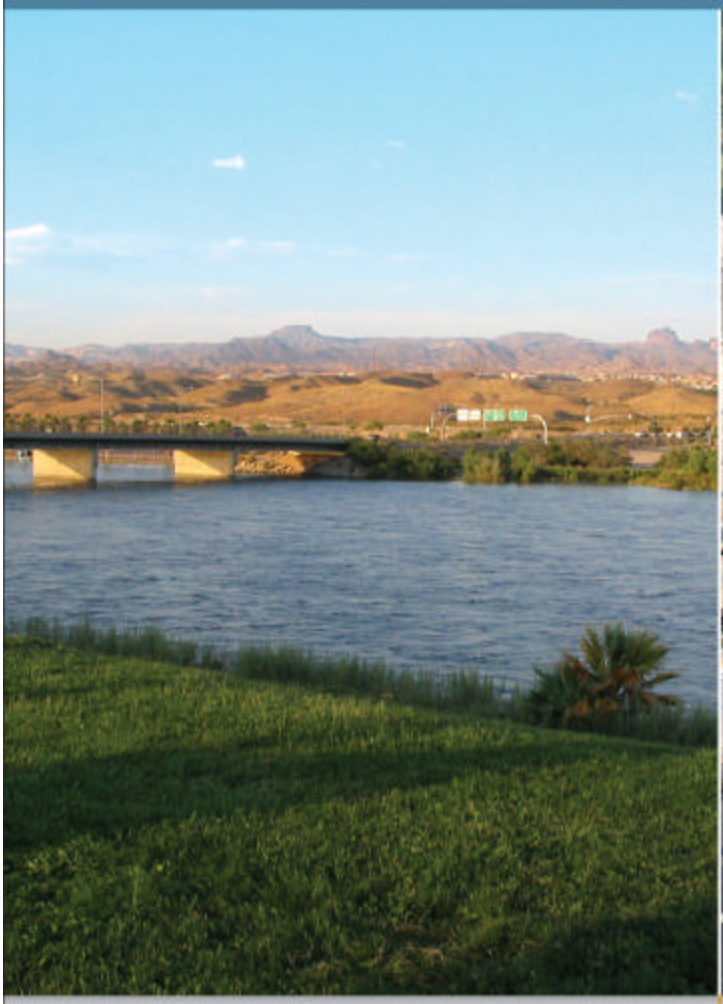
*Clark County*
*Real Property Management*

Feasibility Study

# Southland Business and Industrial Park 400 Acres



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# FEASIBILITY STUDY

# FOR

# LAUGHLIN 400 ACRES

# CLARK COUNTY, NEVADA

**W.O. # 7180**

**August 4, 2009**

Prepared for:
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Submitted to:
**CLARK COUNTY**
**REAL PROPERTY MANAGEMENT**

vtn CONSULTING

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## 1. INTRODUCTION

This feasibility study was commissioned to evaluate three alternative 400± acre site locations for a proposed industrial park within the Southland proposed master plan development. Southland is a 9,000 acre site acquired by Clark County from the Colorado River Commission. The property came out of 15,000 acres of federal land sold to Colorado River Commission for the purpose as stated in the Fort Mohave Valley Development Act of 1960, as amended. The Town of Laughlin has received control of the property and intends to continue the purposes of the act. Presently the majority of the Southland site is vacant undeveloped land encumbered by a NV Energy power line and Southwest Gas natural gas transmission lines. Southland is located in the most southern tip of the State of Nevada. Southland is bordered by the state of California on the southwest, the Colorado River and the state of Arizona to the east, Nevada BLM land to the west, and the township of Laughlin to the north. The Needles Highway traverses Southland diagonally, in the southwest/northeast direction. The Fort Mohave Indian Reservation is the only adjacent development. Located on the reservation is the AVI Resort and Casino, a golf course with single family residences surrounding the course, and agricultural farming.

As directed by Clark County and the Town of Laughlin, three alternative 400± acre site locations were evaluated for the proposed industrial park. This Feasibility Study will evaluate the alternative site locations for an Industrial Park development. One objective is to determine the anticipated off-site costs for each location. All 3 sites are located directly west of the Needles Highway. The site locations are labeled A, B, and C (see Project Vicinity Map in *Appendix A*). Site A is closest to the township of Laughlin with an approximate distance of 3 miles from the southern edge of the developed Laughlin area. Site B is adjacently located to the southwest of Site A with some acreage overlapping. Site C is located east of the California border. All 3 sites are in undeveloped natural terrain with minimal land disturbance from the before mentioned transmission lines.

As directed by the County, this study utilizes a typical 120 acre manufacturing plant site with a 1.9 million square footage building and 4,000 employees for service demands. This will be referenced as Phase 1 of the 400 acre industrial park. The demands for the remaining 280 acres will be proportional to the Phase 1 demands. Through out this report these demands will be used for the analysis of all dry and wet utilities. The traffic analysis will also be based on typical demands of these parameters.

## 2. 400± ACRE INDUSTRIAL PARK

The 400± acre site plan for Site A and B were determined by utilizing the existing assessor's section lines in the Southland area. Site C was established by the Needles Highway and the California border. It is anticipated that the industrial park is will be built out in 4 phases over an estimated 5 year period. The phases may range in size from 40 to 200 acres. The first proposed phase is approximately 120 acres based on industrial development for light manufacturing purposes.

## 2.1 Site A Location and Description

Site A has the closest proximity to the developed Laughlin area. Site A will have lower off site utility development costs due to the shorter distance to the existing dry utilities and the Laughlin Wastewater Reclamation Facility (LWRF) if utilized. Site A is a 402± acre site with approximately 240 feet of elevation fall at the longest distance of the site in the west to east direction. The site is within APN #'s 265-00-001-014 and 265-00-001-041, and is located northwest of the Needles Highway and Camel Trail intersection, in Laughlin, Clark County, Nevada. Site A is impacted by the existing Southwest Gas transmission line. The gas line transverses the site within a 50-foot wide easement. The easement is in the east-west direction, located in the northern portion of the site. The topography is at a consistent 5% grade with no major washes. The site is adjacent to a mountain range located along the northern site boundary. There are 3 storm drain culvert crossings along the Needles Highway frontage within the proposed frontage of the site.

## 2.2 Site B Location and Description

Site B is located between Sites A and C. Site B was evaluated for slope analysis to determine if the site's topography would be better suited for large box industrial buildings. Site B is a 417± acre site, with a portion that overlaps Site A fronting the Needles Highway. The site is within APN #'s 265-00-001-043 and 265-00-001-041, and is located north of the Needles Highway and Camel Trail intersection, in Laughlin, Clark County, Nevada. The topography is at a consistent 5% grade and has approximately 160 feet of elevation fall in the west-east direction with many minor washes. There are 6 storm drain culvert crossings along the Needles highway, within the proposed frontage of the site. Four of the crossings are located in the over lapping portion of Site A.

## 2.3 Site C Location and Description

Site C was evaluated for its proximity to the California border and Highway 40, a major transportation corridor to the Los Angeles area. Site C is a 408± acre site similar in shape to Site B. The site is within APN #'s 265-00-002-001, 266-00-002-002, 266-00-002-003, and is located northwest of the Needles Highway adjacent to the California/Nevada border, in Laughlin, Clark County, Nevada. A 40-foot wide power easement impacts Site C. The easement traverses the site in a north-south direction within the western portion of the site. The topography is at a consistent 5% grade and has approximately 120 feet of elevation fall in the west-east direction with a major wash dissecting the center of the site. There are 7 storm drain culvert crossings along the Needles Highway site frontage.

# 3. PLANNING AND LANDUSE

The subject properties consist of the following APN #'s:

| | |
|---|---|
| 265-00-001-014 | 265-00-002-012 |
| 265-00-001-041 | 266-00-002-002 |
| 265-00-001-043 | 266-00-002-003 |
| 265-00-002-001 | |

## 3.1 Zoning Information

The subject properties are currently zoned RU (Rural Open Lands) per Clark County Records. Zone RU is defined as a district established to provide very low density residential use and appropriate use of vast areas of rural land, including dwellings which do not conform to the design restrictions for single family dwellings.

## 3.2 Master Planning Information

The subject properties are currently master planned BDRP (Business and Design/Research Park) and OL (Open Lands) per the Laughlin Land Use Plan. BDRP is defined as an area where commercial, professional or manufacturing developments are designed to assure minimal impact on surrounding areas. OL is defined as an area designated to provide for permanent open space in the community; to prevent irreversible damage to sensitive areas; and to deter development in areas with highly limited availability of public services and facilities.

**Table 1 - Zoning Classification & Land Use by APN**

| APN Number | Zoning Classification | Land Use Classification |
|---|---|---|
| 265-00-001-014 | RU | BDRP |
| 265-00-001-041 | RU | BDRP |
| 265-00-001-043 | RU | BDRP |
| 265-00-002-001 | RU | BDRP |
| 265-00-002-012 | RU | BDRP |
| 266-00-002-002 | RU | OL |
| 266-00-002-003 | RU | OL |

The surrounding land uses are as follows:

| | |
|---|---|
| North | Public Facilities (Big Ben State Park) |
| South | Business Design / Research Park |
| East | Major Development Projects / Business Design/Research Park |
| West | Open Lands |

Development of the entire property will require APN #'s 266-00-002-003 and 266-00-002-002 to be amended to change the land use designation from OL to BDRP. A rezoning application will be required to one of the approved zones allowed within the land use category.

As defined by the Clark County Code, the allowed uses within the BDRP (Business Design/Research Park) category are as follows:

- C-P (Office and professional)
- C-1 (Local Business)
- C-2 (General Commercial)
- M-D (Designed Manufacturing)
- P-F (Public Facilities)

See *Appendix B* for specific details.

## 4. SITE CHARACTERISTICS

The Southland site consists mostly of desert rangeland sloping in the southeast direction at approximately 4 to 6 percent. The offsite basins impacting the 3 potential Southland project sites includes mountainous and desert rangeland areas to the north and west of the site. Offsite runoff from the mountainous area is collected in numerous washes that create a typical alluvial fan pattern as they spread into the flatter desert rangeland downstream. Flows reach the site within numerous small braided washes and as sheet flow from the offsite tributary area. Storm runoff generated from onsite and offsite basins travel through the Southland areas in a southeast direction and discharge to the Needles Highway a several culvert crossings.

## 5. SOILS

Based on the Soil Exhibit and Soils Engineering Properties from the U.S. Department of Agriculture Natural Resources Conservation Service (USDA) included in *Appendix C*, the soil classification for Sites A and B is Carrwash type that consists of extremely gravelly course sand to very gravelly loamy coarse sand. Site C soil classification is Riverbend for the majority of the site. Riverbend soil consists of stratified extremely gravelly coarse sand to very gravelly loamy coarse sand. Site C has a large wash that dissects the site. The soil type in the wash is Carrizo soil which is the same as Riverbend with the upper soil layer being very cobbly coarse sand. See *Appendix C* for a soils exhibit encompassing the possible site locations.

# 6. TRAFFIC

## 6.1 Project Description

The planned 400± acre industrial site will be located south of Laughlin on Needles Highway. Three different sites are being evaluated for this development, all west of Needles Highway. The 3 possible sites are equal in terms of traffic generated, traffic distribution and turning movements. As stated previously, development is planned in 4 phases. The building area and total employment expected for Phase 1 was used to project the building area and employment for the other phases. Based on that, the total site is anticipated to have over 6.4 million square feet of building area and over 13,000 employees. A summary of the breakdown by phase is provided in the following table.

**Table 2 - Phase Breakdown Summary**

| Phase | Area (Acres) | Building Area (sf) | Employees |
|---|---|---|---|
| Phase I | 120 | 1,934,064 | 4,000 |
| Phase II | 30 | 483,516 | 1,000 |
| Phase III | 45 | 725,274 | 1,500 |
| Phase IV | 204 | 3,287,909 | 6,800 |
| Total | 399 | 6,430,763 | 13,300 |

## 6.2 Trip Generation

The traffic generated by the proposed development was estimated based on the data provided in the Institute of Transportation Engineers (ITE) Trip Generation, 8th Edition. This is a reference tool for estimating the number of vehicle trips likely to be generated for a particular land use and is based on multiple trip generation studies. Vehicle trips are defined as a single or one-direction vehicle movement with either the origin or destination (exiting and entering) inside a study site. The ITE Land Use Manufacturing (ITE Code 140) best fits the proposed site and was used to estimate the trip generation for the proposed development. The following table summarizes the trip generation expected for this project:

**Table 3 - Project Trip Generation Summary**

| Phase | Size (Th. Sq. Ft. GFA) | 24 Hour Volume | AM | | PM | |
|---|---|---|---|---|---|---|
| | | | Enter | Exit | Enter | Exit |
| Phase I | 1,934 | 7,483 | 1,229 | 347 | 537 | 955 |
| Phase II | 484 | 1,857 | 290 | 82 | 130 | 231 |
| Phase III | 725 | 2,792 | 446 | 126 | 198 | 352 |
| Phase IV | 3,288 | 12,737 | 2,106 | 594 | 918 | 1,631 |
| Total | | 24,869 | 4,071 | 1,149 | 1,783 | 3,169 |

Th. Sq. Ft. GFA= Thousand Square Feet of Gross Floor Area

This is a very preliminary estimate of the amount of traffic generated by the development based on assumed land uses and densities. Once more information is known about the land uses for the site, a more specific trip generation estimate could be determined.

### 6.3 Trip Distribution

The direction in which the traffic approaches and departs the proposed site was estimated based on assumptions made about the type of traffic generated during the peak hours. It was assumed that the majority (90%) of the traffic generated during the peak hours is employee trips and will have a distribution of 75% to/from the north and 25% to/from the south. The remaining 10% of the peak hour traffic was assumed to be truck trips and have a distribution of 25% to the north and 75% to the south. This results in 70% of the total peak hour traffic to/from the north and 30% of the peak hour traffic to/from the south. Two access points were assumed for the development from Needles highway. Figure 1 in *Appendix D* provides an illustration of the traffic volumes and turning movements at ach of the access points assuming both are equal. Again, once more information about the land uses, internal roadway network, and access points is known a more specific distribution could be determined.

### 6.4 Area Roadways

Needles Highway will provide access to the proposed development from Laughlin to the north and Needles and I-40 to the south. This road provides 2 travel lanes southbound to the Nevada-California border and 1 lane northbound from the Nevada-California border to Aha Macav Parkway and 2 travel lanes from Aha Macav Parkway to the north. The posted speed limit is 45 miles per hour in the northern section and 55 MPH in the southern section.

Needles Highway in the vicinity of the proposed development currently carries approximately 2,400 vehicles per day. Assuming a conservative peak hour factor of 12%, the existing peak hour traffic volume is approximately 300 vehicles per hour. This represents 5-6% of the peak hour traffic generated by the proposed development.

The Nevada Department of Transportation (NDOT) and the Regional Transportation Commission of Southern Nevada (RTC) are studying the Colorado River Bridge Crossings in the vicinity of the proposed development. Three alternatives are being evaluated in the Environmental Assessment (EA). A draft EA is expected to be complete in the fall of 2009 with construction completion in 2013 or later depending on funding. Any of these crossings will be beneficial to the regional access to the proposed development as they tie into Needles Highway in the vicinity of the development area. Since a significant number of employees may come from Bullhead City. A bridge crossing in this vicinity will provide a more direct connection between these proposed employment centers and employees, which would also reduce the amount of traffic added to the roadways within Laughlin.

### 6.5 Mitigation Measures

Based on the estimated trip generation and turning movements, it is expected that left and right turn deceleration and storage lanes will be needed on Needles Highway. These are expected to be similar to what is provided at Aha Macav Parkway and approximately 1,000 feet long for the right turn lane and 2,000 feet for the left turn lane including transition, taper, deceleration, and storage. In addition, an acceleration lane may be needed on northbound Needles Highway based on the projected turning movements. This lane would be approximately 2,700 feet including transition, taper and acceleration lane.

## 7. DRAINAGE

Three site locations within the proposed Southland master plan were analyzed for off-site drainage impact and required drainage facilities. The sites are labeled A, B, and C and are consistent in shape, size, and location as referenced within this report.

### 7.1 Site A

#### 7.1.1 Flood Zone Information

The site is located within the FEMA Flood Insurance Rate Map (FIRM) Panel # 4060 on Map # 32003C4060E, with an effective date of September 27, 2002. According to the FIRM, the site is located within Zone “X.” A Zone “X” is an area which outside of the 0.2% annual chance floodplain. See Figure A: Flood Zone Map in *Appendix E*.

#### 7.1.2 Drainage Basins

In general the area tributary to the site, as well as the site itself, drains in a south east direction. Figure 5B, Watershed Map, shows the location of the site and the corresponding upstream drainage basins based on the 2009 Outlying Area Master Plan Update. According to the MPU, the site is situated within basin ON9, which drains in a southeast direction towards Needles Highway. The existing condition flows impacting the site

location are routed to Needles Highway and through several existing culvert crossing. The table below summarizes the offsite drainage basin information impacting the site.

**Table 4 - Tributary Offsite Basin Summary (Site A)**

| Concentration Point | Basins | Total Area (sq.mi.) | 100-year Flow (cfs) |
|---|---|---|---|
| CP2 | ON4, OFF2 | 6.5 | 4,427 |

The total offsite flow impacting the site during the 100-year storm event is 4,427 cfs according to the 2009 Outlying Area Master Plan Update. The northern portion of basin ON4 extends past the site boundary by approximately 2,500 feet and contains approximately 362 acres of area that, per the available topography, would be routed north of the site. For the preliminary purposes of this report and for consistency with the Outlying Area MPU, the flows impacting the site were estimated using the flow values of the entire basin ON4. It is anticipated that the MPU facilities adjacent to Site A, or equivalent facilities, will need to be constructed to provide flood protection for the site.

### 7.1.3 CCRFCD Master Plan Facilities

The site is located within the CCRFCD 2009 Outlying Area Flood Control Master Plan Update (MPU) Figure E-2B. Several Category "A" proposed flood control facilities are located directly adjacent to site's western and southern property lines. The following proposed flood control facilities are adjacent to the property, with the pertinent design flow rate:

- Facility LUSO0274 – (5) 12'x 6' RCB @ Needles Highway [6,916-cfs]
- Facility LUSO0280 – Concrete Channel 70'W, 6'D, 2:1 SS [6,916-cfs]
- Facility LUSO0320 – 10' Gabion Dike [4,427-cfs]
- Facility LUSO0321 – Gabion Channel 150'W, 4'D, 2:1SS [4,427-cfs]

Construction of the proposed Master Plan Flood control facilities listed above or equivalent facilities is anticipated to be necessary to mitigate the flows impacting the site. Construction of these facilities will concentrate flows at the discharge point of the MPU facilities downstream of Needles Highway. These concentrated flows may impact areas downstream that are not owned by Clark County. Should further hydraulic analyses indicate an impact to adjacent property owners, then appropriate mitigation design shall be required to minimize any detrimental effects resulting from the construction of the facilities listed above.

### 7.1.4 Existing Local Drainage Facilities

The table below summarizes culvert type, size, and preliminary capacity calculations for the existing culvert crossing under the Needles Highway adjacent to Site A.

**Table 5 - Existing Local Drainage Facilities Summary (Site A)**

| Culvert ID | Type & Size | Length (LF) | 25-yr Flow (cfs) | 100-yr Flow Manual (cfs) | 100-yr Flow Road (cfs) |
|---|---|---|---|---|---|
| Cul 15 | 10-10'x4' RCB | 134 | 3,564 | 3,425 | 5,710 |
| Cul 16 | 2-36" RCP | 110 | 124 | 121 | 129 |
| Cul 17 | 2-36" RCP | 114 | 102 | 121 | 162 |

The culvert ID and 25-year flow capacities were referenced from the *Improvement Plans for Needles Highway California/Nevada Border to Approximately Five Miles North*, prepared in 2005. The 100-year flow capacities were calculated through inlet control calculations. Capacity calculations were computed two ways. The first calculation utilizes the maximum headwater based on headwater criteria from the Clark County Flood Control District Hydrologic Criteria and Drainage Design Manual. Headwater was limited to a depth of 5 feet for all culverts 36 inch in diameter or less and 1.5 times the diameter for culvert larger than 36 inch. The second calculation was based on setting the headwater depth to not exceed the edge of pavement elevation at the upstream end of the culvert. Both capacity estimates are reported in the table above. Both 100-year flow approximations represent the maximum flow that can be discharged to each existing facility after the development of the site without exceeding the established criteria.

### 7.1.5 Proposed Drainage Facilities Cost Estimate

The following cost estimate is for the construction of the proposed MPU flood control facilities adjacent to the site. Note that this cost analysis was based on facilities and quantities determined from the CCRFCD 2009 MPU Outlying Areas (for the town of Laughlin).

**Table 6 - Proposed Drainage Facilities Summary (Site A)**

| Facility ID | Facility Description | Length (LF) | Estimated Cost |
|---|---|---|---|
| LUSO0280 | Concrete Channel 70'W 5'D 2:1 SS | 1,400 | $1,875,000 |
| LUSO0274 | 5: 12'x6' RCB @ Needles Hwy | 300 | $1,513,000 |
| LUSO0320 | Gabion Dike 10' High | 6,300 | $1,627,000 |
| LUSO0321 | Gabion Channel 150'W 4'D 2:1 SS | 6,300 | $8,395,000 |
| | | | |
| | Southland Facilities Total | | $13,410,000 |

The use of the Gabion as a channel lining has shown to be labor intensive and expensive compared to other alternative linings. It also appears that the Gabion Dike may be proposed specifically for the purpose of providing additional freeboard against flow momentum and channel overtopping, due to the flow entering the channel nearly perpendicular to the structure. It would be advantageous to investigate the use of

alternative linings such as articulated block, grouted rip-rap, and roller compacted concrete for these facilities to provide equivalent structures at a more economical cost.

## 7.2 Site B

### 7.2.1 Flood Zone Information

The site is located within the FEMA Flood Insurance Rate Map (FIRM) Panel 4060 Map number 32003C4060E, with an effective date of September 27, 2002. According to the FIRM, the site is located within Zone "X." A Zone "X" is an area which outside of the 0.2% annual chance floodplain. See Figure B: Flood Zone Map in *Appendix E*.

### 7.2.2 Drainage Basins

In general, the area tributary to the site as well as the site itself drains in a south east direction. Figure 5B, Watershed Map, shows the location of the site and the corresponding upstream drainage basins based on the 2009 Outlying Area Master Plan Update. The site is located within the MPU basins ON9 and ON10. The table below summarizes the offsite drainage basin information impacting the site.

**Table 7 - Tributary Offsite Basin Summary (Site B)**

| Concentration Point | Basins | Total Area (sq.mi.) | 100-year Flow (cfs) |
|---|---|---|---|
| CP2 | ON4, OFF2 | 6.5 | 4,427 |
| CP3 | ON5, OFF3 | 10.0 | 5,211 |
| CP4 | CP2, CP3 | 16.5 | 6,916 |

Only a portion of concentration points CP2 and CP3 impact Site B. However since the Regional Facilities that are adjacent to the northwestern boundary collect flows from the entire area; the facilities used to protect the site must be sized for the entire flows that will eventually be routed to them. It is anticipated that the Regional Facilities shown in the Outlying Area Master Plan Update or equivalent facilities will be required for flood protection of Site B.

### 7.2.3 CCRFCD Master Plan Facilities

The site is located within the CCRFCD 2009 Outlying Area Flood Control Master Plan Update (MPU) Figure E-2B. Several Category "A" proposed flood control facilities are located adjacent to site's western property lines and through the center of the site. The following proposed flood control facilities are adjacent to or within the property, with the pertinent design flow rate:

- Facility LUSO0274 – (5) 12'x 6' RCB @ Needles Highway [6,916-cfs]
- Facility LUSO0280 – Concrete Channel 70'W, 6'D, 2:1 SS [6,916-cfs]
- Facility LUSO0310 – 10' Gabion Dike [5211-cfs]
- Facility LUSO0311 – Gabion Channel 150'W, 4.5'D, 2:1 SS [5211-cfs]
- Facility LUSO0320 – 10' Gabion Dike [4,427-cfs]
- Facility LUSO0321 – Gabion Channel 150'W, 4'D, 2:1SS [4,427-cfs]

Construction of the proposed Master Plan Flood control facilities listed above or equivalent facilities is anticipated to be necessary to mitigate the flows impacting the site. Construction of these facilities will concentrate flows at the discharge point of the MPU facilities downstream of Needles Highway. These concentrated flows may impact areas downstream that are not owned by Clark County. Should further hydraulic analyses indicate an impact to adjacent property owners, then appropriate mitigation design shall be required to minimize any detrimental effects resulting from the construction of the facilities listed above.

### 7.2.4 Existing Local Drainage Facilities

The table below summarizes culvert type, size, and preliminary capacity calculations for the existing culvert crossing under the Needles Highway adjacent to Site B.

**Table 8 - Existing Local Drainage Facilities Summary (Site B)**

| Culvert ID | Type & Size | Length (LF) | 25-yr Flow (cfs) | 100-yr Flow Manual (cfs) | 100-yr Flow Road (cfs) |
|---|---|---|---|---|---|
| Cul 10 | 3-10'x4' RCB | 125 | 1,066 | 1,028 | 1,090 |
| Cul 11 | 10'x4' RCB | 126 | 311 | 343 | 442 |
| Cul 12 | 2-10'x4' RCB | 110 | 631 | 685 | 796 |
| Cul 13 | 2-10'x4' RCB | 110 | 631 | 685 | 799 |
| Cul 14 | 2-10'x4' RCB | 110 | 631 | 685 | 856 |
| Cul 15 | 10-10'x4' RCB | 134 | 3,564 | 3,425 | 5,710 |

The culvert ID and 25-year flow capacities were referenced from the *Improvement Plans for Needles Highway California/Nevada Border to Approximately Five Miles North*, prepared in 2005. 100-year flow capacities were calculated through inlet control calculations. Capacity calculations were computed two ways. The first calculation utilizes the maximum headwater based on headwater criteria from the Clark County Flood Control District Hydrologic Criteria and Drainage Design Manual. Headwater was limited to a depth of 5 feet for all culverts 36 inch in diameter or less and 1.5 times the diameter for culverts larger than 36 inch. The second calculation was based on setting the headwater depth to not exceed the edge of pavement elevation at the upstream end of the culvert. Both capacity estimates are reported in the table above. Both 100-year flow approximations

represent the maximum flow that can be discharged to each existing facility after the development of the site without exceeding the established criteria.

### 7.2.5 Proposed Drainage Facilities Cost Estimate

The following cost estimate is for the construction of the proposed MPU flood control facilities adjacent to the site. Note that this cost analysis was based on facilities and quantities determined from the CCRFCD 2009 MPU Outlying Areas (for the town of Laughlin). The alignment of facilities LUSO0310, LUSO0311, LUSO0320, and LUSO0321 would need to be altered in order to position these faculties at the boundary of Site B. The facility lengths utilized in the estimate below assumes that the faculties are revised to align with the boundary of the site.

**Table 9 - Proposed Drainage Facilities Summary (Site B)**

| Facility ID | Facility Description | Length (LF) | Estimated Cost |
|---|---|---|---|
| LUSO0280 | Concrete Channel 70'W 5'D 2:1 SS | 2,600 | $3,481,400 |
| LUSO0274 | 5: 12'x6' RCB @ Needles Hwy | 300 | $1,513,000 |
| LUSO0310 | Gabion Dike 10' High | 5,400 | $1,393,200 |
| LUSO0311 | Gabion Channel 150'W 4.5'D 2:1 SS | 5,400 | $7,484,400 |
| LUSO0320 | Gabion Dike 10' High | 1,600 | $412,800 |
| LUSO0321 | Gabion Channel 150'W 4'D 2:1 SS | 1,600 | $2,132,800 |
| | | | |
| | Southland Facilities Total | | $16,417,600 |

The use of the Gabion as a channel lining has shown to be labor intensive and expensive compared to other alternative linings. It also appears that the Gabion Dike may be proposed specifically for the purpose of providing additional freeboard against flow momentum and channel overtopping, due to the flow entering the channel nearly perpendicular to the structure. It would be advantageous to investigate the use of alternative linings such as articulated block, grouted rip-rap, and roller compacted concrete for these facilities to provide equivalent structures at a more economical cost.

## 7.3 Site C

### 7.3.1 Flood Zone Information

The site is located within a portion of FEMA Flood Insurance Rate Map (FIRM) Panel 4070 and 4075, Maps numbers 32003C4070E and 32003C4075E, with effective date September 27, 2002. According to the FIRM, the site is located within Zone "X." A Zone "X" is an area which outside of the 0.2% annual chance floodplain. See Figure C: Flood Zone Map in *Appendix E*.

### 7.3.2 Drainage Basins

In general the area tributary to the site, as well as the site itself, drains in a south east direction. Figure 5B, Watershed Map, shows the location of the site and the corresponding upstream drainage basins based on the 2009 Outlying Area Master Plan Update. The site is located within portions of basins ON7, ON10, and ON11. Based on the available topography there is a wide wash that passes through the center of the site that routes the majority of the offsite flows impacting the site. The remainder of the flows impacting the site appears to transverse through the site as sheet flow. A portion of basin OFF4 was divided out to determine the area impacting the southern boundary of the site. This sub-basin is shown on Figure 5B and was determined to be 3.64 square miles. Based on a rough area to flow approximation with basin OFF4, the flow from the sub-basin was estimated at 1,695 cfs. Existing flows routed through the site are discharged through several culverts under the Needles Highway adjacent to the site. The table below summarizes the drainage basin information impacting the site.

**Table 10 - Tributary Offsite Basin Summary (Site C)**

| Concentration Point | Basins | Total Area (sq.mi.) | 100-year Flow (cfs) |
|---|---|---|---|
| CP7 | ON7, ON11, OFF4 | 20.6 | 9,547 |

The total flow impacting the site during the 100-year storm event is 9,547 cfs according to the 2009 Outlying Area Master Plan Update. The development of this site would require the construction of drainage facilities to route this flow through the site and discharge it at the historical flow location adjacent to Needles Highway.

### 7.3.3 CCRFCD Master Planned Facilities

The site is located within the CCRFCD 2009 Outlying Area Flood Control Master Plan Update (MPU) Figure E-2B. MPU Facility LUSO0310 and LUSO0311 extend approximately 500 feet along the western border of the site. However, per available topography, there is only a small offsite area that discharges directly to the facilities that impacts the site location. The majority of the site is not protected by any MPU facilities as shown on Figure E-2B of the Outlying Area Master Plan.

### 7.3.4 Existing Local Drainage Facilities

The table below shows culvert type, size, and preliminary capacity calculations for the existing culvert crossing under the Needles Highway adjacent to Site C.

**Table 11 - Existing Local Drainage Facilities Summary (Site C)**

| Culvert ID | Type & Size | Length (LF) | 25-yr Flow (cfs) | 100-yr Flow Manual (cfs) | 100-yr Flow Road (cfs) |
|---|---|---|---|---|---|
| Cul 01 | 2-24” RCP | 93 | 25 | 52 | 45 |
| Cul 02 | 2-36” RCP | 113 | 97 | 122 | 152 |
| Cul 03 | 36” RCP | 113 | 16 | 61 | 83 |
| Cul 04 | 36” RCP | 110 | 33 | 61 | 84 |
| Cul 05 | 36” RCP | 110 | 33 | 61 | 71 |
| Cul 06 | 36” RCP | 110 | 28 | 61 | 75 |
| Cul 07 | 12-12’x6’ RCB | 110 | 5,698 | 9,055 | 9,150 |

The culvert ID and 25-year flow capacities were referenced from the *Improvement Plans for Needles Highway California/Nevada Border to Approximately Five Miles North*, prepared in 2005. 100-year flow capacities were calculated through inlet control calculations. Capacity calculations were computed two ways. The first calculation utilizes the maximum headwater based on headwater criteria from the Clark County Flood Control District Hydrologic Criteria and Drainage Design Manual. Headwater was limited to a depth of 5 feet for all culverts 36 inch in diameter or less and 1.5 times the diameter for culvert larger than 36 inch. The second calculation was based on setting the headwater depth to not exceed the edge of pavement elevation at the upstream end of the culvert. Both capacity estimates are reported in the table above. Both 100-year flow approximations represent the maximum flow that can be discharged to each existing facility after the development of the site without exceeding the established criteria.

### 7.3.5 Proposed Drainage Facilities

A preliminary analysis was completed for drainage facilities required to flood protect Site C. The locations of those facilities are shown on Figure E-2B. A description of the drainage faculties is provided below.

**Table 12 - Proposed Drainage Facilities Summary (Site C)**

| Facility ID | Facility Description | Facility Length (LF) | 100-yr Flow Estimate |
|---|---|---|---|
| 000-1 | Concrete, Channel 70’W, 7’D, 0:1 SS | 3,200 | 9,547 |
| 000-2 | Rip-Rap Lined Berm, 10’H, 62’W, 12’ TW | 2,400 | 4,774 |
| 000-3 | Rip-Rap Lined Berm, 10’H, 62’W, 12’ TW | 2,400 | 4,774 |

In order to meet the Design Manual criteria for velocities not exceeding 30 fps, the concrete channel will need to be constructed with drop structures to reduce the slope of the facility to approximately 1 percent. Flows routed through the site would be discharged into

Existing Culvert 07. Preliminary estimates show that the culvert is close to having enough capacity to handle the anticipated flows. More in depth analysis will be required to determine if any additional cells will need to be added to the existing culvert.

### 7.3.6 Proposed Drainage Facilities Cost Estimate

The following cost estimate is for the construction of the proposed flood control facilities adjacent to the site. The cost analysis utilizes pricing from the CCRFCD 2009 MPU Outlying Areas to try and be as consistent as possible with that document. For facilities that did not associate well with the cost tools available with the MPU Outlying Area, cost estimates were based off of Clark County Bond Estimate.

**Table 13 - Proposed Drainage Facilities Cost Estimate Summary (Site C)**

| Facility ID | Facility Description | Length (LF) | Estimated Cost |
|---|---|---|---|
| 000-1 | Concrete Channel 70'W 7'D 0:1 SS | 3,200 | $5,650,136 |
| 000-2 | Rip-Rap Lined Berm 10'H 62'W 12'TW | 2,400 | $633,353 |
| 000-3 | Rip-Rap Lined Berm 10'H 62'W 12'TW | 2,400 | $633,353 |
| | | | |
| | 10% Contingency | | $691,685 |
| | Southland Facilities Total | | $7,608,527 |

## 8. WET UTILITIES

### 8.1 Potable Water

All the proposed 400± acre Southland Business and Industrial Park sites are located 3 to 5 miles from the existing Big Bend Water District facilities. The study has evaluated the use of a private well system versus public water district improvements. To utilize a private well system, groundwater rights need to be obtained from the same basin/aquifer. If groundwater rights are available, a transfer of the matter of use, place of use, and point of diversion will be required to the proposed site locations. Research has determined that groundwater rights in the Laughlin area basin to service the proposed site are not available. The groundwater rights that do exist are presently being utilized and there is no access water available for purchase or lease. A private well system to service the proposed sites is not a feasible option. This study will concentrate on the evaluated public water service to the proposed sites.

The three proposed sites will be served by the Big Bend Water District. The Laughlin Water System is currently composed of five established Pressure Zones: 750, 780, 890, 1000, and 1130 and two future Pressure Zones: 1250 and 1370. The Big Bend Water District provides potable water to the community via a Raw Water Pumping Station Intake at the Colorado River

and the Big Bend Water District Water Treatment Facility. Several pump stations and reservoir tanks route the treated water through a network of main transmission lines.

The proposed site water demands and required fire flow were calculated using the provided information of a 1.9 million square foot light manufacturing plant on the first phase 120 acre piece (see *Appendix F* for calculations and assumptions). The remaining phases used this baseline guide for determining the potable water and fire flow demand assuming a similar development and building square footage based upon the phase area.

Several meetings were held with the Las Vegas Valley Water District, which operates and maintains the Big Bend Water District, to discuss the capacity of the existing facilities and the availability of potable water to service the Southland Business and Industrial Park based upon the calculated demands of the site for Fire Flow and Domestic Water as shown in *Appendix F*. Three options were analyzed to provide potable water to the proposed 400± acre sites (site's A, B, and C). The three options include: 1) Ground Water Well with Package Treatment Plant, 2) Pipeline Extension, and 3) New Water Treatment Plant utilizing underground power to service the plant. Estimated costs are feasibility level and may vary depending on specifics of project, including project demands and timing of system facilities. Estimates do not include onsite infrastructure requirements. Also, estimates do not include building permits, licenses, environmental, rights-of-way, or other costs. Project estimates are as of July 6, 2009.

### 8.1.1 Site A

#### 8.1.1.1 Option 1 – Ground Water Well with Package Treatment Plant (600 GPM)

The acquisition and transfer of groundwater rights will be required for each of the proposed project sites. Big Bend Water District has the ability to acquire ground water rights and transfer the rights to the treatment plant location. The water quality and quantity available will need to be explored and researched further to determine if a well system can provide the adequate flow and demand for the proposed development, along with determining the ground water basin and aquifer limits. The preliminary findings of the Big Bend Water District include the following infrastructure improvements for the groundwater well with a package treatment plant option at Site A:

**Table 14 - Proposed Potable Water Facility and Cost Estimate Summary (Option 1-Site A)**

| Description | Total Cost |
|---|---|
| *Water Treatment Improvements* | |
| Package Treatment Plant | $5,300,000 |
| Construct Underground Power | $2,952,000 |
| *Groundwater Well Improvements* | |
| Drill and equip well (2 wells) | $3,000,000 |
| *Reservoir Improvements* | |
| 2 MG Storage | $2,000,000 |
| *Pumping Station Improvements* | |
| Construct pumping station downstream of Package Treatment Plant (to serve 890 Pressure Zone) | $2,300,000 |
| *Pipeline Improvements* | |
| 1,000 LF of 20-inch diameter raw water pipeline | $243,600 |
| 4,900 LF of 20-inch diameter inlet/outlet pipeline | $1,193,400 |
| | |
| Estimated Costs for Groundwater Well with Package Water Treatment Plant Option, Site A | $16,989,000 |

(Note: Feasibility level estimates, does not include on-site facilities or permitting costs)

#### 8.1.1.2 Option 2 – Pipeline Extension

There is available capacity at the existing Laughlin Water Treatment Facility to serve the anticipated demands for the Southland Industrial Business Park. To convey the additional capacity, upgrades to the existing facilities and additional infrastructure will need to be constructed. The preliminary findings of the Big Bend Water District include the following infrastructure improvements for the pipeline extension option at Site A (see *Appendix F* for Pipeline Exhibits).

**Table 15 - Proposed Potable Water Facility and Cost Estimate Summary (Option 2-Site A)**

| Description | Total Cost |
|---|---|
| *Reservoir Improvements* | |
| 2 MG Storage | $2,000,000 |
| *Pumping Station Improvements* | |
| Add unit to existing Casino Drive Pumping Station | $345,000 |
| Construct pumping station in South (to serve 890 Pressure Zone) | $2,300,000 |
| Construct Underground Power | $2,952,000 |
| *Pipeline Improvements* | |
| 500 LF of 42-inch diameter pipeline along Casino Drive | $324,200 |
| 14,760 LF of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $4,462,100 |
| 4,900 LF of 20-inch diameter inlet/outlet pipeline | $1,193,400 |
| | |
| Sub-Total | $13,576,700 |
| Oversizing Estimate | $2,042,800 |
| Estimated Costs for Pipeline Extension Option, Site A | $15,619,500 |

(Note: Feasibility level estimates, does not include on-site facilities or permitting costs)

The above infrastructure will be required at a minimum to service the site at the present time. Additional facilities may be needed if additional development in the Laughlin area occurs prior to the construction of the Southland project. Oversizing of the 12 inch main transmission line in Needles Highway is recommended for the future development of the overall 9,000 acres.

Sites B and C will require the above facilities and additional infrastructure due to the distance from existing facilities and the site topography. The topography for Sites B and C will require that each site be split into two different pressure zones, thus requiring an additional Pump Station or a Pressure Reducing Valve to supply adequate water pressure. Sites B and C will result in a higher development cost than Site A for potable water.

#### 8.1.1.3 Option 3 – Water Treatment Plant (600 GPM)

The construction of a Water Treatment Plant will require that a raw Water Intake at the Colorado River be constructed along with the pipelines needed to convey the raw water to the plant. This system would be independent of the current Big Bend Water System but may be connected in the future for redundancy, depending on the future need for such a system. The location of the raw Water Intake and package Treatment Plant will need to be further analyzed; however this study assumes that it can be generally located at the north end of the 9,000 acre boundary. This location requires the least amount of pipeline and is the most convenient for the Site A option. The preliminary findings of

the Big Bend Water District include the following infrastructure improvements for the Water Treatment Plant option at Site A:

**Table 16 - Proposed Potable Water Facility and Cost Estimate Summary (Option 3– Site A)**

| Description | Total Cost |
|---|---|
| *Water Treatment Improvements* | |
| Intake | $1,000,000 |
| Package Treatment Plant (600 GPM) | $5,300,000 |
| Construct Underground Power | $2,952,000 |
| *Reservoir Improvements* | |
| 2 MG Storage | $2,000,000 |
| *Pumping Station Improvements* | |
| Construct raw water pumping station in South | $3,190,000 |
| Construct finished water pumping station in South (to serve 890 Pressure Zone) | $3,580,000 |
| *Pipeline Improvements* | |
| 1,000 LF of 20-inch diameter raw water pipeline | $243,600 |
| 4,900 LF of 20-inch diameter inlet/outlet pipeline | $1,193,400 |
| | |
| Estimated Costs for Water Treatment Plant Option, Site A | $19,459,000 |

(Note: Feasibility level estimates, does not include on-site facilities or permitting costs)

### 8.1.2 Site B

#### 8.1.2.1 Option 1 – Ground Water Well with Package Treatment Plant (600 GPM)

As mentioned previously, the acquisition and transfer of groundwater rights will be required for the proposed project at site B for a groundwater well option. The preliminary findings of the Big Bend Water District include the following infrastructure improvements for the groundwater well with a package treatment plant option at Site B:

**Table 17 - Proposed Potable Water Facility and Cost Estimate Summary (Option 1-Site B)**

| Description | Total Cost |
|---|---|
| *Water Treatment Improvements* | |
| Package Treatment Plant | $5,300,000 |
| Construct Underground Power | $4,132,000 |
| *Groundwater Well Improvements* | |
| Drill and equip well (2 wells) | $3,000,000 |
| *Reservoir Improvements* | |
| 2 MG Storage | $2,000,000 |
| *Pumping Station Improvements* | |
| Construct pumping station downstream of Package Treatment Plant (to serve 1000 Pressure Zone) | $2,300,000 |
| *Pipeline Improvements* | |
| 1,000 LF of 20-inch diameter raw water pipeline | $243,600 |
| 7,100 LF of 20-inch diameter inlet/outlet pipeline | $1,729,200 |
| | |
| Estimated Costs for Groundwater Well with Package Water Treatment Plant Option, Site B | $18,704,800 |

(Note: Feasibility level estimates, does not include on-site facilities or permitting costs)

#### 8.1.2.2 Option 2 – Pipeline Extension

As mentioned previously, there is available capacity at the existing Laughlin Water Treatment Facility to serve the anticipated demands for the Southland Industrial Business Park. Upgrades to the existing facilities and additional infrastructure will need to be constructed to convey the additional capacity. Preliminary findings of the Big Bend Water District include the following infrastructure improvements for the pipeline extension option at Site B (see *Appendix F* for Pipeline Exhibits).

**Table 18 - Proposed Potable Water Facility and Cost Estimate Summary (Option 2-Site B)**

| Description | Total Cost |
|---|---|
| *Reservoir Improvements* | |
| 2 MG Storage | $2,000,000 |
| *Pumping Station Improvements* | |
| Add unit to existing Casino Drive Pumping Station | $345,000 |
| Construct pumping station in South (to serve 1000 Pressure Zone) | $3,230,000 |
| Construct Underground Power | $4,132,000 |
| *Pipeline Improvements* | |
| 500 LF of 42-inch diameter pipeline along Casino Drive | $324,200 |
| 14,760 LF of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $4,462,100 |
| 5,900 LF of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $1,783,700 |
| 7,100 LF of 20-inch diameter inlet/outlet pipeline | $1,729,200 |
| | |
| Sub-Total | $18,006,200 |
| Oversizing Estimate (12-inch to 24-inch) | $2,859,300 |
| Estimated Costs for Pipeline Extension Option, Site B | $20,865,500 |

(Note: Feasibility level estimates, does not include on-site facilities or permitting costs)

#### 8.1.2.3 Option 3 – Water Treatment Plant (600 GPM)

Similar to option 3 for Site A, the construction of a Water Treatment Plant will require that a raw Water Intake at the Colorado River be constructed along with the pipelines needed to convey the raw water to the plant. The location of the raw Water Intake and package Treatment Plant will need to be further analyzed; however this study assumes that it can be generally located at the north end of the 9,000 acre boundary. The preliminary findings of the Big Bend Water District include the following infrastructure improvements for the Water Treatment Plant option at Site B:

**Table 19 - Proposed Potable Water Facility and Cost Estimate Summary (Option 3-Site B)**

| Description | Total Cost |
|---|---|
| *Water Treatment Improvements* | |
| Intake | $1,000,000 |
| Package Treatment Plant | $5,300,000 |
| Construct Underground Power | $4,132,000 |
| *Reservoir Improvements* | |
| 2 MG Storage | $2,000,000 |
| *Pumping Station Improvements* | |
| Construct raw water pumping station in South | $3,190,000 |
| Construct finished water pumping station in South (to serve 1000 Pressure Zone) | $7,730,000 |
| *Pipeline Improvements* | |
| 1,000 LF of 20-inch diameter raw water pipeline | $243,600 |
| 5,900 LF of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $1,783,700 |
| 7,100 LF of 20-inch diameter inlet/outlet pipeline | $1,729,200 |
| | |
| Sub-Total | $27,108,500 |
| Oversizing Estimate (12-inch to 24-inch) | $816,588 |
| Estimated Cost for Water Treatment Plant Option, Site B | $27,925,088 |

(Note: Feasibility level estimates, does not include on-site facilities or permitting costs)

### 8.1.3 Site C

#### 8.1.3.1 Option 1 – Ground Water Well with Package Treatment Plant (600 GPM)

As mentioned previously, the acquisition and transfer of groundwater rights will be required for the proposed project at site C for a groundwater well option. The preliminary findings of the Big Bend Water District include the following infrastructure improvements for the groundwater well with a package treatment plant option at Site C:

**Table 20 - Proposed Potable Water Facility and Cost Estimate Summary (Option 1-Site C)**

| Description | Total Cost |
|---|---|
| *Water Treatment Improvements* | |
| Package Treatment Plant | $5,300,000 |
| Construct Underground Power | $5,792,000 |
| *Groundwater Well Improvements* | |
| Drill and equip well (2 wells) | $3,000,000 |
| *Reservoir Improvements* | |
| 2 MG Storage | $2,000,000 |
| *Pumping Station Improvements* | |
| Construct pumping station downstream of Package Treatment Plant (to serve 1130 Pressure Zone) | $2,300,000 |
| *Pipeline Improvements* | |
| 1,000 LF of 20-inch diameter raw water pipeline | $243,600 |
| 9,000 LF of 20-inch diameter inlet/outlet pipeline | $2,191,900 |
| | |
| Estimated Cost for Groundwater Well with Package Water Treatment Plant Option, Site C | $20,827,500 |

(Note: Feasibility level estimates, does not include on-site facilities or permitting costs)

#### 8.1.3.2 Option 2 – Pipeline Extension

There is available capacity at the existing Laughlin Water Treatment Facility to serve the anticipated demands for the Southland Industrial Business Park. Upgrades to the existing facilities and additional infrastructure will need to be constructed to convey the additional capacity. Preliminary findings of the Big Bend Water District include the following infrastructure improvements for the pipeline extension option at Site C (see *Appendix F* for Pipeline Exhibits).

**Table 21 - Proposed Potable Water Facility and Cost Estimate Summary (Option 2-Site C)**

| Description | Total Cost |
|---|---|
| *Reservoir Improvements* | |
| 2 MG Storage | $2,000,000 |
| *Pumping Station Improvements* | |
| Add unit to existing Casino Drive Pumping Station | $345,000 |
| Construct pumping station in South (to serve 1130 Pressure Zone) | $5,600,000 |
| Construct Underground Power | $5,792,000 |
| *Pipeline Improvements* | |
| 500 LF of 42-inch diameter pipeline along Casino Drive | $324,200 |
| 14,760 LF of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $4,462,100 |
| 14,200 LF of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $4,292,800 |
| 9,000 LF of 20-inch diameter inlet/outlet pipeline | $2,191,900 |
| | |
| Sub-Total | $25,008,000 |
| Oversizing Estimate (12-inch to 24-inch) | $4,008,100 |
| Estimated Cost for Pipeline Extension Option, Site C | $29,016,100 |

(Note: Feasibility level estimates, does not include on-site facilities or permitting costs)

#### 8.1.3.3 Option 3 – Water Treatment Plant (600 GPM)

Similar to option 3 for Site A, the construction of a Water Treatment Plant will require that a raw Water Intake at the Colorado River be constructed along with the pipelines needed to convey the raw water to the plant. The location of the raw Water Intake and package Treatment Plant will need to be further analyzed. The preliminary findings of the Big Bend Water District include the following infrastructure improvements for the Water Treatment Plant option at Site C:

**Table 22 - Proposed Potable Water Facility and Cost Estimate Summary (Option 3-Site C)**

| Description | Total Cost |
|---|---|
| *Water Treatment Improvements* | |
| Intake | $1,000,000 |
| Package Treatment Plant | $5,300,000 |
| Construct Underground Power | $5,792,000 |
| *Reservoir Improvements* | |
| 2 MG Storage | $2,000,000 |
| *Pumping Station Improvements* | |
| Construct raw water pumping station in South | $3,190,000 |
| Construct finished water pumping station in South (to serve 1130 Pressure Zone) | $8,520,000 |
| *Pipeline Improvements* | |
| 1,000 LF of 20-inch diameter raw water pipeline | $243,600 |
| 14,200 LF of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $4,292,800 |
| 9,000 LF of 20-inch diameter inlet/outlet pipeline | $2,191,900 |
| | |
| Sub-Total | $32,530,300 |
| Oversizing Estimate (12-inch to 24-inch) | $1,965,349 |
| Estimated Cost for Water Treatment Plant Option, Site C | $34,495,649 |

(Note: Feasibility level estimates, does not include on-site facilities or permitting costs)

### 8.2 Sanitary Sewer

The proposed 400± acre Industrial Park site locations A, B, and C are all located within the jurisdiction of the Clark County Water Reclamation District (CCWRD). The Laughlin Wastewater Reclamation Facility (LWRF) is an 8 MGD biological treatment facility located west of the Laughlin gaming district. Influent untreated wastewater is processed and then provided to reclaimed customers and released into the Colorado River (see *Appendix G* for a flow chart of the wastewater treatment process).

CCWRD determined that a new treatment plant will be required to service the entire 9,000 acre Southland Master Plan area, independent of which Industrial Park site location is chosen. In addition, CCWRD concluded that discharging sewage to the existing LWRF would not be feasible due to the need for numerous new lift stations, as well as additional upgrades to existing stations. Based on the 120 acre Phase 1 demand, a 1.3 Million Gallon per Day (MGD) plant would be required for the 400 acre industrial park.

The optimal location for the proposed wastewater treatment plant location would be in the northeast portion of the Southland site east of the Needles Highway. This location would be able to service the majority of the future development within the Southland Master Plan by use of gravity lines, while avoiding lift stations. The CCWRD requires that the 400 acre industrial park development be serviced by a publicly owned and operated modular waste water treatment plant (MWWTP) with expansion capabilities to accommodate future development of the remaining 9,000 acres. Design of the plant shall comply with all CCWRD, County, State, and Federal standards. The design of the MWWTP will include sufficient area to accommodate green technology such as solar power generation facilities and re-use water storage basins. A 20-acre site is required to accommodate the MWWTP to service the 400 acre development, as well remaining portion of the 9,000 acre site.

A re-use water distribution system would also be required to accommodate re-use water storage. The re-use water distribution lines can be located within Needles Highway to serve future golf course or landscape irrigation needs. The CCWRD's preferred method of effluent discharge from the MWWTP would be by pipe outfall directly to the Colorado River. Adequate outfall pipe easements will be required along the pipeline alignment from the MWWTP to the actual point of discharge at the Colorado River. Adequate odor control and remediation measures will need to be incorporated within the design of the MWWTP to meet not only aesthetics purposes but also County air quality standards.

Design of the MWWTP will be privately funded by the developer and coordinated with the CCWRD design / engineering division. The final design of the MWWTP must go through a formal review process and must be approved by CCWRD prior to applying for a discharge permit from the Nevada Department of Environmental Protection (NDEP). The application process for an NDEP discharge permit will be applied for by the developer with the permit applicant being the CCWRD.

As mentioned previously, based on the 120 acre Phase 1 demand, a 1.3 Million Gallon per Day (MGD) plant would be required for the 400 acre industrial park. A similar treatment plant (Coyote Springs treatment plant) had a total cost of 40 million dollars after it was converted to a public facility. The cost of the permitting is not included in the 40 million dollar construction cost.

# 9. DRY UTILITIES

## 9.1 Power

NV Energy is the electrical power provider for the Southland area. Presently there is a 69kV Transmission line the traverses the Southland site. The line has limited additional capacity and may be required to be upgraded depending on the demands of the industrial park and other future developments. NV Energy has a first come, first served policy and will not reserve power capacity for proposed future developments. The cost to upgrade the transmission line is approximately 1 million dollars per mile.

A 44.8 MVA Distribution Substation will be required independent of which site is chosen. The substation will require 5 gross acres to be acquired. The substation footprint is approximately 3.2 acres with typical perimeter dimensions of 255-ft x 540-ft. The remaining acreage is utilized for access to the substation, maintenance of the perimeter walls, landscaping if required, and for slope transition. The grading criteria for the 3.2 acre portion are level in the long direction and 1% maximum gradient in the short direction. The location of the substation has been suggested by NV Energy to be located on the industrial park site. This will save off-site distribution infrastructure costs. If an on-site substation location is not feasible the proposed substation will located adjacent to the existing NV Energy transmission line that traverses the Southlands site at the north end. The cost of a substation is approximately 3 million dollars. Refer to *Appendix H* for pertinent material.

## 9.2 Natural Gas

Southwest Gas Corporation (SWG) is the provider of natural gas for the Southland area. There are two existing 16-inch steel high pressure gas transmission lines within a 50-foot wide easement that traverses Site A in the northern portion of the site in the east-west direction. The transmission lines terminate at a gas regulation station located on the east side of Needles Highway across from the north boundary of Southland.

At the time of this report, SWG states that there was adequate capacity for industrial and manufacturing use. Based on the limited gas demand information, SWG could only estimate what the required line sizes and associated costs. SWG estimates that a 6-inch steel transmission line will be required in the Needles Highway along with 4-inch stubs into 2 regulatory stations for redundancy. These improvements will service the entire 400 acre industrial park. The preliminary cost estimate for the 120 acre Phase I site gas line infrastructure is $500,000, which applies to all 3 sites (A, B, and C). The development of the remaining 280 acres will be an additional $500,000.

## 9.3 Telephone

Embarq is the provider of phone service for the Southland area. Their facilities are approximately 200 feet to the north of Site A along the Needles Highway. There is capacity in

both fiber optic and copper. The developer will be responsible for extending conduits to the site. The carrier will provide the service facilities on site.

## 10. SURVEY

### 10.1 Site A Location – Legal Description of the Approximate Area

BEING THOSE PORTIONS OF SECTION 8, AND SECTION 17, TOWNSHIP 33 SOUTH, RANGE 66 EAST, M.D.M., CLARK COUNTY, NEVADA, LYING WESTERLY OF THE WESTERLY RIGHT-OF-WAY OF NEEDLES HIGHWAY (270 FEET WIDE).

### 10.2 Site B Location – Legal Description of the Approximate Area

BEING THOSE PORTIONS OF SECTION 17, AND SECTION 18, TOWNSHIP 33 SOUTH, RANGE 66 EAST, M.D.M., CLARK COUNTY, NEVADA, LYING WESTERLY OF THE WESTERLY RIGHT-OF-WAY OF NEEDLES HIGHWAY (270 FEET WIDE), AND EASTERLY OF A LINE LYING 2895.00 FEET WESTERLY OF THE WESTERLY RIGHT-OF-WAY OF NEEDLES HIGHWAY (270 FEET WIDE).

### 10.3 Site C Location – Legal Description of the Approximate Area

BEING THOSE PORTIONS OF SECTION 19, AND SECTION 30, TOWNSHIP 33 SOUTH, RANGE 66 EAST, AND SECTION 24, AND SECTION 25, TOWNSHIP 33 SOUTH, RANGE 65 EAST, M.D.M., CLARK COUNTY, NEVADA, LYING WESTERLY OF THE WESTERLY RIGHT-OF-WAY OF NEEDLES HIGHWAY (270 FEET WIDE), EASTERLY OF A LINE LYING 2895 FEET WESTERLY OF THE WESTERLY RIGHT-OF-WAY OF NEEDLES HIGHWAY (270 FEET WIDE), NORTHERLY OF THE CALIFORNIA / NEVADA STATE LINE, AND SOUTHERLY OF A LINE LYING 1990 FEET SOUTH OF THE NORTH SECTION LINE OF SAID SECTION 19 AND SAID SECTION 24.

# 11. COST ESTIMATE SUMMARY

## 11.1 Site A Cost Estimate

The following table summarizes the cost estimate for developing Site A. Refer to *Appendix J* for detailed cost analysis calculations.

**Table 23 - Cost Summary Table for Site A**

| Description | Total Cost |
|---|---|
| | |
| Total Cost (with Water Option 1) | $81,260,685 |
| 15% Contingency | $12,189,103 |
| Total Cost (with Contingency + Water Option 1) | **$93,449,788** |
| | |
| Total Cost (with Water Option 2) | $79,891,185 |
| 15% Contingency | $11,983,678 |
| Total Cost (with Contingency + Water Option 2) | **$91,874,863** |
| | |
| Total Cost (with Water Option 3) | $83,730,685 |
| 15% Contingency | $12,559,603 |
| Total Cost (with Contingency + Water Option 3) | **$96,290,288** |
| | |

## 11.2 Site B Cost Estimate

The following table summarizes the cost estimate for developing Site B. Refer to *Appendix J* for detailed cost analysis calculations.

**Table 24 - Cost Summary Table for Site B**

| Description | Total Cost |
|---|---|
| | |
| Total Cost (with Water Option 1) | $88,652,035 |
| 15% Contingency | $13,297,805 |
| Total Cost (with Contingency + Water Option 1) | **$101,949,841** |
| | |
| Total Cost (with Water Option 1) | $90,812,735 |
| 15% Contingency | $13,621,910 |
| Total Cost (with Contingency + Water Option 1) | **$104,434,645** |
| | |
| Total Cost (with Water Option 2) | $97,872,323 |
| 15% Contingency | $14,680,848 |
| Total Cost (with Contingency + Water Option 2) | **$112,553,172** |
| | |

## 11.3 Site C Cost Estimate

The following table summarizes the cost estimate for developing Site C. Refer to *Appendix J* for detailed cost analysis calculations.

**Table 25 - Cost Summary Table for Site C**

| Description | Total Cost |
|---|---|
| | |
| Total Cost (with Water Option 1) | $83,528,662 |
| 15% Contingency | $12,529,299 |
| Total Cost (with Contingency + Water Option 1) | **$96,057,961** |
| | |
| Total Cost (with Water Option 2) | $91,717,262 |
| 15% Contingency | $13,757,589 |
| Total Cost (with Contingency + Water Option 2) | **$105,474,851** |
| | |
| Total Cost (with Water Option 3) | $97,196,811 |
| 15% Contingency | $14,579,522 |
| Total Cost (with Contingency + Water Option 3) | **$111,776,333** |
| | |

## 12. CONCLUSIONS

Based on the findings of this report, Site A would be the most feasible location for the proposed 400 acre Industrial Park due to the proximity to the developed Laughlin area and the least off-site cost to develop. Site A, utilizing water option 2, provides the lowest off-site development costs. Water option 2 utilizes an accepted standard method of water main extensions and does not include contingencies, such as acquiring groundwater rights. The gradient slope of all three sites is basically the same so no one site has a benefit over the other concerning the grading of the site. In conclusion Site A is best suited for the development of a 400 acre Industrial Park.

# REFERENCES


## Drainage

1. *Flood Insurance Rate Map*, Community Panel Number 32003C4060E, Clark County, Nevada and Incorporated Areas, effective date of September 27, 2002.

2. *Flood Insurance Rate Map*, Community Panel Number 32003C4070E, Clark County, Nevada and Incorporated Areas, effective date of September 27, 2002.

3. *Flood Insurance Rate Map*, Community Panel Number 32003C4075E, Clark County, Nevada and Incorporated Areas, effective date September 27, 2002.

4. *Clark County Regional Flood Control District (CCRFCD) Master Plan Update 2009 – Outlying Areas (Laughlin).*

5. *Clark County Nevada Department of Public Works – Improvement Plans for Needles Highway California/Nevada Border 2005*, by CH2M Hill Stamped by Michael S. Lasko (NV# 10302).

6. *Hydrologic Criteria and Drainage Design Manual*, Clark County Regional Flood Control District, 1990.

## Traffic

7. *Trip Generation, 8th Edition*, Institute of Transportation Engineers

## Water

8. *Uniform Design and Construction Standards for Potable Water Systems*, Las Vegas Valley Water District, 2nd Edition 2003.

9. *Clark County Fire Code – Table A-III-A-1*, Clark County Fire Department 2005 Edition.

## Wastewater / Sanitary Sewer

10. *Design and Construction Standards for Wastewater Collection Systems – Southern Nevada*, Clark County Water Reclamation District, 3rd Draft dated May 21, 2009.

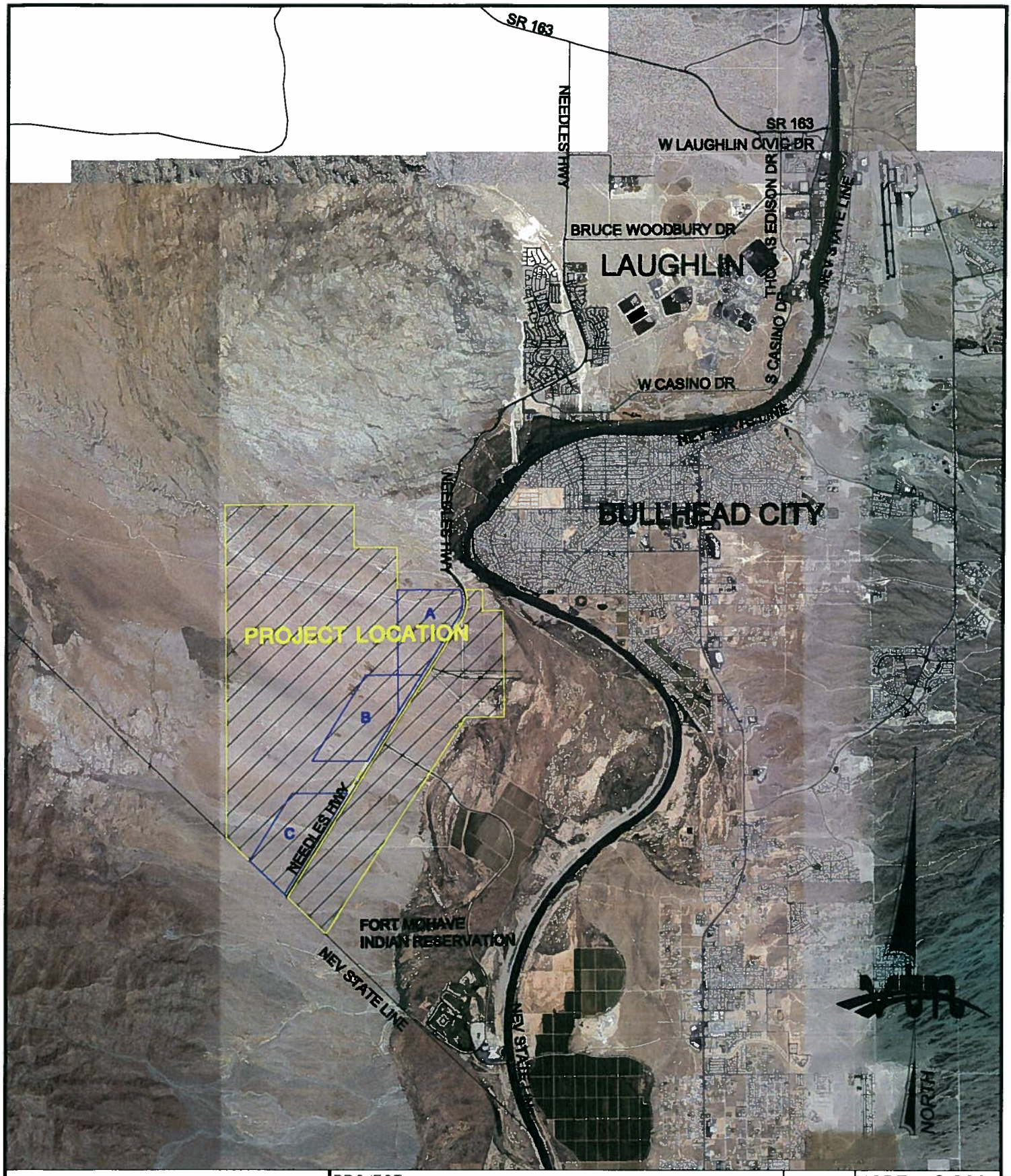
## Cost Analysis

11. *Clark County Department of Development Services-Civil Engineering Division Off-Site Improvement Bond Estimate Tabulations*, dated May 20, 2009.

12. *Laughlin 400 Acres Industrial Feasibility Study Potable Water Facilities Estimated Costs*, Las Vegas Valley Water District Planning Division, dated July 7, 2009.

# APPENDIX A

PROJECT SITE VICINITY MAP




| | | | |
|---|---|---|---|
| vtn CONSULTING | PROJECT: SOUTHLAND | SCALE | HORZ. 1"=8000 |
| | | | VERT. NA |
| | PROJECT VICINITY MAP | W.O. NO. | 7180 |
| | | DRAWN BY: | R.M.S. |
| | FOR: CLARK COUNTY | DATE: | 7-07-09 |
| | | SHEET | OF |

# APPENDIX B

PLANNING AND
LANDUSE DOCUMENTATION

# COMMERCIAL BUSINESS DESIGN/RESEARCH PARK

Commercial development and Business and Design/Research Parks within Laughlin should accommodate low intensity/non-nuisance development with less of a focus on industrial uses and more on commercial office space with the corresponding amenities. Concurrently these land developments should provide for the diversification of the region's economic base and employment opportunities. Commercial development and Business and Design/Research Park proposals should demonstrate compliance with the following goal and policies.

## Goal 11

**Provide opportunities for commercial and/or business and design/research park development.**

### Policy 11.1

The location of commercial and/or business and design/research park developments should consider compatibility with existing land use patterns, appropriate access routes and traffic volumes, environmental concerns, as well as proximity to single family residential uses, buffering, transitional land uses, and proper siting and storage of hazardous materials.

### Policy 11.2

Through site planning and building design, ensure that developments are compatible with adjoining residential uses. Appropriate buffers, setbacks, landscaping, building height and materials, lighting, signage, on-site circulation and adjoining land uses and densities should be considered and integrated into business and design/research park developments.

### Policy 11.3

Multi-family uses in the commercial and/or business and design/research park categories may be allowed as a part of a mixed use development.

**Policy 11.4**
Single family developments (as primary uses) are not allowed in commercial and business and design/research park categories.

**Policy 11.5**
Outdoor storage areas are discouraged. If developed, outdoor storage areas must be screened from adjacent parcels and from streets.

**Policy 11.6**
Encourage outside storage areas, loading areas with roll-up, overhead doors, service areas, and areas intended for large semi-truck parking to be screened from streets, residential and other adjacent uses.

**Policy 11.7**
To improve visual quality and compatibility, encourage commercial and/or business and design/research park developments to orient less intensive uses such as outside storage and landscaping, adjacent to public rights-of-way (on the perimeter of the developments). Other more intensive uses should be internalized within the development.

**Policy 11.8**
Commercial and/or business and design/research park developments should reduce or limit: points of ingress and egress on arterial or collector streets, traffic congestion and hazards, proliferation of signs and visual clutter, and incompatible architectural styles.

**Policy 11.9**
Encourage commercial and/or business park developments to be designed as centers or campuses with coordinated architectural and signage programs, screened parking areas, and appropriate landscaping.

**Policy 11.10**
Encourage commercial, business and design/research park developments to incorporate sufficient on-site buffering and minimize impacts to surrounding uses.

**Policy 11.11**
Building heights should be transitioned so that a structure adjacent to a residential neighborhood is of a similar height.

**Policy 11.12**
Encourage signage that is compatible with the area. Signage will be subject to setbacks, size, height and other provisions of the Unified Development Code (Title 30). Monument signs are encouraged.

**Policy 11.13**
All new sound and masonry walls should be decorative and designed to visually minimize the stark appearance of a monotonous block wall face by incorporating landscaping with climbing vegetation and/or variations in surface planes, landscape pockets, height, material, or texture.

**Policy 11.14**
Encourage the use of xeriscape landscape design techniques (appropriate to the Town of Laughlin) in new developments and in retrofitting older areas.

**Policy 11.15**
The public access portion of all building footprints visible from a right-of-way or a residential use should have a landscape area between the building and parking area. In no instance should pavement for parking aisles or spaces directly abut the building footprint.

**Policy 11.16**
Developers should contact Development Services to request a pre-application conference for preliminary designs of egress and access points on all arterial and collector streets.

**Policy 11.17**
Encourage commercial and/or business and design/research park developments to incorporate pedestrian and bicycle circulation systems that connect with existing and proposed transit routes, trail systems (see transportation and trails elements), parks, and open space.

**Policy 11.18**
Encourage drive-thru facilities and stacking lanes, when contiguous to any public right-of-way, residential use, or pedestrian gathering area to be obscured from view by an intense landscape buffer consistent with the Clark County Unified Development Code (Title 30).

**Policy 11.19**
Encourage the construction of right turn deceleration lanes into major retail developments that are Projects of Regional Significance (PRS).

**Policy 11.20**
Continue to require the placement of bus turnouts in accordance with RTC standards.

## BDRP - Business and Design/Research Park

The Business and Design/Research Park category applies to areas where commercial, professional or manufacturing developments are designed to assure minimal impact on surrounding areas. Major uses in the category include research and development, incubator businesses, food sales and distribution, postal and data processing centers, vehicle sales and repair (inside), and general non-hazardous warehousing. Public facility uses are also allowed in this category with appropriate buffering and setbacks.

The category includes the following zoning districts: Office and Professional (C-P), Local Business, (C-1), General Commercial (C-2), Designed Manufacturing (M-D), and Public Facility (P-F).

## IND - Industrial

The Industrial category applies to areas of industrial use and provides areas for new and existing industrial development in proximity to major transportation facilities. These uses should be reviewed for safety and aesthetic reasons when they adjoin other uses. Public facility uses are also allowed in this category with appropriate buffering and setbacks.

The category includes the following zoning districts: Designed Manufacturing (M-D), Light Industrial (M-1) and Public Facility (P-F).

## HI - Heavy Industrial

The Heavy Industrial category applies to areas of industrial use and provides areas for intense industrial operations and development in proximity to major transportation facilities. These areas are generally located outside the Las Vegas Valley for safety or nuisance reasons. Public Facility uses are also allowed in this category with appropriate buffering and setbacks.

The category includes the following zoning districts: Designed Manufacturing (M-D), Light Industrial (M-1), Industrial (M-2) and Public Facility (P-F).

## PF - Public Facilities

The Public Facilities category allows public parks and recreational areas such as public and private golf courses; trails and easements; drainage ways and detention basins; storm water control facilities; and any other large areas of permanent open land. Public Facilities include governmental building sites and complexes, police and fire facilities, noncommercial hospitals and rehabilitation sites, schools, and other uses considered public and quasi public such as libraries, clubs, religious facilities and other public utility facilities. In certain areas planned as Public Facilities, there may be privately held lands eligible for residential development at densities in accordance with the existing zoning.

Suggested zoning district would include: Public Facility (P-F).

# MAJOR PROJECTS

A major project (master planned community) should demonstrate compliance with the following major project policies.

## Goal 17

**Provide opportunities for the development of major projects.**

### Policy 17.1

Amendment of this plan should occur when a major project, as defined in Title 30, the Clark County Development Code or as approved by the BCC, is proposed and adopted within Laughlin.

### Policy 17.2

Ensure that a major project provides a mix of residential, commercial, industrial and public facilities land uses where residents will have the opportunity to live, work, and recreate. The design of a major project should be compatible within the development as well as with adjoining land uses and the natural environment.

### Policy 17.3

Multiple family, office, and commercial uses should be concentrated in nodes at intersections or on arterial and collector streets to promote orderly development and reduce traffic impacts on neighborhoods, unless they are part of a comprehensive business or industrial park or a transit oriented retail/mixed use district.

### Policy 17.4

A major project should avoid "strip commercial" or "spot commercial" development patterns within the project boundary. A major project should be designed to reduce the negative impacts associated with ""strip" commercial" and "spot commercial" land use patterns such as excessive vehicular access and congestion along arterial streets, proliferation of sign and visual clutter, and inconsistent architectural designs. A major project development should facilitate and promote the use of mass transit and/or other alternative modes of transportation.

### Policy 17.5

Ensure that a major project provides adequate public services and facilities that meet appropriate standards in accordance with the Clark County Unified Development Code (Title 30) to ensure that a major project is adequately served without adversely impacting existing populated areas.

### Policy 17.6

Construction of infrastructure and public facilities for a major project should be timed to run concurrently with the development it supports in order to provide adequate service and to minimize financial burden to the service provider and the public.

### Policy 17.7

Ensure that a major project is designed to integrate transportation planning with land use planning. In addition, a major project should incorporate other linear infrastructure such as drainage, water reclamation and water.

### Policy 17.8

Encourage a major project to design residential subdivisions that include local neighborhood streets that service only local traffic and promote neighborhood integrity. Collector streets should be designed to distribute traffic to and from a neighborhood, as opposed to providing "shortcuts" through a neighborhood.

### Policy 17.9

Encourage a major project to incorporate comprehensive pedestrian and bicycle circulation systems that include provisions to install paths in new and existing rights-of-way and connect schools, residential areas, recreation areas and commercial areas. Major projects should also integrate with existing and proposed regional and community equestrian and multiple use trail systems, parks, and open space.

### Policy 17.10

Encourage a major project to conserve water by incorporating water conservation concepts and proven water conservation equipment, techniques and materials. Examples include, but are not limited to, use of gray water for golf courses, large turf areas for parks and other open space.

### Policy 17.11

The Clark County Major Projects Review Process should address the development of parcels located adjacent to, but not a part of, a major project to ensure compatibility with established land use patterns and ensure compliance with the policies contained herein

### Policy 17.12

Projects of regional significance should coordinate land use applications with NDOT, CCPW, RTC and CCCP in order to resolve transportation issues. Other issues involving schools, fire and police should also be coordinated with all applicable agencies at this time as well.

| APPENDIX F: C-1 | |
|---|---|
| Accessory Uses and Structures | A |
| Acupuncture - See "Office (Medical)" | |
| Agriculture - Gardening/Greenhouse, Accessory | A |
| Aircraft Hangars | A |
| Aircraft Sale, Maintenance, Repair, Assembly, Fuel Storage | A |
| Airport/Airstrip | S |
| Alcohol, On-Premise Consumption | S |
| Alcohol Sales, Beer and Wine - (Packaged Only) | P |
| Alcohol Sales, Liquor - (Packaged Only) | C |
| Amusement/Theme Park - See "Recreational Facility" | |
| Antique Restoration | A |
| Antiques | P |
| Arcade | S |
| Art Gallery/Studio | P |
| Artist - See "Home Occupation" or "Art Gallery/Studio" | |
| Asphalt Manufacturing - See "Batch Plant" | |
| Assisted/Independent Living | S |
| Auction, Auto Auction | S |
| Auto Detailing (Accessory or Wash Related) - See also "Home Occupation" or "Car Wash" | S |
| Automobile Maintenance | C |
| Automobile Rental | S |
| Automobile Sales | S |
| Bakery - See "Food Processing" | |
| Banquet Facilities | S |
| Batch Plant, Temporary | S |
| Beauty Salon - See "Personal Services" | |
| Bicycle Repair - See "Retail Sales and Service" | |
| Boat Storage - See "Recreational Vehicle and Boat Storage" | |
| Body Piercing | P |
| Brew Pub - See "On-Premise Consumption of Alcohol" | |
| Broadcast Facility - See "Recording Studio" | |
| Building Materials Storage and Sales Yard - See "Home Improvement Center" | |
| Carnival/Circus - (Temporary Use Only) | C |
| Car Wash - See also "Accessory Commercial" (Chapter 30.08)) | S |
| Caterer | P |
| Cemetery | C |
| Check Cashing | S |
| Child Care Institution - See "Day Care" | S |
| Christmas Tree Sales Lot - See "Seasonal Sales" | |
| Clinic - See "Office" | |
| Collectible/Memorabilia Store - See "Antiques" | |
| College or University | S |
| Communication Building | P |
| Communication Towers and Antennas | |
| Antennas | C |
| Towers | C |
| Community Residence | C |
| Congregate Care | S |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: C-1 | |
|---|---|
| Construction Activities, Temporary | A |
| Construction Storage, Temporary | S |
| Convenience Stores | S |
| Convention Facilities/Exposition Halls | S |
| Copy Center | P |
| Crematories - See "Funeral Home" | |
| Day Care | C |
| Day Spa - See "Personal Services" | |
| Dormitory | S |
| Dry Cleaner | S |
| Dry Cleaner Office - See also "Laundry Services" | P |
| Dwelling | |
| Condominium (See Chapter 30.24) | S |
| Multiple-Family and Multiple-Family Dwelling Groups | S |
| Single Room Occupancy Unit | S |
| Electric Generation, Distributed (See also "Electric Generation, Emergency" or "Electric Generating Station") | A |
| Electric Generation, Emergency (See also "Electric Generation, Distributed" or "Electric Generating Station") | A |
| Electronic Equipment Sales and Service | P |
| Emergency Care Facility | S |
| Escort Bureau | S |
| Exotic Animals | S |
| Fairground | S |
| Farmer's Market | S |
| Financial Services | P |
| Food Cart/Booth | C |
| Food Processing | C |
| Funeral Home | P |
| Furniture Repair | A |
| Gravel Pit, Temporary | S |
| Grocery Store | P |
| Gunsmith | S |
| Hardware Store | P |
| Health Club | P |
| Heliport | S |
| Home Improvement Center | C |
| Hospital | S |
| Hot Air Balloon - See "Heliport" | |
| Household Pet - See also "Kennel" | C |
| Janitorial Service - See also "Home Occupation" | S |
| Jewelry Making (excluding metal smelting) - See also "Home Occupation" | C |
| Jewelry Repair | P |
| Jewelry Sales (including Secondhand Sales) | P |
| Kiosk/Information (outdoor) | S |
| Laboratory, Medical/Dental | C |
| Land Sales Presentation Unit Broker Office - See also "Office" | |
| Large Scale Retail Business | S |
| Laundromat | P |
| Laundry Service | P |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: C-1 | |
|---|---|
| Library | P |
| Live Entertainment | S |
| Locksmith | S |
| Lounge - See "On-Premise Consumption of Alcohol" | |
| Manager's Unit | A |
| Massage - See also "Home Occupation" | A |
| Mini-Warehouse | S |
| Mobile Food Vendors | C |
| Model Residences – See also "Temporary Sales Office" | A |
| Monorail | S |
| Mortuary - See "Funeral Home" | |
| Movie Theater | S |
| Movie Theater, Drive-In (outdoor) | S |
| Museum | S |
| Office - See also "Construction Activities, Temporary", "Home Occupation", "Retail", or "Temporary Office, Commercial" | P |
| Outcall Entertainment Referral Service | S |
| Outside Dining, Drinking and Cooking | C |
| Park and Ride | P,A |
| Parks | S |
| Parking Lot | P |
| Passenger Terminal | S |
| Pawn Shop | S |
| Permanent Make-Up | P |
| Personal Services | P |
| Pet Shop | C |
| Pharmacy | P |
| Photographic Studio | P |
| Place of Worship | S |
| Planned Unit Development | S |
| Plant Nursery | C |
| Postal Services | P |
| Prison | S |
| Project of Regional Significance | S |
| Psychic Arts | S |
| Public Address Systems (See 30.68.020) | S |
| Public Storage Bin Facility | S |
| Public Utility Structures, including 34.5 kv or greater transmission lines (not including communication towers and antennas) | S, C |
| Public/Quasi-Public Buildings and Facilities | S |
| Racetrack | S |
| Reclamation Facility | S |
| Recording Studio | C |
| Recreational Facility | S |
| Recreational Vehicle and Boat Storage | S |
| Rental Store | P |
| Restaurant | P |
| Retail Sales and Service - See also "Home Occupation" | P |
| School | S |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: C-1 | |
|---|---|
| Seasonal Sales - See also "Temporary Outdoor Commercial Event" | T |
| Second Hand Sales | S |
| Security Services | S |
| Senior Housing | S |
| Service Bar - See "On-Premise Consumption of Alcohol" | |
| Service Station | S |
| Shoe Repair | P |
| Shopping Center | P |
| Sporting Goods | P |
| Sporting Goods - Firearms | S |
| Suntanning – see "Tanning Salon" | |
| Supper Club – See "On-Premise Consumption of Alcohol" | |
| Supportive Housing | S |
| Swap Meets | S |
| Tailor - See "Personal Services" | |
| Tailor and Sewing Service - See "Home Occupation" or "Personal Services" | |
| Tanning Salon – See "Personal Services" | |
| Tattoo | C |
| Temporary Government Facilities | C |
| Temporary Office, Commercial | C |
| Temporary Outdoor Commercial Event - See also " Seasonal Sales" and "Carnival/Circus Temporary Use" | T |
| Temporary Sales/Leasing Office – See also "Model Residence" | C |
| Training Facility, Instruction | P |
| Training Facility, Major | S |
| Training Facility, Minor | P |
| Transitional Living Facility for Released Offenders | S |
| Truck and Trailer Rental | S |
| Union Hall | S |
| Vacation Sales (O.P.C. Booth) - See "Office" | |
| Veterinary Clinic and Service | S |
| Video Store | P |
| Watch/Small Clock Repair | P |
| Watchman's Manufactured Home | S |
| Wedding Chapel | A |
| Wholesale - See also "Home Occupation" | A |
| Wine Sales - See "Beer and Wine Sales" | |

(Ord. 3757 § 14 (part), 4/2009; Ord. 3668 § 16 (part), 10/2008; Ord. 3635 § 12 (part), 6/2008; Ord 3586 § 13 (part), 2/2008; Ord. 3423 § 6 (part), 8/2006; Ord. 3357 § 5 (part), 3/2006; Ord. 3354 § 16(part), 2/2006; Ord. 3296 § 11(part), 10/2005; Ord. 3229 § 14 (part), 6/2005; Ord. 3219 § 10, 5/2005; Ord. 3209 § 14 (part), 3/2005; Ord. 3160 § 17 (part), 11/2004; Ord. 3106 § 15 (part), 8/2004; Ord. 3061 § 10 (part), 5/2004; Ord 3008 § 10 (part), 12/2003; Ord. 2961 § 11 (part), 10/2003; Ord. 2906 § 1, 6/2003)

| APPENDIX F: C-2 | |
|---|---|
| Accessory Uses and Structures | A |
| Acupuncture – See "Office (Medical)" | |
| Agriculture - Gardening/Greenhouse, Accessory | A |
| Aircraft Hangars | A |
| Aircraft Sale, Maintenance, Repair, Assembly, Fuel Storage | A |
| Airport/Airstrip | S |
| Alcohol, On-Premise Consumption | C |
| Alcohol Sales, Beer and Wine - (Packaged Only) | P |
| Alcohol Sales, Liquor - (Packaged Only) | P |
| Amusement/Theme Park - See "Recreational Facility" | |
| Animal Hospital - See "Veterinary Clinic and Service" | |
| Antique Restoration | A |
| Antiques | P |
| Appliance Repair | S |
| Arcade | P |
| Art Gallery/Studio | P |
| Artist - See "Home Occupation" or "Art Gallery/Studio" | |
| Asphalt Manufacturing - See "Batch Plant" | |
| Assisted/Independent Living | S |
| Auction, Auto Auction | S |
| Auto Detailing (Accessory or Wash Related) - See also "Home Occupation" or "Car Wash" | C |
| Automobile Maintenance | C |
| Automobile Minor Paint/Body Shop - see also "Automotive Paint and Body Shop" | S |
| Automobile Paint and Body Shop see also "Minor Paint/Body Shop" | S |
| Automobile Rental | C |
| Automobile Repair (for accessory repair at residence, see definition in 30.08) | S |
| Automobile Sales | C |
| Bakery - See "Food Processing" | |
| Banquet Facilities | C |
| Bar - See "On-Premise Consumption of Alcohol" | |
| Batch Plant, Temporary | S |
| Beauty Salon - See "Personal Services" | |
| Beer and Wine Sales - (Packaged Only) | P |
| Bicycle Repair - See "Retail Sales and Service" | |
| Billiard Hall | P |
| Boat Repair | S |
| Boat Storage – See "Recreational Vehicle and Boat Storage" | |
| Body Piercing | P |
| Brew Pub - See "On-Premise Consumption of Alcohol" | |
| Broadcast Facility - See "Recording Studio" | |
| Building Materials Storage and Sales Yard - See "Home Improvement Center" | |
| Carnival/Circus - (Temporary Use Only) | C |
| Car Wash - (also see "Accessory Commercial" definition in 30.08) | C |
| Caterer | P |
| Cemetery | C |
| Check Cashing | C |
| Child Care Institution - See "Day Care" | S |
| Christmas Tree Sales Lot - See "Seasonal Sales" | |
| Clinic - See "Office" | |
| Club | C |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: C-2 | |
|---|---|
| Collectible/Memorabilia Store - See "Antiques" | |
| College or University | S |
| Communication Building | P |
| Communication Towers and Antennas | |
| Antennas | C |
| Towers | C |
| Community Residence | C |
| Congregate Care | S |
| Construction Activities, Temporary | A |
| Construction Storage, Temporary | S |
| Convenience Stores | C |
| Convention Facilities/Exposition Halls | S |
| Copy Center | P |
| Crematories - See "Funeral Home" | |
| Day Care | C |
| Day Spa - See "Personal Services" | |
| Diaper Service | P |
| Dormitory | S |
| Dry Cleaner | P |
| Dry Cleaner Office - See also "Laundry Services" | P |
| Dwelling | |
| Condominium (See Chapter 30.24) | S |
| Single Room Occupancy Unit | S |
| Electric Generation, Distributed (See also "Electric Generation, Emergency" or "Electric Generating Station") | A |
| Electric Generation, Emergency (See also "Electric Generation, Distributed" or "Electric Generating Station") | A |
| Electronic Equipment Sales and Service | P |
| Emergency Care Facility | S |
| Equipment Rental | S |
| Escort Bureau | S |
| Exotic Animals | S |
| Fairground | S |
| Farmer's Market | S |
| Feed Store | C |
| Financial Services | P |
| Food Cart/Booth | C, S |
| Food Processing | C |
| Funeral Home | P |
| Furniture Repair | A |
| Gravel Pit, Temporary | S |
| Grocery Store | P |
| Gunsmith | P |
| Hardware Store | P |
| Health Club | P |
| Heliport | S |
| Home Improvement Center | C |
| Hospital | S |
| Hot Air Balloon - See "Heliport" | |
| Hotel (including Condominium Hotel) | C |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: C-2 | |
|---|---|
| Household Pet - See also "Kennel" | C |
| Instructional Wine-Making Facility | S |
| Janitorial Service - See also "Home Occupation" | P |
| Jewelry Making (excluding metal smelting) - See also "Home Occupation" | C |
| Jewelry Repair | P |
| Jewelry Sales (including Secondhand Sales) | P |
| Kennel | S |
| Kiosk/Information (outdoor) | S |
| Laboratory, Medical/Dental | P |
| Land Sales Presentation Unit Broker Office - See "Office" | |
| Large Scale Retail Business | C |
| Laundromat | P |
| Laundry Service | P |
| Library | P |
| Live Entertainment | S |
| Locksmith | P |
| Lounge - See "On-Premise Consumption of Alcohol" | |
| Mail Order Puzzle Contest | S |
| Manager's Unit | A |
| Manufactured Home Sales | S |
| Marine Sales/Rental | S |
| Massage - See also "Home Occupation" | S, A |
| Medical - See "Office" | |
| Mini-Warehouse | P |
| Mobile Food Vendors | C |
| Model Residences – See also "Temporary Sales Office" | A |
| Monorail | S |
| Monument Sales | P |
| Mortuary - See "Funeral Home" | |
| Motel (including Condominium Motel) | C |
| Movie Theater | P |
| Movie Theater, Drive-In (outdoor) | S |
| Museum | S |
| Office - See also "Construction Activities, Temporary", "Home Occupation", "Retail", or "Temporary Office, Commercial" | P |
| Outcall Entertainment Referral Service | S |
| Outside Dining, Drinking and Cooking | C |
| Outside Storage/Outside Display | C |
| Park and Ride | P,A |
| Parks | S |
| Parking Lot | P |
| Passenger Terminal | S |
| Pawn Shop | S |
| Permanent Make-Up | P |
| Personal Services | P |
| Pet Shop | C |
| Pharmacy | P |
| Photographic Studio | P |
| Place of Worship | S |
| Planned Unit Development | S |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: C-2 | |
|---|---|
| Plant Nursery | C |
| Postal Services | P |
| Print Shop | S |
| Project of Regional Significance | S |
| Psychic Arts | S |
| Public Address Systems (See 30.68.020) | S |
| Public Storage Bin Facility | S |
| Public Utility Structures, including 34.5 kv or greater transmission lines (not including communication towers and antennas) | S, C |
| Public/Quasi-Public Buildings and Facilities | S |
| Racetrack | S |
| Reclamation Facility | S |
| Recording Studio | C |
| Recreational Facility | S |
| Recreational Fields, Courts, Pools | A |
| Recreational Vehicle Repair | S |
| Recreational Vehicle Sales and Rental | S |
| Recreational Vehicle and Boat Storage | S |
| Recyclable Collection | A |
| Rental Store | P |
| Restaurant | P |
| Retail Sales and Service - See also "Home Occupation" | P |
| School | S |
| Seasonal Sales - See also "Temporary Outdoor Commercial Event" | T |
| Second Hand Sales | P |
| Security Services | P |
| Senior Housing | S |
| Service Bar - See "On-Premise Consumption of Alcohol" | |
| Service Station | C |
| Shoe Repair | P |
| Shopping Center | P |
| Smog Check – See "Automobile Maintenance" | |
| Sporting Goods | P |
| Sporting Goods - Firearms | P |
| Suntanning- see "Tanning Salon" | |
| Supper Club – See "On-Premise Consumption of Alcohol" | |
| Supportive Housing | S |
| Swap Meets | S |
| Swimming Pool (Outdoor/Indoor) | A |
| Tailor - See "Personal Services" | |
| Tailor and Sewing Service - See "Home Occupation" or "Personal Services" | |
| Tanning Salon – See "Personal Services" | |
| Tattoo | P |
| Tavern See "On-Premise Consumption of Alcohol" | |
| Temporary Government Facilities | C |
| Temporary Outdoor Commercial Event - See also " Seasonal Sales" and "Carnival/Circus Temporary Use" | T |
| Temporary Sales Office - See also "Model Residence" | C |
| Temporary Office, Commercial | C |
| Time Share - Residential/Commercial | A |
| Tire Sales and Installation | S |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: C-2 | |
|---|---|
| Trailer Sales (outside display permitted) | S |
| Training Facility, Instruction | P |
| Training Facility, Major | S |
| Training Facility, Minor | P |
| Transitional Living Facility for Released Offenders | S |
| Transportation Service (including Tour Guide Services) | C |
| Truck and Trailer Rental | C |
| Truck Fueling - See "Truck Stop" | |
| Truck Stop | S |
| Union Hall | S |
| Vacation Sales (O.P.C. Booth) - See "Office" | |
| Veterinary Clinic and Service | C |
| Video Store | P |
| Watch/Small Clock Repair | P |
| Watchman's Manufactured Home | S |
| Wedding Chapel | A |
| Wholesale - See also "Home Occupation" | A |
| Wine Sales - See "Beer and Wine Sales" | |

(Ord. 3757 § 14 (part), 4/2009; Ord. 3668 § 16 (part), 10/2008; Ord. 3635 § 12 (part), 6/2008; Ord 3586 § 13 (part), 2/2008; Ord. 3423 § 6 (part), 8/2006; Ord. 3397 § 14 (part), 6/2006; Ord. 3357 § 5 (part), 3/2006; Ord. 3354 § 16(part), 2/2006; Ord. 3296 § 11 (part), 10/2005; Ord. 3229 § 14 (part), 6/2005; Ord. 3209 § 14 (part), 3/2005; Ord. 3160 § 17 (part), 11/2004; Ord. 3106 § 15 (part), 8/2004; Ord. 3061 § 10 (part), 5/2004; Ord 3008 § 10 (part), 12/2003; Ord. 2961 § 11 (part), 10/2003; Ord. 2906 § 1, 6/2003)

| APPENDIX F: C-P | |
|---|---|
| Accessory Uses and Structures | A |
| Acupuncture – See "Office (Medical)" | P |
| Agriculture - Gardening/Greenhouse, Accessory | A |
| Amusement/Theme Park - See "Recreational Facility" | |
| Animal Hospital - See "Veterinary Clinic and Service" | |
| Antique Restoration | A |
| Antiques | S |
| Art Gallery/Studio | P |
| Artist - See "Home Occupation" or "Art Gallery/Studio" | |
| Assisted/Independent Living | S |
| Beauty Salon – See "Personal Services" | |
| Bicycle Repair - See "Retail Sales and Service" | |
| Body Piercing | A |
| Broadcast Facility - See "Recording Studio" | |
| Carnival/Circus - (Temporary Use Only) | C |
| Cemetery | C |
| Child Care Institution - See "Day Care" | S |
| Christmas Tree Sales Lot - See "Seasonal Sales" | |
| Clinic - See "Office" | |
| Collectible/Memorabilia Store - See "Antiques" | |
| College or University | S |
| Communication Building | S |
| Communication Towers and Antennas | |
| Antennas | C |
| Towers | C |
| Community Residence | C |
| Condominium | S |
| Congregate Care | S |
| Construction Activities, Temporary | A |
| Construction Storage, Temporary | S |
| Copy Center | C |
| Crematories - See "Funeral Home" | |
| Day Care | S |
| Day Spa – See "Personal Services" | |
| Dormitory | S |
| Dry Cleaner Office - See also "Laundry Services" | C |
| Dwellings | |
| Electric Generation, Distributed (See also "Electric Generation, Emergency" or "Electric Generating Station") | A |
| Electric Generation, Emergency (See also "Electric Generation, Distributed" or "Electric Generating Station") | A |
| Electronic Equipment Sales and Service | S |
| Emergency Care Facility | S |
| Exotic Animals | S |
| Fairground | S |
| Farmer's Market | S |
| Financial Services | C |
| Food Cart/Booth | C, S |
| Funeral Home | S |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: C-P | |
|---|---|
| Health Club | A |
| Heliport | S |
| Hospital | S |
| Hot Air Balloon - See "Heliport" | |
| Household Pet - See also "Kennel" | C |
| Laboratory, Medical/Dental | C |
| Land Sales Presentation Unit Broker Office - See "Office" | |
| Laundry Service | S |
| Library | S |
| Live Entertainment | S |
| Manager's Unit | A |
| Massage - See also "Home Occupation" | A |
| Medical - See "Office" | |
| Model Residences – See also "Temporary Sales Office" | S |
| Monorail | S |
| Mortuary - See "Funeral Home" | |
| Museum | S |
| Office - See also "Construction Activities, Temporary", "Home Occupation", "Retail", or "Temporary Office, Commercial" | P |
| Park and Ride | S,A |
| Parks | S |
| Parking Lot | S |
| Passenger Terminal | S |
| Permanent Make-Up | S |
| Personal Services | S |
| Pharmacy | S, A |
| Photographic Studio | P |
| Place of Worship | S |
| Planned Unit Development | S |
| Postal Services | S |
| Public Address Systems (See 30.68.020) | S |
| Public Storage Bin Facility | S |
| Public Utility Structures, including 34.5 kv or greater transmission lines (not including communication towers and antennas) | S, C |
| Public/Quasi-Public Buildings and Facilities | S |
| Racetrack | S |
| Recording Studio | C |
| Recreational Facility | S |
| Recreational Fields, Courts, Pool | A |
| Restaurant | C, A |
| Retail Sales and Service - See also "Home Occupation" | C,A |
| School | S |
| Seasonal Sales - See also "Temporary Outdoor Commercial Event" | T |
| Shoe Repair | S |
| Sporting Goods | S |
| Tailor - See "Personal Services" | |
| Tailor and Sewing Service - See "Home Occupation" or "Personal Services" | |
| Temporary Government Facilities | C |
| Temporary Office, Commercial | C |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: C-P | |
|---|---|
| Temporary Outdoor Commercial Event - See also " Seasonal Sales" and "Carnival/Circus Temporary Use" | T |
| Temporary Sales/Leasing Office – See also "Model Residence" | C |
| Training Facility, Instruction | S |
| Training Facility, Major | S |
| Training Facility, Minor | S |
| Transitional Living Facility for Released Offenders | S |
| Vacation Sales (O.P.C. Booth) - See "Office" | P |
| Veterinary Clinic and Service | S |
| Watch/Small Clock Repair | C |
| Wedding Chapel | A |

(Ord. 3757 § 14 (part), 4/2009; Ord. 3668 § 16 (part), 10/2008; Ord. 3635 § 12 (part), 6/2008; Ord 3586 § 13 (part), 2/2008; Ord. 3432 § 14 (part), 10/2006; Ord. 3423 § 6 (part), 8/2006; Ord. 3397 § 14 (part), 6/2006; Ord. 3354 § 16(part), 2/2006; Ord. 3296 § 11 (part), 10/2005; Ord. 3229 § 14 (part), 6/2005; Ord. 3209 § 14 (part), 3/2005; Ord. 3160 § 17 (part), 11/2004; Ord. 3106 § 15 (part), 8/2004; Ord. 2961 § 11 (part), 10/2003; Ord. 2906 § 1, 6/2003)

| APPENDIX F: M-D | |
|---|---|
| Accessory Uses and Structures | A |
| Acupuncture – See "Office (Medical)" | |
| Agriculture - Gardening/Greenhouse, Accessory | A |
| Aircraft Hangars | A |
| Aircraft Sale, Maintenance, Repair, Assembly, Fuel Storage | A |
| Airport/Airstrip | S |
| Alcohol, On-Premise Consumption | S |
| Alcohol Sales, Beer and Wine - (Packaged Only) | S |
| Alcohol Sales, Liquor - (Packaged Only) | S |
| Amusement/Theme Park - See "Recreational Facility" | |
| Animal Hospital - See "Veterinary Clinic and Service" | |
| Antique Restoration | A |
| Antiques | S |
| Appliance Repair | C |
| Arcade | S |
| Art Gallery/Studio | S |
| Artist - See "Home Occupation" or "Art Gallery/Studio" | |
| Asphalt Manufacturing - See "Batch Plant" | |
| Assisted/Independent Living | S |
| Auction, Auto Auction | S,A |
| Auto Detailing (Accessory or Wash Related) - See also "Home Occupation" or "Car Wash" | C |
| Automobile Maintenance | C |
| Automobile Minor Paint/Body Shop - See also "Automotive Paint and Body Shop" | S |
| Automobile Rental | C |
| Automobile Paint and Body Shop - See also "Minor Paint/Body Shop" | S |
| Automobile Rental | C |
| Automobile Repair (for accessory repair at residence, see definition in 30.08) | C |
| Automobile Sales | C |
| Bakery - See "Food Processing" | |
| Banquet Facilities | S |
| Bar - See "On-Premise Consumption of Alcohol" | |
| Batch Plant, Temporary | S |
| Beauty Salon - See "Personal Services" | |
| Beverage Plant | C |
| Bicycle Repair - See "Retail Sales and Service" | |
| Billiard Hall | S |
| Boat Repair | C |
| Boat Building | C |
| Boat Storage - See "Recreational Vehicle and Boat Storage" | |
| Body Piercing | P |
| Book Binding | P |
| Brew Pub - See "On-Premise Consumption of Alcohol" | |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: M-D | |
|---|---|
| Broadcast Facility - See "Recording Studio" | |
| Building Materials Storage and Sales Yard - See "Home Improvement Center" | |
| Carnival/Circus - (Temporary Use Only) | C |
| Car Wash - (See also "Accessory Commercial" definition in 30.08) | C |
| Caterer | P |
| Cemetery | C |
| Ceramics Manufacturing - See "Manufacturing, Light" | |
| Check Cashing | S |
| Child Care Institution - See "Day Care" | S |
| Christmas Tree Sales Lot - See "Seasonal Sales" | |
| Clinic - See "Office" | |
| Club | S |
| Collectible/Memorabilia Store - See "Antiques" | |
| College or University | S |
| Communication Building | P |
| Communication Towers and Antennas | |
| Antennas | C |
| Towers | C |
| Congregate Care | S |
| Construction Activities, Temporary | A |
| Construction Storage, Temporary | S |
| Convenience Stores | S |
| Convention Facilities/Exposition Halls | S |
| Copy Center | P |
| Crematories – See "Funeral Home" | |
| Day Care | S |
| Day Spa - See "Personal Services" | |
| Diaper Service | P |
| Distribution Center | C |
| Document Destruction and Recycling | S |
| Dormitory | S |
| Dry Cleaner | P |
| Dry Cleaner Office - See also "Laundry Services" | P |
| Dry Cleaning Plant | P |
| Electric Generating Station (See also "Electric Generation, Distributed" or "Electric Generation, Emergency") | S |
| Electric Generation, Distributed (See also "Electric Generation, Emergency" or 'Electric Generating Station") | A |
| Electric Generation, Emergency (See also "Electric Generation, Distributed" or "Electric Generating Station") | A |
| Electronic Equipment Sales and Service | P |
| Emergency Care Facility | S |
| Equipment Rental | C |
| Equipment Sales/Rental/Service, Construction or Heavy Equipment | C |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: M-D | |
|---|---|
| Escort Bureau | C |
| Exotic Animals | S |
| Fairground | S |
| Farmer's Market | S |
| Feed Store | C |
| Financial Services | S |
| Food Cart/Booth | C, S |
| Food Processing | P |
| Fuel Storage Yard | S |
| Funeral Home | P |
| Furniture Repair | C |
| Gravel Pit, Temporary | S |
| Grocery Store | S |
| Gunsmith | P |
| Hardware Store | P |
| Hazardous Materials Storage | S |
| Health Club | S, A |
| Heliport | S |
| Home Improvement Center | C |
| Hospital | S |
| Hot Air Balloon - See "Heliport" | |
| Hotel (including Condominium Hotel) | S |
| Household Pet - See also "Kennel" | C |
| Ice and Cold Storage Plant | P |
| Instructional Wine-Making Facility | S |
| Janitorial Service - See also "Home Occupation" | P |
| Jewelry Making (excluding metal smelting) - See also "Home Occupation" | P |
| Jewelry Repair | P |
| Jewelry Sales – (including Secondhand Sales) | S |
| Kennel - See also "Veterinary Service" | C |
| Laboratory, Medical/Dental | P |
| Laboratory, Experimental | S |
| Land Sales Presentation Unit Broker Office - Also See "Office" | |
| Large Scale Retail Business | S |
| Laundromat | P |
| Laundry Service | P |
| Library | S |
| Live Entertainment | S |
| Locksmith | P |
| Lounge - See "On-Premise Consumption of Alcohol" | |
| Manager's Unit | A |
| Manufactured Home Assembly/Repair | S |
| Manufactured Home Sales | S |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: M-D | |
|---|---|
| Manufacturing, Furniture | C |
| Manufacturing, Light | C |
| Manufacturing, Pharmaceutical | S |
| Manufacturing, Sign | P |
| Marine Sales/Rental | P |
| Massage - See also "Home Occupation" | A |
| Medical, See "Office" | |
| Mini-Warehouse | P |
| Mobile Food Vendors | C |
| Model Residences – See also "Temporary Sales Office" | A |
| Monorail | S |
| Monument Sales | P |
| Mortuary - See "Funeral Home" | |
| Motel (including Condominium Motel) | S |
| Motion Picture Production/Studio | C, S |
| Movie Theater | S |
| Movie Theater, Drive-In (outdoor) | S |
| Museum | S |
| Office - See also "Construction Activities, Temporary", "Home Occupation", "Retail", or "Temporary Office, Commercial" | S, A |
| Outcall Entertainment Referral Service | C |
| Outside Dining, Drinking and Cooking | S |
| Outside Storage/Outside Display | C, S |
| Package Wastewater Treatment Plant | S |
| Park and Ride | P,A |
| Parks | S |
| Parking Lot | P |
| Passenger Terminal | S |
| Pawn Shop | S |
| Permanent Make-Up | P |
| Personal Services | S |
| Pest Extermination - See also "Home Occupation" | C |
| Pet Shop | S |
| Pharmacy | S |
| Photographic Studio | S |
| Place of Worship | S |
| Planned Unit Development | S |
| Plant Nursery | C |
| Postal Services | S |
| Print Shop | P |
| Project of Regional Significance | S |
| Psychic Arts | S |
| Public Address Systems (See 30.68.020) | S |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: M-D | |
|---|---|
| Public Storage Bin Facility | S |
| Public Utility Structures, including 34.5 kv or greater transmission lines (not including communication towers and antennas) | S, C |
| Public/Quasi-Public Buildings and Facilities | S |
| Racetrack | S |
| Reclamation Facility | S |
| Recording Studio | C |
| Recreational Facility | S |
| Recreational Vehicle Repair | C |
| Recreational Vehicle Sales and Rental | P |
| Recreational Vehicle and Boat Storage | C |
| Recyclable Collection | C |
| Renewable Fuels Processing | A |
| Rental Store | S |
| Restaurant | S, A |
| Retail Sales and Service - See also "Home Occupation" | S, A |
| School | S |
| Seasonal Sales - See also "Temporary Outdoor Commercial Event" | T |
| Second Hand Sales | S |
| Security Services | P |
| Service Bar - See "On-Premise Consumption of Alcohol" | |
| Service Station | C |
| Sewage (Wastewater) Treatment Plant | S |
| Shoe Repair | P |
| Shopping Center | S |
| Smog Check – See "Automobile Maintenance" | |
| Sporting Goods | S |
| Sporting Goods - Firearms | S |
| Suntanning – see "Tanning Salon" | |
| Supper Club – See "On-Premise Consumption of Alcohol" | |
| Swap Meets | S |
| Tailor - See "Personal Services" | |
| Tailor and Sewing Service - See "Home Occupation" or "Personal Services" | |
| Tanning Salon – See "Personal Services" | |
| Tattoo | P |
| Tavern See "On-Premise Consumption of Alcohol" | |
| Taxidermist | P |
| Temporary Government Facilities | C |
| Temporary Office, Commercial | C |
| Temporary Outdoor Commercial Event - See also " Seasonal Sales" and "Carnival/Circus Temporary Use" | T |
| Temporary Sales/Leasing Office – See also "Model Residence" | C |
| Tire Sales and Installation | C |
| Towing Service | S |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: M-D | |
|---|---|
| Trailer Rental - See "Truck and Trailer Rental" | |
| Trailer Sales (outside display permitted) | P |
| Training Facility, Instruction | S |
| Training Facility, Major | S |
| Training Facility, Minor | P |
| Transitional Living Facility for Released Offenders | S |
| Transportation Service (including Tour Guide Services) | P |
| Truck and Trailer Rental | C |
| Truck Fueling - See "Truck Stop" | |
| Truck Maintenance | S |
| Truck Rental - See "Truck and Trailer Rental" | |
| Truck Repair | S |
| Truck Sales (outside display permitted) | P |
| Truck Stop | C |
| Truck Wash | S |
| Union Hall | P |
| Vacation Sales (O.P.C. Booth) - See "Office" | |
| Veterinary Clinic and Service | C |
| Video Store | S |
| Warehouse/Storage (as Principal Use) | P |
| Watch/Small Clock Repair | P |
| Watchman's Manufactured Home | S |
| Wedding Chapel | A |
| Wholesale - See also "Home Occupation" | P |
| Wine Sales – See "Beer and Wine Sales" | |

(Ord. 3757 § 14 (part), 4/2009; Ord. 3668 § 16 (part), 10/2008; Ord. 3635 § 12 (part), 6/2008; Ord 3586 § 13 (part), 2/2008; Ord. 3472 § 16 (part), 1/2007; Ord. 3397 § 14 (part), 6/2006; Ord. 3357 § 5 (part), 3/2006; Ord. 3354 § 16 (part), 2/2006; Ord. 3296 § 11 (part), 10/2005; Ord. 3229 § 14 (part), 6/2005; Ord. 3209 § 14 (part), 3/2005; Ord. 3160 § 17 (part), 11/2004; Ord. 3106 § 15 (part), 8/2004; Ord. 3061 § 10 (part), 5/2004; Ord 3008 § 10 (part), 12/2003); Ord. 2961 § 11 (part), 10/2003; Ord. 2906 § 1, 6/2003)

| APPENDIX F: P-F | |
|---|---|
| Accessory Uses and Structures | A |
| Agriculture - Gardening/Greenhouse, Accessory | A |
| Aircraft Hangars | A |
| Aircraft Sale, Maintenance, Repair, Assembly, Fuel Storage | A |
| Airport/Airstrip | S |
| Amusement/Theme Park - See "Recreational Facility" | |
| Art Gallery/Studio | P |
| Artist - See "Home Occupation" or "Art Gallery/Studio" | |
| Asphalt Manufacturing - See "Batch Plant" | |
| Assisted/Independent Living | S |
| Auto Detailing (Accessory or Wash Related) - See also "Home Occupation" or "Car Wash" | S |
| Automobile Sales | C |
| Automobile Rental | S |
| Batch Plant, Temporary | S |
| Bicycle Repair - See "Retail Sales and Service" | |
| Carnival/Circus (Temporary Use Only) | C |
| Cemetery | S |
| Child Care Institution - See "Day Care" | S |
| College or University | S |
| Communication Building | S |
| Communication Towers and Antennas | |
| Antennas | C |
| Towers | C |
| Congregate Care | S |
| Construction Activities, Temporary | A |
| Construction Storage, Temporary | S |
| Convention Facilities/Exposition Halls | S |
| Crematories – See "Funeral Home" | |
| Day Care | S |
| Detention Facility | S |
| Dormitory | S |
| Electric Generating Station (See also "Electric Generation, Distributed" or "Electric Generation Emergency") | S |
| Electric Generation, Distributed (See also "Electric Generation, Emergency" or "Electric Generating Station") | A |
| Electric Generation, Emergency (See also "Electric Generation, Distributed" or "Electric Generating Station") | A |
| Emergency Care Facility | S |
| Exotic Animals | S |
| Fairground | S |
| Farmer's Market | S |
| Food Cart/Booth | C |
| Funeral Home | S |
| Gravel Pit, Temporary | S |
| Hazardous Materials Storage | S |
| Heliport | S |
| Hospital | S |
| Hot Air Balloon - See "Heliport" | |
| Household Pet - See also "Kennel" | C |

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

| APPENDIX F: P-F | |
|---|---|
| Library | P |
| Live Entertainment | S |
| Monorail | S |
| Mortuary - See "Funeral Home" | |
| Museum | P |
| Office – See also "Construction Activities, Temporary", "Home Occupation", "Retail Sales and Service" or "Temporary Office, Commercial" | S, A |
| Outside Storage/Outside Display | C |
| Package Wastewater Treatment Plant | S |
| Park and Ride | C |
| Parks | P |
| Passenger Terminal | S |
| Place of Worship | S |
| Postal Services | P |
| Prison – See "Detention Facility" | |
| Project of Regional Significance | S |
| Public Address Systems (See 30.68.020) | S |
| Public Storage Bin Facility | S |
| Public Utility Structures, including 34.5 kv or greater transmission lines (not including communication towers and antennas) | S,C |
| Public/Quasi-Public Buildings and Facilities | P |
| Racetrack | S |
| Reclamation Facility | S |
| Recreational Facility | S |
| Recreation Fields, Courts, Pools | P |
| Recyclable Collection | A |
| Restaurant | A |
| Retail Sales and Service - See also "Home Occupation" | A, S |
| School | P |
| Sewage (Wastewater) Treatment Plant | S |
| Swap Meets | S |
| Swimming Pool (Outdoor/Indoor) | A |
| Temporary Government Facilities | C |
| Temporary Office, Commercial | C |
| Temporary Outdoor Commercial Event - See also " Seasonal Sales" and "Carnival/Circus Temporary Use" | T |
| Training Facility, Instruction | |
| Training Facility, Major | S |
| Training Facility, Minor | P |
| Transitional Living Facility for Released Offenders | S |
| Transportation Service (including Tour Guide Services) | S |
| Watchman's Manufactured Home | S |
| Wedding Chapel | A |
| Wildlife Preserves | P |

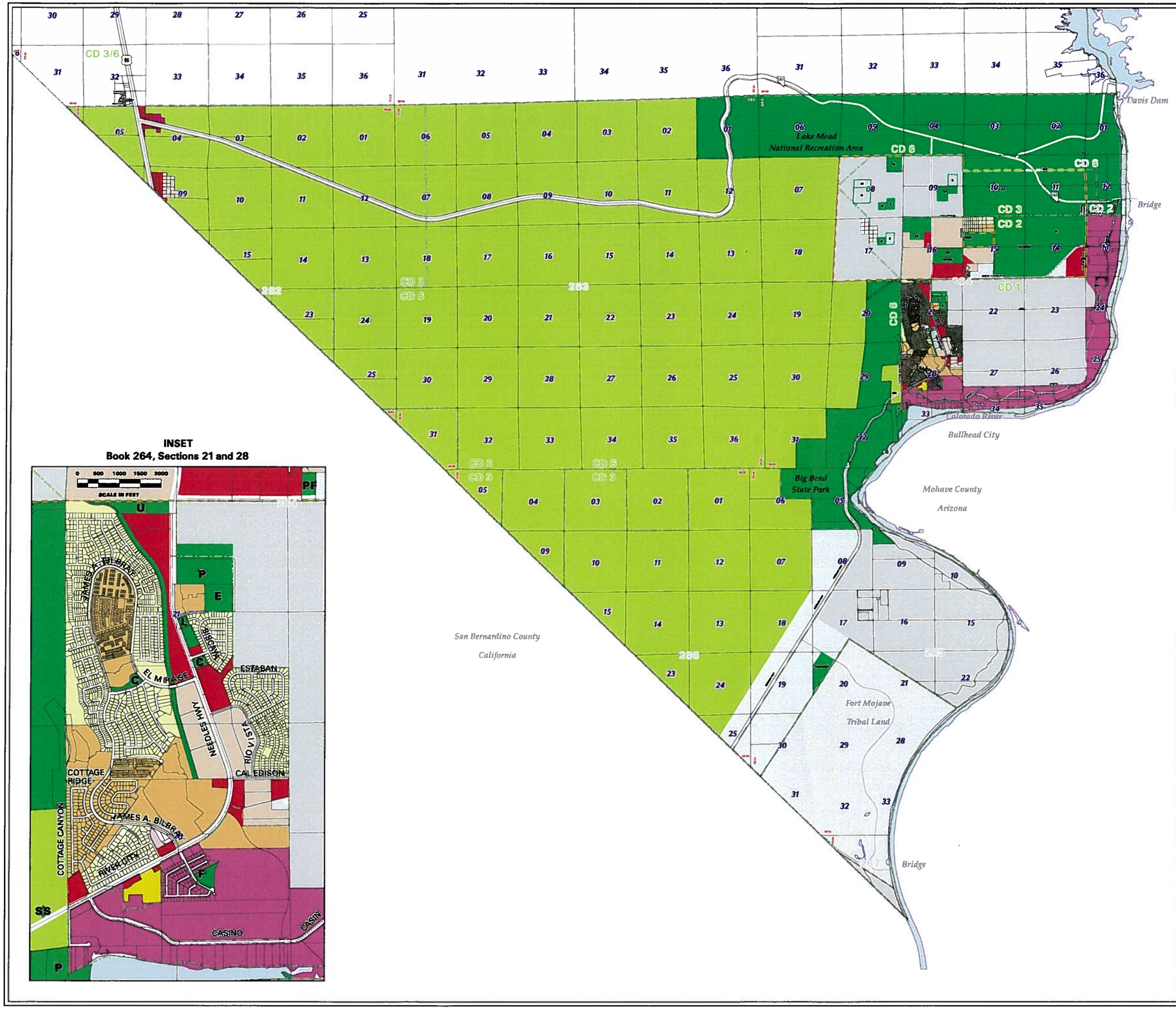
(Ord. 3668 § 16 (part), 10/2008; Ord. 3635 § 12 (part), 6/2008; Ord 3586 § 13 (part), 2/2008; Ord. 3397 § 14 (part), 6/2006; Ord. 3357 § 5 (part), 3/2006; Ord. 3354 § 16 (part), 2/2006; Ord. 3296 § 11 (part), 10/2005; Ord. 3209 § 14 (part), 3/2005; Ord. 3160 § 17 (part), 11/2004; Ord. 3106 § 15 (part), 8/2004; Ord. 3061 § 10 (part), 5/2004; Ord. 2906 § 1, 6/2003)

**A=Accessory Use C=Conditional Use P=Permitted Use S=Special Use T=Administrative Temporary Use**

# Comprehensive Planning
## LAUGHLIN
## Planned Land Use

**Adopted on: May 16, 2007**

**Amended on: September 5, 2007**




- Open Lands
- Residential Rural Up to 0.5 du/1ac
- Residential Agricultural Up to 1 du/1ac
- Rural Neighborhood Up to 2 du/1ac
- Rural Neighborhood Preservation Up to 2 du/1ac
- Residential Low Up to 3.5 du/1ac
- Residential Suburban Up to 8 du/1ac
- Residential Medium From 3 du/1ac to 14 du/1ac
- Residential High From 8 du/1ac to 18 du/1ac
- Residential Urban Center From 18 du/1ac to 32 du/1ac
- Residential High Rise Center Greater than 32 du/1ac
- Office Professional
- Commercial Neighborhood
- Commercial General
- Commercial Tourist
- Business and Design Research Park
- Industrial
- Heavy Industrial
- Public Facilities
- Major Development Projects
- MDP Schools
- Disposal Boundaries
- LAUGHLIN Planning Area
- Community Districts
- Incorporated Cities Tribal Lands

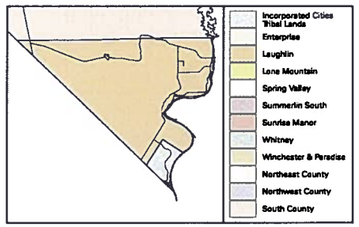
| | | | |
|---|---|---|---|
| C | = Church | U | = Other Utility |
| E | = Elementary School | CCSD | = School District Property |
| F | = Fire Department | CCWRD | = Clark County Water Reclamation Dist. |
| G | = Government Facility | GC | = Golf Course |
| H | = High School | PD | = Police Department |
| L | = Library | PW | = Public Works |
| M | = Middle School | RFC | = Regional Flood Control |
| P | = Park | RTC | = Regional Transportation Commission |
| Q | = Quasi Public Use | SS | = Electrical Sub-Station |
| S | = School | UNLV | = University of Nevada |
| | | WD | = Water District |

RON NEWELL
CHAIR, PLANNING COMMISSION

BARBARA GINQULIAS
EXECUTIVE SECRETARY

RORY REID
CHAIR, BOARD OF COUNTY COMMISSIONERS

SHIRLEY B. PARRAGUIRRE
COUNTY CLERK




0 1800 3600 5400 7200
SCALE IN FEET

**Plot created on: October 17, 2008**

*This information is for display purposes only.*
*No liability is assumed as to the accuracy of the data delineated hereon.*

*For detailed Land Use information, see Adopted Land Use Plans.*

*NOTE: This map reflects parcels as they were configured at the time of Adoption. Please see the LAUGHLIN Planned Land Use with Current Parcel Configuration map for current parcel configuration.*

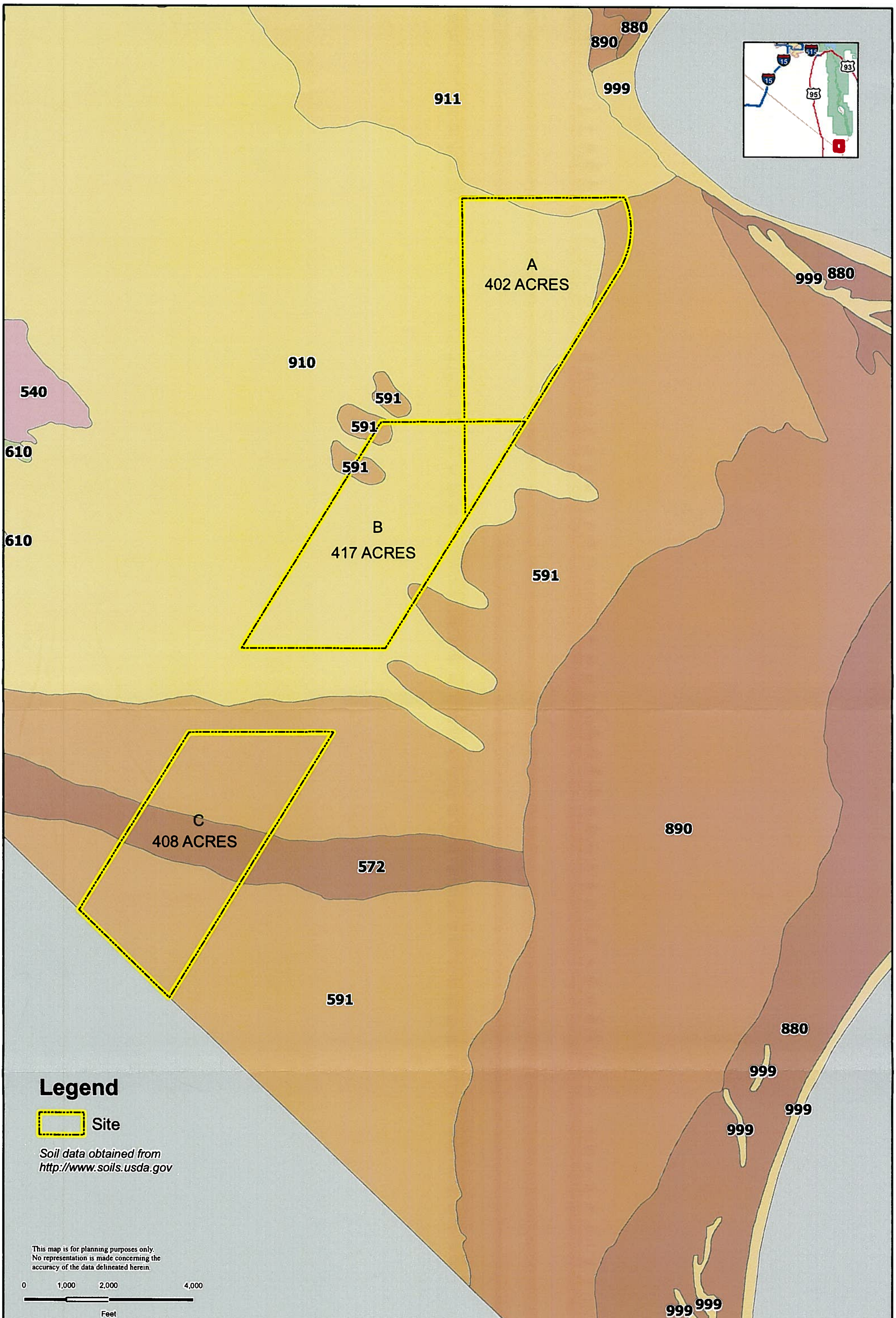
CLARK COUNTY NEVADA

Comprehensive Planning
COMMUNITY PLANNING

\\coglis1\gisdata\proomp\projects\cf\laughlin\plotlaughlinplu-a.aml

# APPENDIX C

SOILS




vtn
www.vtnnv.com

**SOIL EXHIBIT**

**LAUGHLIN 9000 ACRES**

N
W E
S

| | |
|---|---|
| W.O.#: | 7180 |
| DATE | 06/30/09 |
| BY: | TvH |
| SCALE: | 1 inch = 2,000 feet |
| SHEET: | 1 |

# Engineering Properties

Clark County Area, Nevada

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash.

| Map symbol and soil name | Depth | USDA texture | Classification | | Fragments | | Percent passing sieve number-- | | | | Liquid limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | >10 Inches | 3-10 Inches | 4 | 10 | 40 | 200 | | |
| | *In* | | | | *Pct* | *Pct* | | | | | *Pct* | |
| 572: | | | | | | | | | | | | |
| Carrizo | 0-7 | Very cobbly coarse sand | GP-GM, SP-SM | A-1 | 0-15 | 25-45 | 45-70 | 35-60 | 20-40 | 5-10 | 0-21 | NP-4 |
| | 7-60 | Stratified extremely gravelly coarse sand to very gravelly sand | GP, GP-GM, GW | A-1 | 0-15 | 0-15 | 25-55 | 15-45 | 5-25 | 0-7 | 0-20 | NP-4 |
| 591: | | | | | | | | | | | | |
| Riverbend | 0-3 | Extremely gravelly coarse sandy loam | GM, GP-GM | A-1 | 0-5 | 0-7 | 25-40 | 15-25 | 10-25 | 5-15 | 15-20 | NP-5 |
| | 3-10 | Very gravelly coarse sand, Very gravelly loamy coarse sand | GC-GM, GM, GP-GC, GP-GM | A-1 | 0-5 | 0-5 | 40-60 | 30-50 | 20-30 | 5-15 | 0-23 | NP-6 |
| | 10-60 | Stratified extremely gravelly coarse sand to very gravelly loamy coarse sand | GC-GM, GM, GP-GC, GP-GM, GW-GM | A-1 | 0-10 | 0-10 | 25-60 | 15-50 | 10-30 | 5-15 | 0-23 | NP-6 |
| Carrwash | 0-3 | Very gravelly coarse sandy loam | SM, SP-SM | A-1 | 0 | 0-8 | 60-80 | 30-50 | 15-35 | 10-15 | 0-20 | NP-4 |
| | 3-8 | Very gravelly coarse sandy loam | SM, SP-SM | A-1 | 0 | 0-5 | 60-80 | 30-50 | 15-35 | 10-15 | 0-20 | NP-4 |
| | 8-60 | Stratified extremely gravelly coarse sand to very gravelly loamy coarse sand | SP-SM | A-1 | 0 | 0-5 | 60-80 | 30-50 | 15-30 | 5-10 | 0-18 | NP-2 |

# Engineering Properties

Clark County Area, Nevada

| Map symbol and soil name | Depth | USDA texture | Classification | | Fragments | | Percent passing sieve number– | | | | Liquid limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | >10 Inches | 3-10 Inches | 4 | 10 | 40 | 200 | | |
| | *In* | | | | *Pct* | *Pct* | | | | | *Pct* | |
| 910: | | | | | | | | | | | | |
| Carrwash | 0-3 | Very gravelly coarse sandy loam | SM, SP-SM | A-1 | 0 | 0-8 | 60-80 | 30-50 | 15-35 | 10-15 | 0-20 | NP-4 |
| | 3-8 | Very gravelly coarse sandy loam | SM, SP-SM | A-1 | 0 | 0-5 | 60-80 | 30-50 | 15-35 | 10-15 | 0-20 | NP-4 |
| | 8-60 | Stratified extremely gravelly coarse sand to very gravelly loamy coarse sand | SP-SM | A-1 | 0 | 0-5 | 60-80 | 30-50 | 15-30 | 5-10 | 0-18 | NP-2 |
| Riverbend, rarely flooded | 0-3 | Extremely gravelly coarse sandy loam | GM, GP-GM | A-1 | 0-5 | 0-7 | 25-40 | 15-25 | 10-25 | 5-15 | 15-20 | NP-5 |
| | 3-10 | Very gravelly coarse sand, Very gravelly loamy coarse sand | GC-GM, GM, GP-GC, GP-GM | A-1 | 0-5 | 0-5 | 40-60 | 30-50 | 20-30 | 5-15 | 0-23 | NP-6 |
| | 10-60 | Stratified extremely gravelly coarse sand to very gravelly loamy coarse sand | GC-GM, GM, GP-GC, GP-GM, GW-GM | A-1 | 0-10 | 0-10 | 25-60 | 15-50 | 10-30 | 5-15 | 0-23 | NP-6 |
| 911: | | | | | | | | | | | | |
| Carrwash | 0-3 | Very gravelly coarse sandy loam | SM, SP-SM | A-1 | 0 | 0-8 | 60-80 | 30-50 | 15-35 | 10-15 | 0-20 | NP-4 |
| | 3-8 | Very gravelly coarse sandy loam | SM, SP-SM | A-1 | 0 | 0-5 | 60-80 | 30-50 | 15-35 | 10-15 | 0-20 | NP-4 |
| | 8-60 | Stratified extremely gravelly coarse sand to very gravelly loamy coarse sand | SP-SM | A-1 | 0 | 0-5 | 60-80 | 30-50 | 15-30 | 5-10 | 0-18 | NP-2 |

# Engineering Properties

Clark County Area, Nevada

| Map symbol and soil name | Depth | USDA texture | Classification | | Fragments | | Percent passing sieve number-- | | | | Liquid limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | >10 Inches | 3-10 Inches | 4 | 10 | 40 | 200 | | |
| | *In* | | | | *Pct* | *Pct* | | | | | *Pct* | |
| 911: | | | | | | | | | | | | |
| Carrwash, steep | 0-3 | Very gravelly coarse sandy loam | SM, SP-SM | A-1 | 0 | 0-8 | 60-80 | 30-50 | 15-35 | 10-15 | 0-20 | NP-4 |
| | 3-8 | Very gravelly coarse sandy loam | SM, SP-SM | A-1 | 0 | 0-5 | 60-80 | 30-50 | 15-35 | 10-15 | 0-20 | NP-4 |
| | 8-60 | Stratified extremely gravelly coarse sand to very gravelly loamy coarse sand | SP-SM | A-1 | 0 | 0-5 | 60-80 | 30-50 | 15-30 | 5-10 | 0-18 | NP-2 |

# APPENDIX D

TRAFFIC

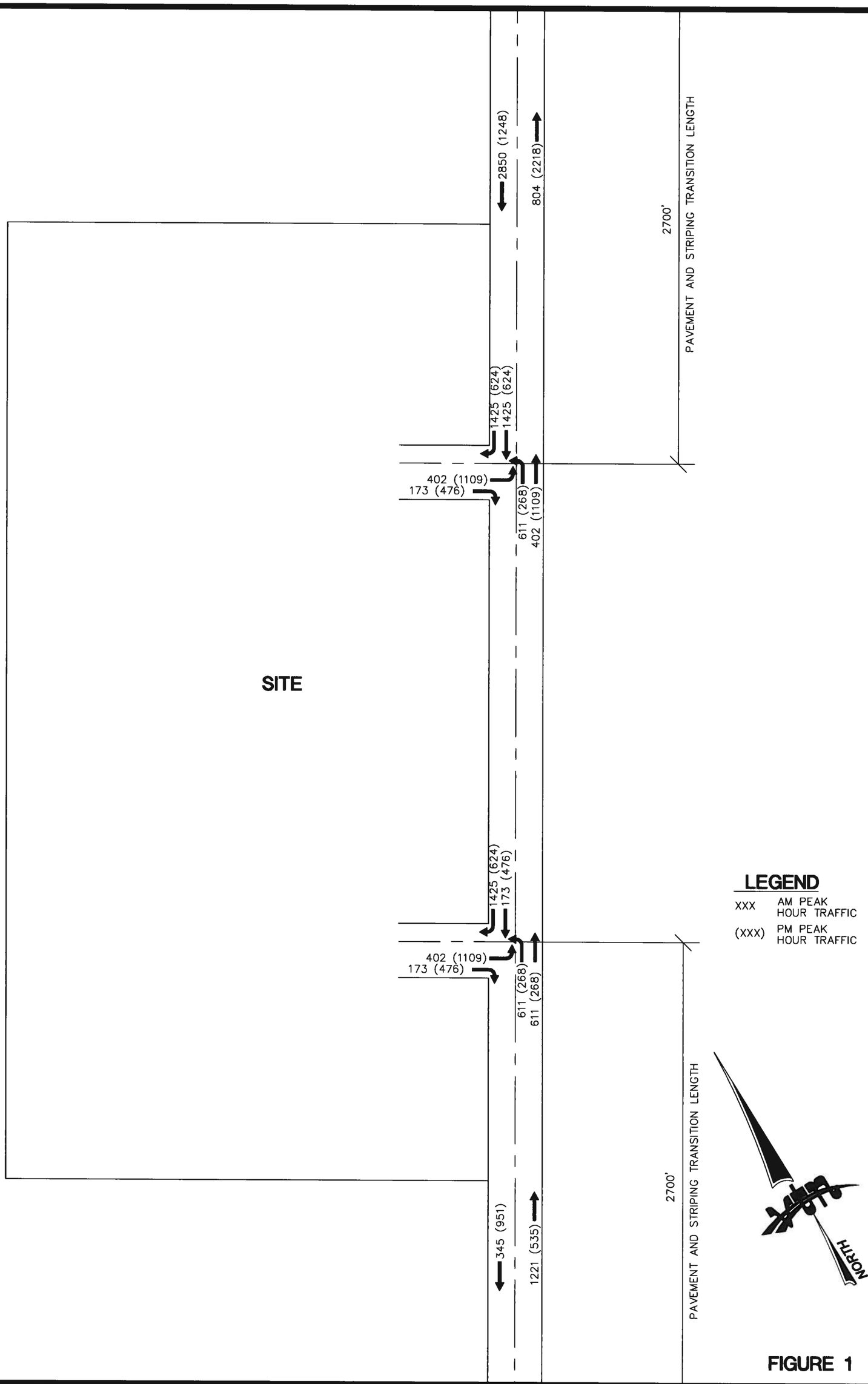



FIGURE 1

vtn nevada

**ESTIMATED PEAK HOUR TYPICAL SITE GENERATED TRAFFIC VOLUMES**

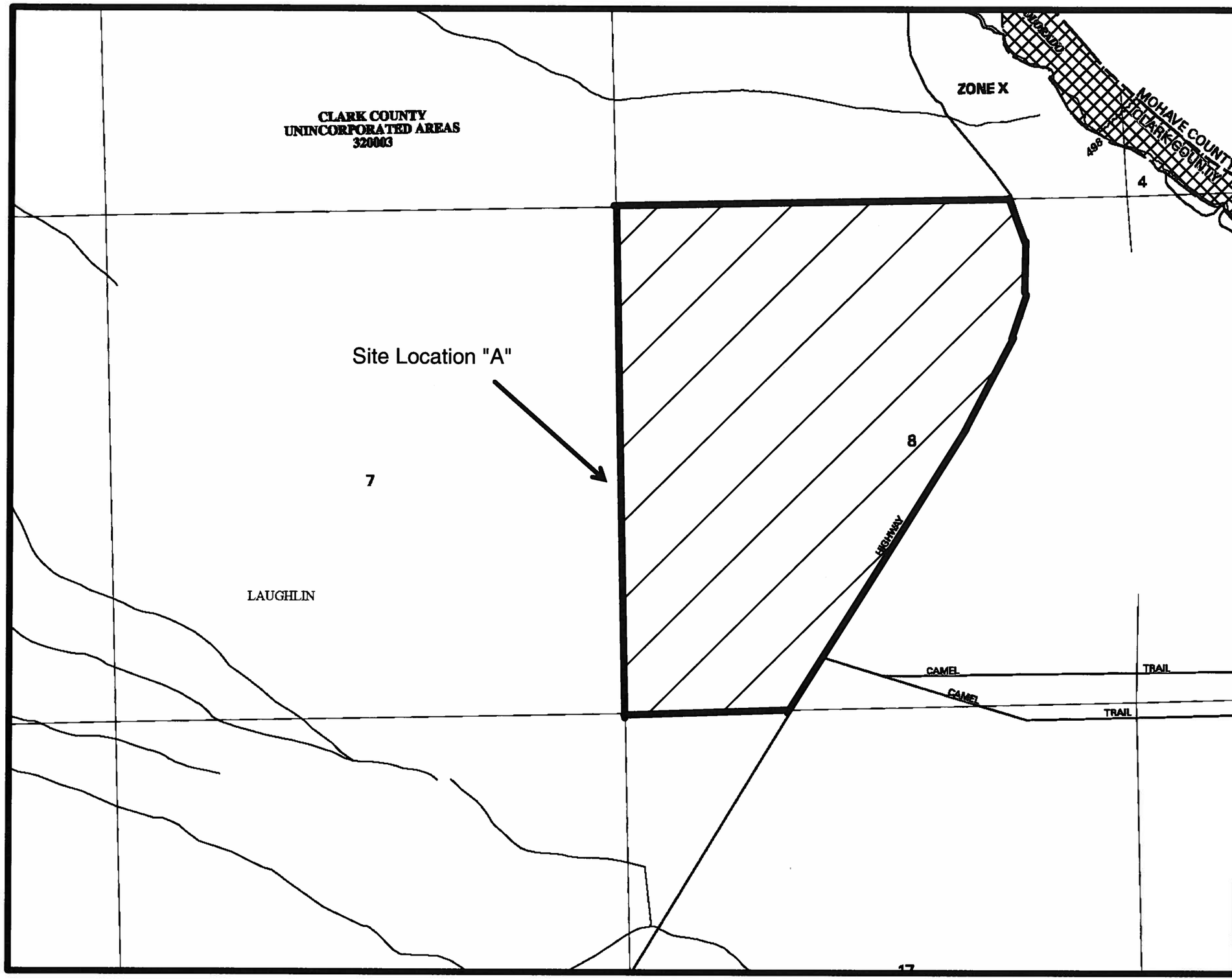
| | |
|---|---|
| W.O.#: | 7180 |
| DATE: | 7-01-09 |
| BY: | R.M.S. |
| SCALE: | NA |
| SHEET | 1 OF |

# APPENDIX E

DRAINAGE AND HYDRAULICS

DRAINAGE AND HYDRAULICS

FIGURES




MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

0 0 300 600

NFIP

PANEL 4060 E

# FIRM

## FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

**PANEL 4060 OF 4090**

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|---|---|---|---|
| CLARK COUNTY, UNINCORPORATED AREAS | 320003 | 4060 | E |

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**
**32003C4060 E**

**MAP REVISED:**
**SEPTEMBER 27, 2002**

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT Version 1.0. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. Futher information about National Flood Insurance Program flood hazard maps is available at www.fema.gov/mit/tsd.

Print Date: 8/10/2009 (printed at scale and type 8)

FIGURE A

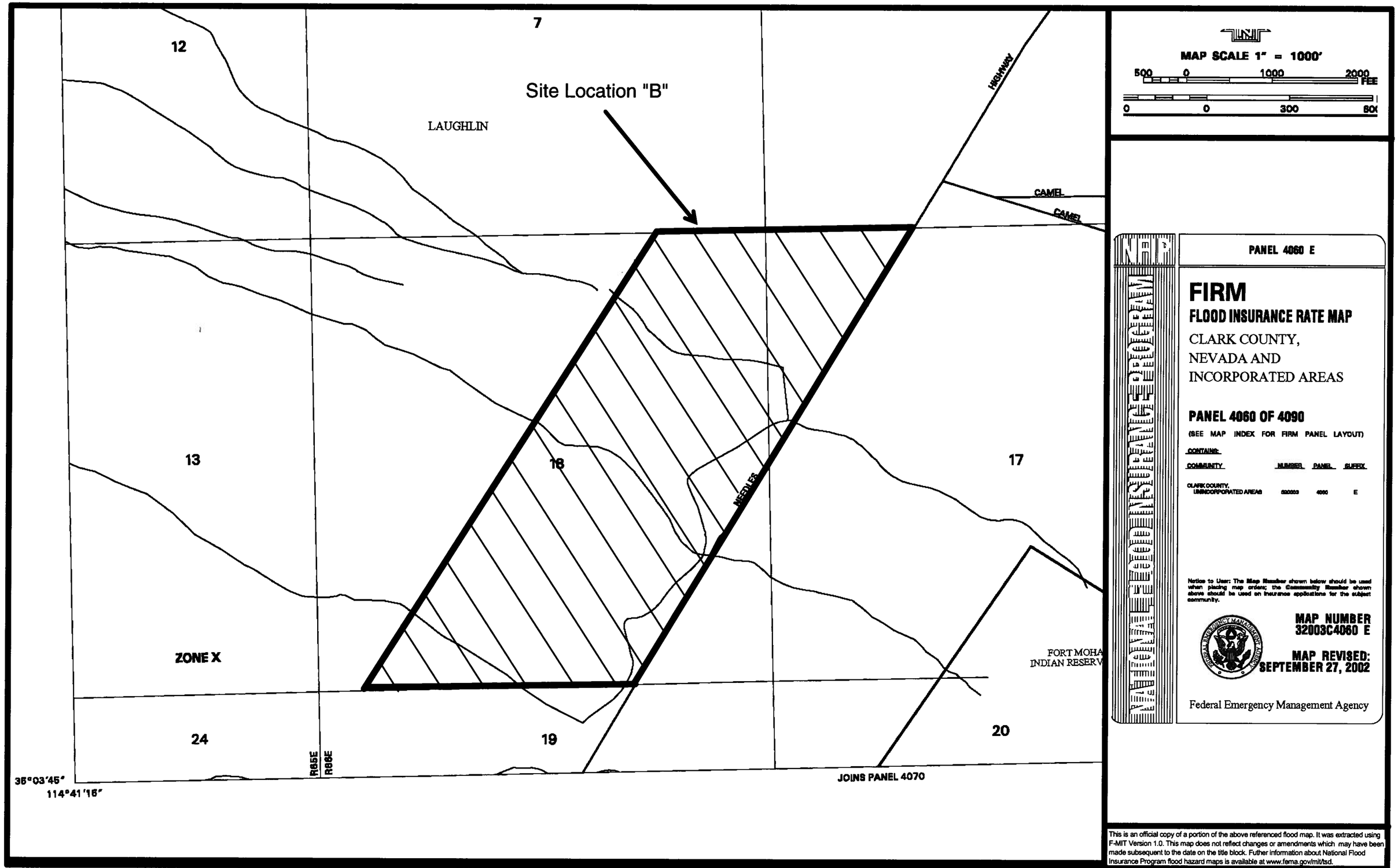

7
12
Site Location "B"
LAUGHLIN
HIGHWAY
CAMEL
CAMEL
13
18
17
NEEDLES
ZONE X
FORT MOHA
INDIAN RESERV
24
19
20
R65E
R66E
35°03'45"
114°41'15"
JOINS PANEL 4070
MAP SCALE 1" = 1000'
500 0 1000 2000
FEE
0 0 300
PANEL 4060 E
FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS
PANEL 4060 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS 320003 4060 E
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
32003C4060 E
MAP REVISED:
SEPTEMBER 27, 2002
Federal Emergency Management Agency
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PRELIMINARY FLOOD INSURANCE RATE MAP
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT Version 1.0. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. Futher information about National Flood Insurance Program flood hazard maps is available at www.fema.gov/mit/tsd.
Print Date: 8/10/2009 (printed at scale and type B)

FIGURE B

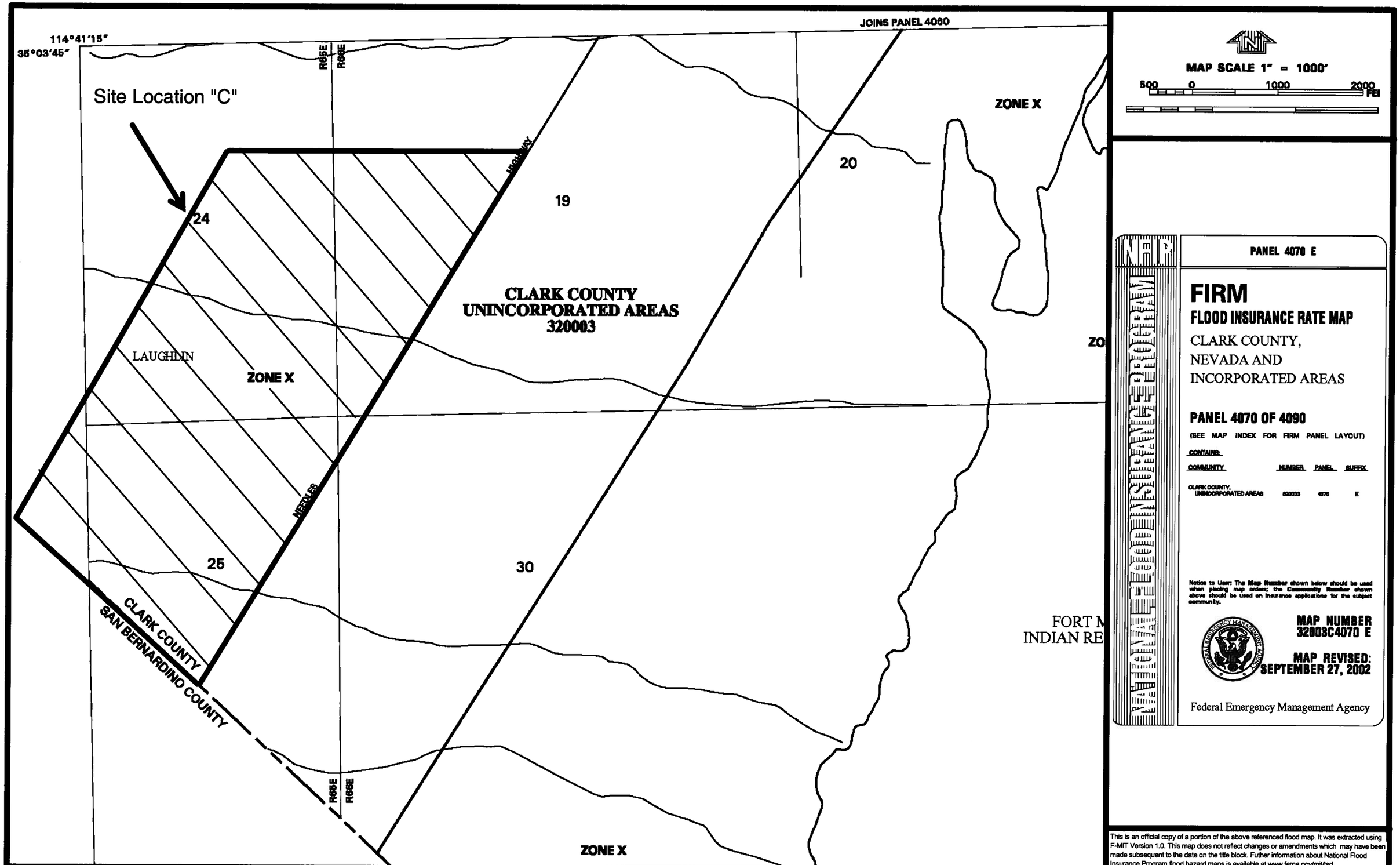
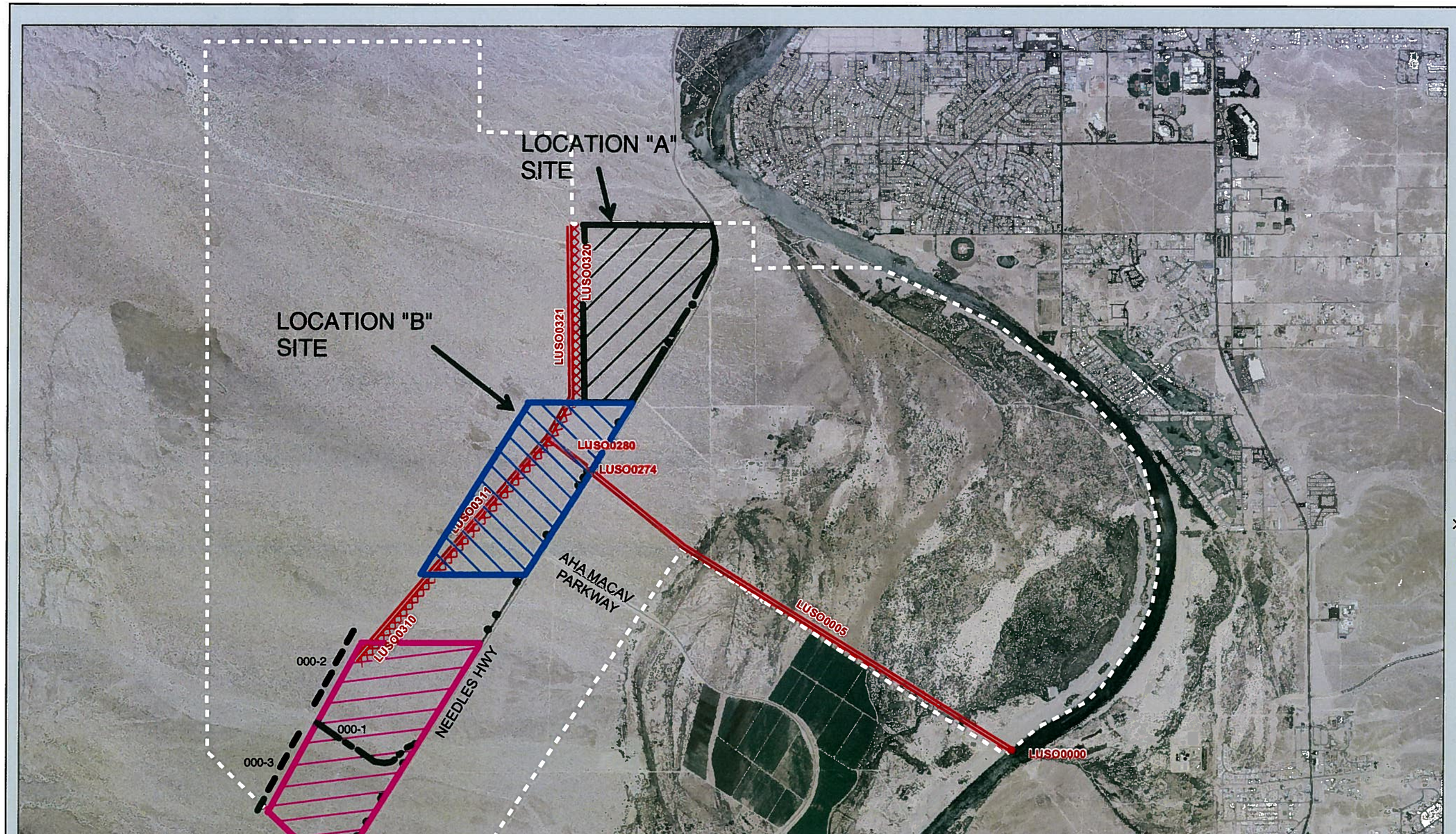

114°41'15"
35°03'45"
JOINS PANEL 4060
R65E
R66E
Site Location "C"
ZONE X
24
19
20
CLARK COUNTY
UNINCORPORATED AREAS
320003
LAUGHLIN
ZONE X
NEDLES
25
30
CLARK COUNTY
SAN BERNARDINO COUNTY
FORT M
INDIAN RE
ZONE X
MAP SCALE 1" = 1000'
500 0 1000 2000 FEI
PANEL 4070 E
FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS
PANEL 4070 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS 320003 4070 E
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
32003C4070 E
MAP REVISED:
SEPTEMBER 27, 2002
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT Version 1.0. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. Futher information about National Flood Insurance Program flood hazard maps is available at www.fema.gov/mit/tsd.
Print Date: 6/10/2009 (printed at scale and type B)

FIGURE C




| ID / River Mile | Status | Facility Description | Length (ft.) | Flow (cfs) | HEC-HMS Node | HEC-HMS Model | Tributary Area (sq.mi.) | Channel Slope (%) |
|---|---|---|---|---|---|---|---|---|
| | | **SOUTHLAND** | | | | | | |
| LUSO0000 | P1 | Energy Dissipator | 50 | 6916 | CP4 | STLND_5 | 16.520 | |
| LUSO0005 | P1 | Conc Chnl 70'W 5'D 2:1 SS | 14465 | 6916 | CP4 | STLND_5 | 16.520 | 3.50 |
| LUSO0274 | P1 | 5: 12' X 6' RCB @ Needles Hwy | 300 | 6916 | CP4 | STLND_5 | 16.520 | 3.00 |
| LUSO0280 | P1 | Conc Chnl 70'W 6'D 2:1 SS | 1400 | 6916 | CP4 | STLND_5 | 16.520 | 1.00 |
| LUSO0310 | P1 | Gabion Dike 10' | 8530 | 5211 | CP3 | STLND_4 | 10.033 | 1.80 |
| LUSO0311 | P1 | Gabion Chnl 150'W 4.5'D 2:1 SS | 8530 | 5211 | CP3 | STLND_4 | 10.033 | 1.80 |
| LUSO0320 | P1 | Gabion Dike 10' | 6300 | 4427 | CP2 | STLND_3 | 6.487 | 2.00 |
| LUSO0321 | P1 | Gabion Chnl 150'W 4'D 2:1 SS | 6300 | 4427 | CP2 | STLND_3 | 6.487 | 2.00 |

REGIONAL FLOOD CONTROL DISTRICT

2009
OUTLYING AREA
FLOOD CONTROL
MASTER PLAN UPDATE

**FIGURE E-2B**
**SOUTHLAND**

**RECOMMENDED FLOOD CONTROL FACILITIES**

**LEGEND**

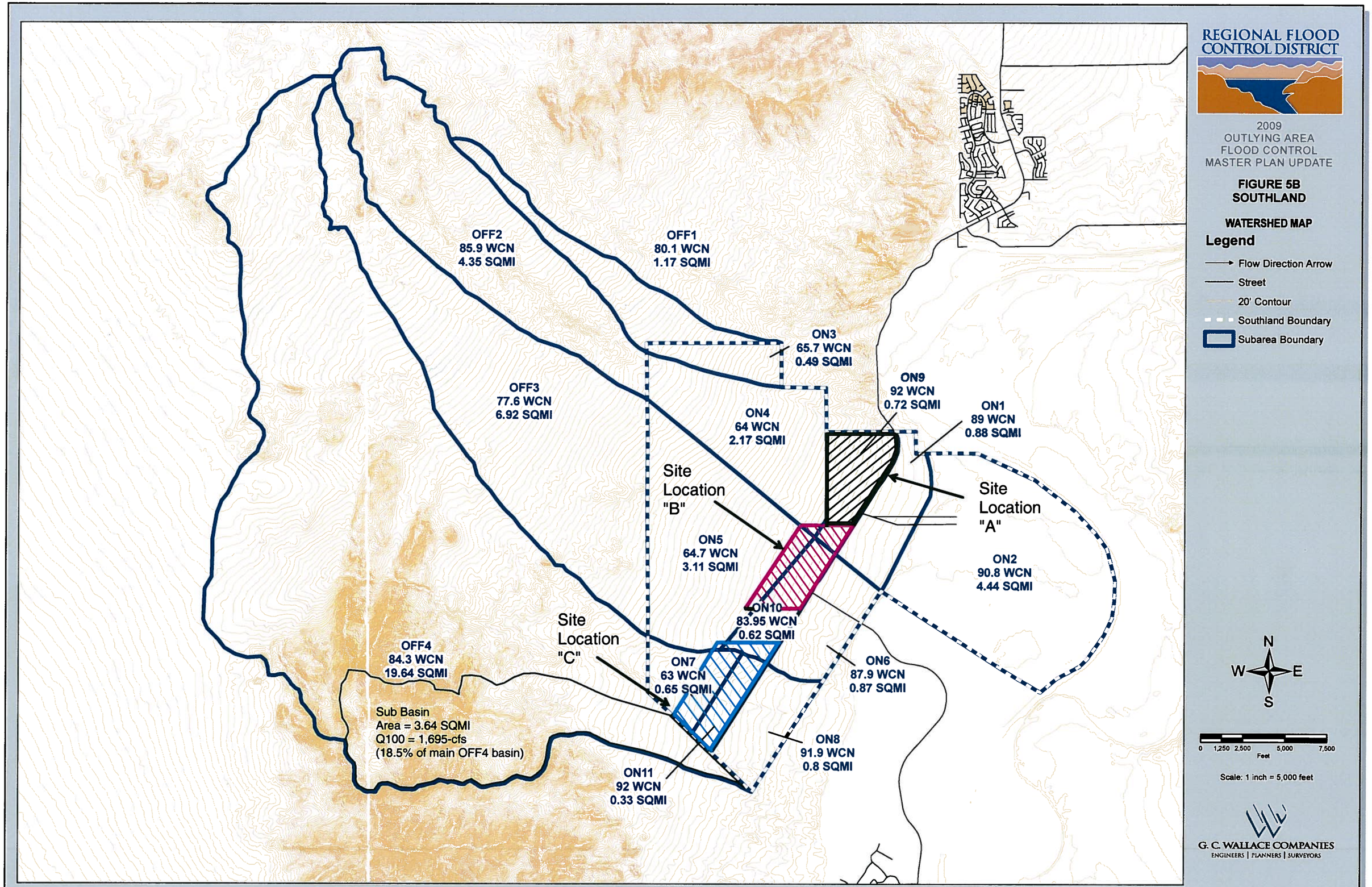
- Existing Facilities
- Category A Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin
- Culvert or Bridge Crossing
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator
- Southland Boundary

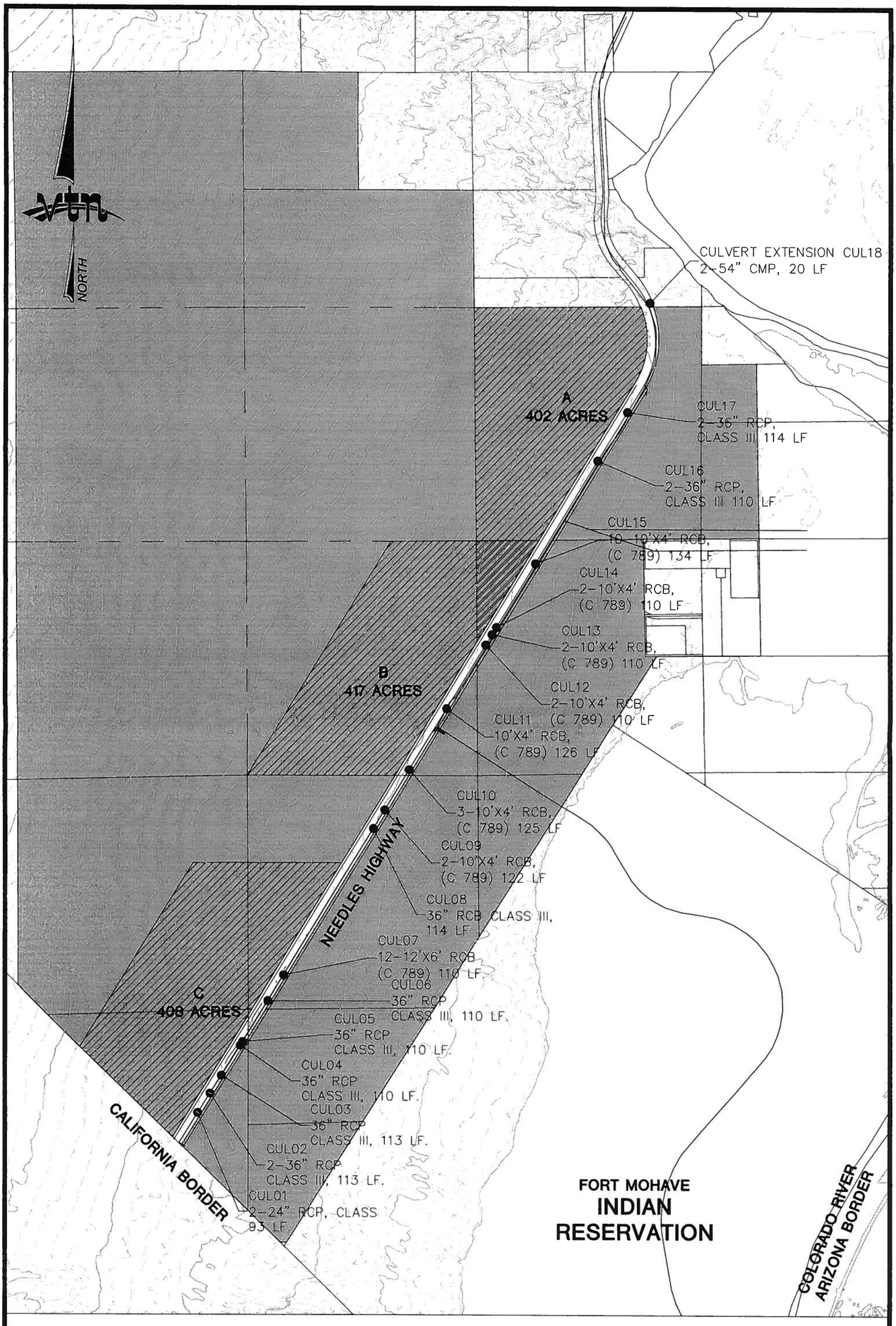
N
W E
S

0 750 1,500 3,000 4,500
Feet

Scale: 1 inch = 3,000 feet

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS


REGIONAL FLOOD CONTROL DISTRICT
2009
OUTLYING AREA
FLOOD CONTROL
MASTER PLAN UPDATE
FIGURE 5B
SOUTHLAND
WATERSHED MAP
Legend
Flow Direction Arrow
Street
20' Contour
Southland Boundary
Subarea Boundary
OFF2
85.9 WCN
4.35 SQMI
OFF1
80.1 WCN
1.17 SQMI
ON3
65.7 WCN
0.49 SQMI
OFF3
77.6 WCN
6.92 SQMI
ON9
92 WCN
0.72 SQMI
ON1
89 WCN
0.88 SQMI
ON4
64 WCN
2.17 SQMI
Site
Location
"B"
Site
Location
"A"
ON5
64.7 WCN
3.11 SQMI
ON2
90.8 WCN
4.44 SQMI
ON10
83.95 WCN
0.62 SQMI
Site
Location
"C"
OFF4
84.3 WCN
19.64 SQMI
ON7
63 WCN
0.65 SQMI
ON6
87.9 WCN
0.87 SQMI
Sub Basin
Area = 3.64 SQMI
Q100 = 1,695-cfs
(18.5% of main OFF4 basin)
ON8
91.9 WCN
0.8 SQMI
ON11
92 WCN
0.33 SQMI
N
W
E
S
0 1,250 2,500 5,000 7,500
Feet
Scale: 1 inch = 5,000 feet
G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS



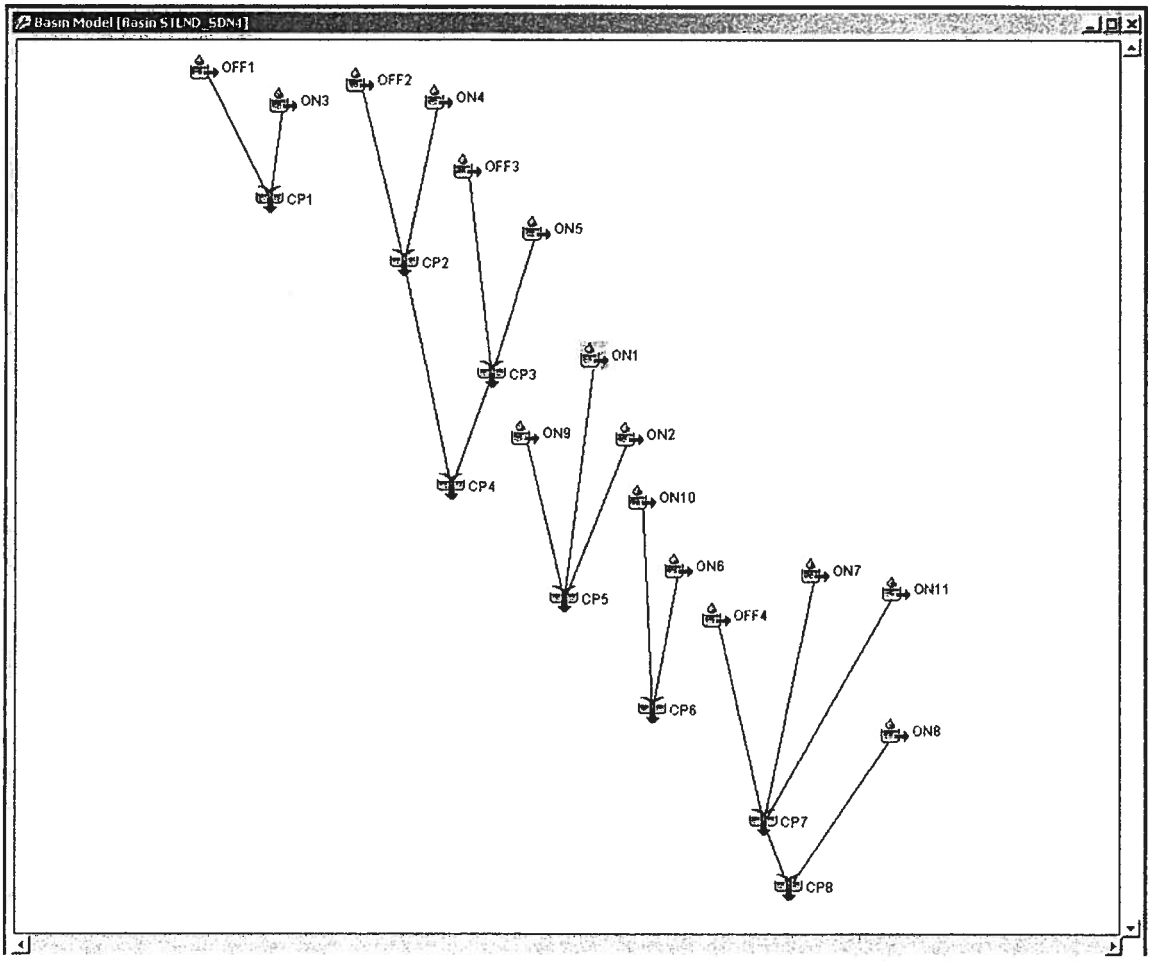

vtn nevada

**EXISTING CULVERT**
**EXHIBIT**
**NEEDLES HIGHWAY**

| | |
|---|---|
| W.O.#: | 7180 |
| DATE: | 6-12-09 |
| BY: | R.M.S. |
| SCALE: | 1"=200' |
| SHEET | 1 OF 1 |

DRAINAGE AND HYDRAULICS

REFERENCED HYDROLOGIC ANALYSIS
FROM
CCRFCD 2009 OUTLYING AREA FLOOD CONTROL
MASTER PLAN UPDATE


Basin Model [Basin STUND_SDN4]
OFF1
ON3
CP1
OFF2
ON4
OFF3
ON5
CP2
CP3
ON1
ON9
ON2
CP4
ON10
ON6
ON7
ON11
CP5
OFF4
CP6
ON8
CP7
CP8

Project: STLND_SDN5 Simulation Run: 0.81 DARF 16-20 SQ MI

Start of Run: 01Jan3000, 01:00 Basin Model: Basin STLND_SDN5
End of Run: 02Jan3000, 01:55 Meteorologic Model: Met STLND_SDN5
Compute Time: 15Dec2008, 14:28:12 Control Specifications: Control STLND_SDN5

Volume Units: AC-FT

| Hydrologic Element | Drainage Area (MI2) | Peak Discharge (CFS) | Time of Peak | Volume (AC-FT) |
|---|---|---|---|---|
| CP1 | 1.659 | 845 | 01Jan3000, 05:00 | 137 |
| CP2 | 6.487 | 2977 | 01Jan3000, 05:25 | 619 |
| CP3 | 10.033 | 3964 | 01Jan3000, 05:15 | 743 |
| CP4 | 16.520 | 6916 | 01Jan3000, 05:20 | 1361 |
| CP5 | 6.042 | 3777 | 01Jan3000, 04:40 | 873 |
| CP6 | 1.489 | 2123 | 01Jan3000, 04:40 | 207 |
| CP7 | 20.622 | 9547 | 01Jan3000, 05:55 | 2321 |
| CP8 | 21.420 | 10098 | 01Jan3000, 05:55 | 2441 |
| OFF1 | 1.172 | 705 | 01Jan3000, 05:05 | 113 |
| OFF2 | 4.321 | 2474 | 01Jan3000, 05:25 | 525 |
| OFF3 | 6.925 | 3154 | 01Jan3000, 05:20 | 602 |
| OFF4 | 19.643 | 9146 | 01Jan3000, 05:50 | 2244 |
| ON1 | 0.883 | 1258 | 01Jan3000, 04:40 | 120 |
| ON10 | 0.617 | 913 | 01Jan3000, 04:40 | 93 |
| ON11 | 0.333 | 619 | 01Jan3000, 04:35 | 50 |
| ON2 | 4.440 | 3030 | 01Jan3000, 05:20 | 644 |
| ON3 | 0.487 | 220 | 01Jan3000, 04:45 | 23 |
| ON4 | 2.166 | 515 | 01Jan3000, 05:20 | 94 |
| ON5 | 3.108 | 872 | 01Jan3000, 05:10 | 141 |
| ON6 | 0.872 | 1210 | 01Jan3000, 04:40 | 114 |
| ON7 | 0.646 | 253 | 01Jan3000, 04:45 | 26 |
| ON8 | 0.798 | 1211 | 01Jan3000, 04:40 | 120 |
| ON9 | 0.719 | 1093 | 01Jan3000, 04:40 | 109 |

Project: STLND_SDN3 Simulation Run: 0.89 DARF 6-8 SQ MI

Start of Run: 01Jan3000, 01:00 Basin Model: Basin STLND_SDN3
End of Run: 02Jan3000, 01:55 Meteorologic Model: Met STLND_SDN3
Compute Time: 15Dec2008, 14:14:05 Control Specifications: Control STLND_SDN3

Volume Units: AC-FT

| Hydrologic Element | Drainage Area (MI2) | Peak Discharge (CFS) | Time of Peak | Volume (AC-FT) |
|---|---|---|---|---|
| CP1 | 1.659 | 1325 | 01Jan3000, 05:05 | 161 |
| CP2 | 6.487 | 4427 | 01Jan3000, 05:25 | 718 |
| CP3 | 10.033 | 6114 | 01Jan3000, 05:20 | 883 |
| CP4 | 16.520 | 10461 | 01Jan3000, 05:20 | 1601 |
| CP5 | 6.042 | 5317 | 01Jan3000, 04:40 | 986 |
| CP6 | 1.489 | 3511 | 01Jan3000, 04:40 | 235 |
| CP7 | 20.622 | 13250 | 01Jan3000, 05:50 | 2672 |
| CP8 | 21.420 | 13584 | 01Jan3000, 05:50 | 2807 |
| OFF1 | 1.172 | 1102 | 01Jan3000, 05:10 | 132 |
| OFF2 | 4.321 | 3614 | 01Jan3000, 05:30 | 601 |
| OFF3 | 6.925 | 4776 | 01Jan3000, 05:25 | 708 |
| OFF4 | 19.643 | 12972 | 01Jan3000, 05:50 | 2582 |
| ON1 | 0.883 | 2104 | 01Jan3000, 04:40 | 136 |
| ON10 | 0.617 | 1486 | 01Jan3000, 04:40 | 105 |
| ON11 | 0.333 | 993 | 01Jan3000, 04:35 | 57 |
| ON2 | 4.440 | 4415 | 01Jan3000, 05:25 | 727 |
| ON3 | 0.487 | 373 | 01Jan3000, 04:50 | 29 |
| ON4 | 2.166 | 848 | 01Jan3000, 05:20 | 117 |
| ON5 | 3.108 | 1469 | 01Jan3000, 05:10 | 175 |
| ON6 | 0.872 | 2024 | 01Jan3000, 04:40 | 130 |
| ON7 | 0.646 | 446 | 01Jan3000, 04:45 | 33 |
| ON8 | 0.798 | 2020 | 01Jan3000, 04:40 | 135 |
| ON9 | 0.719 | 1824 | 01Jan3000, 04:40 | 122 |

Project: STLND_SDN4 Simulation Run: 0.87 DARF 8-10 SQ MI

Start of Run: 01Jan3000, 01:00
End of Run: 02Jan3000, 01:55
Compute Time: 15Dec2008, 14:22:41

Basin Model: Basin STLND_SDN4
Meteorologic Model: Met STLND_SDN4
Control Specifications: Control STLND_SDN4

Volume Units: AC-FT

| Hydrologic Element | Drainage Area (MI2) | Peak Discharge (CFS) | Time of Peak | Volume (AC-FT) |
|---|---|---|---|---|
| CP1 | 1.659 | 1119 | 01Jan3000, 05:00 | 155 |
| CP2 | 6.487 | 3814 | 01Jan3000, 05:25 | 693 |
| CP3 | 10.033 | 5211 | 01Jan3000, 05:20 | 847 |
| CP4 | 16.520 | 8981 | 01Jan3000, 05:20 | 1540 |
| CP5 | 6.042 | 4655 | 01Jan3000, 04:40 | 958 |
| CP6 | 1.489 | 2869 | 01Jan3000, 04:40 | 228 |
| CP7 | 20.622 | 11726 | 01Jan3000, 05:50 | 2583 |
| CP8 | 21.420 | 12175 | 01Jan3000, 05:55 | 2715 |
| OFF1 | 1.172 | 929 | 01Jan3000, 05:05 | 127 |
| OFF2 | 4.321 | 3116 | 01Jan3000, 05:30 | 582 |
| OFF3 | 6.925 | 4092 | 01Jan3000, 05:20 | 681 |
| OFF4 | 19.643 | 11375 | 01Jan3000, 05:50 | 2497 |
| ON1 | 0.883 | 1712 | 01Jan3000, 04:40 | 132 |
| ON10 | 0.617 | 1220 | 01Jan3000, 04:40 | 102 |
| ON11 | 0.333 | 820 | 01Jan3000, 04:35 | 55 |
| ON2 | 4.440 | 3797 | 01Jan3000, 05:25 | 706 |
| ON3 | 0.487 | 309 | 01Jan3000, 04:45 | 28 |
| ON4 | 2.166 | 714 | 01Jan3000, 05:20 | 111 |
| ON5 | 3.108 | 1225 | 01Jan3000, 05:10 | 166 |
| ON6 | 0.872 | 1649 | 01Jan3000, 04:40 | 126 |
| ON7 | 0.646 | 367 | 01Jan3000, 04:45 | 31 |
| ON8 | 0.798 | 1642 | 01Jan3000, 04:40 | 132 |
| ON9 | 0.719 | 1482 | 01Jan3000, 04:40 | 119 |

DRAINAGE AND HYDRAULICS

CULVERT CAPACITY CALCULATIONS
BASED ON HEADWATER CRITERIA

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 01

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 24 | in | INLET CTRL HWo: | | |
| Number of pipes | 2 | | beveled edge | 3.78 | ft |
| Slope | 0.005 | ft/ft | sq edge headwall | 4.11 | ft |
| Manning's n | 0.013 | | thin edged proj | 5.00 | ft |
| Culvert length | 93 | ft | OUTLET CTRL HWo | 4.24 | ft |
| Discharge | 52 | cfs | velocity | 8.3 | fps |
| | | | critical depth | 1.81 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 02

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 2 | | beveled edge | 4.65 | ft |
| Slope | 0.010 | ft/ft | sq edge headwall | 5.00 | ft |
| Manning's n | 0.013 | | thin edged proj | 5.90 | ft |
| Culvert length | 113 | ft | OUTLET CTRL HWo | 4.30 | ft |
| Discharge | 122 | cfs | velocity | 8.6 | fps |
| | | | critical depth | 2.48 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 03

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 1 | | beveled edge | 4.64 | ft |
| Slope | 0.014 | ft/ft | sq edge headwall | 5.00 | ft |
| Manning's n | 0.013 | | thin edged proj | 5.89 | ft |
| Culvert length | 113 | ft | OUTLET CTRL HWo | 3.81 | ft |
| Discharge | 61 | cfs | velocity | 8.6 | fps |
| | | | critical depth | 2.48 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 04

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 1 | | beveled edge | 4.64 | ft |
| Slope | 0.005 | ft/ft | sq edge headwall | 5.00 | ft |
| Manning's n | 0.013 | | thin edged proj | 5.89 | ft |
| Culvert length | 110 | ft | OUTLET CTRL HWo | 4.81 | ft |
| Discharge | 61 | cfs | velocity | 8.6 | fps |
| | | | critical depth | 2.48 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 05

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | | |
| Number of pipes | 1 | | beveled edge | 4.64 | ft | |
| Slope | 0.005 | ft/ft | sq edge headwall | 5.00 | ft | |
| Manning's n | 0.013 | | thin edged proj | 5.89 | ft | |
| Culvert length | 110 | ft | OUTLET CTRL HWo | 4.81 | ft | |
| Discharge | 61 | cfs | velocity | 8.6 | fps | |
| | | | critical depth | 2.48 | ft | |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 06

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 1 | | beveled edge | 4.64 | ft |
| Slope | 0.023 | ft/ft | sq edge headwall | 5.00 | ft |
| Manning's n | 0.013 | | thin edged proj | 5.89 | ft |
| Culvert length | 110 | ft | OUTLET CTRL HWo | 2.84 | ft |
| Discharge | 61 | cfs | velocity | 8.6 | fps |
| | | | critical depth | 2.48 | ft |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 07

| | | | | | | |
|---|---|---|---|---|---|---|
| Box height | 6.0 | ft | INLET CTRL HWo: | | | |
| Box width | 12.0 | ft | tapered throat | 7.48 | ft | |
| Number of boxes | 12 | | 45 degree bevels | 8.29 | ft | |
| Slope | 0.00500 | ft/ft | sq edge headwall | 9.00 | ft | |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 7.35 | ft | |
| Culvert length | 110 | ft | Velocity | 10.5 | fps | |
| Discharge | 9055 | cfs | Critical depth | 4.97 | ft | |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 10

| | | | | | |
|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | |
| Box width | 10.0 | ft | tapered throat | 4.99 | ft |
| Number of boxes | 3 | | 45 degree bevels | 5.53 | ft |
| Slope | 0.00500 | ft/ft | sq edge headwall | 6.00 | ft |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 4.83 | ft |
| Culvert length | 125 | ft | Velocity | 8.6 | fps |
| Discharge | 1028 | cfs | Critical depth | 3.32 | ft |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 11

| | | | | | | |
|---|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | | |
| Box width | 10.0 | ft | tapered throat | 4.99 | ft | |
| Number of boxes | 1 | | 45 degree bevels | 5.53 | ft | |
| Slope | 0.00500 | ft/ft | sq edge headwall | 6.00 | ft | |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 4.83 | ft | |
| Culvert length | 126 | ft | Velocity | 8.6 | fps | |
| Discharge | 343 | cfs | Critical depth | 3.32 | ft | |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 12

| | | | | | |
|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | |
| Box width | 10.0 | ft | tapered throat | 4.99 | ft |
| Number of boxes | 2 | | 45 degree bevels | 5.53 | ft |
| Slope | 0.00500 | ft/ft | sq edge headwall | 6.00 | ft |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 4.86 | ft |
| Culvert length | 110 | ft | Velocity | 8.6 | fps |
| Discharge | 685 | cfs | Critical depth | 3.32 | ft |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 13

| | | | | | |
|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | |
| Box width | 10.0 | ft | tapered throat | 4.99 | ft |
| Number of boxes | 2 | | 45 degree bevels | 5.53 | ft |
| Slope | 0.00500 | ft/ft | sq edge headwall | 6.00 | ft |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 4.86 | ft |
| Culvert length | 110 | ft | Velocity | 8.6 | fps |
| Discharge | 685 | cfs | Critical depth | 3.32 | ft |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 14

| | | | | | | |
|---|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | | |
| Box width | 10.0 | ft | tapered throat | 4.99 | ft | |
| Number of boxes | 2 | | 45 degree bevels | 5.53 | ft | |
| Slope | 0.00500 | ft/ft | sq edge headwall | 6.00 | ft | |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 4.86 | ft | |
| Culvert length | 110 | ft | Velocity | 8.6 | fps | |
| Discharge | 685 | cfs | Critical depth | 3.32 | ft | |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 15

| | | | | | |
|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | |
| Box width | 10.0 | ft | tapered throat | 4.99 | ft |
| Number of boxes | 10 | | 45 degree bevels | 5.53 | ft |
| Slope | 0.01000 | ft/ft | sq edge headwall | 6.00 | ft |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 4.15 | ft |
| Culvert length | 134 | ft | Velocity | 8.6 | fps |
| Discharge | 3425 | cfs | Critical depth | 3.32 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 16

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 2 | | beveled edge | 4.64 | ft |
| Slope | 0.005 | ft/ft | sq edge headwall | 5.00 | ft |
| Manning's n | 0.013 | | thin edged proj | 5.89 | ft |
| Culvert length | 110 | ft | OUTLET CTRL HWo | 4.81 | ft |
| Discharge | 121 | cfs | velocity | 8.6 | fps |
| | | | critical depth | 2.48 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 17

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 2 | | beveled edge | 4.64 | ft |
| Slope | 0.005 | ft/ft | sq edge headwall | 5.00 | ft |
| Manning's n | 0.013 | | thin edged proj | 5.89 | ft |
| Culvert length | 114 | ft | OUTLET CTRL HWo | 4.83 | ft |
| Discharge | 121 | cfs | velocity | 8.6 | fps |
| | | | critical depth | 2.48 | ft |

DRAINAGE AND HYDRAULICS

CULVERT CAPACITY CALCULATIONS
BASED ON ROADWAY ELEVATIONS

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 01

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 24 | in | INLET CTRL HWo: | | |
| Number of pipes | 2 | | beveled edge | 3.18 | ft |
| Slope | 0.005 | ft/ft | sq edge headwall | 3.43 | ft |
| Manning's n | 0.013 | | thin edged proj | 4.05 | ft |
| Culvert length | 93 | ft | OUTLET CTRL HWo | 3.48 | ft |
| Discharge | 45 | cfs | velocity | 7.2 | fps |
| | | | critical depth | 1.68 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 02

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 2 | | beveled edge | 6.13 | ft |
| Slope | 0.010 | ft/ft | sq edge headwall | 6.69 | ft |
| Manning's n | 0.013 | | thin edged proj | 8.24 | ft |
| Culvert length | 113 | ft | OUTLET CTRL HWo | 5.95 | ft |
| Discharge | 152 | cfs | velocity | 10.8 | fps |
| | | | critical depth | 2.78 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 03

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 1 | | beveled edge | 6.90 | ft |
| Slope | 0.014 | ft/ft | sq edge headwall | 7.61 | ft |
| Manning's n | 0.013 | | thin edged proj | 9.53 | ft |
| Culvert length | 113 | ft | OUTLET CTRL HWo | 6.33 | ft |
| Discharge | 83 | cfs | velocity | 11.7 | fps |
| | | | critical depth | 2.90 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 04

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 1 | | beveled edge | 6.98 | ft |
| Slope | 0.005 | ft/ft | sq edge headwall | 7.71 | ft |
| Manning's n | 0.013 | | thin edged proj | 9.67 | ft |
| Culvert length | 110 | ft | OUTLET CTRL HWo | 7.40 | ft |
| Discharge | 84 | cfs | velocity | 11.8 | fps |
| | | | critical depth | 2.92 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 05

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 1 | | beveled edge | 5.64 | ft |
| Slope | 0.005 | ft/ft | sq edge headwall | 6.12 | ft |
| Manning's n | 0.013 | | thin edged proj | 7.44 | ft |
| Culvert length | 110 | ft | OUTLET CTRL HWo | 5.91 | ft |
| Discharge | 71 | cfs | velocity | 10.1 | fps |
| | | | critical depth | 2.69 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 06

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 1 | | beveled edge | 5.99 | ft |
| Slope | 0.023 | ft/ft | sq edge headwall | 6.52 | ft |
| Manning's n | 0.013 | | thin edged proj | 8.00 | ft |
| Culvert length | 110 | ft | OUTLET CTRL HWo | 4.33 | ft |
| Discharge | 75 | cfs | velocity | 10.6 | fps |
| | | | critical depth | 2.75 | ft |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 07

| | | | | | | |
|---|---|---|---|---|---|---|
| Box height | 6.0 | ft | INLET CTRL HWo: | | | |
| Box width | 12.0 | ft | tapered throat | 7.54 | ft | |
| Number of boxes | 12 | | 45 degree bevels | 8.37 | ft | |
| Slope | 0.00500 | ft/ft | sq edge headwall | 9.09 | ft | |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 7.42 | ft | |
| Culvert length | 110 | ft | Velocity | 10.6 | fps | |
| Discharge | 9150 | cfs | Critical depth | 5.01 | ft | |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 10

| | | | | | | |
|---|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | | |
| Box width | 10.0 | ft | tapered throat | 5.21 | ft | |
| Number of boxes | 3 | | 45 degree bevels | 5.85 | ft | |
| Slope | 0.00500 | ft/ft | sq edge headwall | 6.35 | ft | |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 5.12 | ft | |
| Culvert length | 125 | ft | Velocity | 9.1 | fps | |
| Discharge | 1090 | cfs | Critical depth | 3.45 | ft | |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 11

| | | | | | | |
|---|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | | |
| Box width | 10.0 | ft | tapered throat | 6.02 | ft | |
| Number of boxes | 1 | | 45 degree bevels | 7.15 | ft | |
| Slope | 0.00500 | ft/ft | sq edge headwall | 7.83 | ft | |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 6.34 | ft | |
| Culvert length | 126 | ft | Velocity | 11.1 | fps | |
| Discharge | 442 | cfs | Critical depth | 3.93 | ft | |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 12

| | | | | | |
|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | |
| Box width | 10.0 | ft | tapered throat | 5.56 | ft |
| Number of boxes | 2 | | 45 degree bevels | 6.40 | ft |
| Slope | 0.00500 | ft/ft | sq edge headwall | 6.97 | ft |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 5.64 | ft |
| Culvert length | 110 | ft | Velocity | 10.0 | fps |
| Discharge | 796 | cfs | Critical depth | 3.66 | ft |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 13

| | | | | | |
|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | |
| Box width | 10.0 | ft | tapered throat | 5.58 | ft |
| Number of boxes | 2 | | 45 degree bevels | 6.42 | ft |
| Slope | 0.00500 | ft/ft | sq edge headwall | 7.00 | ft |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 5.66 | ft |
| Culvert length | 110 | ft | Velocity | 10.0 | fps |
| Discharge | 799 | cfs | Critical depth | 3.67 | ft |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 14

| | | | | | |
|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | |
| Box width | 10.0 | ft | tapered throat | 5.88 | ft |
| Number of boxes | 2 | | 45 degree bevels | 6.90 | ft |
| Slope | 0.00500 | ft/ft | sq edge headwall | 7.55 | ft |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 6.10 | ft |
| Culvert length | 110 | ft | Velocity | 10.7 | fps |
| Discharge | 856 | cfs | Critical depth | 3.85 | ft |

B O X  C U L V E R T

Inlet control and outlet control parameters

Cul 15

| | | | | | |
|---|---|---|---|---|---|
| Box height | 4.0 | ft | INLET CTRL HWo: | | |
| Box width | 10.0 | ft | tapered throat | 7.51 | ft |
| Number of boxes | 10 | | 45 degree bevels | 9.78 | ft |
| Slope | 0.01000 | ft/ft | sq edge headwall | 10.73 | ft |
| Manning's n | 0.013 | | OUTLET CTRL HWo | 8.08 | ft |
| Culvert length | 134 | ft | Velocity | 14.3 | fps |
| Discharge | 5710 | cfs | Critical depth | 4.66 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 16

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 2 | | beveled edge | 4.98 | ft |
| Slope | 0.005 | ft/ft | sq edge headwall | 5.37 | ft |
| Manning's n | 0.013 | | thin edged proj | 6.40 | ft |
| Culvert length | 110 | ft | OUTLET CTRL HWo | 5.19 | ft |
| Discharge | 129 | cfs | velocity | 9.1 | fps |
| | | | critical depth | 2.56 | ft |

P I P E  C U L V E R T

Inlet control and outlet control parameters

Cul 17

| | | | | | |
|---|---|---|---|---|---|
| Pipe diameter | 36 | in | INLET CTRL HWo: | | |
| Number of pipes | 2 | | beveled edge | 6.65 | ft |
| Slope | 0.005 | ft/ft | sq edge headwall | 7.30 | ft |
| Manning's n | 0.013 | | thin edged proj | 9.09 | ft |
| Culvert length | 114 | ft | OUTLET CTRL HWo | 7.06 | ft |
| Discharge | 162 | cfs | velocity | 11.4 | fps |
| | | | critical depth | 2.86 | ft |

DRAINAGE AND HYDRAULICS

CULVERT CAPACITY CALCULATIONS
SUMMARY TABLE

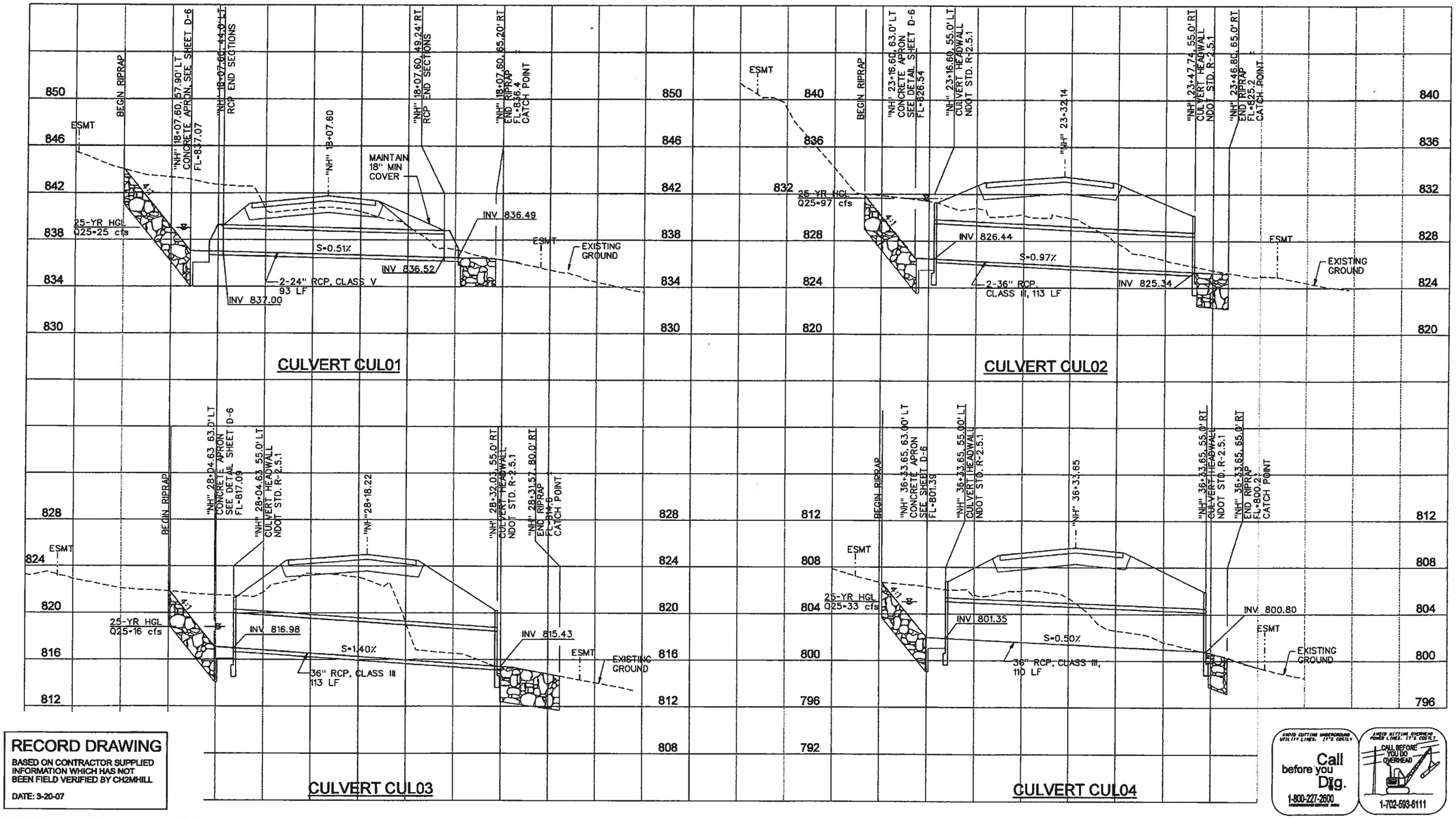
## CULVERT CAPACITIES

| Culvert | Culvert Type/Size | Invert Elevation | C/L Road Elevation | Edge of Pavement Elevation | Road Overtop Hw (ft) | Max Hw Manual (ft) | Culvert Capacity Road Overtop (cfs) | Culvert Capacity Manual (cfs) |
|---|---|---|---|---|---|---|---|---|
| Cul 01 | 2-24" RCP | 837.00 | 841.69 | 841.05 | 4.05 | 5.00 | 45 | 52 |
| Cul 02 | 2-36" RCP | 826.44 | 833.77 | 833.13 | 6.69 | 5.00 | 152 | 122 |
| Cul 03 | 36" RCP | 816.98 | 825.23 | 824.59 | 7.61 | 5.00 | 83 | 61 |
| Cul 04 | 36" RCP | 801.35 | 809.70 | 809.06 | 7.71 | 5.00 | 84 | 61 |
| Cul 05 | 36" RCP | 800.42 | 807.18 | 806.54 | 6.12 | 5.00 | 71 | 61 |
| Cul 06 | 36" RCP | 765.32 | 772.48 | 771.84 | 6.52 | 5.00 | 75 | 61 |
| Cul 07 | 12-12'x6' RCB | 757.48 | 767.21 | 766.57 | 9.09 | 9.00 | 9150 | 9055 |
| Cul 10 | 3-10'x4' RCB | 685.65 | 692.96 | 692.00 | 6.35 | 6.00 | 1090 | 1028 |
| Cul 11 | 10'x4' RCB | 675.95 | 684.74 | 683.78 | 7.83 | 6.00 | 442 | 343 |
| Cul 12 | 2-10'x4' RCB | 668.59 | 676.20 | 675.56 | 6.97 | 6.00 | 796 | 685 |
| Cul 13 | 2-10'x4' RCB | 667.18 | 674.82 | 674.18 | 7.00 | 6.00 | 799 | 685 |
| Cul 14 | 2-10'x4' RCB | 665.69 | 673.88 | 673.24 | 7.55 | 6.00 | 856 | 685 |
| Cul 15 | 10-10'x4' RCB | 642.50 | 653.87 | 653.23 | 10.73 | 6.00 | 5710 | 3425 |
| Cul 16 | 2-36" RCP | 633.97 | 639.98 | 639.34 | 5.37 | 5.00 | 129 | 121 |
| Cul 17 | 2-36" RCP | 622.40 | 630.34 | 629.70 | 7.30 | 5.00 | 162 | 121 |

DRAINAGE AND HYDRAULICS

REFERENCE NEEDLES
HIGHWAY PLANS

RECORD DRAWING

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BASED ON CONTRACTOR SUPPLIED INFORMATION WHICH HAS NOT BEEN FIELD VERIFIED BY CH2MHILL

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CLARK COUNTY NEVADA

# NEEDLES HIGHWAY CA/NV BORDER TO 5 MILES NORTH

## CULVERT PROFILE

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

THIS DRAWING WAS ORIGINALLY STAMPED BY MICHAEL S. LASKO NO. 10302 ON 3/2/05

CH2MHILL PROJECT NO.: 172914

DESIGNED: B. SANCHEZ DRAWN: T. UY

APPROVED: M. LASKO CHECKED: G. SORENSEN

CH2MHILL

2285 CORPORATE CIRCLE SUITE 200
HENDERSON, NEVADA 89074-7757
(702) 369-6175

SCALE

HORIZ: 1" = 20'

VERT: 1" = 4'

FIELD BOOK

L-1734

DRAWING NO.

D-1

SHT 45 OF 67

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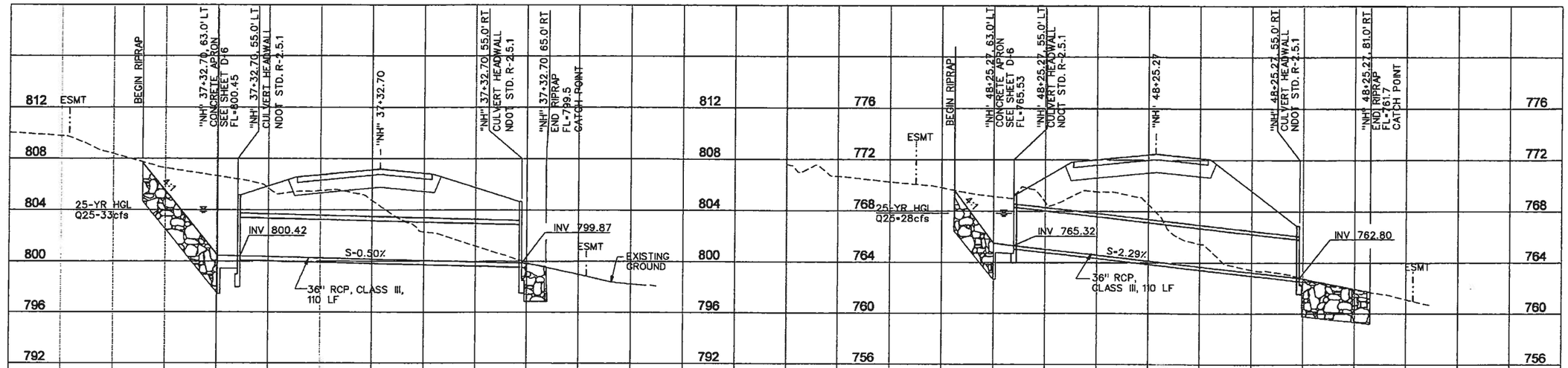
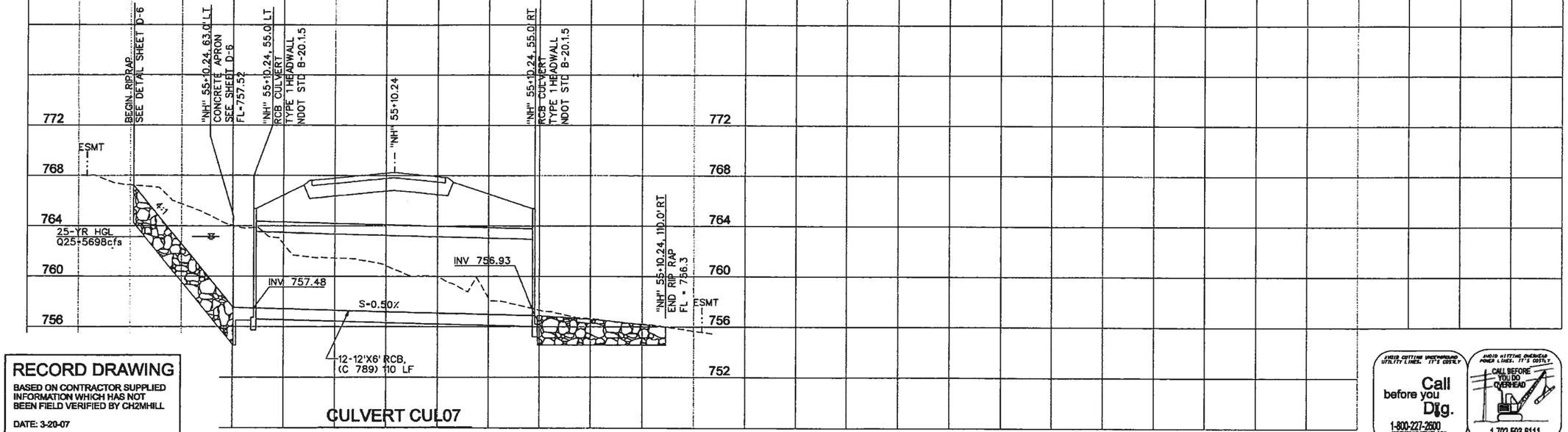
RECORD DRAWING




CULVERT CUL05




CULVERT CUL06




CULVERT CUL07

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| NO. | DATE | DESCRIPTION | APVD |
|---|---|---|---|

CLARK COUNTY NEVADA

# NEEDLES HIGHWAY CA/NV BORDER TO 5 MILES NORTH

## CULVERT PROFILE

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

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CH2MHILL PROJECT NO.: 172914
DESIGNED: B. SANCHEZ DRAWN: T. UY
APPROVED: M. LASKO CHECKED: G. SORENSEN

CH2MHILL
2285 CORPORATE CIRCLE SUITE 200
HENDERSON, NEVADA 89074-7757
(702) 369-6175

SCALE
HORIZ: 1" = 20'
VERT: 1" = 4'
FIELD BOOK

L-1734
DRAWING NO.
D-2
SHT 46 OF 67

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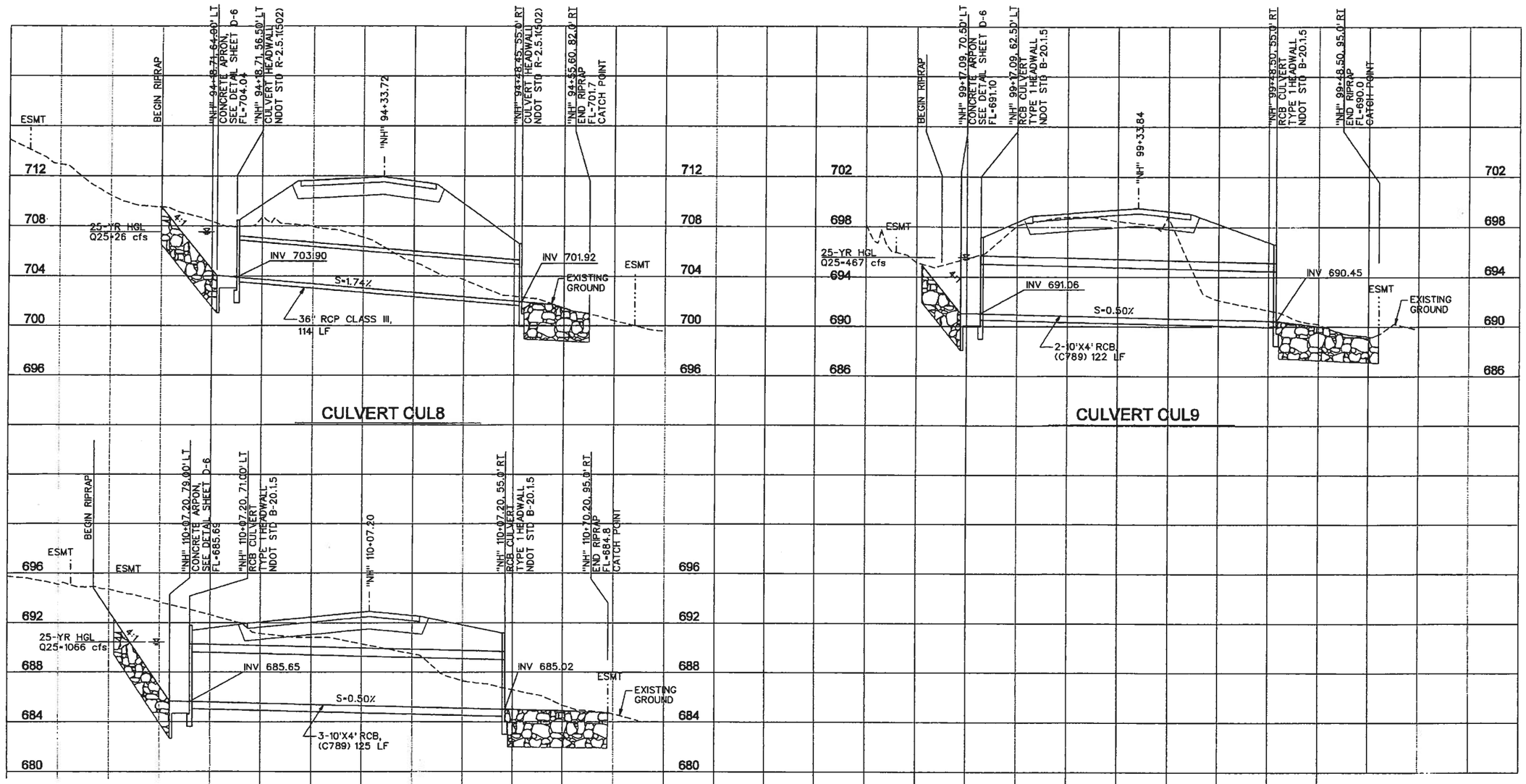
RECORD DRAWING

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CLARK COUNTY NEVADA

# NEEDLES HIGHWAY CA/NV BORDER TO 5 MILES NORTH

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CH2MHILL

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HENDERSON, NEVADA 89074-7757
(702) 369-6175

SCALE

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VERT: 1" = 4'

FIELD BOOK

L-1734

DRAWING NO.

D-3

SHT 47 OF 67

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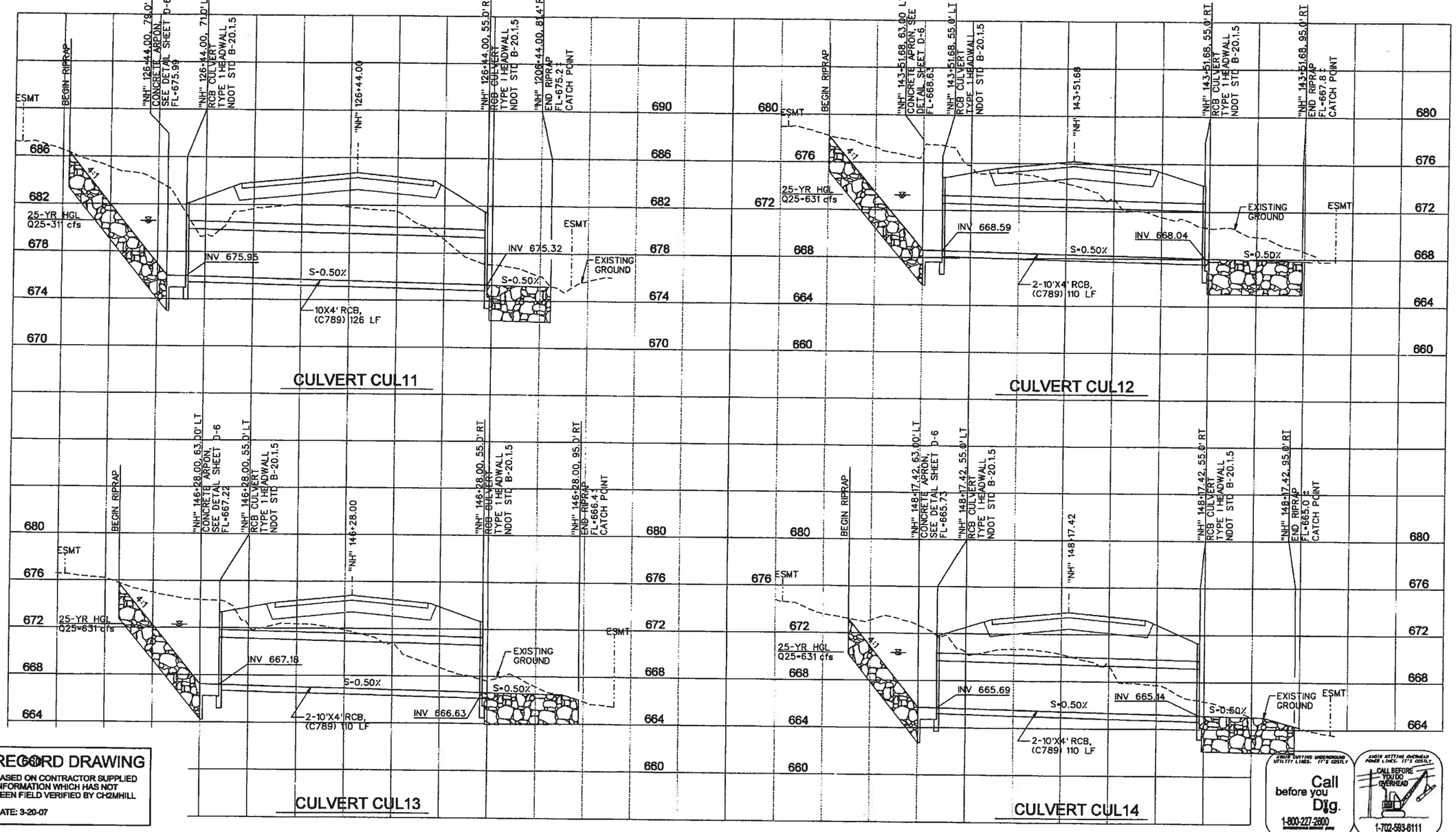
RECORD DRAWING

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CALL BEFORE YOU DO OVERHEAD 1-702-593-6111

| NO. | DATE | DESCRIPTION | APVD |
|---|---|---|---|

# NEEDLES HIGHWAY CA/NV BORDER TO 5 MILES NORTH

## CULVERT PROFILE

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

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(702) 369-6175

SCALE
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FIELD BOOK

L-1734
DRAWING NO.
D-4
SHT 48 OF 67

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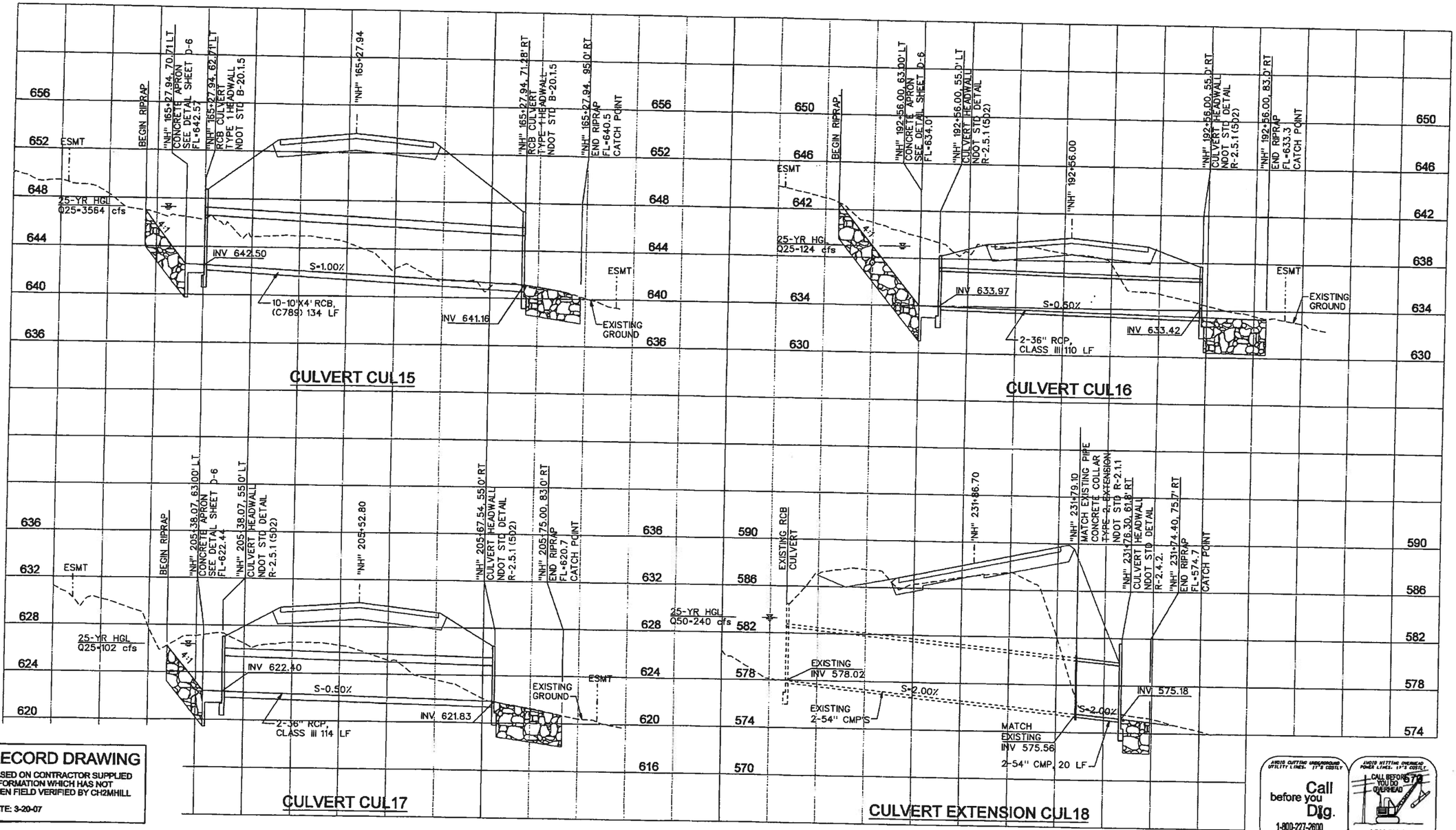
RECORD DRAWING

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|---|---|---|---|

# NEEDLES HIGHWAY CA/NV BORDER TO 5 MILES NORTH

## CULVERT PROFILE

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CH2MHILL PROJECT NO.: 172914

DESIGNED: B. SANCHEZ DRAWN: T. UY

APPROVED: M. LASKO CHECKED: G. SORENSEN

CH2MHILL

2285 CORPORATE CIRCLE SUITE 200 HENDERSON, NEVADA 89074-7757 (702) 369-6175

SCALE

HORIZ: 1" = 20'

VERT: 1" = 4'

FIELD BOOK

L-1734

DRAWING NO.

D-5

SHT 49 OF 67

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RECORD DRAWINGS

DRAINAGE AND HYDRAULICS

PRELIMINARY FACILITY
HYDRAULIC CALCULATIONS

# Worksheet for Rectangular Channel - 1

## Project Description

| | | |
|---|---|---|
| Friction Method | Manning Formula | FACILITY # 000-1 |
| Solve For | Normal Depth | |

## Input Data

| | | | |
|---|---|---|---|
| Roughness Coefficient | 0.013 | | |
| Channel Slope | 1.00 | % | → ASSUMING MAX SLOPE DROP STRUCTURES WILL BE REQUIRED. |
| Bottom Width | 70.00 | ft | |
| Discharge | 9547.00 | ft³/s | |

## Results

| | | | |
|---|---|---|---|
| Normal Depth | 4.65 | ft | FREEBOARD REQUIRED FOR SUPERCRITICAL FLOW EQN# 7.4.7 FROM CCRFCD MANUAL. |
| Flow Area | 325.71 | ft² | |
| Wetted Perimeter | 79.31 | ft | |
| Top Width | 70.00 | ft | |
| Critical Depth | 8.33 | ft | $F_B = 1.0 + 0.025 V d^{1/3}$ |
| Critical Slope | 0.00161 | ft/ft | |
| Velocity | 29.31 | ft/s | $F_B = 1.0 + 0.025 (29.31)(4.65)^{1/3}$ |
| Velocity Head | 13.35 | ft | $F_B = 2.22$ ft |
| Specific Energy | 18.00 | ft | |
| Froude Number | 2.40 | | |
| Flow Type | Supercritical | | TOTAL CHANNEL DEPTH = 4.65 + 2.22 = 6.87-ft OR 7-ft |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 4.65 | ft |
| Critical Depth | 8.33 | ft |
| Channel Slope | 0.01000 | ft/ft |
| Critical Slope | 0.00161 | ft/ft |

# Cross Section for Rectangular Channel - 1

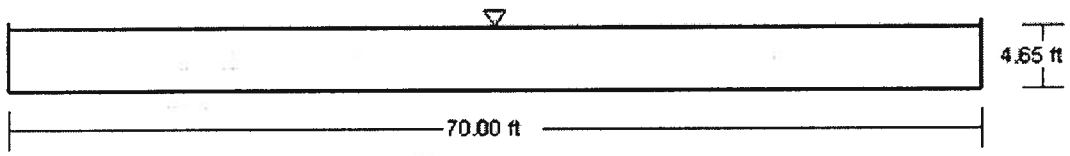
## Project Description

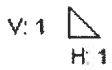
| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.013 | |
| Channel Slope | 1.00 | % |
| Normal Depth | 4.65 | ft |
| Bottom Width | 70.00 | ft |
| Discharge | 9547.00 | $ft^3/s$ |

## Cross Section Image



# Worksheet for FMA-Berm Facility 000-2

## Project Description

| | | |
|---|---|---|
| Friction Method | Manning Formula | FACILITY # 000-2 |
| Solve For | Normal Depth | |

## Input Data

| | | | |
|---|---|---|---|
| Channel Slope | 0.50 | % | → ASSUMING MAX SLOPE TO CONTROL EROSION POTENTIAL |
| Discharge | 4774.00 | ft³/s | |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 930.00 |
| 0+12 | 930.00 |
| 0+32 | 920.00 |
| 4+32 | 940.00 |
| 10+32 | 960.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 930.00) | (0+12, 930.00) | 0.025 |
| (0+12, 930.00) | (0+32, 920.00) | 0.035 |
| (0+32, 920.00) | (10+32, 960.00) | 0.025 |

## Results

| | | | |
|---|---|---|---|
| Normal Depth | | 6.91 | ft → BERM HEIGHT LMIN PLUS FREEBOARD = 10-ft |
| Elevation Range | 920.00 to 960.00 ft | | |
| Flow Area | | 524.75 | ft² |
| Wetted Perimeter | | 153.75 | ft |
| Top Width | | 151.95 | ft |
| Normal Depth | | 6.91 | ft |
| Critical Depth | | 6.51 | ft |
| Critical Slope | | 0.00684 | ft/ft |
| Velocity | | 9.10 | ft/s |
| Velocity Head | | 1.29 | ft |
| Specific Energy | | 8.19 | ft |

# Worksheet for FMA-Berm Facility 000-2

## Results

| | | |
|---|---|---|
| Froude Number | 0.86 | |
| Flow Type | Subcritical | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 6.91 | ft |
| Critical Depth | 6.51 | ft |
| Channel Slope | 0.00500 | ft/ft |
| Critical Slope | 0.00684 | ft/ft |

# Cross Section for FMA-Berm Facility 000-2

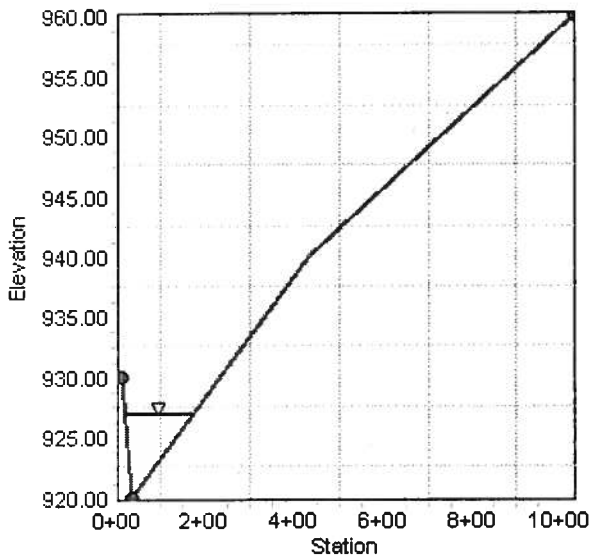
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.50 | % |
| Normal Depth | 6.91 | ft |
| Discharge | 4774.00 | $ft^3/s$ |

## Cross Section Image



# Worksheet for FMB-Berm Faciltiy 000-3

## Project Description

| | | |
|---|---|---|
| Friction Method | Manning Formula | FACILITY # 000-3 |
| Solve For | Normal Depth | |

## Input Data

| | | | |
|---|---|---|---|
| Channel Slope | 0.50 | % | → ASSUMING MAX SLOPE TO CONTROL EROSION POTENT. |
| Discharge | 4774.00 | ft³/s | |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 988.00 |
| 0+12 | 988.00 |
| 0+32 | 978.00 |
| 1+32 | 980.00 |
| 6+32 | 1000.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 988.00) | (0+12, 988.00) | 0.025 |
| (0+12, 988.00) | (0+32, 978.00) | 0.035 |
| (0+32, 978.00) | (6+32, 1000.00) | 0.025 |

## Results

| | | | |
|---|---|---|---|
| Normal Depth | | 5.15 | ft → BERM HEIGHT LAND PLUS FREEBOARD ≈ ± 10-FT |
| Elevation Range | 978.00 to 1000.00 ft | | |
| Flow Area | | 565.41 | ft² |
| Wetted Perimeter | | 190.33 | ft |
| Top Width | | 189.03 | ft |
| Normal Depth | | 5.15 | ft |
| Critical Depth | | 4.81 | ft |
| Critical Slope | | 0.00690 | ft/ft |
| Velocity | | 8.44 | ft/s |
| Velocity Head | | 1.11 | ft |
| Specific Energy | | 6.26 | ft |

# Worksheet for FMB-Berm Faciltiy 000-3

## Results

| | | |
|---|---|---|
| Froude Number | 0.86 | |
| Flow Type | Subcritical | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 5.15 | ft |
| Critical Depth | 4.81 | ft |
| Channel Slope | 0.00500 | ft/ft |
| Critical Slope | 0.00690 | ft/ft |

# Cross Section for FMB-Berm Faciltiy 000-3

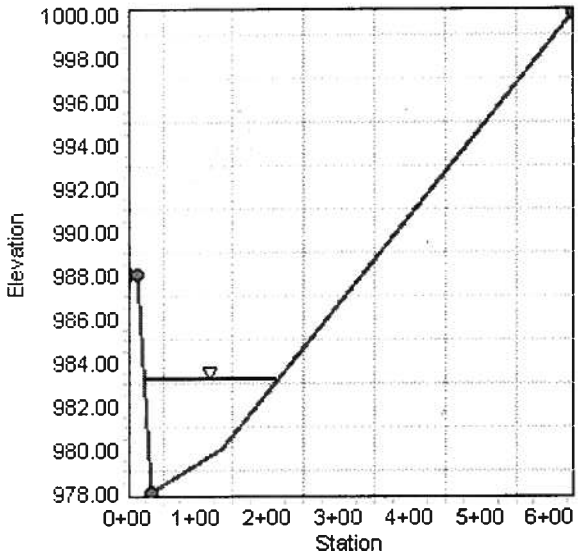
## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.50 | % |
| Normal Depth | 5.15 | ft |
| Discharge | 4774.00 | $ft^3/s$ |

## Cross Section Image



# APPENDIX F
POTABLE WATER

**LAUGHLIN 400 ACRES INDUSTRIAL FEASIBILITY STUDY**
**POTABLE WATER FACILITIES ESTIMATED COSTS**

**Estimated Costs to Accommodate 400 Acre Industrial Area - Site A**

Groundwater Well with Package Treatment Plant - 400 Acres

| **Water Treatment Improvements** | **Total Cost** |
|---|---|
| Package Treatment Plant * | $5,300,000.00 |
| Construct underground power (for trenching, conduit, and manholes) | $2,952,000.00 |
| **Groundwater Well Improvements** | **Total Cost** |
| Drill and equip well (2 Wells) | $3,000,000.00 |
| **Reservoir Improvements** | **Total Cost** |
| 2 MG Storage | $2,000,000.00 |
| **Pumping Station Improvements** | **Total Cost** |
| Construct pumping station downstream of Package Treatment Plant (to serve 890 Pressure Zone) | $2,300,000.00 |
| **Pipeline Improvements** | **Total Cost** |
| 1,000 linear feet of 20-inch diameter raw water pipeline | $243,600.00 |
| 4,900 linear feet of 20-inch diameter inlet/outlet pipeline | $1,193,400.00 |
| **ESTIMATED COST FOR WELL WITH WATER TREATMENT PLANT OPTION** | **$16,989,000** |

*Treatment Plant costs were estimated by Kirkpatrick Construction Consulting and contingencies were added

Pipeline Extension - 400 Acres

| **Reservoir Improvements** | **Total Cost** |
|---|---|
| 2 MG Storage | $2,000,000.00 |
| **Pumping Station Improvements** | **Total Cost** |
| Add unit to existing Casino Drive Pumping Station | $345,000.00 |
| Construct pumping station in South (to serve 890 Pressure Zone) | $2,300,000.00 |
| Construct underground power (for trenching, conduit, and manholes) | $2,952,000.00 |
| **Pipeline Improvements** | **Total Cost** |
| 500 linear feet of 42-inch diameter pipeline along Casino Drive | $324,200.00 |
| 14,760 linear feet of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $4,462,100.00 |
| 4,900 linear feet of 20-inch diameter inlet/outlet pipeline | $1,193,400.00 |
| **SUBTOTAL** | **$13,576,700** |
| **OVERSIZING ESTIMATE (12-inch to 24-inch)** | **$2,042,800** |
| **ESTIMATED COST FOR PIPELINE EXTENSION OPTION** | **$15,619,500** |

Water Treatment Plant - 400 Acres

| **Water Treatment Improvements** | **Total Cost** |
|---|---|
| Intake | $1,000,000.00 |
| Package Treatment Plant * | $5,300,000.00 |
| Construct underground power (for trenching, conduit, and manholes) | $2,952,000.00 |
| **Reservoir Improvements** | **Total Cost** |
| 2 MG Storage | $2,000,000.00 |
| **Pumping Station Improvements** | **Total Cost** |
| Construct raw water pumping station in South | $3,190,000.00 |
| Construct finished water pumping station in South (to serve 890 Pressure Zone) | $3,580,000.00 |
| **Pipeline Improvements** | **Total Cost** |
| 1,000 linear feet of 20-inch diameter raw water pipeline | $243,600.00 |
| 4,900 linear feet of 20-inch diameter inlet/outlet pipeline | $1,193,400.00 |
| **ESTIMATED COST FOR WATER TREATMENT PLANT OPTION** | **$19,459,000** |

*Treatment Plant costs were estimated by Kirkpatrick Construction Consulting and contingencies were added

Estimated costs are feasibility level and may vary depending on specifics of project, including project demands and timing of system facilities. Estimates do not include onsite infrastructure requirements. Estimates do not include buildings, permits, license, environmental, rights-of-way, or other costs. Power estimates do not include any NV Energy (NVE) costs such as cable, fuse cabinets, equipment pads, transformers, and other infrastructure costs. Project estimates are as of July 6, 2009.

**LAUGHLIN 400 ACRES INDUSTRIAL FEASIBILITY STUDY**
**POTABLE WATER FACILITIES ESTIMATED COSTS**

**Estimated Costs to Accommodate 400 Acre Industrial Area - Site B**

Groundwater Well with Package Treatment Plant - 400 Acres

| **Water Treatment Improvements** | **Total Cost** |
|---|---|
| Package Treatment Plant * | $5,300,000.00 |
| Construct underground power (for trenching, conduit, and manholes) | $4,132,000.00 |
| **Groundwater Well Improvements** | **Total Cost** |
| Drill and equip well (2 Wells) | $3,000,000.00 |
| **Reservoir Improvements** | **Total Cost** |
| 2 MG Storage | $2,000,000.00 |
| **Pumping Station Improvements** | **Total Cost** |
| Construct pumping station downstream of Package Treatment Plant (to serve 1000 Pressure Zone) | $2,300,000.00 |
| **Pipeline Improvements** | **Total Cost** |
| 1,000 linear feet of 20-inch diameter raw water pipeline | $243,600.00 |
| 7,100 linear feet of 20-inch diameter inlet/outlet pipeline | $1,729,200.00 |
| **ESTIMATED COST FOR WELL WITH WATER TREATMENT PLANT OPTION** | **$18,704,800** |

*Treatment Plant costs were estimated by Kirkpatrick Construction Consulting and contingencies were added

Pipeline Extension - 400 Acres

| **Reservoir Improvements** | **Total Cost** |
|---|---|
| 2 MG Storage | $2,000,000.00 |
| **Pumping Station Improvements** | **Total Cost** |
| Add unit to existing Casino Drive Pumping Station | $345,000.00 |
| Construct pumping station in South (to serve 1000 Pressure Zone) | $3,230,000.00 |
| Construct underground power (for trenching, conduit, and manholes) | $4,132,000.00 |
| **Pipeline Improvements** | **Total Cost** |
| 500 linear feet of 42-inch diameter pipeline along Casino Drive | $324,200.00 |
| 14,760 linear feet of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $4,462,100.00 |
| 5,900 linear feet of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $1,783,700.00 |
| 7,100 linear feet of 20-inch diameter inlet/outlet pipeline | $1,729,200.00 |
| **SUBTOTAL** | **$18,006,200** |
| **OVERSIZING ESTIMATE (12-inch to 24-inch)** | **$2,859,300** |
| **ESTIMATED COST FOR PIPELINE EXTENSION OPTION** | **$20,865,500** |

Water Treatment Plant - 400 Acres

| **Water Treatment Improvements** | **Total Cost** |
|---|---|
| Intake | $1,000,000.00 |
| Package Treatment Plant * | $5,300,000.00 |
| Construct underground power (for trenching, conduit, and manholes) | $4,132,000.00 |
| **Reservoir Improvements** | **Total Cost** |
| 2 MG Storage | $2,000,000.00 |
| **Pumping Station Improvements** | **Total Cost** |
| Construct raw water pumping station in South | $3,190,000.00 |
| Construct finished water pumping station in South (to serve 1000 Pressure Zone) | $7,730,000.00 |
| **Pipeline Improvements** | **Total Cost** |
| 1,000 linear feet of 20-inch diameter raw water pipeline | $243,600.00 |
| 5,900 linear feet of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $1,783,700.00 |
| 7,100 linear feet of 20-inch diameter inlet/outlet pipeline | $1,729,200.00 |
| **SUBTOTAL** | **$27,108,500** |
| **OVERSIZING ESTIMATE (12-inch to 24-inch)** | **$816,588** |
| **ESTIMATED COST FOR WATER TREATMENT PLANT OPTION** | **$27,925,088** |

*Treatment Plant costs were estimated by Kirkpatrick Construction Consulting and contingencies were added

Estimated costs are feasibility level and may vary depending on specifics of project, including project demands and timing of system facilities. Estimates do not include onsite infrastructure requirements. Estimates do not include buildings, permits, license, environmental, rights-of-way, or other costs. Power estimates do not include any NV Energy (NVE) costs such as cable, fuse cabinets, equipment pads, transformers, and other infrastructure costs. Project estimates are as of July 6, 2009.

**LAUGHLIN 400 ACRES INDUSTRIAL FEASIBILITY STUDY**
**POTABLE WATER FACILITIES ESTIMATED COSTS**

**Estimated Costs to Accommodate 400 Acre Industrial Area - Site C**

Groundwater Well with Package Treatment Plant - 400 Acres

| **Water Treatment Improvements** | **Total Cost** |
|---|---|
| Package Treatment Plant * | $5,300,000.00 |
| Construct underground power (for trenching, conduit, and manholes) | $5,792,000.00 |
| **Groundwater Well Improvements** | **Total Cost** |
| Drill and equip well (2 Wells) | $3,000,000.00 |
| **Reservoir Improvements** | **Total Cost** |
| 2 MG Storage | $2,000,000.00 |
| **Pumping Station Improvements** | **Total Cost** |
| Construct pumping station downstream of Package Treatment Plant (to serve 1130 Pressure Zone) | $2,300,000.00 |
| **Pipeline Improvements** | **Total Cost** |
| 1,000 linear feet of 20-inch diameter raw water pipeline | $243,600.00 |
| 9,000 linear feet of 20-inch diameter inlet/outlet pipeline | $2,191,900.00 |
| **ESTIMATED COST FOR WELL WITH WATER TREATMENT PLANT OPTION** | **$20,827,500** |

*Treatment Plant costs were estimated by Kirkpatrick Construction Consulting and contingencies were added

Pipeline Extension - 400 Acres

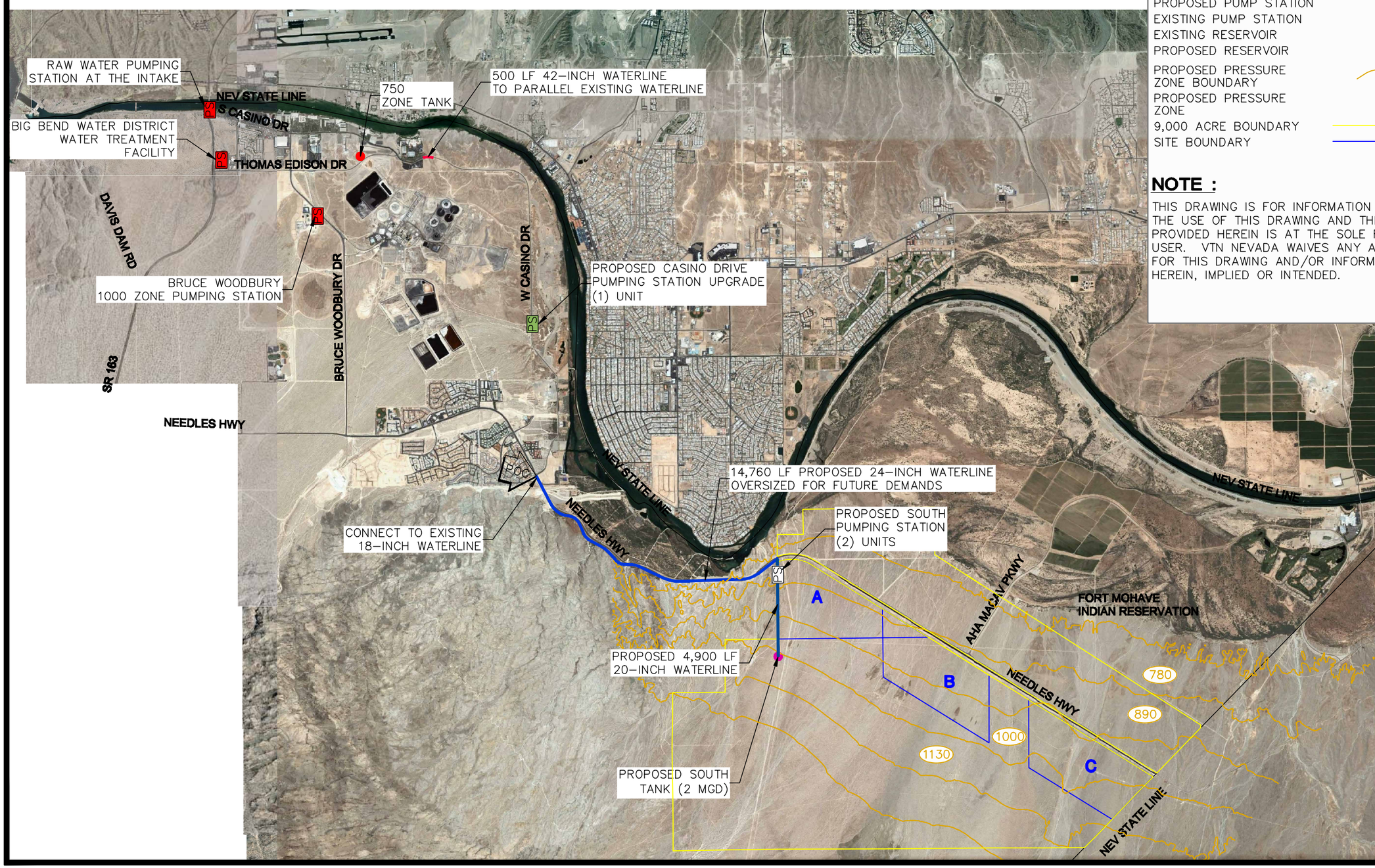
| **Reservoir Improvements** | **Total Cost** |
|---|---|
| 2 MG Storage | $2,000,000.00 |
| **Pumping Station Improvements** | **Total Cost** |
| Add unit to existing Casino Drive Pumping Station | $345,000.00 |
| Construct pumping station in South (to serve 1130 Pressure Zone) | $5,600,000.00 |
| Construct underground power (for trenching, conduit, and manholes) | $5,792,000.00 |
| **Pipeline Improvements** | **Total Cost** |
| 500 linear feet of 42-inch diameter pipeline along Casino Drive | $324,200.00 |
| 14,760 linear feet of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $4,462,100.00 |
| 14,200 linear feet of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $4,292,800.00 |
| 9,000 linear feet of 20-inch diameter inlet/outlet pipeline | $2,191,900.00 |
| **SUBTOTAL** | **$25,008,000** |
| **OVERSIZING ESTIMATE (12-inch to 24-inch)** | **$4,008,100** |
| **ESTIMATED COST FOR PIPELINE EXTENSION OPTION** | **$29,016,100** |

Water Treatment Plant - 400 Acres

| **Water Treatment Improvements** | **Total Cost** |
|---|---|
| Intake | $1,000,000.00 |
| Package Treatment Plant * | $5,300,000.00 |
| Construct underground power (for trenching, conduit, and manholes) | $5,792,000.00 |
| **Reservoir Improvements** | **Total Cost** |
| 2 MG Storage | $2,000,000.00 |
| **Pumping Station Improvements** | **Total Cost** |
| Construct raw water pumping station in South | $3,190,000.00 |
| Construct finished water pumping station in South (to serve 1130 Pressure Zone) | $8,520,000.00 |
| **Pipeline Improvements** | **Total Cost** |
| 1,000 linear feet of 20-inch diameter raw water pipeline | $243,600.00 |
| 14,200 linear feet of 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | $4,292,800.00 |
| 9,000 linear feet of 20-inch diameter inlet/outlet pipeline | $2,191,900.00 |
| **SUBTOTAL** | **$32,530,300** |
| **OVERSIZING ESTIMATE (12-inch to 24-inch)** | **$1,965,349** |
| **ESTIMATED COST FOR WATER TREATMENT PLANT OPTION** | **$34,495,649** |

*Treatment Plant costs were estimated by Kirkpatrick Construction Consulting and contingencies were added

Estimated costs are feasibility level and may vary depending on specifics of project, including project demands and timing of system facilities. Estimates do not include onsite infrastructure requirements. Estimates do not include buildings, permits, license, environmental, rights-of-way, or other costs. Power estimates do not include any NV Energy (NVE) costs such as cable, fuse cabinets, equipment pads, transformers, and other infrastructure costs. Project estimates are as of July 6, 2009.




## LEGEND

- PROPOSED 12-INCH WATERLINE
- PROPOSED 20-INCH WATERLINE
- PROPOSED 30-INCH WATERLINE
- PROPOSED 42-INCH WATERLINE
- PROPOSED PUMP STATION UPGRADE (PS)
- PROPOSED PUMP STATION (PS)
- EXISTING PUMP STATION (PS)
- EXISTING RESERVOIR
- PROPOSED RESERVOIR
- PROPOSED PRESSURE ZONE BOUNDARY
- PROPOSED PRESSURE ZONE (780)
- 9,000 ACRE BOUNDARY
- SITE BOUNDARY

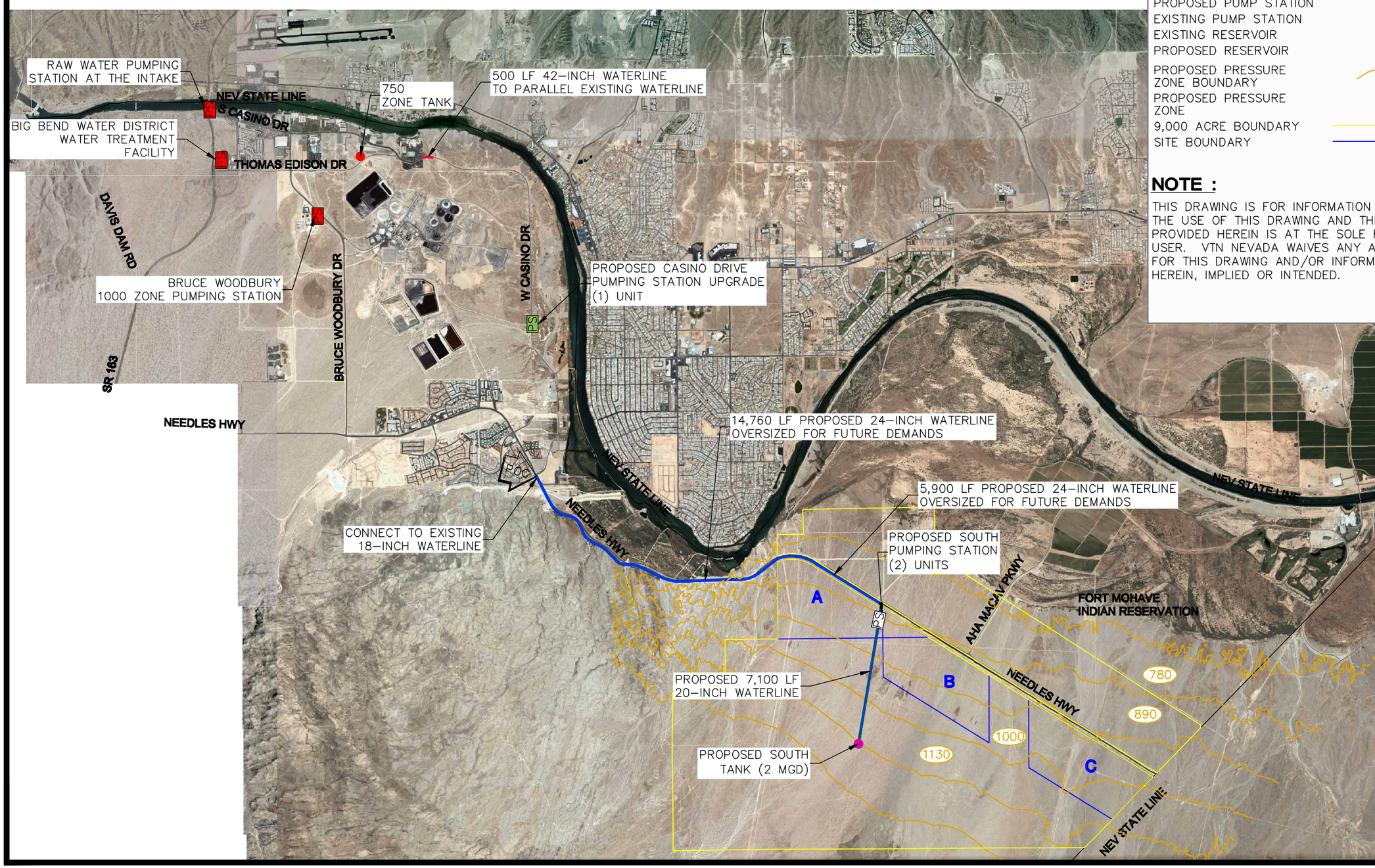
## NOTE :

THIS DRAWING IS FOR INFORMATION PURPOSES ONLY. THE USE OF THIS DRAWING AND THE INFORMATION PROVIDED HEREIN IS AT THE SOLE RISK OF THE USER. VTN NEVADA WAIVES ANY AND ALL LIABILITY FOR THIS DRAWING AND/OR INFORMATION, CONTAINED HEREIN, IMPLIED OR INTENDED.

W.O.#: 7180
DATE: 7-01-09
BY: R.M.S.
SCALE: 1"=5000'
SHEET OF

# WATER FACILITIES EXHIBIT-OPTION 2, PIPELINE EXTENSION
## INDUSTRIAL BUSINESS PARK (SITE A)
## SOUTHLAND

vtn nevada




## LEGEND

- PROPOSED 12-INCH WATERLINE
- PROPOSED 20-INCH WATERLINE
- PROPOSED 30-INCH WATERLINE
- PROPOSED 42-INCH WATERLINE
- PROPOSED PUMP STATION UPGRADE (PS)
- PROPOSED PUMP STATION (PS)
- EXISTING PUMP STATION (PS)
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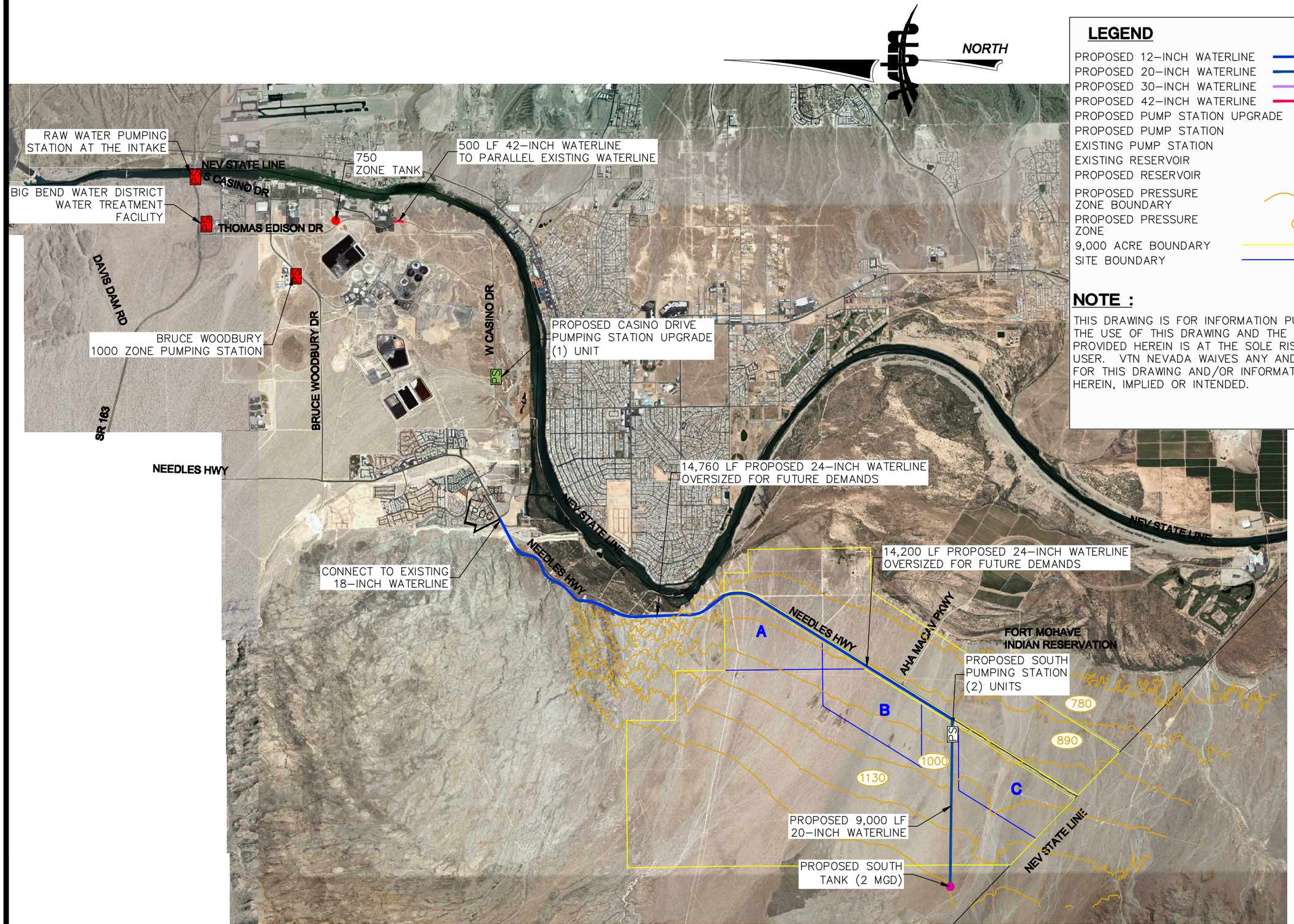
W.O.#: 7180
DATE: 7-01-09
BY: R.M.S.
SCALE: 1"=5000'
SHEET OF

# WATER FACILITIES EXHIBIT-OPTION 2, PIPELINE EXTENSION
## INDUSTRIAL BUSINESS PARK (SITE B)
## SOUTHLAND

vtn nevada




## LEGEND

- PROPOSED 12-INCH WATERLINE
- PROPOSED 20-INCH WATERLINE
- PROPOSED 30-INCH WATERLINE
- PROPOSED 42-INCH WATERLINE
- PROPOSED PUMP STATION UPGRADE (PS)
- PROPOSED PUMP STATION (PS)
- EXISTING PUMP STATION (PS)
- EXISTING RESERVOIR
- PROPOSED RESERVOIR
- PROPOSED PRESSURE ZONE BOUNDARY
- PROPOSED PRESSURE ZONE (780)
- 9,000 ACRE BOUNDARY
- SITE BOUNDARY

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W.O.#: 7180
DATE: 7-01-09
BY: R.M.S.
SCALE: 1"=5000'
SHEET OF

# WATER FACILITIES EXHIBIT-OPTION 2, PIPELINE EXTENSION
## INDUSTRIAL BUSINESS PARK (SITE C)
## SOUTHLAND

vtn nevada

# LAUGHLIN 400 ACRE INDUSTRIAL PARK
# PHASE WATER DEMAND CALCULATIONS

CALCULATED BY: RV
WO#: 7180

## 400 ACRE INDUSTRIAL PARK SITE

| Phase | Land Use[A] | Land Use Area[B] | | Demand Flow Rates (GPM per acre) Maximum Day[C] | Peak Hour[D] | Q Max Day (gpm) | Q Peak Hour (gpm) | Q Fire Flow[E] (gpm) | Q Max Day + FF (gpm) | Q Max Day[F] (MGD) | Q Peak Hour[G] (MGD) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I | Industrial/Manufacturing | 120.0 | ac | 1.5 | 2.30 | 180 | 276 | 6,000 | 6,180 | 0.26 | 0.40 |
| II | Industrial/Manufacturing | 30.0 | ac | 1.5 | 2.30 | 45 | 69 | 6,000 | 6,045 | 0.06 | 0.10 |
| III | Industrial/Manufacturing | 45.0 | ac | 1.5 | 2.30 | 68 | 104 | 6,000 | 6,068 | 0.10 | 0.15 |
| IV | Industrial/Manufacturing | 204.0 | ac | 1.5 | 2.30 | 306 | 470 | 6,000 | 6,306 | 0.44 | 0.68 |
| | | | | | | | | | | | |
| | **Totals (onsite)** | **399.0** | **ac** | | | **599** | **919** | | | **0.86** | **1.32** |

## ADDITIONAL SOUTHLAND AREA

| | Land Use | Land Use Area | | % of Southland Area | Demand Flow Rates (GPM per acre) Maximum Day[C] | Peak Hour[D] | Q Max Day (gpm) | Q Peak Hour (gpm) | Q Max Day[F] (MGD) | Q Peak Hour[G] (MGD) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Residential | 5,160 | ac | 60% | 5.20 | 8.00 | 26,832 | 41,280 | 38.64 | 59.45 | |
| | Multi-Family (apartment-condo) | 430.0 | ac | 5% | 5.20 | 8.00 | 2,236 | 3,440 | 3.22 | 4.96 | |
| | Schools | 430.0 | ac | 5% | 3.50 | 5.40 | 1,505 | 2,322 | 2.17 | 3.35 | |
| | Parks | 430.0 | ac | 5% | 8.40 | 8.40 | 3,612 | 3,612 | 5.21 | 5.21 | |
| | Industrial Park | 430.0 | ac | 5% | 1.50 | 2.30 | 645 | 989 | 0.93 | 1.43 | |
| | Commercial/Public Facilities | 645.0 | ac | 7.5% | 3.00 | 4.60 | 1,935 | 2,967 | 2.79 | 4.28 | |
| | Roadway/Undevelopable | 1,075.0 | ac | 12.5% | 0.00 | 0.00 | 0 | 0 | 0.0 | 0.0 | |
| | **Totals (offsite)** | **8,600.0** | **ac** | **100%** | | | **36,765** | **54,610** | **52.96** | **78.68** | |

## DEMAND SUMMARY

| Location | Area (ac) | Q Max Day (gpm) | Q Peak Hour (gpm) | Q Max Day[F] (MGD) | Q Peak Hour[G] (MGD) |
|---|---|---|---|---|---|
| 400 ACRE INDUSTRIAL PARK SITE | 399.0 | 599 | 919 | 0.86 | 1.32 |
| ADDITIONAL SOUTHLAND AREA | 8,600.0 | 36,765 | 54,610 | 52.96 | 78.68 |
| **Total SouthLand (Onsite + Offsite)** | | **37,364** | **55,529** | **53.82** | **80.00** |

Notes:
A. Phase land use referenced from Final Proposal Report by Clark County.
B. Entire phase area (building, parking lot, and grading/road/landscape areas) conservatively used to determine water demand for each phase.
C. Max Day demand flow rate referenced from "Table 1 - Water Consumption Rates for Various Types of Development" from Las Vegas Valley Water District. Table last updated 2007.
D. Peak Hour demand flow rate (GPM per acre) referenced from "Table 1 - Water Consumption Rates for Various Types of Development" from Las Vegas Valley Water District. Table last updated 2007.
E. Minimum fire flow determined from 2005 Clark County Fire Code Table A-III-A-A for maximum industrial building areas determined for each phase. Refer to Assumptions 1 through 3 shown below.
F. Max Day flow rate conversion from gpm to MGD
G. Peak Hour flow rate conversion from gpm to MGD

Assumptions:
1. Maximum building size assumed is approximately 1,900,000 sq.ft. for Phases I through IV.
2. IBC construction Type V-B (worst case) assumed for all buildings within Phases I through IV.
3. A 25% reduction in fire flow is reflected, it is assumed all buildings are sprinkled within Phases I through IV and that there will be high pile storage onsite.

**TABLE 1**
**LAS VEGAS VALLEY WATER DISTRICT**
**WATER CONSUMPTION RATES FOR VARIOUS TYPES OF DEVELOPMENT**

| CUSTOMER CLASS/DESCRIPTION | DEMAND FLOW RATES | | | | | |
|---|---|---|---|---|---|---|
| | AVERAGE DAY | | MAXIMUM DAY | | PEAK HOUR | |
| | GPM per Unit | GPM per Acre | GPM per Unit | GPM per Acre | GPM per Unit | GPM per Acre |
| Single Family Residential | 0.52 | 2.30 | 1.18 | 5.20 | 1.81 | 8.00 |
| Multi-Family (12 Units or Less per Acre) | 0.52 | 2.30 | 1.18 | 5.20 | 1.81 | 8.00 |
| Residential, Duplex and Triplex | 0.52 | 2.30 | 1.18 | 5.20 | 1.81 | 8.00 |
| Apartments, Condominiums and Townhouses | 0.21 | 5.70 | 0.53 | 14.00 | 0.63 | 16.80 |
| Mobile Home Parks | N/A | 2.40 | N/A | 3.70 | N/A | 5.70 |
| Hotels | 0.29 | N/A | 0.36 | N/A | 0.45 | N/A |
| Golf Courses, Parks and Open Spaces | N/A | 4.40 | N/A | 8.40 | N/A | 8.40 |
| Industrial Park (Light Industry) | N/A | 1.10 | N/A | 1.50 | N/A | 2.30 |
| Commercial | N/A | 2.10 | N/A | 3.00 | N/A | 4.60 |
| Schools | N/A | 1.70 | N/A | 3.50 | N/A | 5.40 |

## TABLE A-III-A-1—MINIMUM REQUIRED FIRE FLOW AND FLOW DURATION FOR BUILDINGS

| FIRE AREA (square feet) X 0.0929 for $m^2$ | | | | | FIRE FLOW (Gallons per minute)[2] | FLOW DURATION (hours) |
|---|---|---|---|---|---|---|
| IBC – I-A<br>IBC – I-B<br>UBC - Type I-F.R.<br>UBC - II-F.R.[1] | IBC – II-A<br>IBC – III-A<br>UBC - Type II One-HR.<br>UBC - III One-HR.[1] | IBC – V-A<br>IBC – IV H.T.<br>UBC - Type IV-H.T.<br>UBC - V-One-HR.[1] | IBC – II-B<br>IBC – III-B<br>UBC - Type II-N<br>UBC - III-N[1] | IBC – V-B<br>UBC - Type V-N[1] | x. 3.785 for L/min. | |
| 0-22,700 | 0-12,700 | 0-8,200 | 0-5,900 | 0-3,600 | 1,500 | 2 |
| 22,701-30,200 | 12,701-17,000 | 8,201-10,900 | 5,901-7,900 | 3.601-4,800 | 1,750 | |
| 30,201-38,700 | 17,01-21,800 | 10,901-12,900 | 7,901-9,800 | 4,801-6,200 | 2,000 | |
| 38,701-48,300 | 21,801-24,200 | 12,901-17,400 | 9,801-12,600 | 6,201-7,700 | 2,250 | |
| 48,301-59,000 | 24,201-33,200 | 17,401-21,300 | 12,601-15,400 | 7,701-9,400 | 2,500 | |
| 59,001-70,900 | 33,201-39,700 | 21,301-25,500 | 15,401-18,400 | 9,401-11,300 | 2,750 | |
| 70,901-83,700 | 39,701-47,100 | 25,501-30,100 | 18,401-21,800 | 11,301-13,400 | 3,000 | 3 |
| 83,701-97,700 | 47,101-54,900 | 30,101-35,200 | 21,801-25,900 | 13,401-15,600 | 3,250 | |
| 97,701-112,700 | 54,901-63,400 | 35,201-40,600 | 25,901-29,300 | 15,601-18,000 | 3,500 | |
| 112,701-128,700 | 63,401-72,400 | 40,601-46,400 | 29,301-33,500 | 18,001-20,600 | 3,750 | |
| 128,701-145,900 | 72,401-82,100 | 46,401-52,500 | 33,501-37,900 | 20,601-23,300 | 4,000 | 4 |
| 145,901-164,200 | 82,101-92,400 | 52,501-59,100 | 37,901-42,700 | 23,301-26,300 | 4,250 | |
| 164,201-183,400 | 92,401-103,100 | 59,101-66,000 | 42,701-47,700 | 26,301-29,300 | 4,500 | |
| 183,401-203,700 | 103,101-114,600 | 66,001-73,300 | 47,701-53,000 | 29,301-32,600 | 4,750 | |
| 203,701-225,200 | 114,601-126,700 | 73,301-81,100 | 53,001-58,600 | 32,601-36,000 | 5,000 | |
| 225,201-247,700 | 126,701-139,400 | 81,101-89,200 | 58,601-65,400 | 36,001-39,600 | 5,250 | |
| 247,701-271,200 | 139,401-152,600 | 89,201-97,700 | 65,401-70,600 | 39,601-43,400 | 5,500 | |
| 271,201-295,900 | 152,601-166,500 | 97,701-106,500 | 70,601-77,000 | 43,401-47,400 | 5,750 | |
| 295,901-Greater | 166,501-Greater | 106,501-115,800 | 77,001-83,700 | 47,401-51,500 | 6,000 | |
| " | " | 115,801-125,500 | 83,701-90,600 | 51,501-55,700 | 6,250 | |
| " | " | 125,501-135,500 | 90,601-97,900 | 55,701-60,200 | 6,500 | |
| " | " | 135,501-145,800 | 97,901-106,800 | 60,201-64,800 | 6,750 | |
| " | " | 145,801-156,700 | 106,801-113,200 | 64,801-69,600 | 7,000 | |
| " | " | 156,701-167,900 | 113,201-121,300 | 69,601-74,600 | 7,250 | |
| " | " | 167,901-179,400 | 121,301-129,600 | 74,601-79,800 | 7,500 | |
| " | " | 179,401-191,400 | 129,601-138,300 | 79,801-85,100 | 7,750 | |
| " | " | 191,401-Greater | 138,301-Greater | 85,101-Greater | 8,000 | |

[1]Types of construction are based upon the Building Code.

[2]Measured at 20 psi (137.9 kPa). See Appendix III-A, Section 2.

# APPENDIX G

SANITARY SEWER

**Laughlin Community Facts...**
**... from the Clark County Water Reclamation District**

### The Laughlin Wastewater Reclamation Facility (LWRF).

The LWRF, located 1 mile west of the Laughlin gaming district, is an 8 million gallons per day (mgd) biological treatment facility. Utilizing state-of-the-art technology and equipment the LWRF has served the town of Laughlin since the dedication of municipal water and wastewater facilities in 1985.

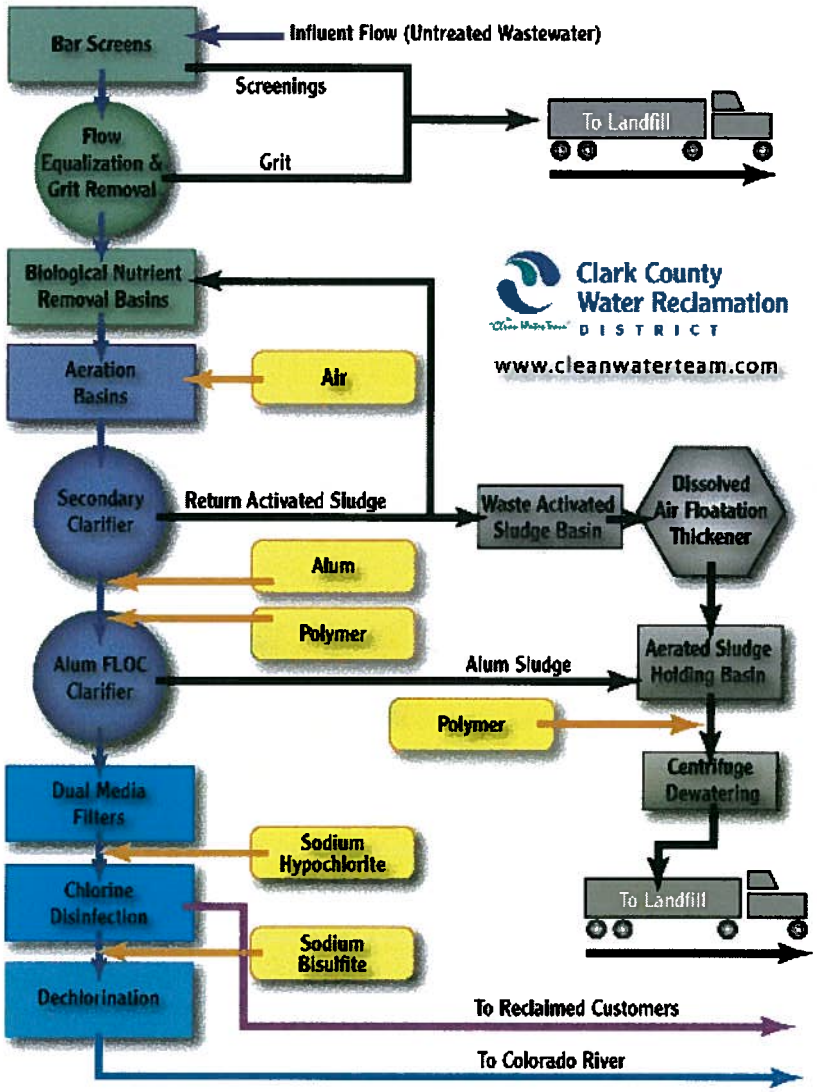
### What happens to the water we use?

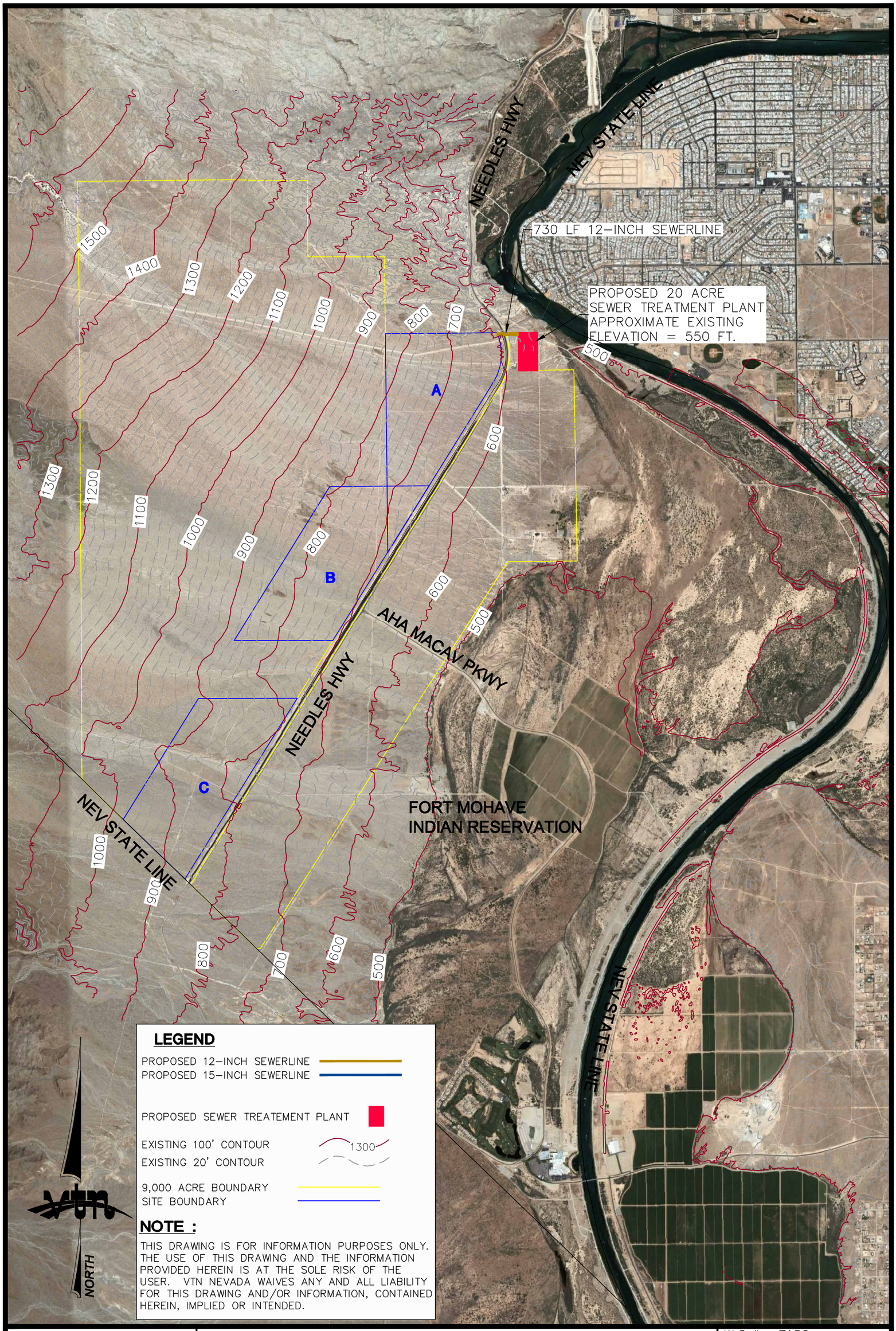
Each day 3.5 million gallons of used water and sewage from local homes, hotels, motels, schools, churches and businesses make their way through the 26 miles of sewer pipe and three pumping stations (lift stations) and are pumped up to the Laughlin Wastewater Reclamation Facility. At the treatment facilities, the wastewater travels through a series of processes allowing the solids to be biologically removed and the reclaimed water is returned to the Colorado River.

### Contact Us

The Clark County Water Reclamation District is pleased to provide wastewater treatment for the community of Laughlin. If you have any questions or comments about wastewater treatment in Laughlin, please contact Community Services at (702) 668-8066 or (800) 782-4324.

## Laughlin Water Reclamation Facility
## Wastewater Treatment Process

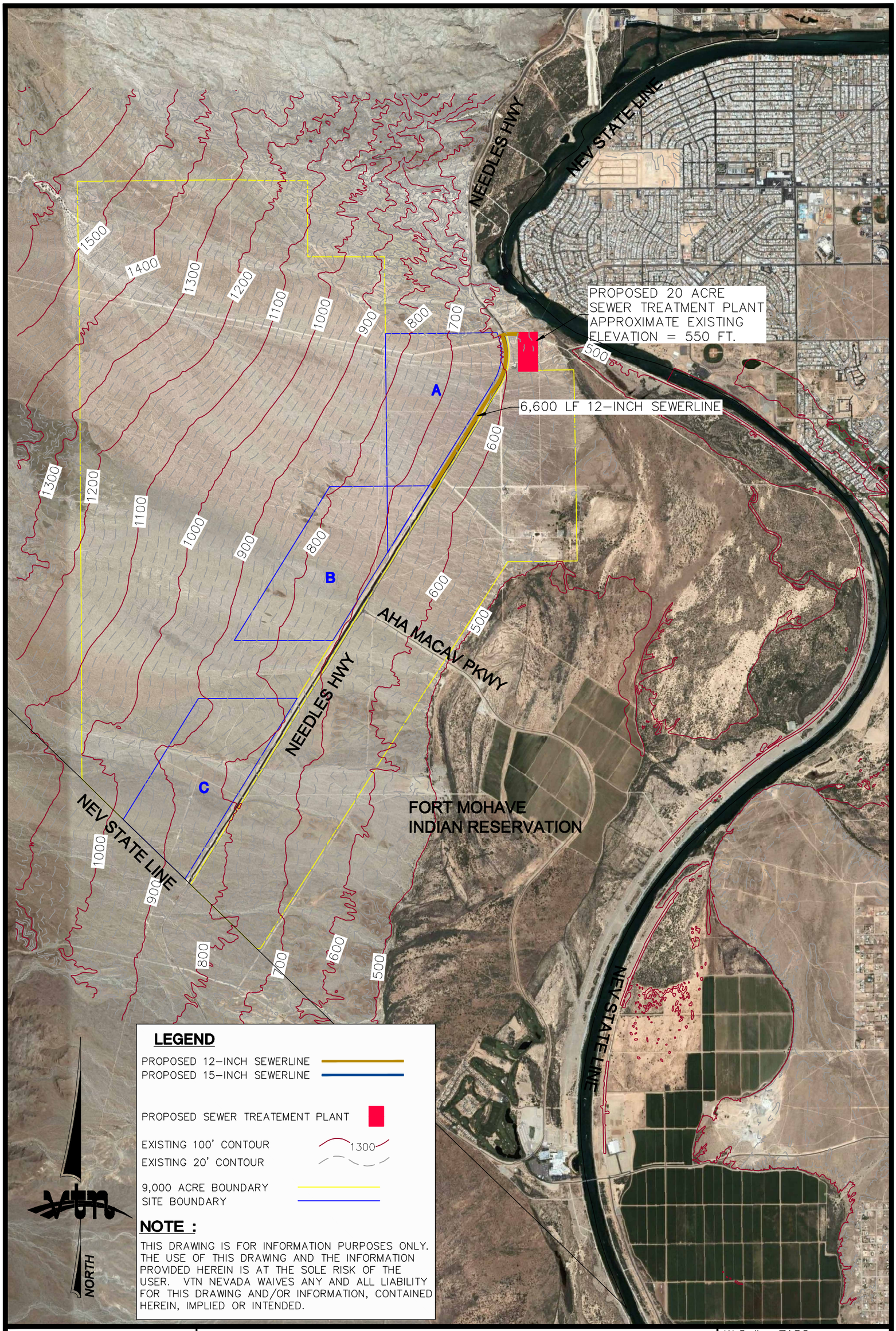





vtn nevada

# SANITARY SEWER FACILITIES EXIHIBIT
## INDUSTRIAL BUSINESS PARK (SITE A)
## SOUTHLAND

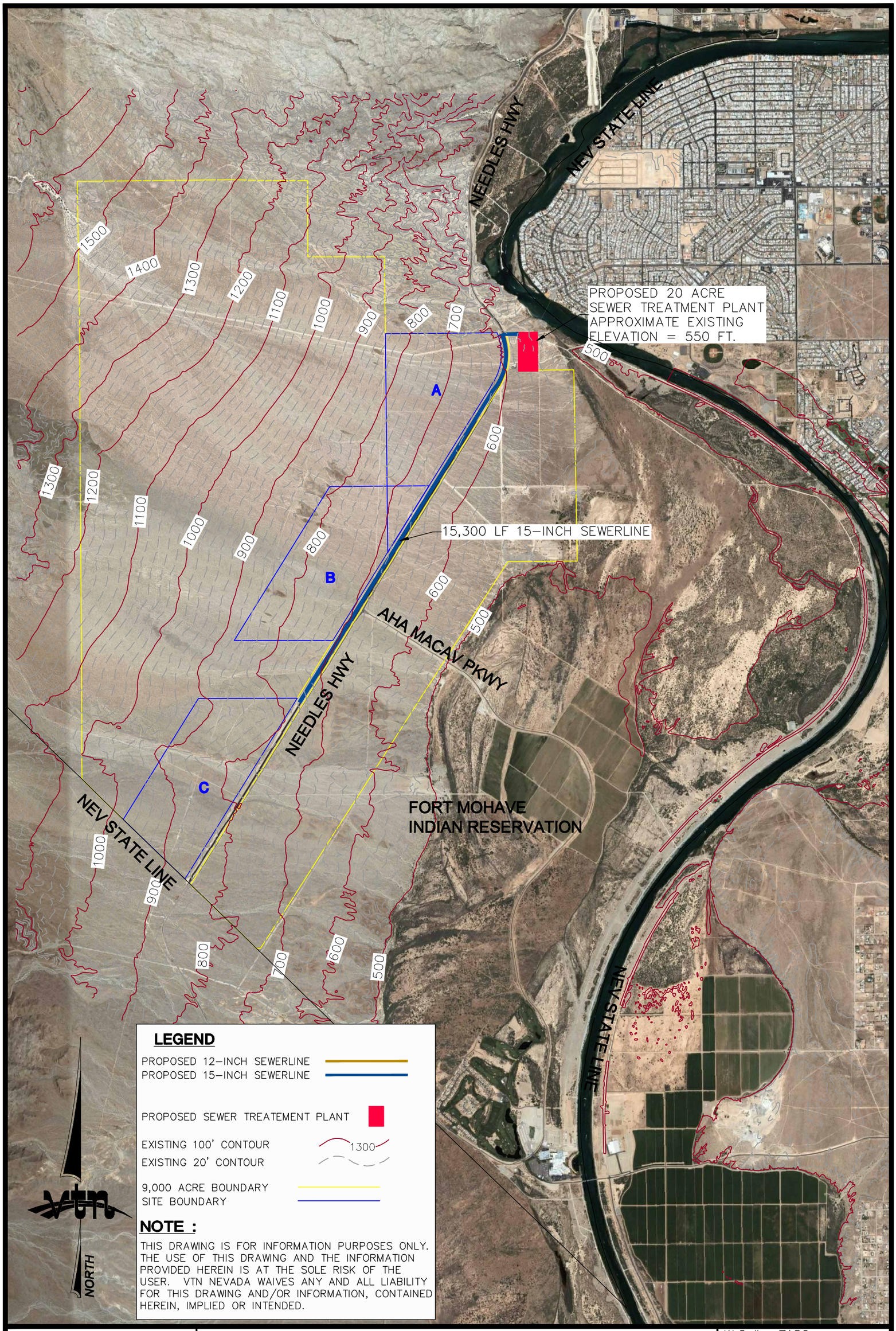
W.O.#: 7180
DATE: 7-07-09
BY: R.M.S.
SCALE: 1"=3000'
SHEET OF




vtn nevada

SANITARY SEWER FACILITIES EXIHIBIT
INDUSTRIAL BUSINESS PARK (SITE B)
SOUTHLAND

W.O.#: 7180
DATE: 7-07-09
BY: R.M.S.
SCALE: 1"=3000'
SHEET OF




vtn nevada

# SANITARY SEWER FACILITIES EXIHIBIT
## INDUSTRIAL BUSINESS PARK (SITE C)
## SOUTHLAND

W.O.#: 7180
DATE: 7-07-09
BY: R.M.S.
SCALE: 1"=3000'
SHEET OF

# LAUGHLIN 400 ACRE INDUSTRIAL PARK
## PHASE DEMAND SEWER CALCULATIONS

**CALCULATED BY:** RV
**WO#:** 7180

| Phase | Units | | AREA | | Density (DU/Acre) | ERU Factor | ERU | AVG. FLOW (GPD) | Avg. Flow (MGD) | Qp Design Peak (MGD) | Design Peak Per Phase (MGD) | Phase Name | POD AREA (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 400 Acre Industial Site | | INDUSTRIAL | 400.00 | AC | | | | 460,000 | 0.46000 | 1.2974 | 1.297 | Onsite | 400.00 |
| Additional SouthLand Area | 20640 | SINGLE FAM | 5,160.00 | AC | 4.0 | 1.00 | 20640 | 5,160,000 | 5.16000 | 11.5502 | | | |
| | 4300 | TOWNHOUSE | 215.00 | AC | 20.0 | 0.50 | 2150 | 537,500 | 0.53750 | 1.4936 | | | |
| | 10750 | CONDOS | 215.00 | AC | 50.0 | 0.50 | 5375 | 1,343,750 | 1.34375 | 3.4207 | | | |
| | | COMMERCIAL | 645.00 | AC | | | | 1,128,750 | 1.12875 | 2.9217 | | | |
| | | INDUSTRIAL | 430.00 | AC | | | | 494,500 | 0.49450 | 1.3851 | | | |
| | | SCHOOL[1] | 430.00 | AC | | 0.10 | 2150 | 537,500 | 0.53750 | 1.4936 | | | |
| | | PARKS[2] | 430.00 | AC | | | | | 0.00000 | 0.0000 | | | |
| | | ROADS/UNDEV.[2] | 1,075.00 | AC | | | | | 0.00000 | 0.0000 | 22.265 | Offsite | 8600.00 |
| | | | 9000 | | | | 30315 | | 9.6620 | 23.562 | 23.562 | | 9000.00 |

| ASSUMPTIONS: SEWER CONTRIBUTIONS | | |
|---|---|---|
| TYPE | AVG. SEWER CONTRIBUTIONS | |
| *Industrial* | 1150 | *gal/day/acre* |
| *COMMERCIAL* | 1750 | *gal/day/acre* |
| | | |
| | | |
| | | |
| *SINGLE FAMILY* | 250 | *gal/day/eru* |
| *SCHOOL[1]* | 50 | *students/acre* |
| *PARKS/ROAD/UNDEV[2]* | 0 | *gal/day/acre* |

| ERU FACTORS | |
|---|---|
| CUSTOMER CLASS | ERU |
| | |
| *SINGLE FAMILY* | 1.00 |
| *TOWNHOUSE* | 0.50 |
| *CONDO* | 0.50 |
| *SCHOOL (per student)* | 0.10 |

$$Q_p = 2.6186 * Q_{avg}^{0.9044}$$

# SEWER INTERCEPTOR LINE CALCULATIONS

**PROJECT: LAUGHLIN 400 ACRE INDUSTRIAL PARK**

**CALCULATED BY: RV** **WO#: 7180**

Manning's Equation

$$V = \frac{1.49}{n} * R^{2/3} * S^{1/2}$$

| Site Location | Slope (ft/ft) | Diameter (in.) | Area (ft) | Wetted Perimeter (ft) | Hydraulic Radius (ft) | Mannings n | Max. Capacity (cfs) | Max. Capacity (MGD) | Actual Capacity (MGD) | Full Flow Velocity (fps) | Actual vs. Max Capacity Check |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 0.0300 | 12 | 0.785 | 3.14 | 0.25000 | 0.013 | 6.188 | 4.00 | 1.3 | 7.88 | OK |
| B | 0.0200 | 12 | 0.785 | 3.14 | 0.25000 | 0.013 | 5.052 | 3.27 | 1.3 | 6.43 | OK |
| C | 0.0140 | 15 | 1.227 | 3.93 | 0.31250 | 0.013 | 7.664 | 4.95 | 1.3 | 6.25 | OK |

Note:
1. Slopes based on extisting topography at specific site location.
2. Minimum slope for Site Location "A" is 0.0180 ft/ft, increase sewer pipe to next size (15") below this slope.
3. Minimum slope for Site Location "B" is 0.0180 ft/ft, increase sewer pipe to next size (15") below this slope.
4. Minimum slope for Site Location "C" is 0.006 ft/ft, increase sewer pipe to next size (18") below this slope.

# APPENDIX H
DRY UTILITIES

NVEnergy

# DISTRIBUTION PLANNING DEPARTMENT
# PLANNING MEMO

## *Electric Assumptions and Requirements:*

| | | | |
|---|---|---|---|
| Date: | June 11, 2009 | ISD: | 2/5/11 |
| Project ID: | 192566 | BOD: | |
| EPD KVA: | 37,733 | Source Fdr. | LIS2501, LIS2502: (new) |
| Planner: | Mark L. Skrable | Cc: | Marty Fisher |
| Subject: | Laughlin 400 Acre Industrial Park (IO) | | |

---

**Please Note:**
**No capacity** will be reserved for this project and the requirements to serve will be reevaluated and may be different following receipt of request for the actual load addition.

**Contingency:**
If the 69kV Transmission Line is determined not to have sufficient capacity (due to conductor size and/or Transmission Bank limits), the customer may be required to upgrade the needed transmission facilities from the Laughlin Substation at location (1).

---

**Applicant's Minimum Requirements Are:**

**FOR Location A:**

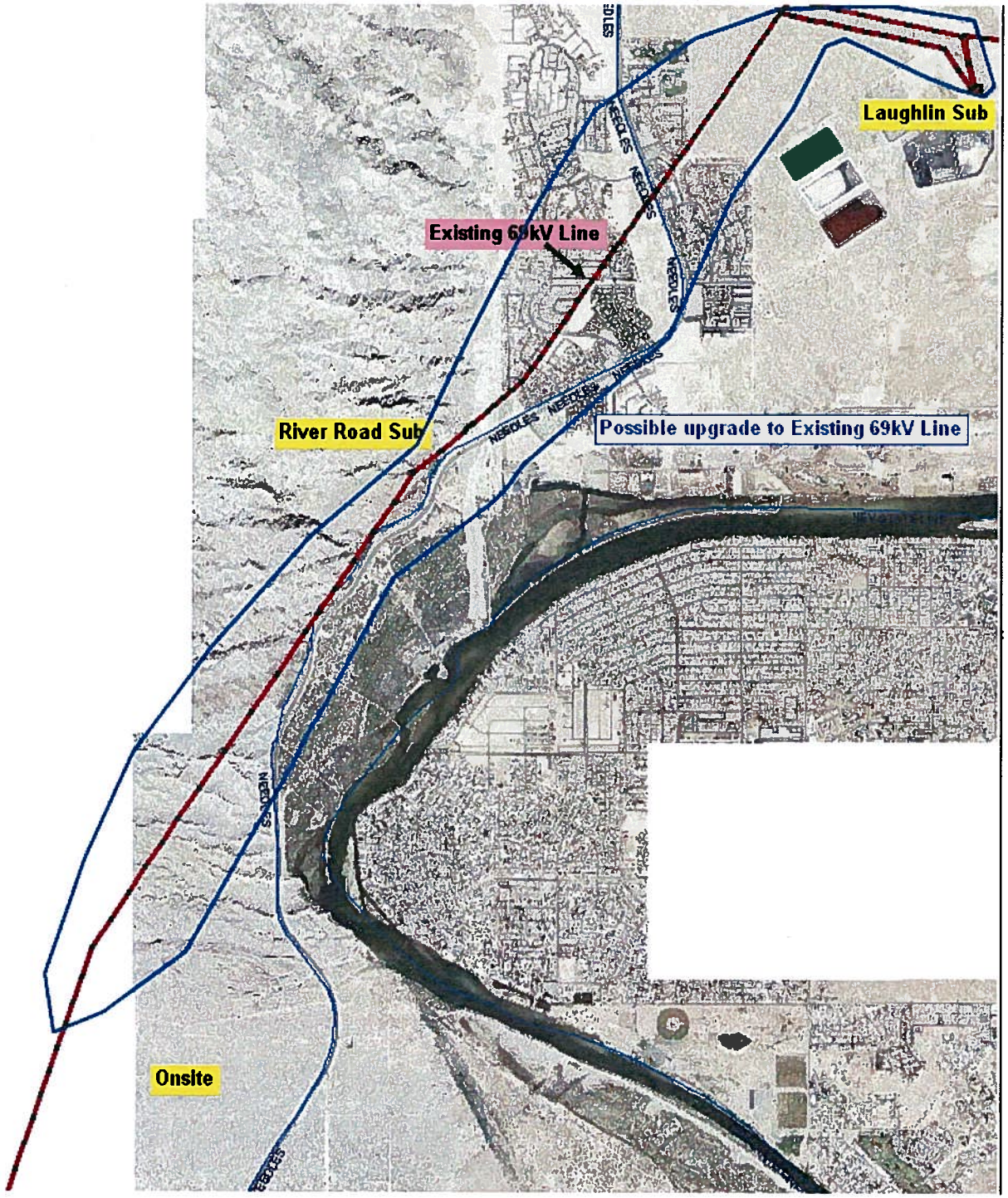
1. Install a 44.8 MVA Distribution Substation (named LIS) onsite near location (2).
2. Install 2 x 22.4 MVA, 69/24.9 kV substation transformer banks in the new substation near location (2).
3. Install 1-1200 Amp feeder breaker and getaway in the new LIS, breaker position 2501 on LIS Bank 1.
4. Install 1-1200 Amp feeder breaker and getaway in the new LIS, breaker position 2502 on LIS Bank 2.
5. Serve the project load from the two new LIS feeders from location (2).

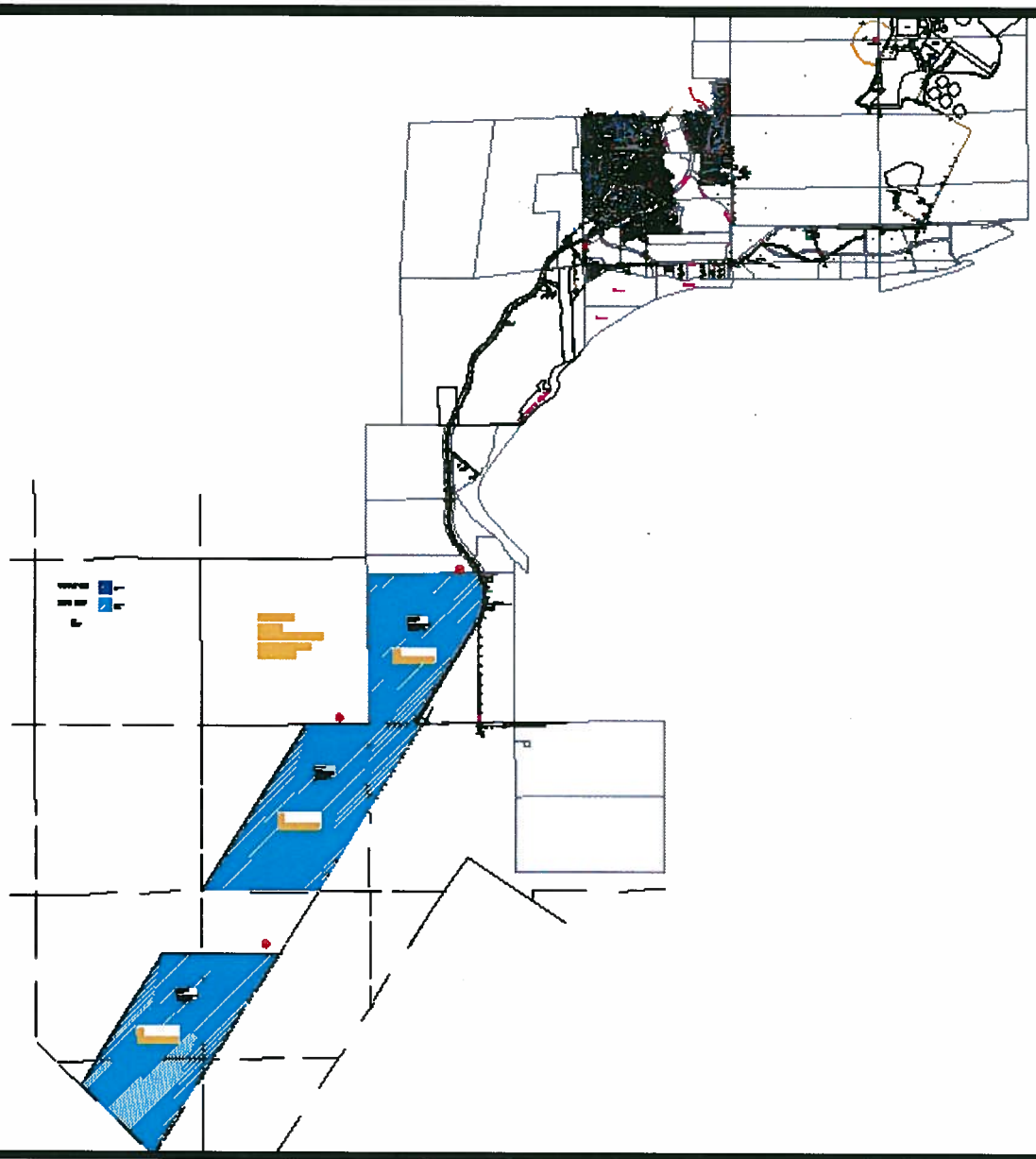
**FOR Location B:**

Same as Location A with the substation near location (3).

**FOR Location C:**

Same as Location A with the substation near location (4).


Laughlin Sub
Existing 69kV Line
River Road Sub
Possible upgrade to Existing 69kV Line
Onsite
NEEDLES

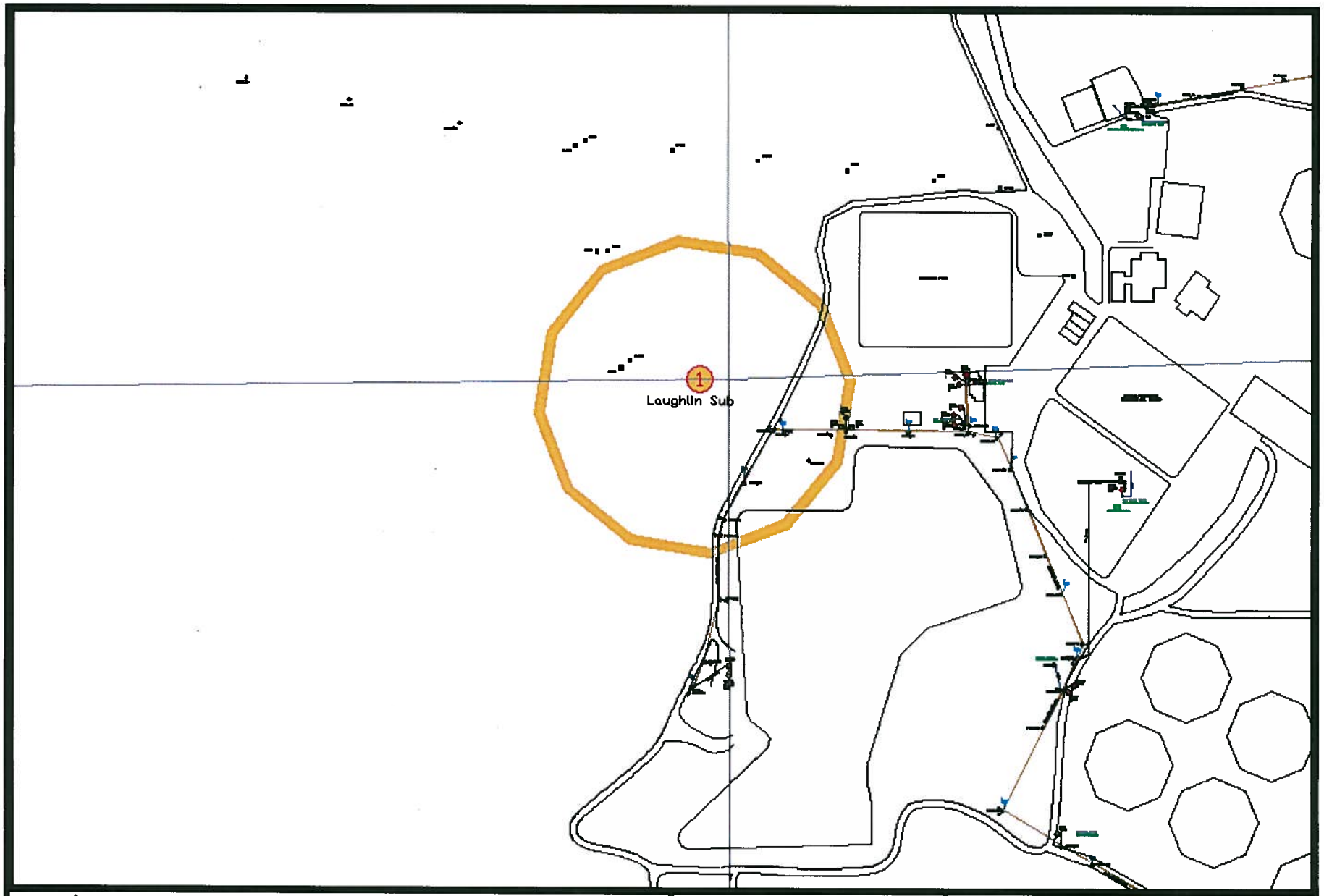


Laughlin 400 Acre Industrial Park

| | |
|---|---|
| Planner: | Mark L. Skrable |
| Date: | 6/11/09 |
| Rev:- | Rev. |
| Project ID: | 192565 |

NVEnergy

DISTRIBUTION PLANNING

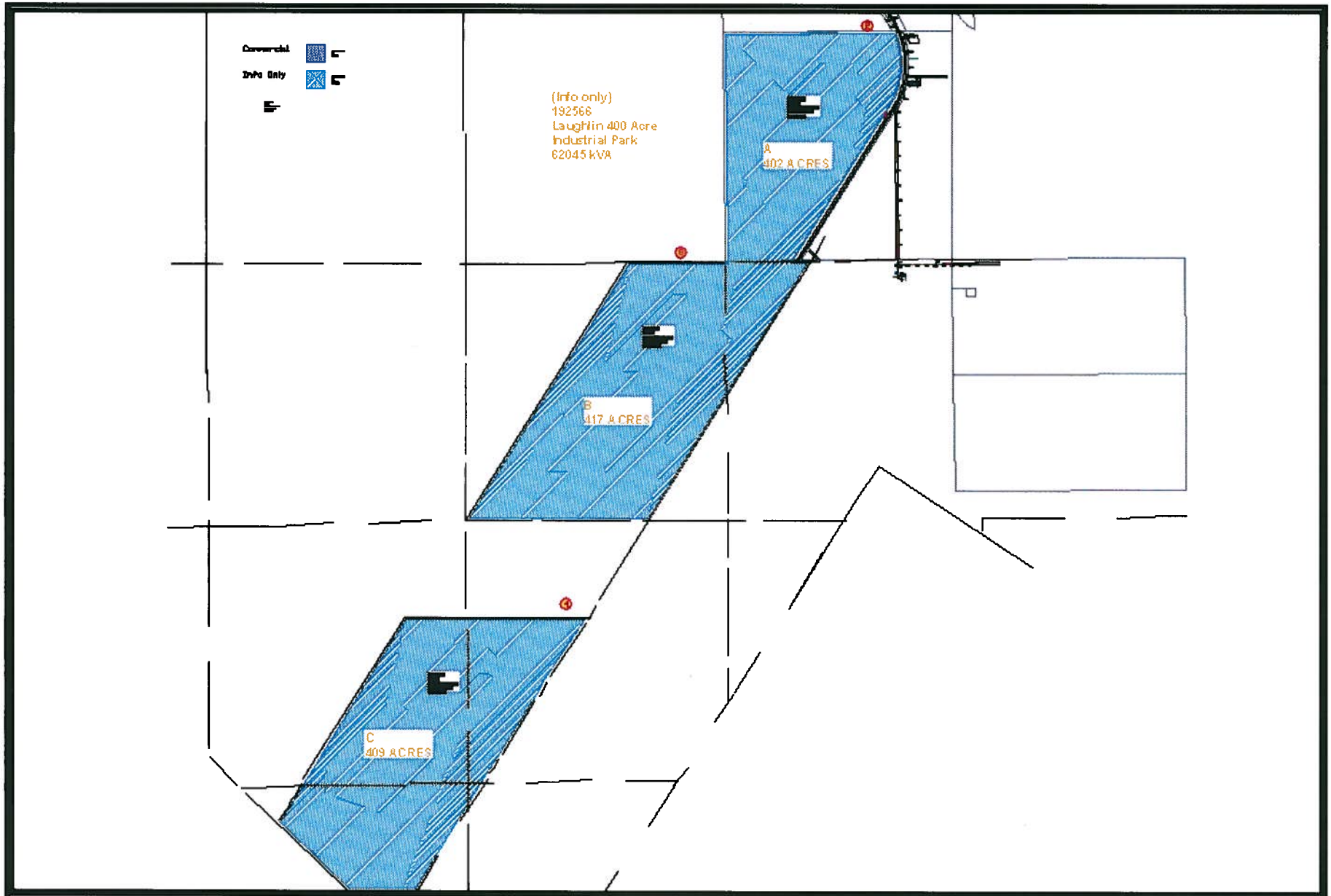



Laughlin 400 Acre Industrial Park

| | |
|---|---|
| Planner: | Mark L. Skrable |
| Date: | 6/11/09 |
| Rev:- | Rev. |
| Project ID: | 192556 |

NVEnergy

DISTRIBUTION PLANNING

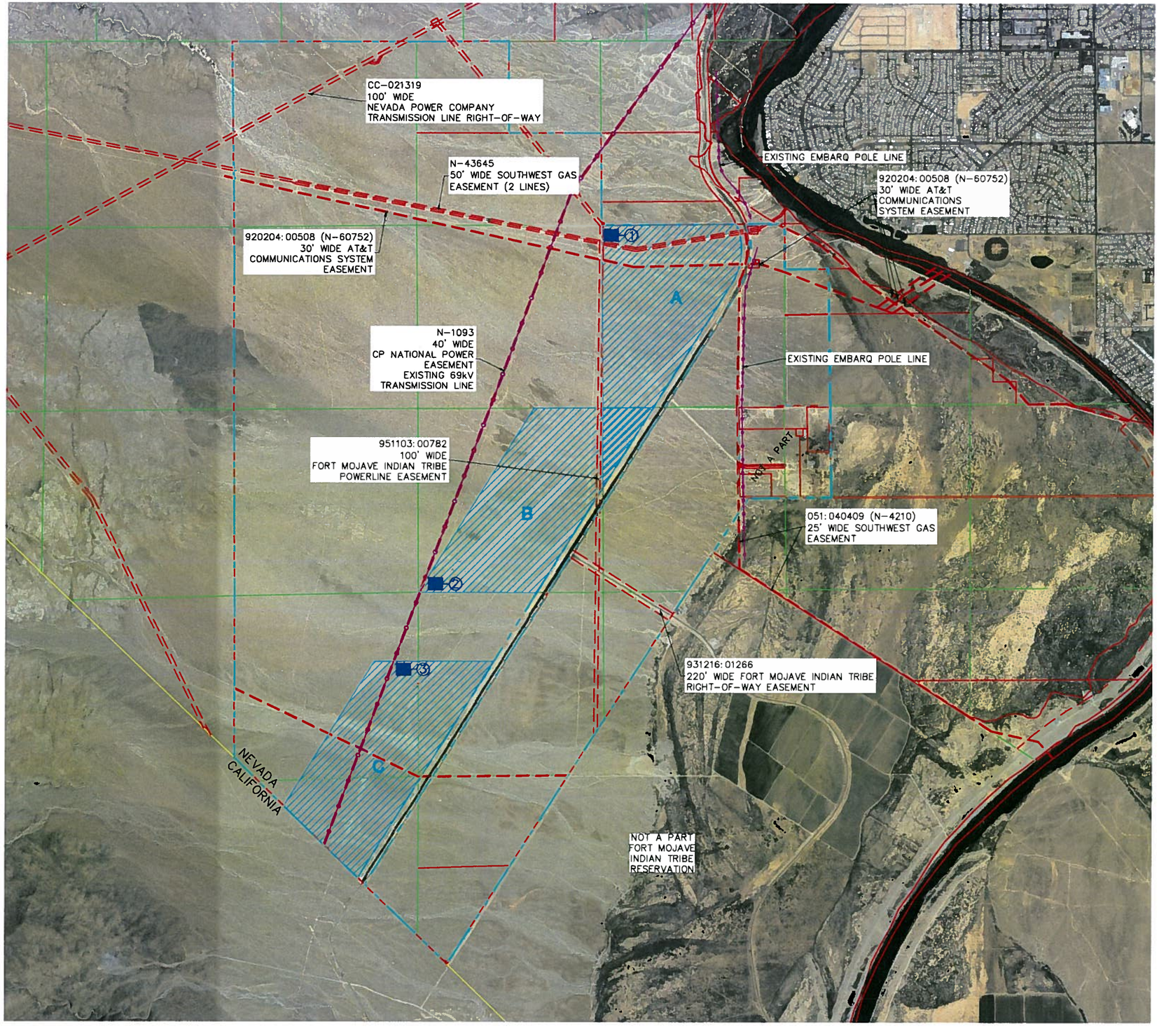



**Laughlin 400 Acre Industrial Park**

| | |
|---|---|
| Planner: | Mark L. Skrable |
| Date: | 6/11/09 |
| Rev:- | Rev. |
| Project ID: | 192566 |

NVEnergy

*DISTRIBUTION PLANNING*




**LEGEND**

- CALIFORNIA / NEVADA STATE BOUNDARY
- SECTION LINE
- EASEMENT LINE
- LIMIT OF FEASABILITY STUDY
- ASSESSOR'S PARCEL LINE
- SECTION NUMBER
- EXISTING 69kV TRANSMISSION LINE
- EXISTING EMBARQ POLE LINE

44.8 MVA DISTRIBUTION SUBSTATION (LIS)
(2) 22.4 MVA, 69/24.9 kV TRANSFORMER BANKS
(2) 1200 AMP FEEDER BREAKER AND GATEWAYS

LOCATION NUMBER
1 IS TO BE USED FOR LOCATION A
2 IS TO BE USED FOR LOCATION B
3 IS TO BE USED FOR LOCATION C

W.O.#: 7180
DATE: 7/6/2009
BY: MKD
SCALE: 1"=2000'
SHEET 1 OF 1

# SUBSTATION LOCATION EXHIBIT
## LAUGHLIN'S 9000 ACRE SOUTHLAND

vtn nevada

H:\7180\Engineering Drawings\Exhibits\7180-Power.dwg, 7/7/2009 3:27:46 PM

**SOUTHWEST GAS CORPORATION**

## LETTER OF TRANSMITTAL

| | | | |
|---|---|---|---|
| TO: | VTN Consulting | DATE: | June 18, 2009 |
| | 2727 South Rainbow Boulevard | ENTITY: | |
| | Las Vegas, NV,. 89146 | PHONE: | (702) 253-2381 |
| ATTN: | Deborah Kaleikini-Johnson | FRAN: ☐ | NEW BUS: ☒ |

PROJECT NAME: Laughlin 400 Acre Industrial Park

| FORWARDING BY: | SUBMITTAL RECEIVED: | DATE SUBMITTAL RECEIVED: |
|---|---|---|
| Pick-up | Preliminary | June 9, 2009 |

| NO. OF COPIES | DESCRIPTION |
|---|---|
| 1 | see attached |

☐ No SWG Facilities presently exist within the project area of the Civil Plans submitted.

☒ Attached to the set of Civil Plans are copies of the SWG Maps & As-builts showing the existing and/or proposed facilities within the project area. These SWG facilities must be shown on the Civil Plans.

☐ The Civil Plans have been "red-lined" to indicate the approximate location of the existing SWG Facilities. Please transfer the information to the updated Civil Plans.

☐ A note must be added near all High-Pressure Gas lines stating, "Caution: High-Pressure Gas!" and "Call Southwest Gas at 365-2296 for Standby when excavating over or near high Pressure Gas lines." All High-Pressure Gas crossings must be potholed and shown in Profile on the Civil Plans.

☐ 100% Civil Plans must be submitted for review prior to requesting signature.

☐ The Civil Plans have been reviewed and are ready for signature.

☒ All remarks and comments listed on this transmittal must be addressed prior to requesting signature.

**REQUIREMENTS:** When requesting signatures, bring the most recent Transmittal, Redlines, all SWG Maps & As-builts listed above, and a complete set of the 100% Civil Plans no later than December 9, 2009.

**COMMENTS:**

SIGNED: ShaLonda Palmore II

ShaLonda Palmore II
Engineering Intern
Southern Nevada Division

Phone: (702) 365-2022
Fax: (702) 221-4116
Email: shalonda.palmore@swgas.com

**From:** Bryan Thatcher
**To:** Pistone, Linda
**Date:** 6/8/2009 8:52 AM
**Subject:** Fwd: Laughlin 400 Acre Industrial Park
**Attachments:** Laughlin 400 Acre Industrial Park

Linda, please have this redlined, as long as the attached info provides the specific location.

Thanks!
Bryan

>>> Tony Stipanov 6/5/2009 4:20 PM >>>
Bryan,

This customer is requesting a red line drawing.

thanks Tony

RECEIVED
JUN 09 2009
DIV. ENG.

NOTICE: THE UTILITY LOCATIONS SHOWN ON THIS MAP ARE APPROXIMATE ONLY, AND ARE NOT RELIABLE FOR CONSTRUCTION PURPOSES FOR ACTUAL FIELD LOCATIONS. CALL USA. 1-800-227-2600

DATE: 06-16-09 INITIAL: TXi2

# Linda Pistone - Laughlin 400 Acre Industrial Park

**From:** "Deborah Johnson" <deborahj@vtnnv.com>
**To:** <tony.stipanov@swgas.com>
**Date:** 6/4/2009 3:40 PM
**Subject:** Laughlin 400 Acre Industrial Park
**Attachments:** 7180-BNDY-Layout1.pdf; 7180-site-Layout1.pdf; Valence.pdf

---

Tony,

Here is the information that we spoke about on the phone. The pdf with BNDY in the title is the three different locations Clark County has asked us to analyze. The second pdf is the break down of the site, as far as layout and building sizes, and the third pdf shows all of this information in a table. (I don't know if the building size makes any difference but I figured I would give you all the information that we had.) I also have information as to probable uses if this information will be helpful in determining size of gas line to feed the site. Let me know if you need this additional information.

Thanks,

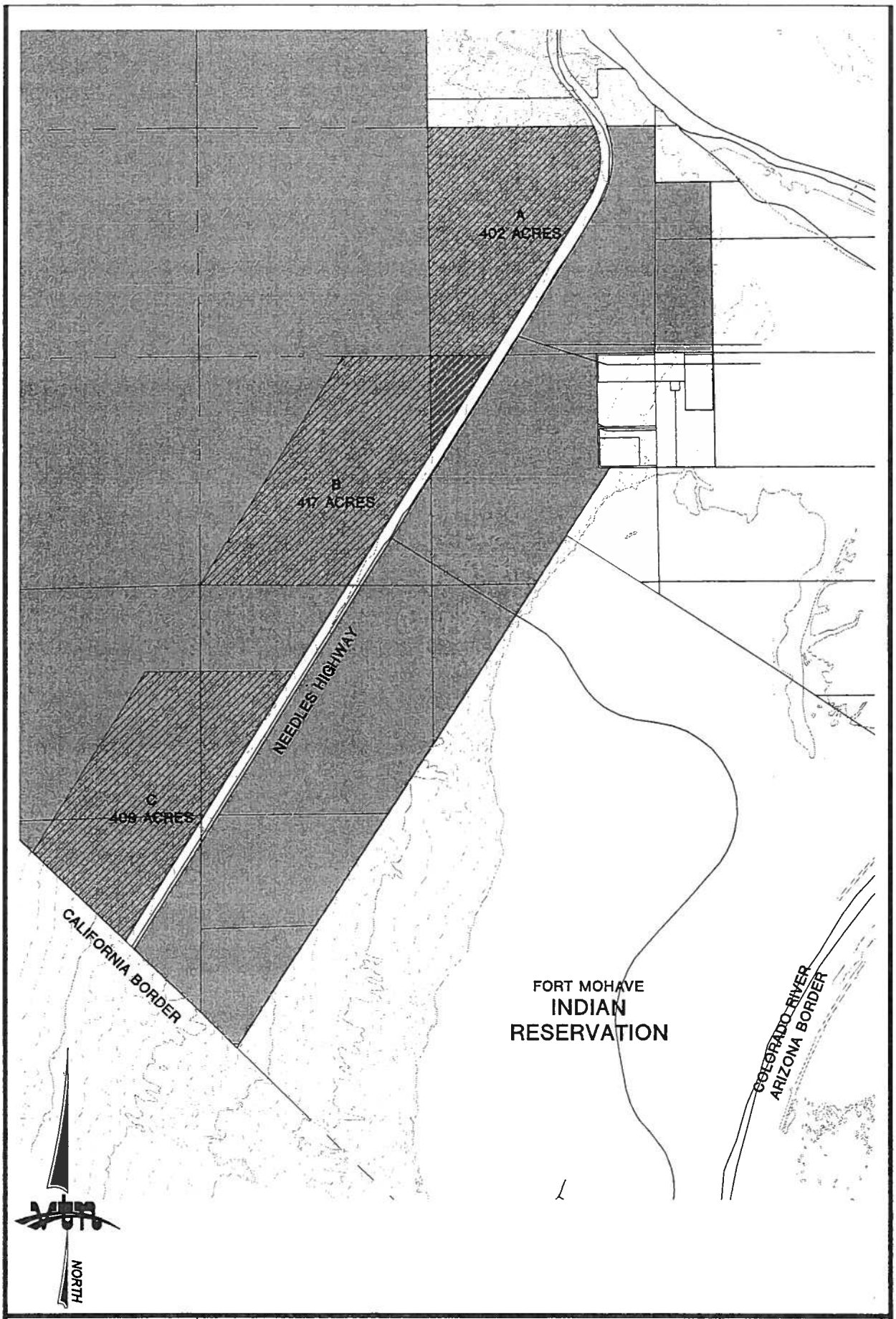
Deborah Kaleikini-Johnson, P.E.
Project Manager

CONSULTING

2727 South Rainbow Blvd.
Las Vegas, NV 89146

phone: 253-2381
fax: 362-2597

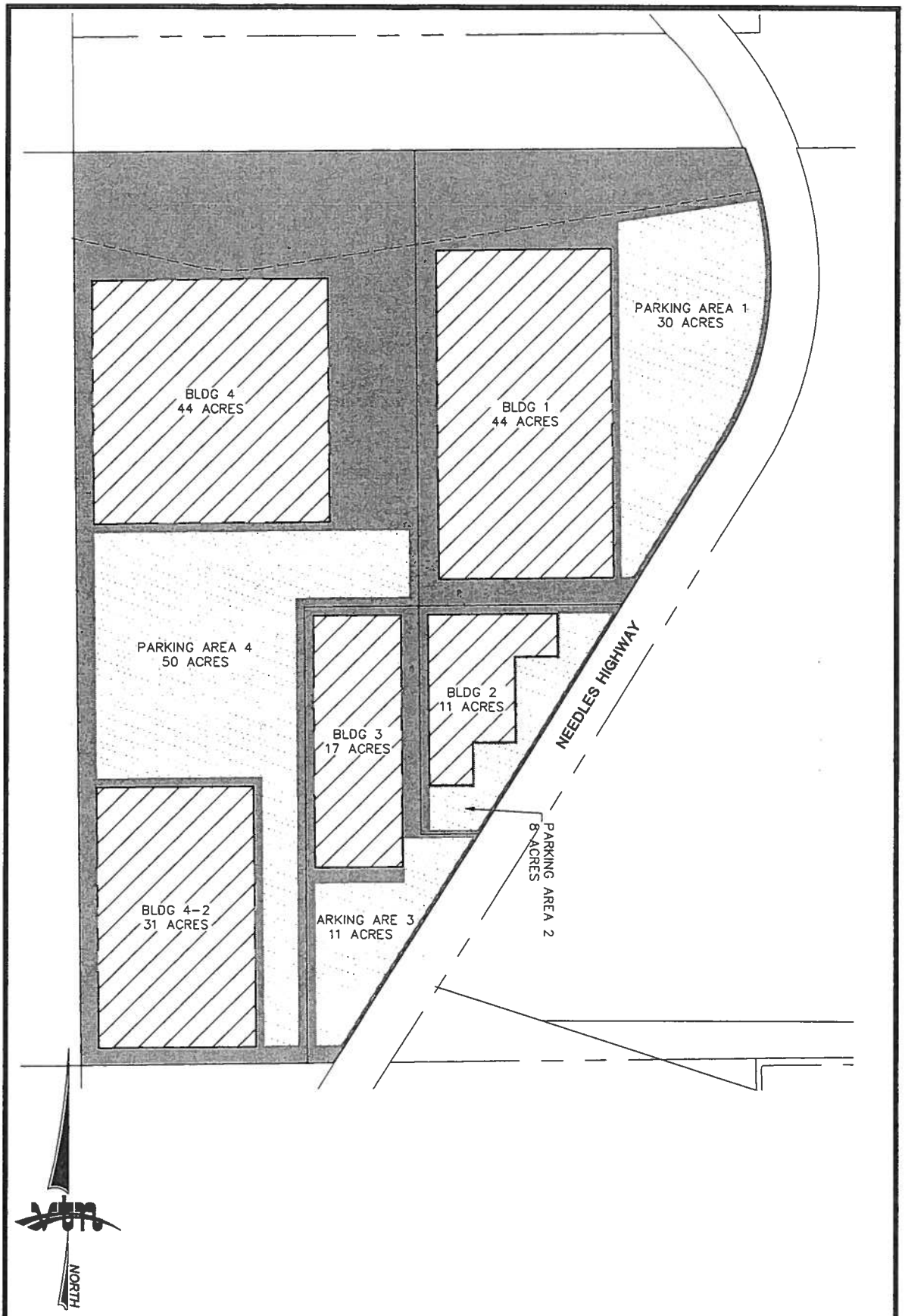
deborahj@vtnnv.com




vtn Nevada

PROPOSED SITE LOCATIONS
400± ACRE INDUSTRIAL PARK

| | |
|---|---|
| W.O.#: | 7180 |
| DATE: | 6-1-09 |
| BY: | R.M.S. |
| SCALE: | 1"=2000' |
| SHEET | 1 OF 1 |




vtn nevada

400± ACRE INDUSTRIAL PARK
PRELIMINARY BUILDING EXHIBIT
SECTION 8

| | |
|---|---|
| W.O.#: | 7180 |
| DATE: | 6-1-09 |
| BY: | R.M.S. |
| SCALE: | 1"=500' |
| SHEET | 1 OF 1 |

NOTICE: THE UTILITY LOCATIONS SHOWN ON THIS MAP ARE APPROXIMATE ONLY, AND ARE NOT RELIABLE FOR CONSTRUCTION PURPOSES. FOR ACTUAL FIELD LOCATIONS. CALL USA. 1-800-227-2600

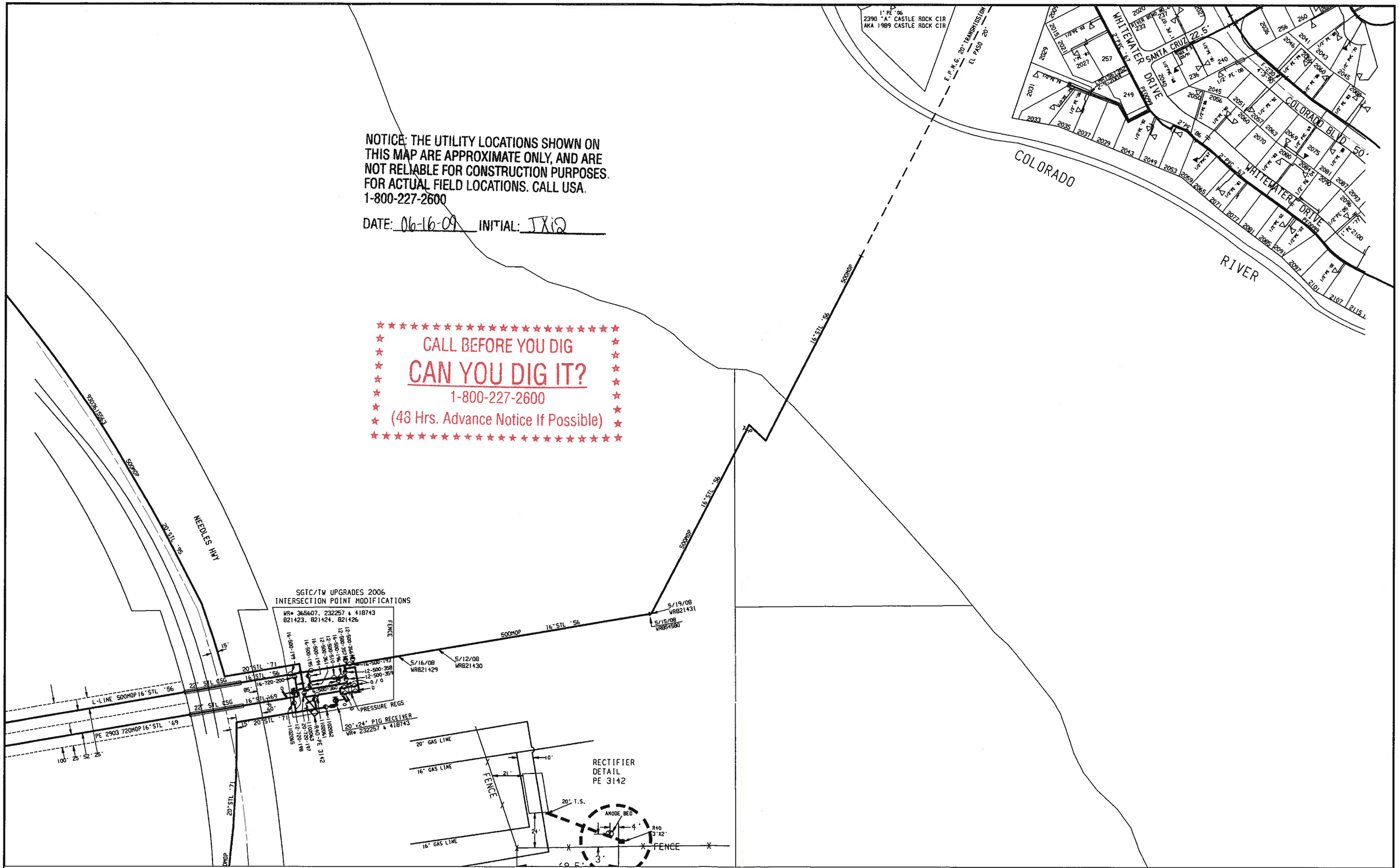
DATE: 06-16-09 INITIAL: JXiQ

CALL BEFORE YOU DIG

CAN YOU DIG IT?

1-800-227-2600

(48 Hrs. Advance Notice If Possible)



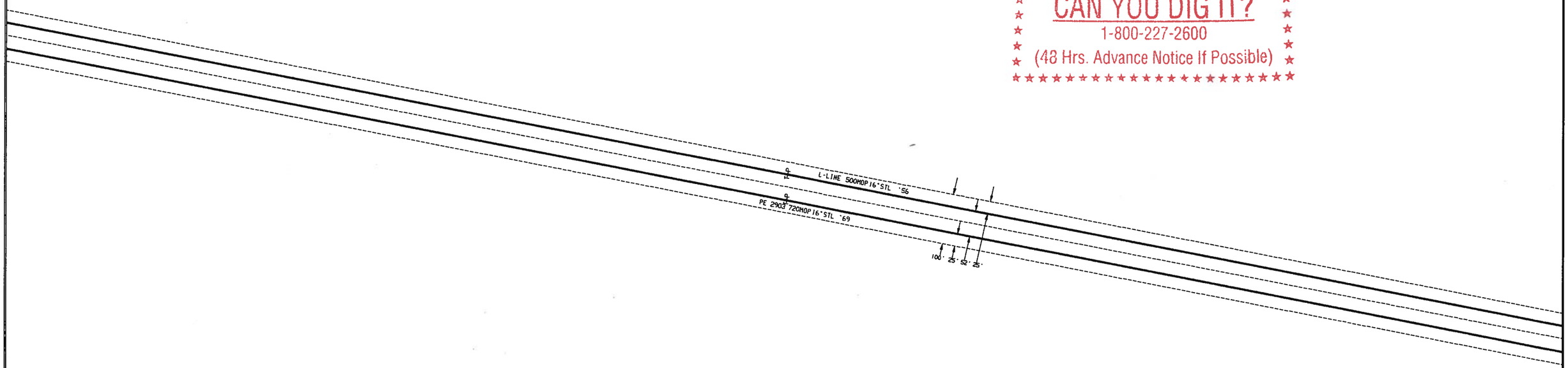

06/16/2009

x780y126

NOTICE: THE UTILITY LOCATIONS SHOWN ON
THIS MAP ARE APPROXIMATE ONLY, AND ARE
NOT RELIABLE FOR CONSTRUCTION PURPOSES.
FOR ACTUAL FIELD LOCATIONS, CALL US
1-800-227-2600

DATE: 06-16-09 INITIAL JXi2

CALL BEFORE YOU DIG
CAN YOU DIG IT?
1-800-227-2600
(48 Hrs. Advance Notice If Possible)




06/16/2009

x771y126

NOTICE: THE UTILITY LOCATIONS SHOWN ON THIS MAP ARE APPROXIMATE ONLY, AND ARE NOT RELIABLE FOR CONSTRUCTION PURPOSES. FOR ACTUAL FIELD LOCATIONS. CALL USA. 1-800-227-2600

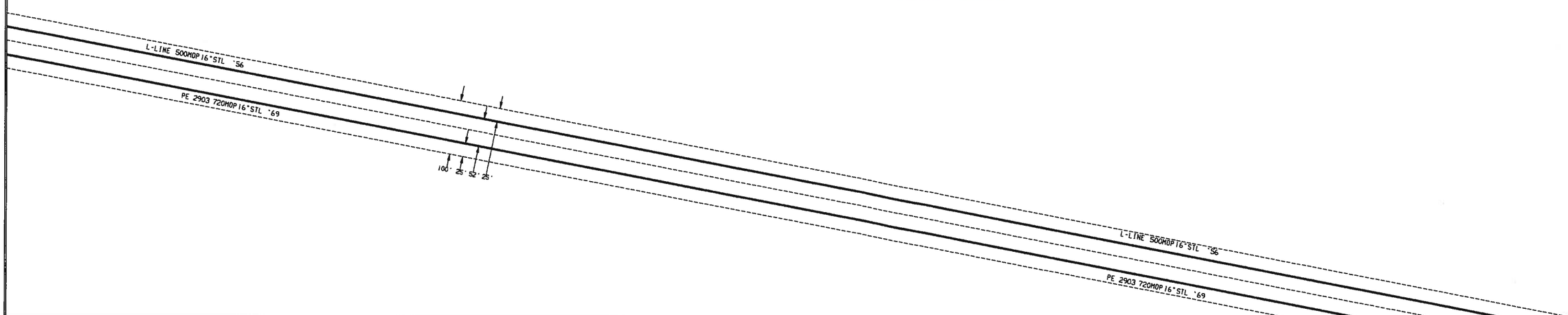
DATE: 06-16-09 INITIAL: JXiQ

CALL BEFORE YOU DIG

CAN YOU DIG IT?

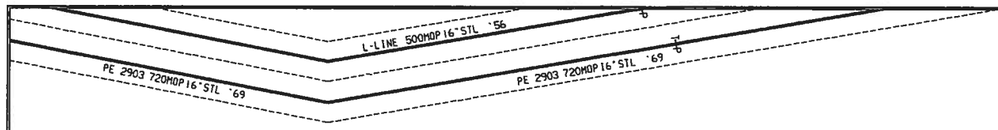
1-800-227-2600

(48 Hrs. Advance Notice If Possible)




06/16/2009

x774y126




NOTICE: THE UTILITY LOCATIONS SHOWN ON THIS MAP ARE APPROXIMATE ONLY, AND ARE NOT RELIABLE FOR CONSTRUCTION PURPOSES. FOR ACTUAL FIELD LOCATIONS. CALL USA. 1-800-227-2600

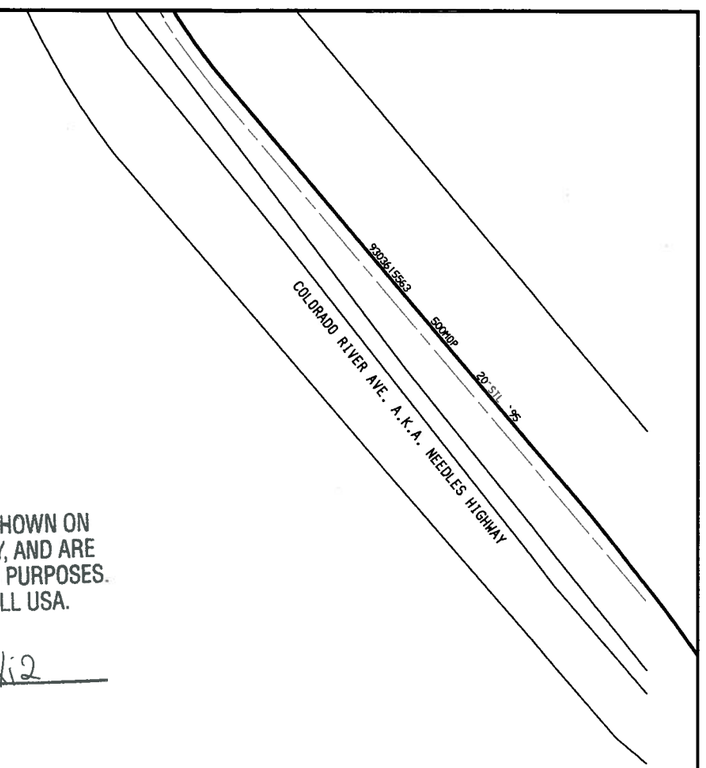
DATE: 06-16-09 INITIAL: JXiQ

CALL BEFORE YOU DIG

CAN YOU DIG IT?

1-800-227-2600

(48 Hrs. Advance Notice If Possible)




NOTICE: THE UTILITY LOCATIONS SHOWN ON THIS MAP ARE APPROXIMATE ONLY, AND ARE NOT RELIABLE FOR CONSTRUCTION PURPOSES. FOR ACTUAL FIELD LOCATIONS. CALL USA. 1-800-227-2600

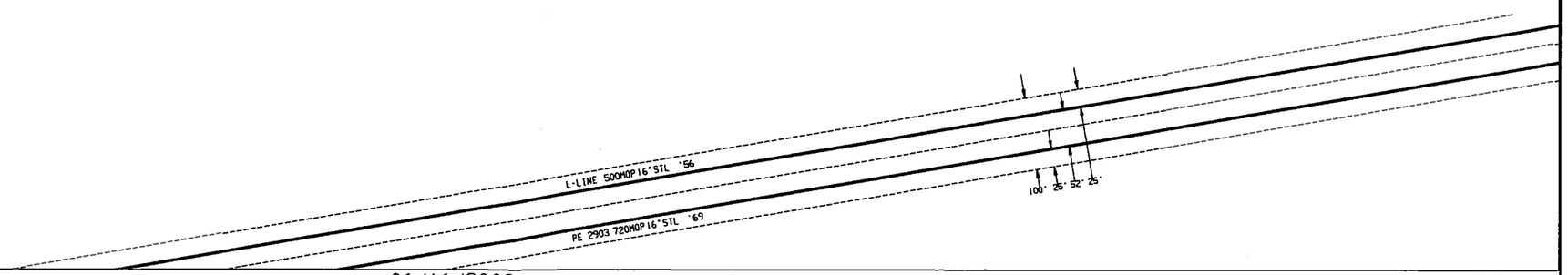
DATE: 06-16-09 INITIAL: TXi2

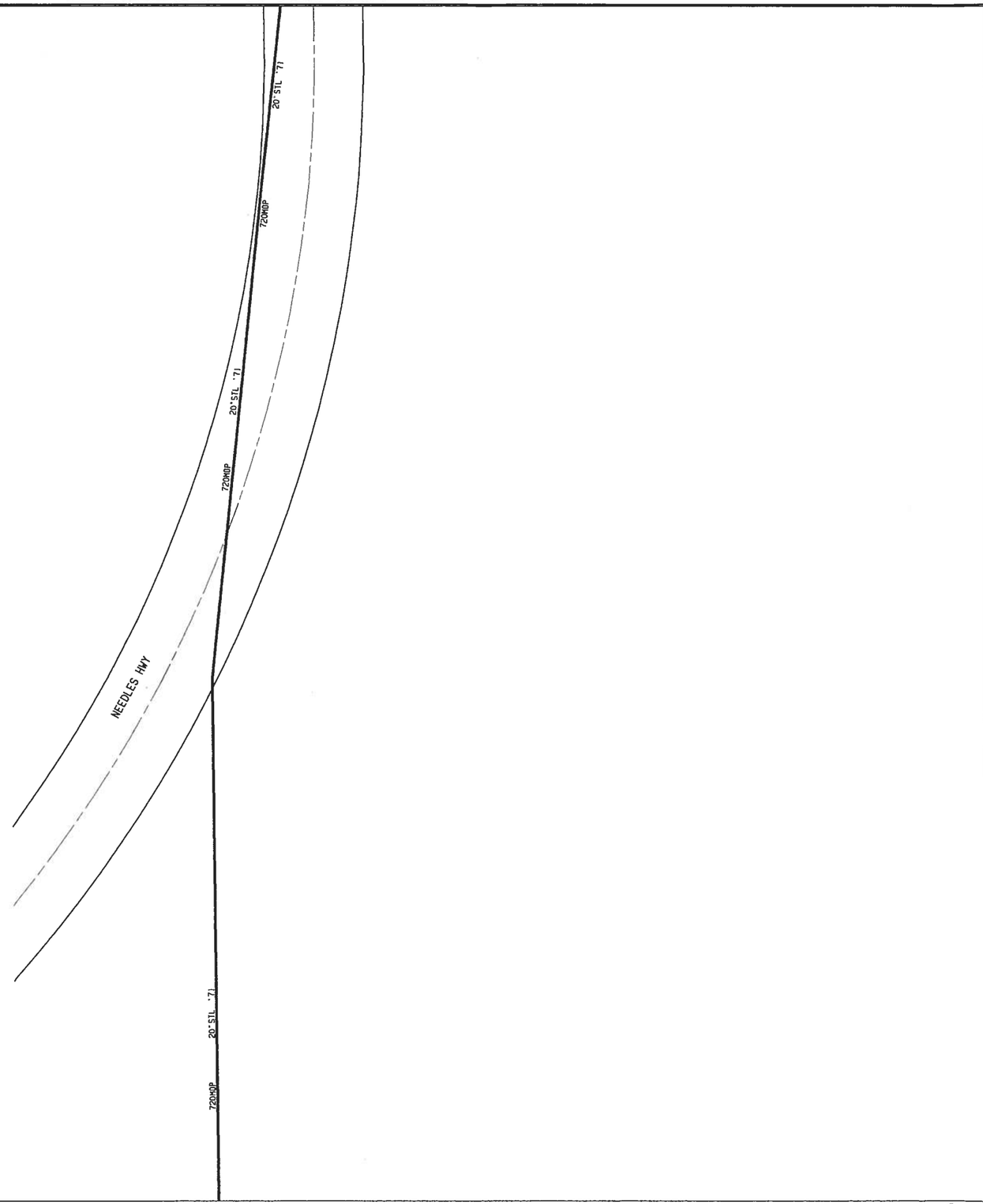
CALL BEFORE YOU DIG

CAN YOU DIG IT?

1-800-227-2600

(48 Hrs. Advance Notice If Possible)



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DATE: 06-16-09 INITIAL: JXiQ

CALL BEFORE YOU DIG

CAN YOU DIG IT?

1-800-227-2600

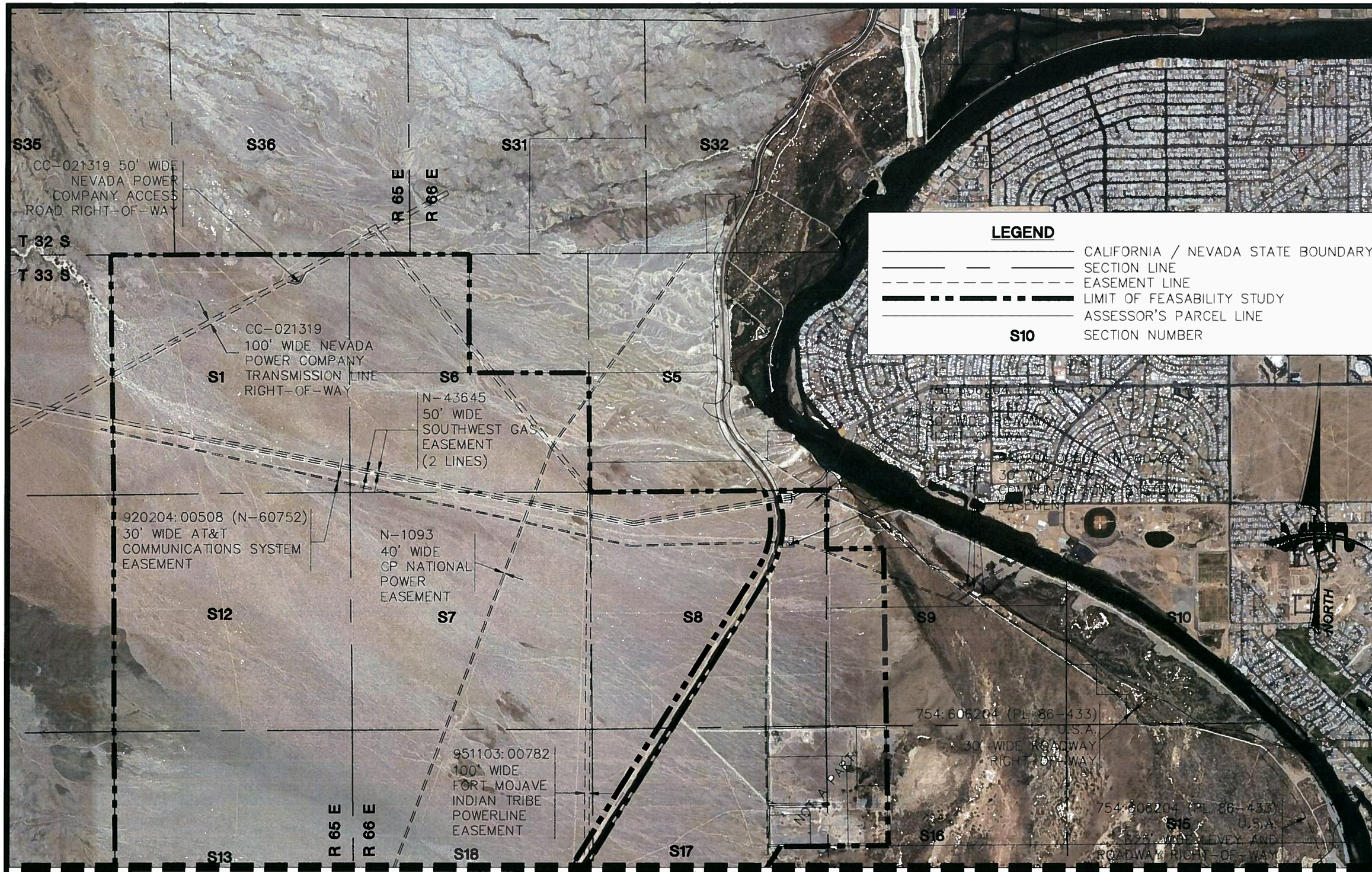
(48 Hrs. Advance Notice If Possible)

06/16/2009

x780y124

# APPENDIX I

SURVEY




MATCHLINE-SEE SHEET 2

W.O.#: 7180
DATE: 7-6-09
BY: R.M.S.
SCALE: 1"=2000'
SHEET 1 OF 2

# ENCUMBRANCE MAP EXHIBIT
## LAUGHLIN'S 9,000 ACRE SOUTHLAND

vtn nevada

MATCHLINE-SEE SHEET 1

W.O.#: 7180
DATE: 7-6-09
BY: R.M.S.
SCALE: 1"=2000'
SHEET 2 OF 2

ENCUMBRANCE MAP EXHIBIT
LAUGHLIN'S 9,000 ACRE
SOUTHLAND

vtn nevada

# APPENDIX J
COST ANALYSIS

# COST ANALYSIS

## SITE A

| WATER - (OPTION 1) | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Package Treatment Plant | EA | 1 | $ 5,300,000.00 | $ 5,300,000 |
| Construct Underground Power | EA | 1 | $ 2,952,000.00 | $ 2,952,000 |
| Drill and Equip well (2 wells) | EA | 1 | $ 3,000,000.00 | $ 3,000,000 |
| 2 MG Storage | EA | 1 | $ 2,000,000.00 | $ 2,000,000 |
| Construct pumping station downstream of Package Treatment Plant (to serve 890 PZ) | EA | 1 | $ 2,300,000.00 | $ 2,300,000 |
| 20-inch diameter raw water pipeline | LF | 1,000 | $ 243.60 | $ 243,600 |
| 20-inch diameter inlet/outlet pipeline | LF | 4,900 | $ 243.55 | $ 1,193,400 |
| *WATER - (OPTION 1) SUB-TOTAL* | | | $ | 16,989,000 |

| WATER - (OPTION 2) | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| 2 MG Storage | EA | 1 | $ 2,000,000 | $ 2,000,000 |
| Add unit to existing Casino Drive Pumping Station | EA | 1 | $ 345,000 | $ 345,000 |
| Construct pumping station in South (to serve 890 PZ) | EA | 1 | $ 2,300,000 | $ 2,300,000 |
| Construct Underground Power | EA | 1 | $ 2,952,000 | $ 2,952,000 |
| 42-inch diameter pipeline along Casino Drive | LF | 500 | $ 648.40 | $ 324,200 |
| 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | LF | 14,760 | $ 302.31 | $ 4,462,100 |
| 20-inch diameter inlet/outlet pipeline | LF | 4,900 | $ 243.55 | $ 1,193,400 |
| | | | $ - | $ - |
| | | | | |
| *WATER - (OPTION 2) SUB-TOTAL* | | | $ | 13,576,700 |
| *OVER SIZING ESTIMATE (12 to 24-inch)* | | | $ | 2,042,800 |
| *WATER - (OPTION 2) TOTAL* | | | $ | 15,619,500 |

| WATER - (OPTION 3) | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Intake | EA | 1 | $ 1,000,000.00 | $ 1,000,000 |
| Package Treatment Plant | EA | 1 | $ 5,300,000.00 | $ 5,300,000 |
| Construct Underground Power | EA | 1 | $ 2,952,000.00 | $ 2,952,000 |
| 2 MG Storage | EA | 1 | $ 2,000,000.00 | $ 2,000,000 |
| Construct raw water pumping station in South | EA | 1 | $ 3,190,000.00 | $ 3,190,000 |
| Construct finished water pumping station in South (to serve 890 PZ) | EA | 1 | $ 3,580,000.00 | $ 3,580,000 |
| 20-inch diameter raw water pipeline | LF | 1,000 | $ 243.60 | $ 243,600 |
| 20-inch diameter inlet/outlet pipeline | LF | 4,900 | $ 243.55 | $ 1,193,400 |
| | | | | |
| *WATER - (OPTION 3) SUB-TOTAL* | | | $ | 19,459,000 |

| SANITARY SEWER | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| 12" PVC Sewer | LF | 730 | $ 85 | $ 62,050 |
| 48" SS Manhole ( d > 6' ) | EA | 2 | $ 13,000 | $ 26,000 |
| Modular Wastewater Treatment Plant - Public | EA | 1 | $ 40,000,000 | $ 40,000,000 |
| | | | $ - | $ - |
| | | | $ - | $ - |
| | | | $ - | $ - |
| | | | | |
| *SANITARY SEWER SUB-TOTAL* | | | $ | 40,088,050 |

| DRAINAGE | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Concrete Channel 70'W 5D' 2:1 SS | LF | 1,400 | $ 1,339.29 | $ 1,875,000 |
| (5) 12' x 6' RCB @ Needles Highway | LF | 300 | $ 5,043.33 | $ 1,513,000 |
| Gabion Dike 10' High | LF | 6,300 | $ 258.25 | $ 1,627,000 |
| Gabion Channel 150'W 4'D 2:1 SS | LF | 6,300 | $ 1,332.54 | $ 8,395,000 |
| | | | | |
| *DRAINAGE SUB-TOTAL* | | | $ | 13,410,000 |

| DRY UTILITIES | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Power - 44.8 MVA Distribution Sub-Station | EA | 1 | $ 3,000,000 | $ 3,000,000 |
| Power - 69kV Transmission Line Upgrade | MI | 6 | $ 1,000,000 | $ 6,000,000 |
| Natural Gas 6" Transmission Main with 4" Subs & 2 Regulatory Stations | EA | 1 | $ 1,000,000.00 | $ 1,000,000 |
| | | | $ - | $ - |
| | | | | |
| *DRY UTILITIES SUB-TOTAL* | | | $ | 10,000,000 |

| ROADWAY | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Plantmix Bituminous Open-Graded Surface (3/4") | SY | 16,667 | $ 8.50 | $ 141,670 |
| Plantmix Bituminous Surfacing (5") | SY | 16,667 | $ 29.25 | $ 487,510 |
| Type I, Class B Aggregate Base (12") | CY | 5,556 | $ 26.00 | $ 144,456 |
| | | | $ - | $ - |
| | | | | |
| *ROADWAY SUB-TOTAL* | | | $ | 773,635 |

| | |
|---|---|
| ***TOTAL COST (WITH WATER OPTION 1)*** | **$ 81,260,685** |
| ***15% CONTINGENCY*** | **$ 12,189,103** |
| ***TOTAL COST (WITH CONTINGENCY)*** | **$ 93,449,788** |

| | |
|---|---|
| ***TOTAL COST (WITH WATER OPTION 2)*** | **$ 79,891,185** |
| ***15% CONTINGENCY*** | **$ 11,983,678** |
| ***TOTAL COST (WITH CONTINGENCY)*** | **$ 91,874,863** |

| | |
|---|---|
| ***TOTAL COST (WITH WATER OPTION 3)*** | **$ 83,730,685** |
| ***15% CONTINGENCY*** | **$ 12,559,603** |
| ***TOTAL COST (WITH CONTINGENCY)*** | **$ 96,290,288** |

# COST ANALYSIS

## SITE B

| WATER - (OPTION 1) | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Package Treatment Plant | EA | 1 | $ 5,300,000.00 | $ 5,300,000 |
| Construct Underground Power | EA | 1 | $ 4,132,000.00 | $ 4,132,000 |
| Drill and Equip well (2 wells) | EA | 1 | $ 3,000,000.00 | $ 3,000,000 |
| 2 MG Storage | EA | 1 | $ 2,000,000.00 | $ 2,000,000 |
| Construct pumping station downstream of Package Treatment Plant (to serve 1000 PZ) | EA | 1 | $ 2,300,000.00 | $ 2,300,000 |
| 20-inch diameter raw water pipeline | LF | 1,000 | $ 243.60 | $ 243,600 |
| 20-inch diameter inlet/outlet pipeline | LF | 7,100 | $ 243.55 | $ 1,729,200 |
| *WATER - (OPTION 1) SUB-TOTAL* | | | $ | 18,704,800 |

| WATER - (OPTION 2) | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| 2 MG Storage | EA | 1 | $ 2,000,000 | $ 2,000,000 |
| Add unit to existing Casino Drive Pumping Station | EA | 1 | $ 345,000 | $ 345,000 |
| Construct pumping station in South (to serve 1000 PZ) | EA | 1 | $ 3,230,000 | $ 3,230,000 |
| Construct Underground Power | EA | 1 | $ 4,132,000 | $ 4,132,000 |
| 42-inch diameter pipeline along Casino Drive | LF | 500 | $ 648.40 | $ 324,200 |
| 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | LF | 14,760 | $ 302.31 | $ 4,462,100 |
| 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | LF | 5,900 | $ 302.32 | $ 1,783,700 |
| 20-inch diameter inlet/outlet pipeline | LF | 7,100 | $ 243.55 | $ 1,729,200 |
| | | | | |
| *WATER - (OPTION 2) SUB-TOTAL* | | | $ | 18,006,200 |
| *OVER SIZING ESTIMATE (12 to 24-inch)* | | | $ | 2,859,300 |
| *WATER - (OPTION 2) TOTAL* | | | $ | 20,865,500 |

| WATER - (OPTION 3) | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Intake | EA | 1 | $ 1,000,000.00 | $ 1,000,000 |
| Package Treatment Plant | EA | 1 | $ 5,300,000.00 | $ 5,300,000 |
| Construct Underground Power | EA | 1 | $ 4,132,000.00 | $ 4,132,000 |
| 2 MG Storage | EA | 1 | $ 2,000,000.00 | $ 2,000,000 |
| Construct raw water pumping station in South | EA | 1 | $ 3,190,000.00 | $ 3,190,000 |
| Construct finished water pumping station in South (to service 1000 PZ) | EA | 1 | $ 7,730,000.00 | $ 7,730,000 |
| 20-inch diameter raw water pipeline | LF | 1,000 | $ 243.60 | $ 243,600 |
| 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | LF | 5,900 | $ 302.32 | $ 1,783,700 |
| 20-inch diameter inlet/outlet pipeline | LF | 7,100 | $ 243.55 | $ 1,729,200 |
| | | | | |
| *WATER - (OPTION 3) SUB-TOTAL* | | | $ | 27,108,500 |
| *OVER SIZING ESTIMATE (12 to 24-inch)* | | | $ | 816,588 |
| *WATER - (OPTION 3) TOTAL* | | | $ | 27,925,088 |

| SANITARY SEWER | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| 12" PVC Sewer | LF | 6,600 | $ 85 | $ 561,000 |
| 48" SS Manhole ( d > 6' ) | EA | 15 | $ 13,000 | $ 195,000 |
| Modular Wastewater Treatment Plant - Public | EA | 1 | $ 40,000,000 | $ 40,000,000 |
| | | | $ - | $ - |
| | | | $ - | $ - |
| | | | $ - | $ - |
| | | | | |
| *SANITARY SEWER SUB-TOTAL* | | | $ | 40,756,000 |

| DRAINAGE | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Concrete Channel 70'W 5D' 2:1 SS | LF | 2,600 | $ 1,339.00 | $ 3,481,400 |
| (5) 12' x 6' RCB @ Needles Highway | LF | 300 | $ 5,043.33 | $ 1,513,000 |
| Gabion Dike 10' High | LF | 7,000 | $ 258.00 | $ 1,806,000 |
| Gabion Channel 150'W 4.5'D 2:1 SS | LF | 5,400 | $ 1,386.00 | $ 7,484,400 |
| Gabion Channel 150'W 4'D 2:1 SS | LF | 1,600 | $ 1,333.00 | $ 2,132,800 |
| | | | | |
| | | | | |
| *DRAINAGE SUB-TOTAL* | | | $ | 16,417,600 |

| DRY UTILITIES | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Power - 44.8 MVA Distribution Sub-Station | EA | 1 | $ 3,000,000 | $ 3,000,000 |
| Power - 69kV Transmission Line Upgrade | MI | 8 | $ 1,000,000 | $ 8,000,000 |
| Natural Gas 6" Transmission Main with 4" Subs & 2 Regulatory Stations | EA | 1 | $ 1,000,000.00 | $ 1,000,000 |
| | | | $ - | $ - |
| | | | | |
| *DRY UTILITIES SUB-TOTAL* | | | $ | 12,000,000 |

| ROADWAY | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Plantmix Bituminous Open-Graded Surface (3/4") | SY | 16,667 | $ 8.50 | $ 141,670 |
| Plantmix Bituminous Surfacing (5") | SY | 16,667 | $ 29.25 | $ 487,510 |
| Type I, Class B Aggregate Base (12") | CY | 5,556 | $ 26.00 | $ 144,456 |
| | | | $ - | $ - |
| | | | | |
| *ROADWAY SUB-TOTAL* | | | $ | 773,635 |

| | |
|---|---|
| ***TOTAL COST (WITH WATER OPTION 1)*** | **$ 88,652,035** |
| ***15% CONTINGENCY*** | **$ 13,297,805** |
| ***TOTAL COST (WITH CONTINGENCY)*** | **$ 101,949,841** |

| | |
|---|---|
| ***TOTAL COST (WITH WATER OPTION 2)*** | **$ 90,812,735** |
| ***15% CONTINGENCY*** | **$ 13,621,910** |
| ***TOTAL COST (WITH CONTINGENCY)*** | **$ 104,434,645** |

| | |
|---|---|
| ***TOTAL COST (WITH WATER OPTION 3)*** | **$ 97,872,323** |
| ***15% CONTINGENCY*** | **$ 14,680,848** |
| ***TOTAL COST (WITH CONTINGENCY)*** | **$ 112,553,172** |

# COST ANALYSIS

## SITE C

| WATER - (OPTION 1) | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Package Treatment Plant | EA | 1 | $ 5,300,000.00 | $ 5,300,000 |
| Construct Underground Power | EA | 1 | $ 5,792,000.00 | $ 5,792,000 |
| Drill and Equip well (2 wells) | EA | 1 | $ 3,000,000.00 | $ 3,000,000 |
| 2 MG Storage | EA | 1 | $ 2,000,000.00 | $ 2,000,000 |
| Construct pumping station downstream of Package Treatment Plant (to serve 1130 PZ) | EA | 1 | $ 2,300,000.00 | $ 2,300,000 |
| 20-inch diameter raw water pipeline | LF | 1,000 | $ 243.60 | $ 243,600 |
| 20-inch diameter inlet/outlet pipeline | LF | 9,000 | $ 243.54 | $ 2,191,900 |
| *WATER - (OPTION 1) SUB-TOTAL* | | | $ | 20,827,500 |

| WATER - (OPTION 2) | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| 2 MG Storage | EA | 1 | $ 2,000,000 | $ 2,000,000 |
| Add unit to existing Casino Drive Pumping Station | EA | 1 | $ 345,000 | $ 345,000 |
| Construct pumping station in South (to serve 1130 PZ) | EA | 1 | $ 5,600,000 | $ 5,600,000 |
| Construct Underground Power | EA | 1 | $ 5,792,000 | $ 5,792,000 |
| 42-inch diameter pipeline along Casino Drive | LF | 500 | $ 648.40 | $ 324,200 |
| 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | LF | 14,760 | $ 302.31 | $ 4,462,100 |
| 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | LF | 14,200 | $ 302.31 | $ 4,292,800 |
| 20-inch diameter inlet/outlet pipeline | LF | 9,000 | $ 243.54 | $ 2,191,900 |
| | | | | |
| *WATER - (OPTION 2) SUB-TOTAL* | | | $ | 25,008,000 |
| *OVER SIZING ESTIMATE (12 to 24-inch)* | | | $ | 4,008,100 |
| *WATER - (OPTION 2) TOTAL* | | | $ | 29,016,100 |

| WATER - (OPTION 3) | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Intake | EA | 1 | $ 1,000,000.00 | $ 1,000,000 |
| Package Treatment Plant | EA | 1 | $ 5,300,000.00 | $ 5,300,000 |
| Construct Underground Power | EA | 1 | $ 5,792,000.00 | $ 5,792,000 |
| 2 MG Storage | EA | 1 | $ 2,000,000.00 | $ 2,000,000 |
| Construct raw water pumping station in South | EA | 1 | $ 3,190,000.00 | $ 3,190,000 |
| Construct finished water pumping station in South (to service 1130 PZ) | EA | 1 | $ 8,520,000.00 | $ 8,520,000 |
| 20-inch diameter raw water pipeline | LF | 1,000 | $ 243.60 | $ 243,600 |
| 12-inch (oversized to 24-inch) diameter pipeline along Needles Highway | LF | 14,200 | $ 302.31 | $ 4,292,800 |
| 20-inch diameter inlet/outlet pipeline | LF | 9,000 | $ 243.54 | $ 2,191,900 |
| | | | | |
| *WATER - (OPTION 3) SUB-TOTAL* | | | $ | 32,530,300 |
| *OVER SIZING ESTIMATE (12 to 24-inch)* | | | $ | 1,965,349 |
| *WATER - (OPTION 3) TOTAL* | | | $ | 34,495,649 |

| SANITARY SEWER | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| 15" PVC Sewer | LF | 15,300 | $ 90 | $ 1,377,000 |
| 48" SS Manhole ( d > 6' ) | EA | 34 | $ 13,000 | $ 442,000 |
| Modular Wastewater Treatment Plant - Public | EA | 1 | $ 40,000,000 | $ 40,000,000 |
| | | | $ - | $ - |
| | | | $ - | $ - |
| | | | $ - | $ - |
| | | | | |
| *SANITARY SEWER SUB-TOTAL* | | | $ | 41,819,000 |

| DRAINAGE | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Concrete Channel 70'W 7'D 0:1 SS | LF | 3,200 | $ 1,765.67 | $ 5,650,136 |
| Rip-rap lined Berm 10'H 62'W 12'TW | LF | 4,800 | $ 263.90 | $ 1,266,706 |
| Miscellaneous Contingency (10%) | EA | 1 | $ 691,685 | $ 691,685 |
| | | | | $ - |
| | | | | |
| *DRAINAGE SUB-TOTAL* | | | $ | 7,608,527 |

| DRY UTILITIES | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Power - 44.8 MVA Distribution Sub-Station | EA | 1 | $ 3,000,000 | $ 3,000,000 |
| Power - 69kV Transmission Line Upgrade | MI | 8.5 | $ 1,000,000 | $ 8,500,000 |
| Natural Gas 6" Transmission Main with 4" Subs & 2 Regulatory Stations | EA | 1 | $ 1,000,000.00 | $ 1,000,000 |
| | | | $ - | $ - |
| | | | | |
| *DRY UTILITIES SUB-TOTAL* | | | $ | 12,500,000 |

| ROADWAY | | | | |
|---|---|---|---|---|
| DESCRIPTION | UNIT | QUANTITY | UNIT PRICE | TOTAL COST |
| Plantmix Bituminous Open-Graded Surface (3/4") | SY | 16,667 | $ 8.50 | $ 141,670 |
| Plantmix Bituminous Surfacing (5") | SY | 16,667 | $ 29.25 | $ 487,510 |
| Type I, Class B Aggregate Base (12") | CY | 5,556 | $ 26.00 | $ 144,456 |
| | | | $ - | $ - |
| | | | | |
| *ROADWAY SUB-TOTAL* | | | $ | 773,635 |

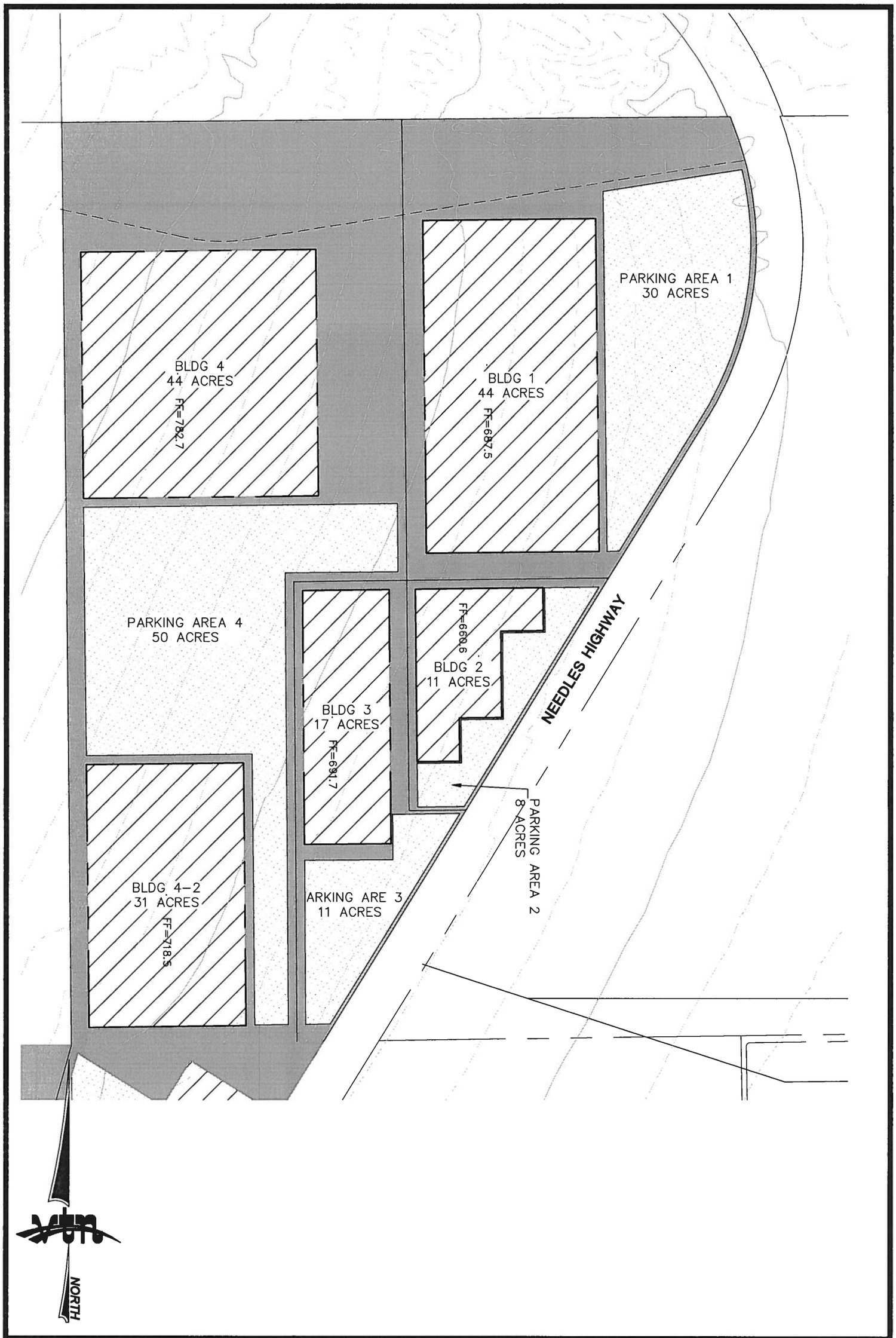
| | |
|---|---|
| ***TOTAL COST (WITH WATER OPTION 1)*** | **$ 83,528,662** |
| ***15% CONTINGENCY*** | **$ 12,529,299** |
| ***TOTAL COST (WITH CONTINGENCY)*** | **$ 96,057,961** |

| | |
|---|---|
| ***TOTAL COST (WITH WATER OPTION 2)*** | **$ 91,717,262** |
| ***15% CONTINGENCY*** | **$ 13,757,589** |
| ***TOTAL COST (WITH CONTINGENCY)*** | **$ 105,474,851** |

| | |
|---|---|
| ***TOTAL COST (WITH WATER OPTION 3)*** | **$ 97,196,811** |
| ***15% CONTINGENCY*** | **$ 14,579,522** |
| ***TOTAL COST (WITH CONTINGENCY)*** | **$ 111,776,333** |

# APPENDIX K

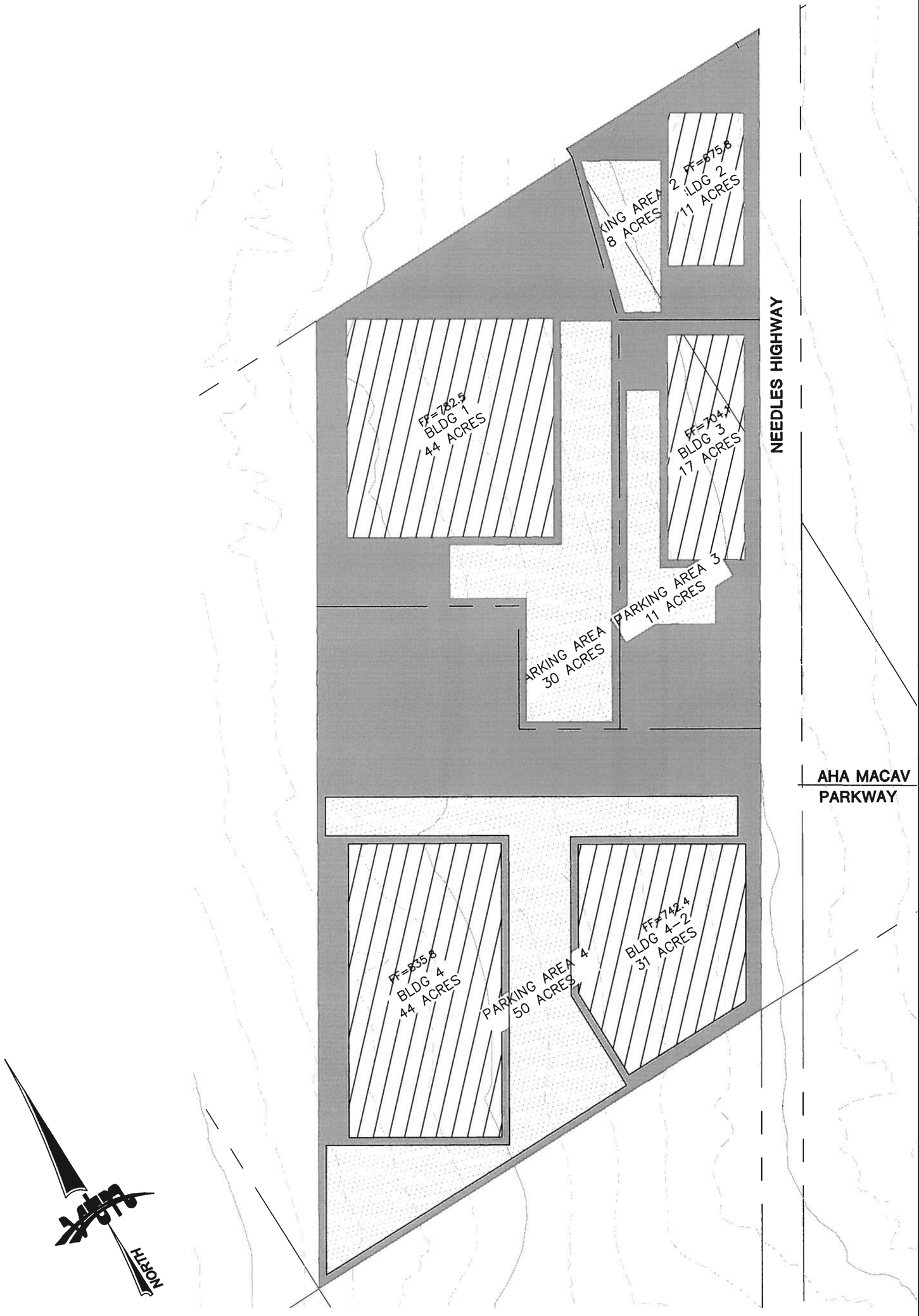
PRELIMINARY SITE PLAN




vtn nevada

**400± ACRE INDUSTRIAL PARK**
**PRELIMINARY BUILDING EXHIBIT**
**A**

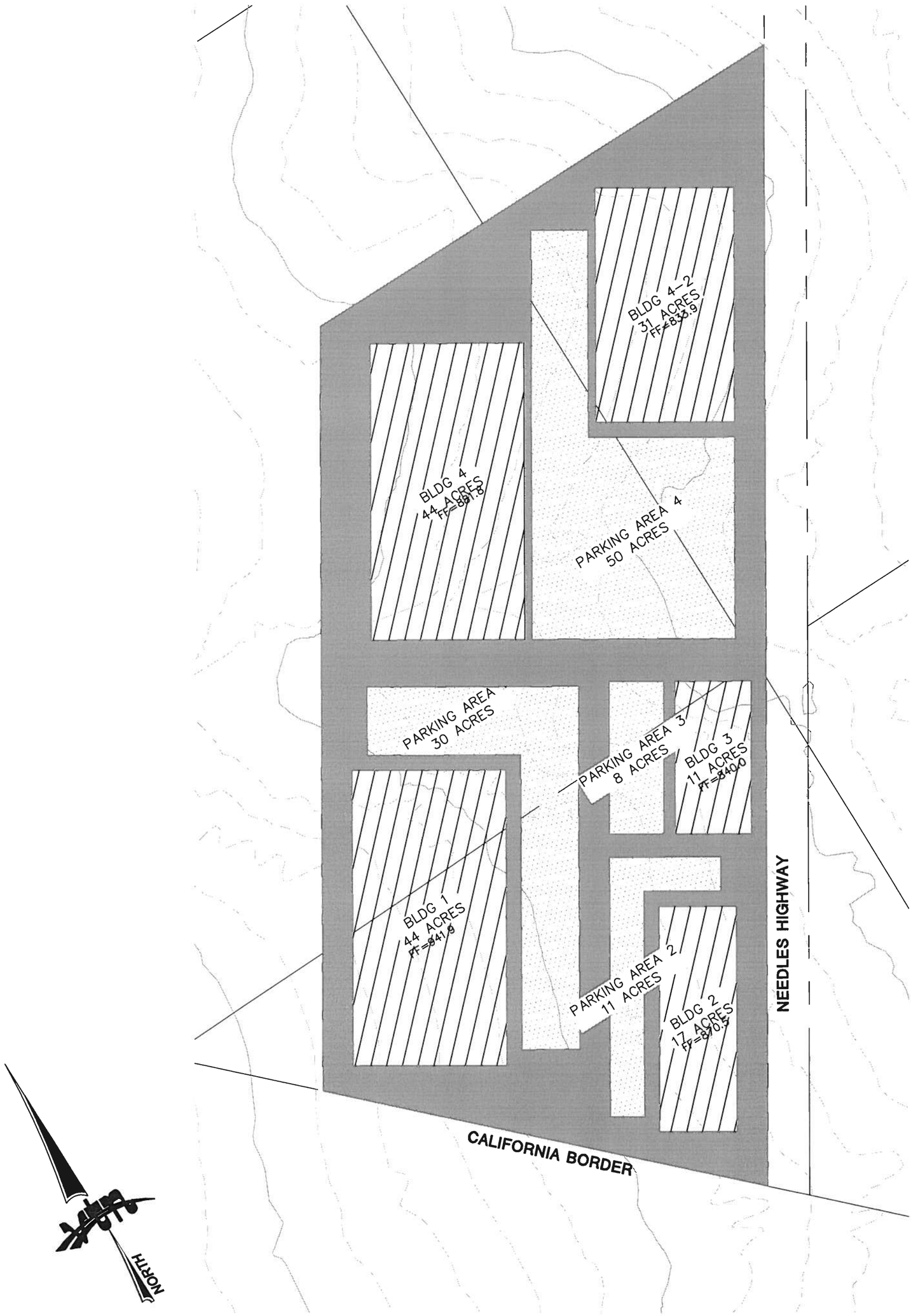
| | |
|---|---|
| W.O.#: | 7180 |
| DATE: | 6-1-09 |
| BY: | R.M.S. |
| SCALE: | 1"=500' |
| SHEET | 1 OF 3 |




vtn nevada

**400± ACRE INDUSTRIAL PARK**
**PRELIMINARY BUILDING EXHIBIT**
**B**

| | |
|---|---|
| W.O.#: | 7180 |
| DATE: | 6-1-09 |
| BY: | R.M.S. |
| SCALE: | 1"=600' |
| SHEET | 2 OF 3 |




vtn nevada

**400± ACRE INDUSTRIAL PARK**
**PRELIMINARY BUILDING EXHIBIT**
**C**

| | |
|---|---|
| W.O.#: | 7180 |
| DATE: | 6-1-09 |
| BY: | R.M.S. |
| SCALE: | 1"=600' |
| SHEET | 3 OF 3 |