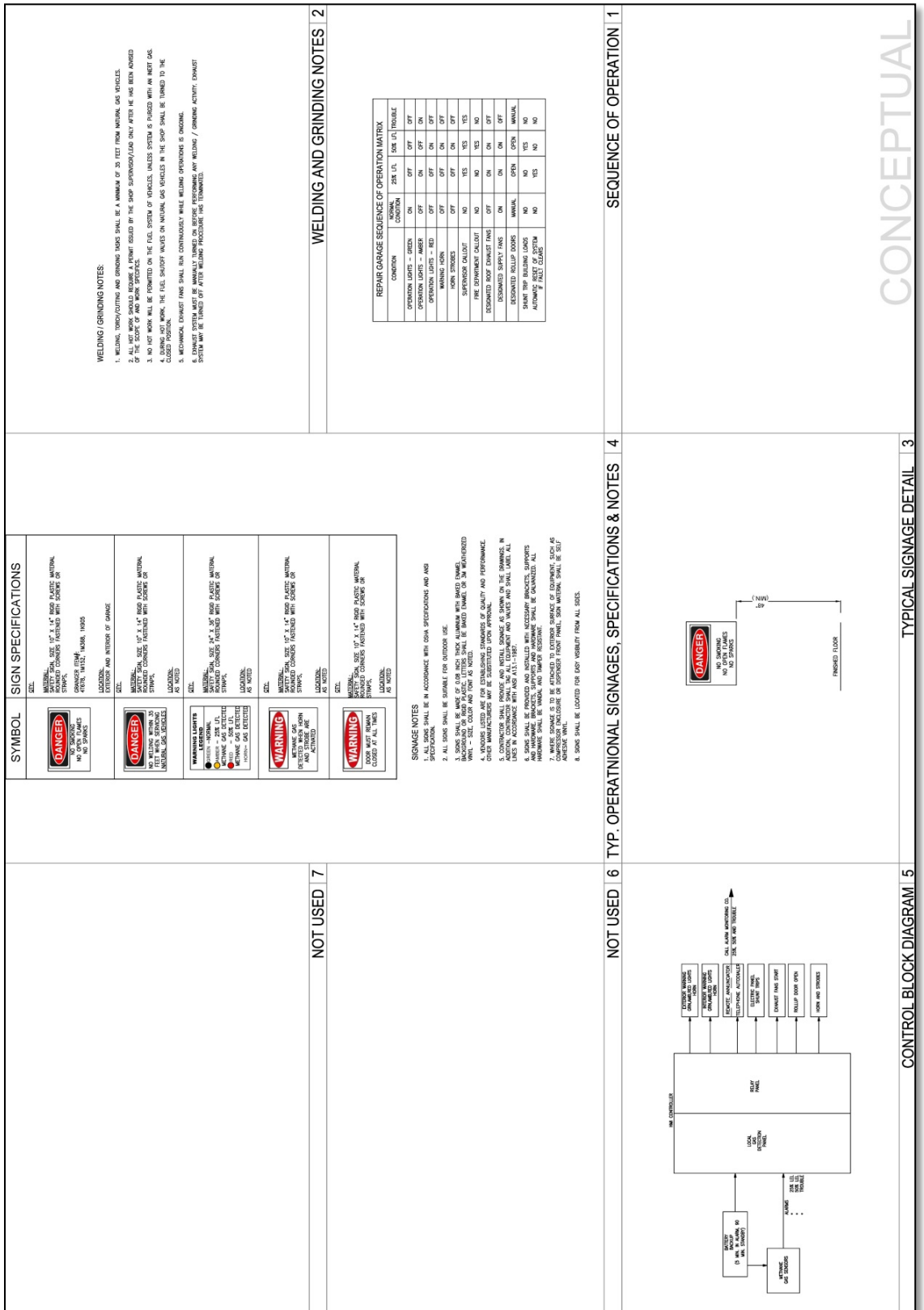
A.1 Vehicle Maintenance Facility Conceptual Design



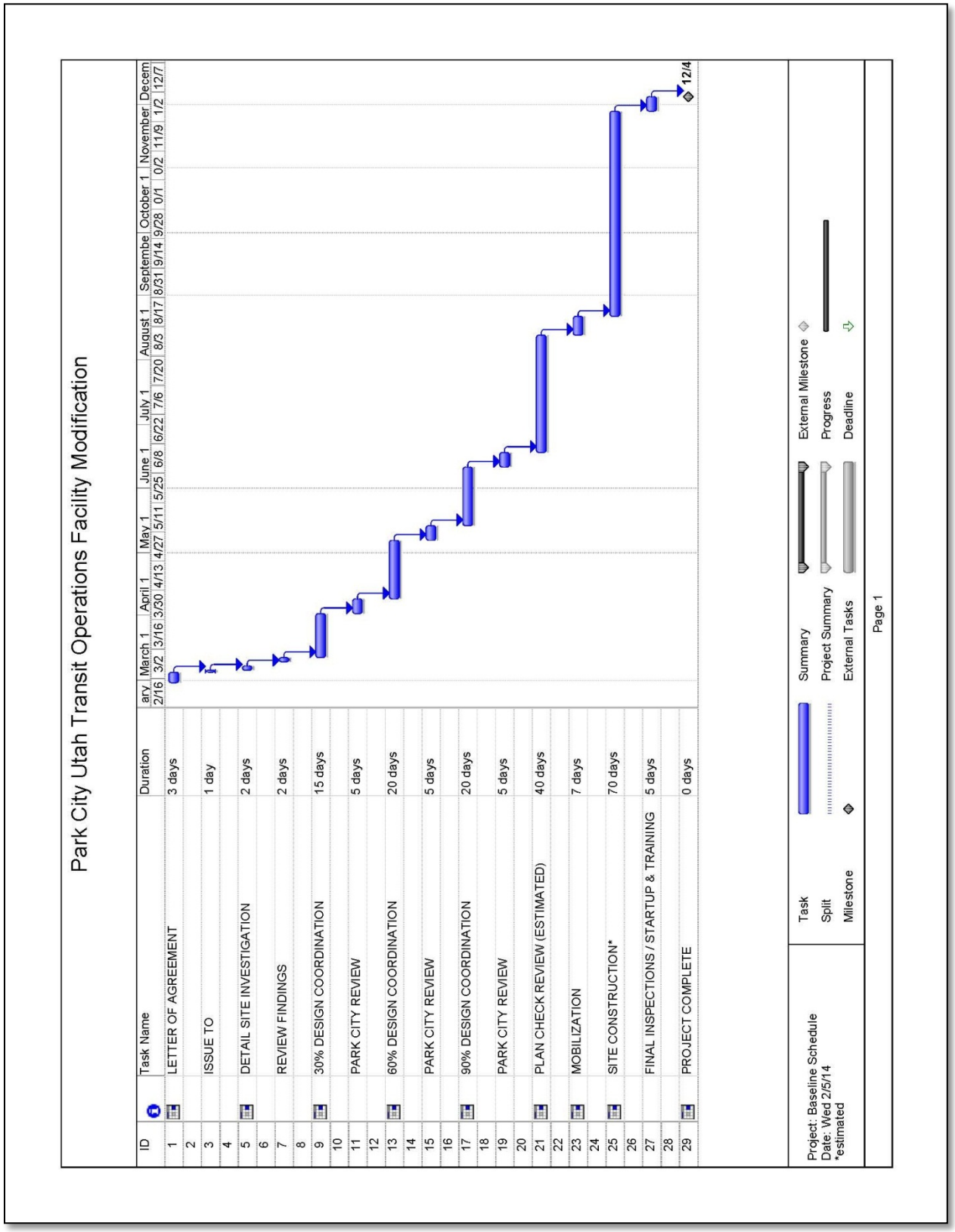
A.2 Bus Storage Facility Conceptual Design



A.3 Typical Operational Signage, Specifications & Notes



A.4 Project Baseline Schedule



B.1 Job Site Photos

FIGURE B.1-1: MAIN REPAIR GARAGE FLOOR

FIGURE B.1-2: EXISTING TUBE HEATER IN THE PARKING AREA

FIGURE B.1-3: EXISTING ELECTRICAL PANEL

FIGURE B.1-4: EXISTING SPACE ADJACENT TO THE REPAIR AREA

FIGURE B.1-5: EXISTING DUCTWORK

FIGURE B.1-6: EXISITNG MAKEUP AIR UNIT

FIGURE B.1-7: EXISTING ELECTRIC UNIT HEATER

FIGURE B.1-8: EXISTING WALL MOUNTED EXHAUST FANS

FIGURE B.1-9: EXISITNG WASH BAY

C.1 Contractor Submittals

Contractor Submittals

1. Manufacturer's Submittals Required Prior to Construction

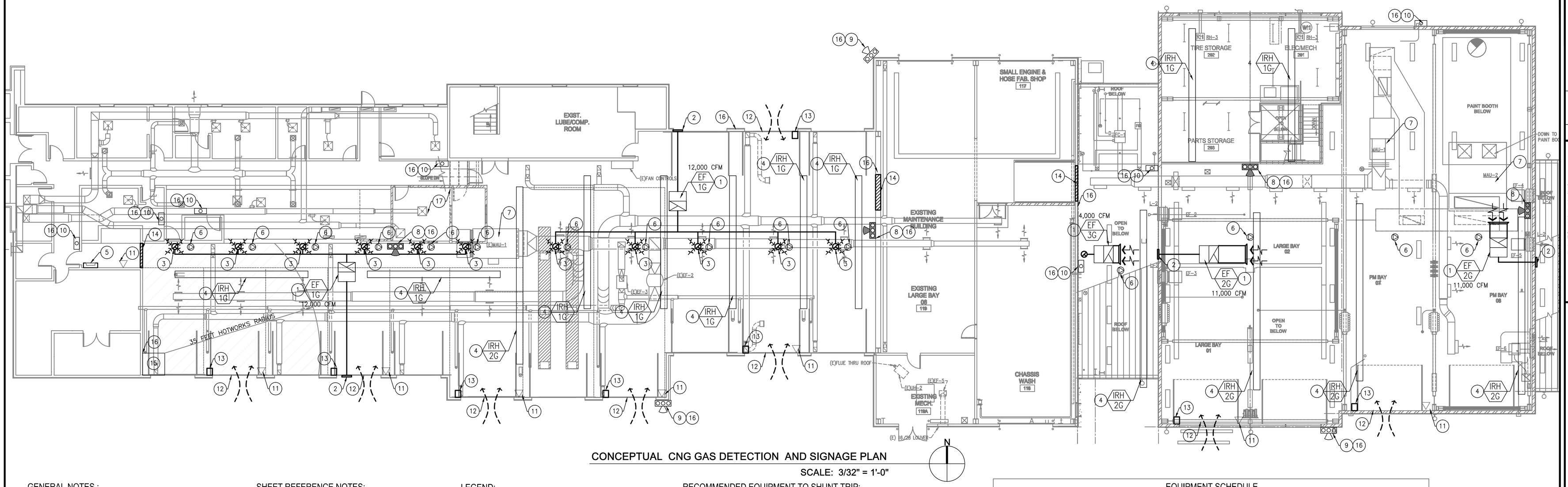
Description

a. Exhaust Fans: Centrifugal Up blast, Explosion-proof Non-sparking
b. Infrared Hydrocarbon Methane Gas Detector Sensor
c. Detector Digital Gas Transmitter
d. Visual Alarm Assembly
e. Audible Alarm
f. Construction Schedule

2. Manufacturer's Submittals Required Upon Completion of Construction

Description

a. Equipment Technical Manuals
b. Record Drawings
c. Spare Parts Lists



CONCEPTUAL CNG GAS DETECTION AND SIGNAGE PLAN

SCALE: 3/32" = 1'-0"

GENERAL NOTES :

1. ALL ELECTRICAL AND SPARK PRODUCING EQUIPMENT WITHIN 18 INCHES BELOW THE CEILING AND 18 INCHES ABOVE FINISH FLOOR, CLASS 1 DIVISION 2 ZONES SHALL BE RELOCATED OUT OF THE CLASS 1 DIVISION 2 ZONE OR REPLACED BY AN NFPA/NEC COMPLIANT EQUIPMENT.
2. WITHIN THE REPAIR AREA, ALL OPEN FLAME TYPE HEATERS AND ANY APPLIANCES WITH SURFACE TEMPERATURE EXCEEDING 750°F SHALL BE REMOVED.
3. REPAIR AREA BOUNDARIES SHALL BE VAPOR PROOF AND SHALL BE FREE OF ANY APERTURES. ANY SPACE, CREVICE OR CRACKS IN THE VAPOR TIGHT BOUNDARY MUST BE SEALED.
4. POINT TYPE METHANE DETECTORS ARE PROPOSED AND SHALL BE INSTALLED IN A REGION NOT MORE THAN 18 INCHES BELOW THE CEILING.
5. THE CURRENT OPERATIONS OF THE FACILITY IS ASSUMED TO COMPLY WITH CURRENT GOVERNING CODES AND PERMITTED.
6. ALL ADJACENT SPACES WITH DIRECT ACCESS TO THE REPAIR GARAGE SHOULD BE KEPT IN A POSITIVE AIR PRESSURE OR SEPARATED BY A VAPOR TIGHT BARRIER.
7. ALL SPARK PRODUCING AND NON CLASSIFIED EQUIPMENT SHALL BE DEENERGIZED DURING A GAS LEAK EVENT VIA THE SHUNT TRIP BREAKER.
8. BATTERY CHARGING TO BE TREATED AS HOT WORKS DUE TO SPARK HAZARD. MINIMUM OFFSET 35 FEET FROM NATURAL GAS VEHICLES.
9. ALL ACCESS DOORS LEADING TO THE REPAIR GARAGE MUST BE VAPOR TIGHT AND PROVIDED WITH SELF CLOSING MECHANISM.
10. ALL ADJACENT WALLS TO THE REPAIR GARAGE MUST BE VAPOR TIGHT. SEAL ALL GAPS IF NECESSARY.
11. AN AUTOMATIC GAS SHUT-OFF VALVE SHALL BE INSTALLED AT THE MAIN GAS SUPPLY LINE OF THE BUILDING WHICH WILL BE INTERCONNECTED TO THE GAS DETECTION CONTROL PANEL.

SHEET REFERENCE NOTES:

1. NEW INLINE TYPE EXHAUST FAN. PROVIDE HANGING SUPPORTS.
2. SIDEWALL EXHAUST OPENING. PROVIDE WALL CAP
3. EXHAUST DUCT WORK UP TO 6 INCHES BELOW THE CEILING. PROVIDE WIRE MESH SCREEN AT THE INLET.
4. NEW RADIANT IR TUBE HEATER. PROVIDE WITH COMBUSTION AIR LINE AND FLUE VENT.
5. GAS DETECTION CONTROL PANEL
6. POINT TYPE METHANE GAS SENSOR
7. EXISTING MAKEUP AIR UNIT. PROVIDE WITH AN AUTOMATIC SHUT OFF VALVE AT THE UNIT'S GAS SUPPLY LINE THAT WILL ACTIVATE AT 25% LEL. VAPOR SEAL HEATING SECTION OF THIS UNIT
8. EXPLOSION PROOF ALARM LIGHT AND HORN ASSEMBLY
9. WEATHER PROOF ALARM LIGHT AND HORN ASSEMBLY
10. HORN STROBE
11. EMERGENCY LIGHTING
12. DESIGNATED DOOR TO OPEN DURING AN ALARM
13. EXISTING ROLLUP DOOR MOTOR. CONNECT WITH THE GAS DETECTION CONTROL PANEL.
14. VAPOR PROOF VINYL CURTAIN
15. DESIGNATED HOTWORKS AREA
16. OPERATIONAL SIGNAGE
17. REPLACE APPROXIMATELY 12 FLUORESCENT LIGHT FIXTURES MOUNTED ON THE ROOF BEAMS IN THIS AREA WITH EXPLOSION PROOF FIXTURES

LEGEND:

SYMBOL	DESCRIPTION
→	SUPPLY AIR FLOW
→	EXHAUST AIR FLOW
	ALARMS LIGHTS AND HORN (WEATHER PROOF)
	ALARMS LIGHTS AND HORN (EXPLOSION PROOF)
	HORN STROBE
	POINT TYPE METHANE DETECTOR, INSTALLED HIGH
▽	EMERGENCY LIGHT

RECOMMENDED EQUIPMENT TO SHUNT TRIP:

- RADIANT TUBE HEATERS
- NON-COMPLIANT EXHAUST FANS
- LIGHTS

NFPA 52 VENTILATION RATE - STANDBY VENTILATION

VENTILATION RATE SHALL BE AT LEAST 1 CFM PER 12 CU FT OF ROOM VOLUME

WEST GARAGE: 7,900 SQ FT, 35 FEET HIGH
GARAGE VOLUME= 276,500 CU FT
REQUIRED CFM= 23,042
CFM CAPACITY OF NEW EXHAUST FANS = 24,000 CFM

EAST GARAGE: 8,585 SQ FT, 35 FEET HIGH
GARAGE VOLUME= 300,475 CU FT
REQUIRED CFM= 25,040
CFM CAPACITY OF NEW EXHAUST FANS = 26,000 CFM

EQUIPMENT SCHEDULE

SYMBOL	TYPE	RATED CAPACITY	AREA OF SERVICE	REMARKS
EF 1G	INLINE TYPE EXHAUST FAN EXPLOSION PROOF	12,000 CFM	GARAGE	WILL BE ACTIVATED DURING A GAS LEAK EVENT.
EF 2G	INLINE TYPE EXHAUST FAN EXPLOSION PROOF	11,000 CFM	GARAGE	WILL BE ACTIVATED DURING A GAS LEAK EVENT.
EF 3G	INLINE TYPE EXHAUST FAN EXPLOSION PROOF	4,000 CFM	GARAGE	WILL BE ACTIVATED DURING A GAS LEAK EVENT.
IRH 1G	INFRARED TUBE HEATER CNG GARAGE COMPLIANT	30 FT 75,000 BTUH	GARAGE	WILL BE ACTIVATED DURING BUS WASHING AND DURING A GAS LEAK EVENT.
1RH 2G	INFRARED TUBE HEATER CNG GARAGE COMPLIANT	40 FT 75,000 BTUH	GARAGE	WILL BE ACTIVATED DURING BUS WASHING AND DURING A GAS LEAK EVENT.

CONCEPTUAL

REV	DATE	REVISIONS	BY
1	02/06/2014	30% DESIGN SET	XX

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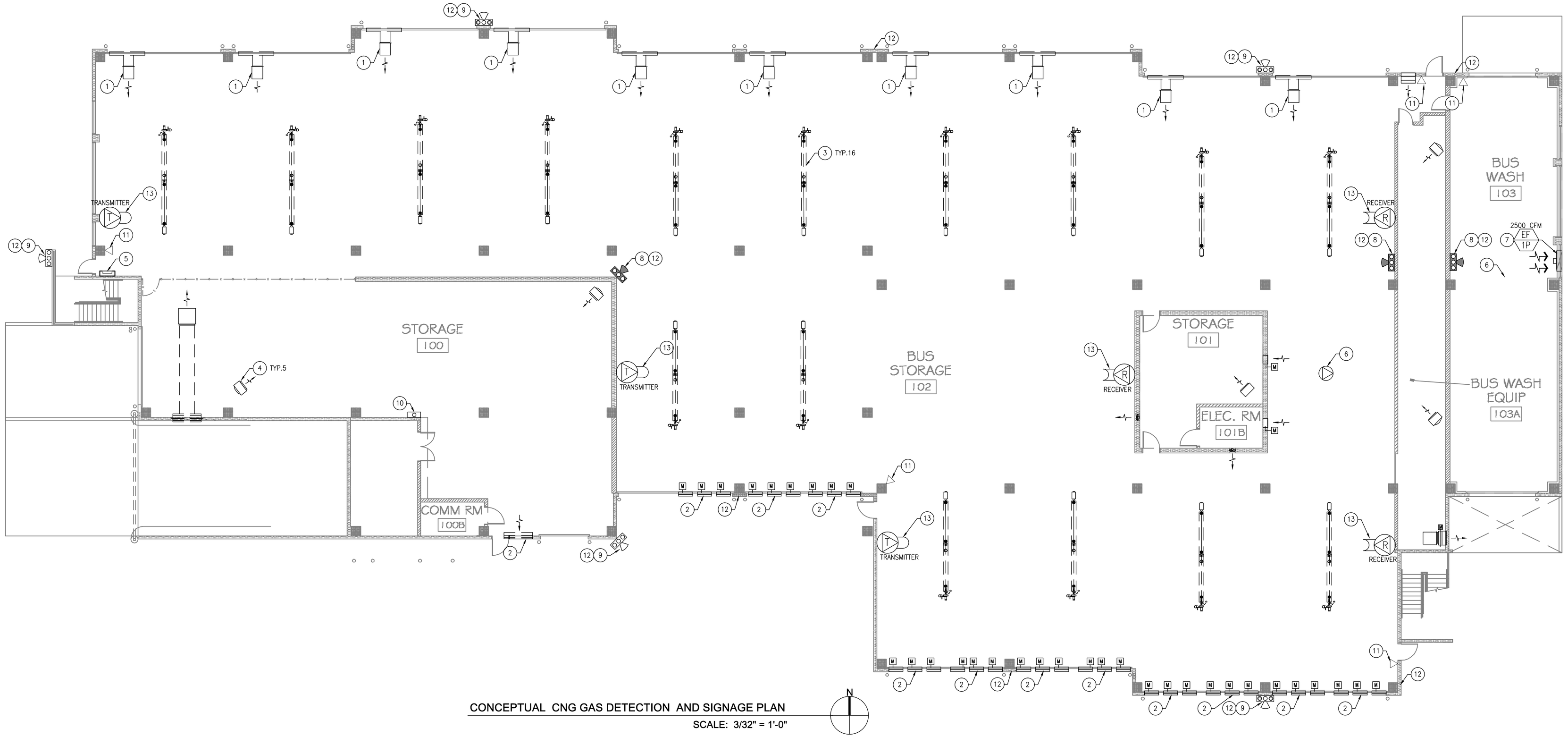
NGV FACILITY MODIFICATIONS
PARK CITY PUBLIC WORKS DEPARTMENT
1053 IRON HORSE DRIVE
PARK CITY, UTAH 84060
REPAIR BUILDING CONCEPTUAL PLAN

DATE	02/06/2014
DESIGNED BY	XXX
CHECKED BY	SC
APPROVED BY	RM
SCALE	AS NOTED
SHEET	CLNE-1



CONCEPTUAL CNG GAS DETECTION AND SIGNAGE PLAN

SCALE: 3/32" = 1'-0"

GENERAL NOTES :

1. FIELD VERIFY THE DISTANCE FROM THE CEILING OF EACH HEATER WITHIN THE PARKING AREA. ANY HEATER WHICH IS WITHIN 18 INCHES OF THE CEILING SHALL BE RELOCATED 20 INCHES OF THE CEILING AS A MINIMUM.
2. BOUNDARIES SHALL BE VAPOR SEALED AND SHALL BE FREE OF ANY APERTURES. ANY SPACE, CREVICE OR CRACKS IN THE VAPOR TIGHT BOUNDARY MUST BE SEALED.
3. THE CURRENT OPERATIONS OF THE FACILITY IS ASSUMED TO COMPLY WITH CURRENT GOVERNING CODES AND PERMITTED.
4. ALL ADJACENT SPACES WITH DIRECT ACCESS TO THE PARKING GARAGE SHOULD BE KEPT IN A POSITIVE AIR PRESSURE OR SEPARATED BY VAPOR BARRIER..
5. ALL NON CLASSIFIED EQUIPMENT SHALL BE DEENERGIZED DURING A GAS LEAK EVENT VIA SHUNT TRIP BREAKER.
6. ALL DAMAGED CEILING INSULATION SHALL BE REPAIRED OR REPLACED.

SHEET REFERENCE NOTES:

1. EXISTING SUPPLY FAN TO BE PROGRAMMED TO RUN CONTINUOUSLY DURING NORMAL GARAGE OPERATIONS. INTERLOCK FAN WITH THE PARKING GARAGE LIGHT SWITCH.
2. DESIGNATED LOUVERS WITH MOTORIZED DAMPER TO BE INTERCONNECTED WITH THE EXISTING SUPPLY FANS
3. EXISTING RADIANT TUBE HEATERS TO REMAIN. VERIFY DISTANCE TO THE CEILING.
4. EXISTING HOT WATER UNIT HEATER TO REMAIN. VERIFY DISTANCE TO THE CEILING.
5. GAS DETECTION CONTROL PANEL
6. POINT TYPE METHANE GAS SENSOR
7. NEW WALL MOUNTED EXHAUST FAN TO RUN CONTINUOUSLY DURING BUS WASHING. INTERCONNECT WITH THE EXISTING BUS WASH EQUIPMENT CONTROLLER.
8. EXPLOSION PROOF ALARM LIGHT AND HORN ASSEMBLY
9. WEATHER PROOF ALARM LIGHT AND HORN ASSEMBLY
10. HORN STROBE
11. EMERGENCY LIGHTING
12. OPERATIONAL SIGNAGE
13. OPEN PATH TYPE METHANE GAS SENSOR

LEGEND:

SYMBOL	DESCRIPTION
	SUPPLY AIR FLOW
	EXHAUST AIR FLOW
	ALARMS LIGHTS AND HORN (WEATHER PROOF)
	ALARMS LIGHTS AND HORN (EXPLOSION PROOF)
	HORN STROBE
	POINT TYPE METHANE DETECTOR, INSTALLED HIGH
	EMERGENCY LIGHT
T	OPEN PATH TYPE METHANE DETECTOR, TRANSMITTER
R	OPEN PATH TYPE METHANE DETECTOR, RECEIVER

RECOMMENDED EQUIPMENT TO SHUNT TRIP:

- RADIANT TUBE HEATERS
- UNIT HEATERS
- LIGHTS

NFPA 88 VENTILATION RATE - CONTINUOUS VENTILATION

VENTILATION RATE SHALL BE AT LEAST 1 CFM PER 1 SQ FT OF FLOOR AREA

PARKING AREA 28,821 SQ FT = 28,821 CFM MINIMUM. TOTAL VENTILATION PROVIDED = 34,880 CFM.

EQUIPMENT SCHEDULE

SYMBOL	TYPE	RATED CAPACITY	AREA OF SERVICE	REMARKS
EF 1P	SIDE WALL EXHAUST PROPELLER FAN	2500 CFM	BUS WASH	WILL BE ACTIVATED DURING BUS WASHING AND DURING A GAS LEAK EVENT.

CONCEPTUAL

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NGV FACILITY MODIFICATIONS
PARK CITY PUBLIC WORKS DEPARTMENT
1053 IRON HORSE DRIVE
PARK CITY, UTAH 84060
PARKING BUILDING CONCEPTUAL PLAN

DATE	02/06/2014
DESIGNED BY	XXX
CHECKED BY	SC
APPROVED BY	RM
SCALE	AS NOTED
SHEET	CLNE-2

Supplemental Cost Estimates

In response to Park City Municipal Corporation Staff request to adjust the proposed maintenance and storage facilities modifications to be aligned with the transition of obtaining the natural gas transit vehicles. CE is proposing modifying phasing in the modifications of the maintenance and storage facilities to reduce the initial capital cost outlay. The cost estimates below and the corresponding drawings reflect phasing the modifications.

Table A: Cost Estimate

Park City Municipal Corporation Eastern Section		
Engineering & Permitting	$	45,616
General Construction	$	360,545
Total Cost (USD)	**$**	**406,161**

Table B: Cost Estimate

Park City Municipal Corporation Western Section		
Engineering & Permitting	$	39,429
General Construction	$	308,867
Total Cost (USD)	**$**	**349,296**

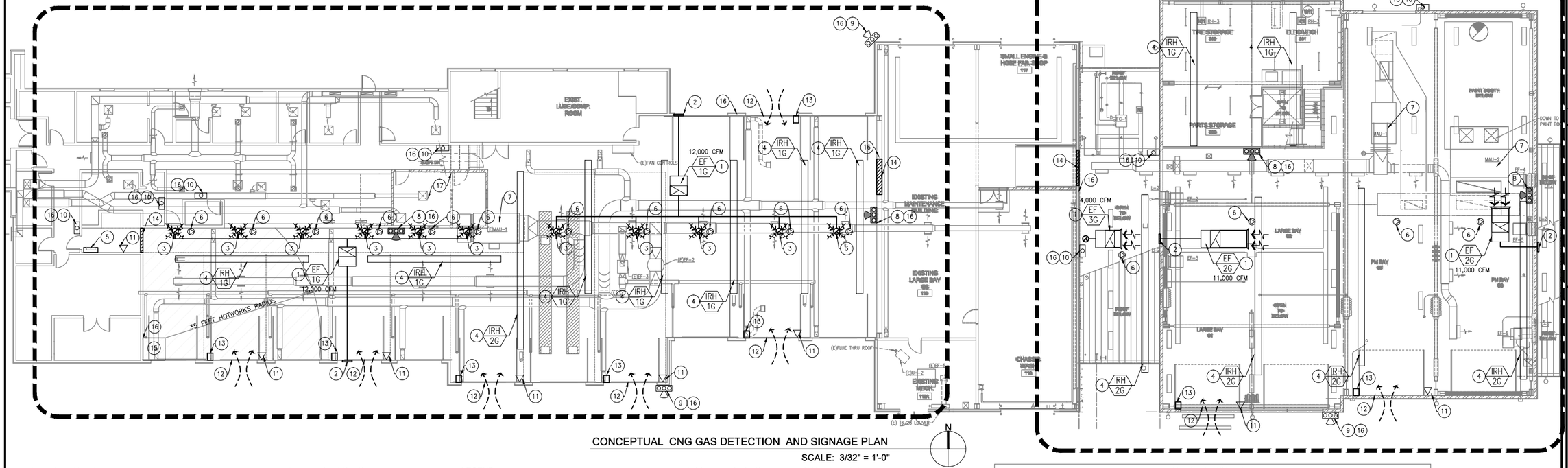
Table C: Cost Estimate

Park City Municipal Corporation Storage Facility		
Engineering & Permitting	$	11,500
General Construction	$	128,994
Total Cost (USD)	**$**	**140,494**

*Taxes not included

OPTION 1 - EASTERN GARAGE UPGRADES

OPTION 2 - WESTERN GARAGE UPGRADES



CONCEPTUAL CNG GAS DETECTION AND SIGNAGE PLAN

SCALE: 3/32" = 1'-0"

GENERAL NOTES :

1. ALL ELECTRICAL AND SPARK PRODUCING EQUIPMENT WITHIN 18 INCHES BELOW THE CEILING AND 18 INCHES ABOVE FINISH FLOOR, CLASS 1 DIVISION 2 ZONES SHALL BE RELOCATED OUT OF THE CLASS 1 DIVISION 2 ZONE OR REPLACED BY AN NFPA/NEC COMPLIANT EQUIPMENT.

2. WITHIN THE REPAIR AREA, ALL OPEN FLAME TYPE HEATERS AND ANY APPLIANCES WITH SURFACE TEMPERATURE EXCEEDING 750'F SHALL BE REMOVED.

3. REPAIR AREA BOUNDARIES SHALL BE VAPOR PROOF AND SHALL BE FREE OF ANY APERTURES. ANY SPACE, CREVICE OR CRACKS IN THE VAPOR TIGHT BOUNDARY MUST BE SEALED.

4. POINT TYPE METHANE DETECTORS ARE PROPOSED AND SHALL BE INSTALLED IN A REGION NOT MORE THAN 18 INCHES BELOW THE CEILING.

5. THE CURRENT OPERATIONS OF THE FACILITY IS ASSUMED TO COMPLY WITH CURRENT GOVERNING CODES AND PERMITTED.

6. ALL ADJACENT SPACES WITH DIRECT ACCESS TO THE REPAIR GARAGE SHOULD BE KEPT IN A POSITIVE AIR PRESSURE OR SEPARATED BY A VAPOR TIGHT BARRIER.

7. ALL SPARK PRODUCING AND NON CLASSIFIED EQUIPMENT SHALL BE DEENERGIZED DURING A GAS LEAK EVENT VIA THE SHUNT TRIP BREAKER.

8. BATTERY CHARGING TO BE TREATED AS HOT WORKS DUE TO SPARK HAZARD. MINIMUM OFFSET 35 FEET FROM NATURAL GAS VEHICLES.

9. ALL ACCESS DOORS LEADING TO THE REPAIR GARAGE MUST BE VAPOR TIGHT AND PROVIDED WITH SELF CLOSING MECHANISM.

10. ALL ADJACENT WALLS TO THE REPAIR GARAGE MUST BE VAPOR TIGHT. SEAL ALL GAPS IF NECESSARY.

11. AN AUTOMATIC GAS SHUT-OFF VALVE SHALL BE INSTALLED AT THE MAIN GAS SUPPLY LINE OF THE BUILDING WHICH WILL BE INTERCONNECTED TO THE GAS DETECTION CONTROL PANEL.

SHEET REFERENCE NOTES:

1. NEW INLINE TYPE EXHAUST FAN. PROVIDE HANGING SUPPORTS.
2. SIDEWALL EXHAUST OPENING. PROVIDE WALL CAP
3. EXHAUST DUCT WORK UP TO 6 INCHES BELOW THE CEILING. PROVIDE WIRE MESH SCREEN AT THE INLET.
4. NEW RADIANT IR TUBE HEATER. PROVIDE WITH COMBUSTION AIR LINE AND FLUE VENT.
5. GAS DETECTION CONTROL PANEL
6. POINT TYPE METHANE GAS SENSOR
7. EXISTING MAKEUP AIR UNIT. PROVIDE WITH AN AUTOMATIC SHUT OFF VALVE AT THE UNIT'S GAS SUPPLY LINE THAT WILL ACTIVATE AT 25% LEL. VAPOR SEAL HEATING SECTION OF THIS UNIT
8. EXPLOSION PROOF ALARM LIGHT AND HORN ASSEMBLY
9. WEATHER PROOF ALARM LIGHT AND HORN ASSEMBLY
10. HORN STROBE
11. EMERGENCY LIGHTING
12. DESIGNATED DOOR TO OPEN DURING AN ALARM
13. EXISTING ROLLUP DOOR MOTOR. CONNECT WITH THE GAS DETECTION CONTROL PANEL.
14. VAPOR PROOF VINYL CURTAIN
15. DESIGNATED HOTWORKS AREA
16. OPERATIONAL SIGNAGE
17. REPLACE APPROXIMATELY 12 FLUORESCENT LIGHT FIXTURES MOUNTED ON THE ROOF BEAMS IN THIS AREA WITH EXPLOSION PROOF FIXTURES

LEGEND:

SYMBOL	DESCRIPTION
→	SUPPLY AIR FLOW
→	EXHAUST AIR FLOW
	ALARMS LIGHTS AND HORN (WEATHER PROOF)
	ALARMS LIGHTS AND HORN (EXPLOSION PROOF)
	HORN STROBE
	POINT TYPE METHANE DETECTOR, INSTALLED HIGH
	EMERGENCY LIGHT

RECOMMENDED EQUIPMENT TO SHUNT TRIP:

- RADIANT TUBE HEATERS
- NON-COMPLIANT EXHAUST FANS
- LIGHTS

NFPA 52 VENTILATION RATE - STANDBY VENTILATION

VENTILATION RATE SHALL BE AT LEAST 1 CFM PER 12 CU FT OF ROOM VOLUME

WEST GARAGE: 7,900 SQ FT, 35 FEET HIGH
GARAGE VOLUME= 276,500 CU FT
REQUIRED CFM= 23,042
CFM CAPACITY OF NEW EXHAUST FANS = 24,000 CFM

EAST GARAGE: 8,585 SQ FT, 35 FEET HIGH
GARAGE VOLUME= 300,475 CU FT
REQUIRED CFM= 25,040
CFM CAPACITY OF NEW EXHAUST FANS = 26,000 CFM

EQUIPMENT SCHEDULE

SYMBOL	TYPE	RATED CAPACITY	AREA OF SERVICE	REMARKS
EF 1G	INLINE TYPE EXHAUST FAN EXPLOSION PROOF	12,000 CFM	GARAGE	WILL BE ACTIVATED DURING A GAS LEAK EVENT.
EF 2G	INLINE TYPE EXHAUST FAN EXPLOSION PROOF	11,000 CFM	GARAGE	WILL BE ACTIVATED DURING A GAS LEAK EVENT.
EF 3G	INLINE TYPE EXHAUST FAN EXPLOSION PROOF	4,000 CFM	GARAGE	WILL BE ACTIVATED DURING A GAS LEAK EVENT.
IRH 1G	INFRARED TUBE HEATER CNG GARAGE COMPLIANT	30 FT 75,000 BTUH	GARAGE	WILL BE ACTIVATED DURING BUS WASHING AND DURING A GAS LEAK EVENT.
IRH 2G	INFRARED TUBE HEATER CNG GARAGE COMPLIANT	40 FT 75,000 BTUH	GARAGE	WILL BE ACTIVATED DURING BUS WASHING AND DURING A GAS LEAK EVENT.

CONCEPTUAL

REV	DATE	REVISIONS	BY
1	02/06/2014	30% DESIGN SET	XX

DIGALERT — Know what's below. CALL 811 before you dig.

CAUTION: THIS DRAWING MAY BE REDUCED
0 1" 2" 3"
1" IN ORIGINAL DRAWING

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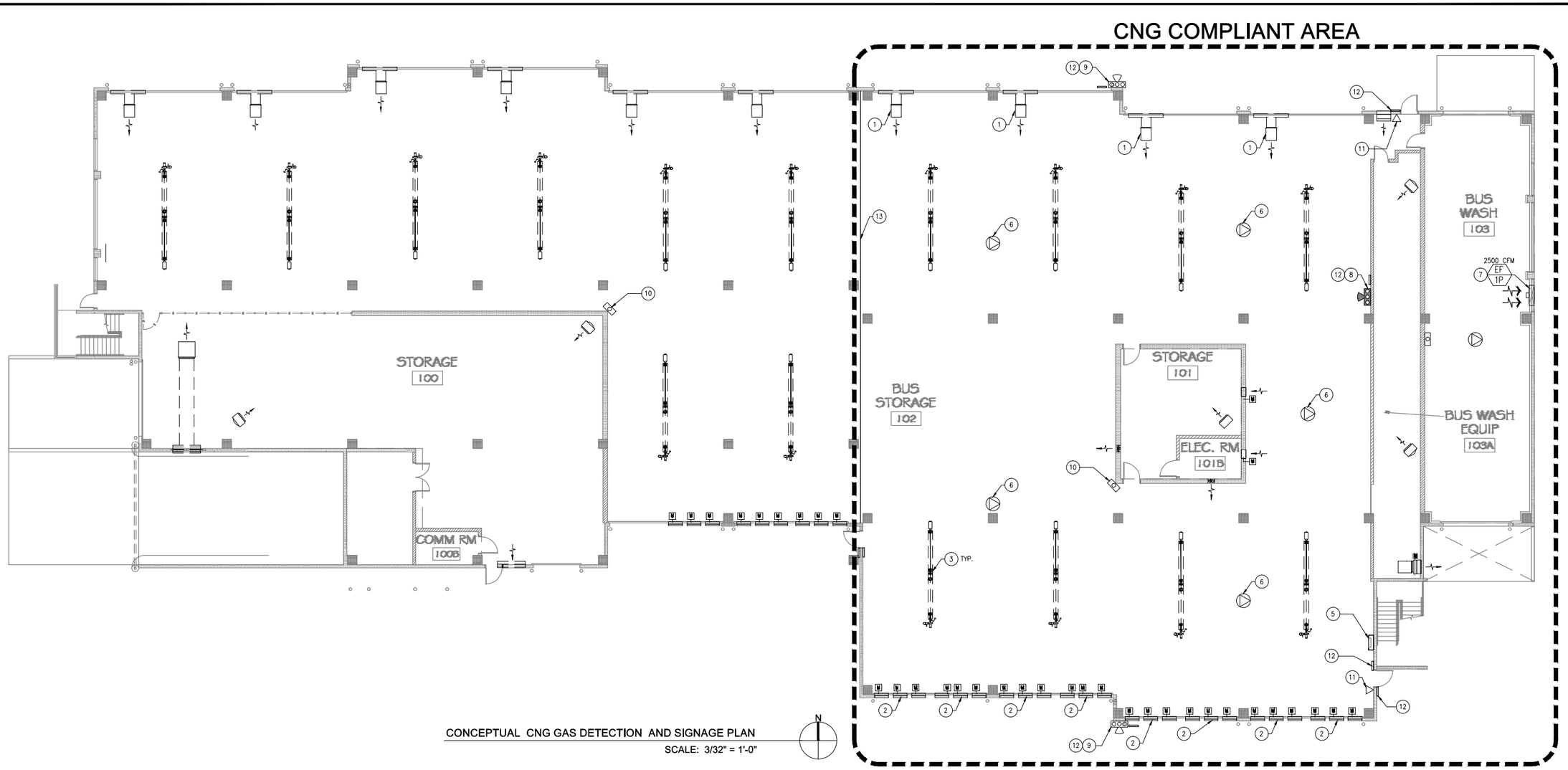
NGV FACILITY MODIFICATIONS
PARK CITY PUBLIC WORKS DEPARTMENT
1053 IRON HORSE DRIVE
PARK CITY, UTAH 84060
REPAIR BUILDING CONCEPTUAL PLAN

DATE	02/06/2014
DESIGNED BY	XXX
CHECKED BY	SC
APPROVED BY	RM
SCALE	AS NOTED
SHEET	CLNE-1



CONCEPTUAL CNG GAS DETECTION AND SIGNAGE PLAN

SCALE: 3/32" = 1'-0"

GENERAL NOTES :

1. FIELD VERIFY THE DISTANCE FROM THE CEILING OF EACH HEATER WITHIN THE PARKING AREA. ANY HEATER WHICH IS WITHIN 18 INCHES OF THE CEILING SHALL BE RELOCATED 20 INCHES OF THE CEILING AS A MINIMUM.
2. BOUNDARIES SHALL BE VAPOR SEALED AND SHALL BE FREE OF ANY APERTURES. ANY SPACE, CREVICE OR CRACKS IN THE VAPOR TIGHT BOUNDARY MUST BE SEALED.
3. THE CURRENT OPERATIONS OF THE FACILITY IS ASSUMED TO COMPLY WITH CURRENT GOVERNING CODES AND PERMITTED.
4. ALL ADJACENT SPACES WITH DIRECT ACCESS TO THE PARKING GARAGE SHOULD BE KEPT IN A POSITIVE AIR PRESSURE OR SEPARATED BY VAPOR BARRIER..
5. ALL NON CLASSIFIED EQUIPMENT SHALL BE DEENERGIZED DURING A GAS LEAK EVENT VIA SHUNT TRIP BREAKER.
6. ALL DAMAGED CEILING INSULATION SHALL BE REPAIRED OR REPLACED.

SHEET REFERENCE NOTES:

1. EXISTING SUPPLY FAN TO BE PROGRAMMED TO RUN CONTINUOUSLY DURING NORMAL GARAGE OPERATIONS. INTERLOCK FAN WITH THE PARKING GARAGE LIGHT SWITCH.
2. DESIGNATED LOUVERS WITH MOTORIZED DAMPER TO BE INTERCONNECTED WITH THE EXISTING SUPPLY FANS
3. EXISTING RADIANT TUBE HEATERS TO REMAIN. VERIFY DISTANCE TO THE CEILING.
4. NEW RETRACTABLE VINYL CURTAIN VAPOR BARRIER TO BE MOUNTED ALONG CEILING LINE
5. GAS DETECTION CONTROL PANEL
6. POINT TYPE METHANE GAS SENSOR
7. NEW WALL MOUNTED EXHAUST FAN TO RUN CONTINUOUSLY DURING BUS WASHING. INTERCONNECT WITH THE EXISTING BUS WASH EQUIPMENT CONTROLLER.
8. EXPLOSION PROOF ALARM LIGHT AND HORN ASSEMBLY
9. WEATHER PROOF ALARM LIGHT AND HORN ASSEMBLY
10. WARNING HORN AND STROBE LIGHT
11. EMERGENCY LIGHTING
12. OPERATIONAL SIGNAGE
13. VINYL CURTAIN

LEGEND:

SYMBOL	DESCRIPTION
→	SUPPLY AIR FLOW
→	EXHAUST AIR FLOW
	ALARMS LIGHTS AND HORN (WEATHER PROOF)
	ALARMS LIGHTS AND HORN (EXPLOSION PROOF)
	HORN STROBE
	POINT TYPE METHANE DETECTOR, INSTALLED HIGH
	EMERGENCY LIGHT

RECOMMENDED EQUIPMENT TO SHUNT TRIP:

- RADIANT TUBE HEATERS
- UNIT HEATERS
- LIGHTS

NFPA 88 VENTILATION RATE - CONTINUOUS VENTILATION

VENTILATION RATE SHALL BE AT LEAST 1 CFM PER 1 SQ FT OF FLOOR AREA

PARKING AREA 28,821 SQ FT = 28,821 CFM MINIMUM. TOTAL VENTILATION PROVIDED = 34,880 CFM.

EQUIPMENT SCHEDULE

SYMBOL	TYPE	RATED CAPACITY	AREA OF SERVICE	REMARKS
EF 1P	SIDE WALL EXHAUST PROPELLER FAN	2500 CFM	BUS WASH	WILL BE ACTIVATED DURING BUS WASHING AND DURING A GAS LEAK EVENT.

CONCEPTUAL

REV	DATE	REVISIONS	BY
1	02/06/2014	30% DESIGN SET	XX

DIGALERT

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REDUCED PLANS
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NGV FACILITY MODIFICATIONS
PARK CITY PUBLIC WORKS DEPARTMENT
1053 IRON HORSE DRIVE
PARK CITY, UTAH 84060
PARKING BUILDING CONCEPTUAL PLAN

DATE	02/06/2014
DESIGNED BY	XXX
CHECKED BY	SC
APPROVED BY	RM
SCALE	AS NOTED
SHEET	CLNE-2