

# **Washoe County Parks and Recreation**

## **Master Effluent Management Plan**



**DRAFT**

*June 2004*

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CROSS-CONNECTION CONTROL PROGRAM.**

## SECTION 8a

### RESIDENTIAL POTABLE AND NON POTABLE WATER SEPARATION

Separation between TMWA's water distribution system and non potable water supplies shall comply with the separation requirements of section 8, "Water and Sewer Separation" of TMWA's Construction & Design Standards, the requirements of this section, and the requirements of NAC445A.

Common or landscaped areas that are adjacent to a dwelling may not be irrigated from a non-potable source. If a property served by TMWA is located immediately adjacent to a property or right of way irrigated with non potable water or located within 10 feet of a non-potable source, the TMWA water supply system shall be protected from a direct or indirect cross connection through the following measures:

All new single family residential services will include the installation of a single angle check valve integral to the meter setter.

In addition, where a parcel's back or side property line is adjacent to a property served with non-potable water, a solid barrier or delineating concrete mow strip (6"W x 6"D), shall be provided between the property served with potable water by TMWA and the property to be irrigated with non-potable water. Non-potable water facilities (piping, spray heads, drip emitters, etc), shall not be installed on the potable water side of the barrier or delineating mow strip. Pressurized non-potable irrigation piping, (upstream of irrigation control valves), shall not be installed within 10-feet of back or side property lines.

A solid barrier is defined as:

a: Any solid face wood, stone, or brick fencing or wall with a minimum height of 3-feet, separating the property served by TMWA and the property irrigated with non-potable water

or

b: A continuous four foot wide concrete or asphalt pavement sidewalk.

For front of property parkways, a sidewalk shall serve as the solid barrier. Pressurized non potable water mains can be installed within the grass area between the sidewalk and curb. Non potable water facilities (piping, spray heads, drip emitters, etc), shall not be installed on the house side of the side walk and spray heads or emitters shall not be allowed to over spray or discharge onto the house side of the side walk.

TMWA reserves the right to require more stringent backflow protection requirements for uncommon or non-standard installations.

**Thermal Expansion Protection:** Please note that a thermal expansion tank is required in any home water supply system that is downstream of a backflow prevention device or check valve. Refer to the requirements of the Uniform Plumbing Code – Section 608.3.

| DRAWN | DESIGN | DATE   | REV | TRUCKEE MEADOWS WATER AUTHORITY   |        |
|-------|--------|--------|-----|---|--------|
|       |        | 1/2004 |     | ENGINEERING & CONSTRUCTION STANDARD<br>SECTION 8a –POTABLE WATER AND NON –POTABLE WATER<br>SEPERATION | 8a - 1 |

# BACKFLOW PREVENTION AND CROSS-CONNECTION CONTROL PROGRAM

FOR

TRUCKEE MEADOWS WATER AUTHORITY

Amended MARCH 2003

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## **SECTION 1      PURPOSE, LEGAL AUTHORITY, RESPONSIBILITY**

### **PURPOSE**

The purpose of TMWA's backflow prevention program is:

1. To protect TMWA's potable distribution system against the possibility of actual or potential contaminants or pollutants entering TMWA's potable water system by containing that contamination or pollution within that water customer's private internal water system.
2. To develop and implement an effective, ongoing, consistent backflow prevention program which will comply with Nevada Administrative Codes (NAC) 445A.67185 through NAC 445A.67255, Public Water Systems.
3. To assist in the education of water customers about health (contamination) and non health (pollution) hazards of water use. This, in turn, will promote the elimination of actual and potential cross connections.

### **LEGAL AUTHORITY**

Under Nevada Administrative Code 445A.67185, Public Water Systems, the water purveyor has the primary responsibility for preventing water from unapproved water supplies, or any other substances, from entering the potable public water system. Per NAC 445A.67185, the water purveyor shall

1. Ensure that there are no unprotected connections between the supplies of water, systems for the pumping, storage and treatment of water, and distribution system of the public water system and any source of pollution or contamination pursuant to which any unsafe water or other degrading material can be discharged or drawn into the public water system as a result of backsiphonage or backpressure.
2. Develop and carry out a program for the control of cross-connections that is approved by the health authority.

### **RESPONSIBILITY**

Clear responsibilities exist in the development, implementation and maintenance of an effective backflow prevention and cross-connection control program. TMWA believes that an effective backflow prevention program includes both service protection and internal protection conscientiously followed by all water customers.

#### ***TMWA RESPONSIBILITY***

TMWA's responsibilities as a purveyor of drinking water include the following:

1. Performing water treatment to ensure all drinking water standards set forth at the State and Federal level are met,
2. Ensuring that drinking water standards are maintained within its distribution system through programs such as flushing and water quality testing



3. Developing, implementing and maintaining a backflow prevention program consisting of service protection at the point where customer services connect to the distribution system.
  - a. TMWA's Backflow Prevention Group will review all new service connection requests and all existing service connections to determine when a service connection presents an actual or potential hazard to TMWA's water distribution system.
  - b. For the purposes of providing service protection for new or existing water services, TMWA will designate the required type of backflow prevention to comply with NAC 445A and TMWA's policy.
  - c. TMWA will designate the installation location for backflow prevention installation.
  - d. TMWA will provide Backflow Prevention Installation Requirements and Standards to the water customer or his/her representative.
  - e. TMWA will require the water customer to install the designated backflow prevention, by and at the customer's expense, within a length of time determined by TMWA, as a requirement for water service.
  - f. TMWA will not authorize water service turn on until backflow prevention has been satisfactorily installed, inspected by a member of the TMWA Backflow Prevention Group and has been tested by a certified tester.
  - g. TMWA will terminate an existing water service if, after a reasonable attempt, a satisfactory conclusion to a retrofit of existing services is not achieved. A satisfactory conclusion includes installation which has been inspected and approved by a member of the TMWA Backflow Prevention Group and has been tested by a certified tester.
  - h. TMWA will notify water customers of tests due.
  - i. TMWA will maintain records and monitor that backflow prevention is properly installed, maintained and tested.
  - j. TMWA will periodically reevaluate service connections to assess the degree of hazard posed by the water customer's premise. This will be done by TMWA Backflow Prevention Group whenever there is a change in the customer at a premise or per a schedule acceptable to TMWA.
  - k. TMWA will define enforcement actions for any customers that fail to comply with the Backflow Prevention Program.
  - l. TMWA is not responsible for detecting, eliminating or controlling cross connections within a customer's water system.

#### *WATER CUSTOMER RESPONSIBILITY*

Customers have very clear responsibilities for backflow prevention and cross-connection control. The following measures ensure the quality of the community's water supply as well as ensuring water quality within internal plumbing.

1. Water customers claim ownership, or custody, of potable water once it passes the water meter or point of connection to TMWA's distribution system. Furthermore,

- customers have the prime responsibility to maintain their internal water piping to ensure that "used water" shall not reverse back into TMWA's distribution system.
2. All costs associated with backflow prevention assemblies shall be borne by the water customer.
  3. It is the water customer's responsibility to design the backflow prevention installation to meet all of TMWA's requirements, and to conform with other applicable codes, such as the Uniform Plumbing Code (UPC), the National Fire Protection Association (NFPA) and all city or building codes.
  4. The customer shall design his water system (either a new water service or the retrofit of an existing water service) to accommodate pressure losses attributed to the installation of backflow prevention assemblies. This may include installing pumps or renovating existing private water systems.
  5. Upon notification from TMWA, the customer shall install, repair, replace or test the backflow prevention assembly within a length of time determined by TMWA.
  6. If the backflow prevention assembly is not installed immediately after the meter or point of connection, the water customer shall provide annually in writing to TMWA a declaration that no connections exist, or will be made, between the meter or point of connection and the backflow prevention assembly.
  7. The customer shall make all installations and repairs such that the assembly remains in factory working condition.
  8. Customers have a responsibility to design, build and maintain their internal private water system per City Building and UPC codes.
  9. The water customer shall have the assembly tested per the requirements in this policy.
  10. The customer is responsible for any loss or damage resulting from the installation, repair, maintenance, operation, malfunction or vandalism of a backflow prevention assembly.
  11. Customers are responsible to notify TMWA of any possible hazards, pollutants or contaminants which may have entered TMWA's distribution system from the customer's internal system.
  12. If service protection does not exist or has been installed internal to a customer's internal system, the customer's system shall be available at all reasonable times for inspection or testing by TMWA to determine the existence of unprotected cross connections.
  13. Customers have the responsibility to notify TMWA Backflow Prevention Group of the intent to use a non potable water on the same premise where TMWA water is being delivered.
  14. If a non potable water is being used on the customer premises, the customer's water system shall be available at reasonable time for a shut down inspection and test by TMWA to determine the existence of cross connections.

## **REFERENCES TO OTHER SECTIONS OF THIS POLICY**

Enforcement Action

## SECTION 2      DEFINITIONS

The following terms are relevant to TMWA's backflow prevention and cross-connection control program. Any term not specifically defined in this section shall revert to the meaning as defined by the Nevada Administrative Code (NAC) 445A – Public Water Systems – and subsequent revisions thereof.

**AIR GAP SEPARATION:** The term air-gap separation means a physical break between the free flowing end of the supply pipe and the overflow rim of a receiving vessel. The air-gap shall be at least double the diameter of the supply pipe measured vertically above the top rim of the vessel, in no case less than one inch. In certain proximity to walls, the air gap shall be three times the diameter of the supply pipe.

**APPROVED BACKFLOW PREVENTION ASSEMBLY:** The term "approved backflow prevention assembly" means an assembly which has passed laboratory and field evaluation tests performed by the University of Southern California (USC) Foundation for Cross-Connection Control and Hydraulic Research.

**APPROVED WATER SUPPLY:** Approved water supply in the context of this policy statement means the treated water supplied by TMWA, the water quality of which is regulated by the State Health Division and the District Health Department.

**ATMOSPHERIC VACUUM BREAKER (AVB):** An atmospheric vacuum breaker means a vacuum breaker that contains an air inlet valve, a check seat and one or more air inlet ports, in which: 1) The flow of water causes the air inlet valve to close the air inlet ports; and 2) When the flow of water stops: (a) the air inlet valve falls and forms a check valve against backsiphonage; and (b) the air inlet ports open to allow air to enter and satisfy the vacuum.

**AUXILIARY WATER SUPPLY:** The term "auxiliary supply" means any water supply on or available to the premises other than the approved water supply.

**AWWA STANDARD:** The term "AWWA Standard" means an official standard developed by the American Water Works Association (AWWA).

**AWWA TEST:** The term "AWWA test" is synonymous with the term "test".

**BACKFLOW:** The term "backflow" shall mean an undesirable flow condition, caused by a differential in pressure, that causes the flow of water or other liquids, gases, mixtures or substances into the distribution system of a potable supply of water from any source or sources other than an approved water supply source. Backsiphonage is one cause of backflow. Backpressure is the other cause.

**BACKFLOW PREVENTION GROUP:** The term "backflow prevention group" means the personnel charged with administration of TMWA's backflow prevention program.

**CERTIFIED SPECIALIST:** The term "certified specialist" shall mean an individual who is certified to perform cross-connection control and backflow prevention surveys.

Certification shall be obtained through the California Nevada Section of the American Water Works Association, or through the USC Foundation for Cross-Connection Control and Hydraulic Research. TMWA maintains a list of certified specialists who are eligible to perform surveys for TMWA water customers. Cross-Connection Control Specialist is synonymous with Certified Specialist.

**CERTIFIED TESTER:** The term "certified tester" shall mean an individual who is certified by the California-Nevada Section of the American Water Works Association, to perform tests on backflow prevention assemblies. In Washoe County, the District Health Department maintains a current list of certified testers.

**COMMUNITY'S DRINKING WATER OR COMMUNITY'S WATER DISTRIBUTION SYSTEM:** This term means the potable water in TMWA Water Distribution System.

**CONSTRUCTION WATER:** The term "construction water" shall mean any water, potable or otherwise, which may be used for any construction activity i.e. dust control and grading purposes, mixing concrete etc. Potable water supplied by TMWA for construction purposes shall be protected with backflow prevention as determined by TMWA's backflow prevention group.

**CONTAMINATION:** The term "contamination" shall mean a degradation of the quality of water by any foreign substance which creates a hazard to the public health, or which may impair the usefulness or quality of the water.

**CROSS-CONNECTION:** The term "cross-connection" as used in this program means any unprotected actual or potential connection between a potable water system and any source or system containing water or a substance that is not or cannot be approved as safe, wholesome, and potable. By-pass arrangements, jumper connections, removable sections, swivel or changeover assemblies, or other assemblies through which backflow could occur, shall be considered to be cross-connections.

**CUSTOMER'S PRIVATE WATER SYSTEM:** The term refers to the water customer's private plumbing system within the customer's premises.

**DISTRIBUTION SYSTEM:** The term shall mean the potable TMWA Water Distribution System.

**DISTRICT HEALTH DEPARTMENT:** This term refers to the Washoe County Health Department.

**DOUBLE CHECK VALVE ASSEMBLY (DC):** The term "double check valve assembly" or DC" means an assembly of two internally loaded, independently acting check valves, including tightly closing resilient seated shut-off valves on each end of the assembly and 4 properly located resilient seated test cocks.

**DOUBLE CHECK DETECTOR ASSEMBLY:** This is a Double Check Valve with a smaller sized approved bypass containing a specific water meter and an approved double check valve assembly.

**FREEZE PROTECTION:** The term "freeze protection" as it pertains to this program means an above or below ground enclosure designed with sufficient insulation and heat to prevent the water in a backflow prevention assembly from freezing. Such enclosure shall also allow ready access for maintenance and testing purposes and provide clearances as defined by TMWA Installation Standards.

**HEALTH AGENCY:** The term "health agency" as it pertains to this program means the Nevada State Health Division.

**HEALTH HAZARD:** The term "health hazard" shall mean actual or potential threat of contamination to the approved water supply.

**INSTALLATION INSPECTION:** The term "installation inspection" as it pertains to this program means an inspection by a member of TMWA's Backflow Prevention Group of a newly installed backflow prevention assembly providing service protection.

**INSTALLATION STANDARDS:** The term "installation standards" as it pertains to TMWA's backflow prevention and cross-connection control program means the Backflow Prevention Installation Requirements and Standards and this policy as developed by TMWA. These standards are consistent with the Nevada Administrative Code and other recognized experts in the backflow prevention field, such as the USC Foundation for Cross-Connection Control and Hydraulic Research.

**INTERNAL BACKFLOW PREVENTION OR INTERNAL BACKFLOW PROTECTION:** The terms "internal backflow prevention" or "internal backflow protection" refer to backflow prevention used for the purpose of isolation on a piece of equipment or use of water within a water customer's private plumbing system.

**INTERNAL WATER SYSTEM:** The term "internal water system" refers to the private piping of water on a water customer's premises.

**LOCAL HEALTH AGENCY:** The term "local health agency" means the Washoe County District Health Department.

**NON HEALTH HAZARD:** The term "non health hazard" shall mean actual or potential threat of pollution to the approved water supply.

**NON POTABLE WATER:** The term "non potable water" shall mean a water supply which has not been approved for human consumption by the health agency having jurisdiction.

**POINT OF CONNECTION (POC):** The Point of Connection is synonymous with Service Connection. The P.O.C. is the back of curb for all streets with planter strips. The P.O.C. is the back of sidewalk for streets with sidewalk contiguous with the curb and gutter. Where the P.O.C. is unclear, the location will be designated by a TMWA Backflow Prevention Group member. If a meter exists, that shall be considered the P.O.C.

**POLICY:** The term "policy" or TMWA "policy" shall refer to the document titled

Backflow Prevention and Cross Connection Control Policy for TMWA and its contents.

**POLLUTION:** The term "pollution" shall mean a degradation of the quality of water by any foreign substance which would not constitute a health hazard to the public health, but which would adversely and unreasonably affect the aesthetic qualities of water for domestic uses.

**PRIVATE WATER SYSTEM:** The term refers to the water customer's private plumbing system within the customer's premises.

**PREMISES:** The term "premises" means any and all areas on a water customer's property which are served or have the potential to be served by TMWA's potable water system.

**RECLAIMED WATER:** The term "reclaimed water" means effluent derived from wastewater treatment system, which as a result of treatment, is suitable for uses other than potable use.

**REDUCED PRESSURE PRINCIPLE ASSEMBLY (RP):** The term "reduced pressure principle assembly" or "RP" means an assembly incorporating two internally loaded, independently operating check valves and an automatically operating differential pressure relief valve located between the two checks, with a resilient seated shut-off valves on each end of the assembly, and equipped with 4 properly located resilient seated test cocks.

**REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY:** This is a Reduced Pressure Principle assembly with a smaller sized approved bypass containing a specific water meter and an approved reduced pressure principle assembly.

**RETROFIT:** The term retrofit refers to installation of backflow prevention assemblies, for the purpose of providing service protection, on existing water services.

**SERVICE CONNECTION:** The term "service connection" refers to the point of connection of a customer's (or water user's) piping to TMWA's main or water meter.

**SERVICE PROTECTION:** The term "service protection" as it pertains to this program means the installation of backflow prevention on the water service connection, just downstream of the water meter or point of connection, the purpose of which is to protect TMWA's distribution system from cross-connections or potential cross-connections within the customer's piping system. A synonym is containment. NAC 445A defines the service connection as the point at which the water purveyor loses its authority and control over water.

**TRUCKEE MEADOWS WATER AUTHORITY:** TRUCKEE MEADOWS WATER AUTHORITY is synonymous with TMWA.

**TEST:** The term "test" as it pertains to this program means a functional test of a USC approved backflow prevention assembly. This test shall be conducted by a CA-NV AWWA Certified Backflow Prevention Tester, per procedures adopted by AWWA.

**THERMAL EXPANSION:** The term "thermal expansion" means the increase in water pressure within a customer's water system due to thermal affects. Thermal expansion is a potential problem within a customer's system which has been equipped with a backflow prevention assembly and appropriate measures shall be taken by the customer, i.e. properly designed and sized thermal expansion tanks.

**USED WATER:** The term "used water" means water which has passed the point of service connection and therefore has left the control of the water purveyor.

**UTILITY:** The term "utility" means TMWA who is responsible for the operation of the water distribution system.

**WATER CUSTOMER:** The term "water customer" means any person (or that person's representative) or agency (or that agency's representative) obtaining or using water from TMWA's water potable water supply system.

**WATER DISTRIBUTION SYSTEM:** Means TMWA's water distribution system.

**WATER USER SUPERVISOR:** When requested by the water purveyor, the water customer shall appoint a water user supervisor who shall be responsible for conformance with all applicable laws, rules and regulations pertaining to backflow prevention; for the installation, operation and use of all water piping systems, backflow prevention assemblies and water using equipment on the premises; and for the avoidance of unprotected cross connections. The Water User Supervisor will be responsible for the customer's private water system and be responsive to backflow prevention requirements set forth by the water purveyor and NAC 445A.

**WATER SUPPLIER:** The term "water supplier" means the person who owns or operates the approved water supply system. The water supplier in this program is TMWA.



## **SECTION 3      GENERAL BACKFLOW PREVENTION REQUIREMENTS**

### **CURRENT INSTALLATION REQUIREMENTS**

Backflow prevention assemblies are required by TMWA (on domestic, fire and irrigation water services) to provide service protection for TMWA's distribution system. This backflow prevention shall be installed per TMWA Backflow Prevention Installation Requirements and Standards and this policy as a condition for new water service or continuation of existing service. Any proposed deviation from these requirements and standards will require approval from a member of TMWA's Backflow Prevention Group.

Backflow prevention requirements and installation standards may change over time. It is the responsibility of the water customer to ensure the current version of TMWA's Backflow Prevention Installation Requirements and Standards and this policy is complied with. These requirements refer to both new and existing water services, and for domestic, irrigation and fire services, unless specified otherwise by TMWA Backflow Prevention Group.

Retrofits of existing services may present some special circumstances that will be dealt with on a case by case basis. For additional information on Retrofits of existing services, please refer to those sections of this policy.

Refer to the TMWA Backflow Prevention Installation Requirements and Standards in the Appendix for detailed installation, inspection, testing and design requirements.

### **DESIGN CONSIDERATIONS**

The installation of backflow prevention requires a number of considerations be reviewed prior to installation. Of particular importance in the design of a system incorporating a backflow prevention assembly are provisions:

- for thermal expansion of downstream water or fluids
- for drainage systems to handle full port discharges from the relief valves of reduced pressure principle backflow prevention assemblies
- to prevent freezing of the backflow prevention assembly and the water service
- to prevent submergence of internally or externally installed backflow prevention assemblies

### **APPROVED ASSEMBLIES**

Pursuant to NAC 445A, any backflow prevention assembly installed for service protection on TMWA water services shall be on the current University of Southern California (USC) List of Approved Backflow Prevention Assemblies. TMWA maintains a current USC list of the approved assemblies and will, upon request, provide the most current list to a water customer.

Backflow prevention assemblies are approved by USC as an integral unit beginning with the #1 shut off valve, through the assembly body and through the #2 shut off valve. Any modification, including use of spare parts other than those of the original manufacturer or using a non-USC-approved shut off valve, invalidates the USC approval, and therefore the approval of TMWA as an acceptable assembly.

## **TYPES AND METHODS OF BACKFLOW PREVENTION**

Types and methods of backflow prevention that are acceptable to TMWA for providing service protection include the following:

- Pressure Vacuum Breaker or Spill Prevention Pressure Vacuum Breaker
- Double Check Valve Assembly and Double Check Valve Detector Assembly
- Reduced Pressure Principle Assembly and Reduced Pressure Principle Detector Assembly
- Air Gap

A member of TMWA's Backflow Prevention Group shall specify the required type of protection based on NAC 445A and TMWA's policies, and to be commensurate with the assessed degree of hazard on the customer's premise. In situations that are not covered in NAC 445A, TMWA shall evaluate each situation on a case by case basis and will determine the required type of backflow prevention. The water customer may at his/her discretion choose a higher level of protection than the minimum required by TMWA.

Per NAC 445A.6721, TMWA reserves the right to require more stringent requirements than that set forth in NAC 445A.

### *DOMESTIC, IRRIGATION*

DC, RP or Air Gap, to be determined by TMWA Backflow Prevention Group.

### *FIRE*

- Dry systems also require double check valve assemblies due to the potential of contamination when non potable water is introduced through the fire pumper connection.
- NFPA Class 1, 2 and 3 systems require the installation of an approved double check valve assembly.
- NFPA Class 4, 5 or 6 systems require the installation of an approved reduced pressure principal assembly.
- At its discretion TMWA may require detector check assemblies.

### *SPECIAL CIRCUMSTANCES*

The normal types of backflow prevention required for a water service are listed above. However a retrofit situation or any special circumstances listed below (or not listed) may

cause an exception to the norm.

- Where access to a premise is denied by the water customer to TMWA Backflow Prevention Group, TMWA's distribution system shall be protected with an Air Gap.
- Where there is one contaminant (health) hazard, TMWA's distribution system shall be protected with a Reduced Pressure Principle Assembly, to be determined by TMWA Backflow Prevention Group.
- If it is impossible or impractical to make a cross connection survey, TMWA's distribution system shall be protected with an Air Gap or a Reduced Pressure Principle Assembly, to be determined by TMWA Backflow Prevention Group.

### **ATMOSPHERIC VACUUM BREAKER (AVB)**

The use of atmospheric vacuum breakers for service protection on new service connections is prohibited.

### **INSPECTIONS**

All inspections shall be performed by the Backflow Prevention Group unless otherwise assigned by mutual agreement to another department of TMWA. Any backflow prevention installed for service protection for a new service connection or existing service connection shall be inspected by a TMWA Backflow Prevention Group member as a condition for new water service or continuation of existing service.

If any inspection is not requested, TMWA may require the service trench be excavated and/or the backflow prevention assembly moved to the meter or the point of connection.

### **BACKFLOW PREVENTION ASSEMBLY TESTS**

The water customer shall have each assembly, which was installed for service protection, tested by a certified tester as a condition for new water service or continuation of existing service. Upon conclusion of the test, it is the water customer's responsibility to submit a copy of this written test report to TMWA. Assembly tests are required:

1. After installation of a new assembly
2. After repair, replacement, relocation of an assembly
3. After a backflow incident
4. Annually; or more frequently as required by TMWA for the purpose of monitoring cross connection hazards; or more frequently for the purpose of reviewing assemblies that repeatedly fail the tests.

Water service will be terminated if tests are not performed as required by TMWA.

Refer to the portion of this section titled Repair and Replacement regarding when a test is not successfully completed.

### **INITIAL TESTS**

Each newly installed backflow prevention assembly, or any backflow prevention assembly which has been repaired, replaced or relocated, shall be tested and the successful test results shall be received by TMWA within seven (7) working days of the water meter turn on or repair of the assembly. If the test is not received in this period the procedure to terminate water service, based on the section Enforcement Action, item 3 of Water Service Termination (Refusal or unapproved delay to test a backflow prevention assembly), will be instituted.

### **ANNUAL TESTS**

TMWA will notify customers by mail when the periodic (usually annual) testing of the assembly providing service protection is required. TMWA may require certain assemblies be tested more frequently and will notify the customer of this requirement. The following communication process will be used:

1. TMWA will notify the water customer of the required backflow prevention test at the beginning of the month in which the test is due. The customer will be given a thirty (30) day time frame to comply and have the test provided to TMWA.
2. A second notice will be sent to the water customer who does not take action on the first notification. The second notice will allow a five (5) work day time frame to comply.
3. The third notice will notify the customer of a Disconnect Notice to be carried out within 48 hours and to remain in effect until the test is completed.
4. A delayed test in the current year will not change the next year's test date to the later date when the test was actually done. For example, a test is due in August 1998, but is not performed until October 1998. The next test will be due in August 1999, not in October 1999.

### **REPAIR OR REPLACEMENT OF ASSEMBLIES**

An assembly may be removed by the customer for repair provided the water is not used until the repair is completed. A retest of the repaired assembly will be required after the repair is complete.

An assembly may be removed by the customer for replacement provided the water is not used until the replacement assembly is installed. All assemblies used as replacements shall be installed per TMWA Backflow Prevention Installation Requirements and Standards and this policy and shall be tested by a certified tester after installation. The manufacturer, serial number, and size of the old assembly shall be noted on the test form and shall be noted as being replaced.

TMWA may notify the customer of required repairs to a backflow prevention assembly or replacement of a backflow prevention assembly. TMWA will notify customers by mail regarding repair or replacement requirements.

## REMOVAL OR RELOCATION OF ASSEMBLIES

Approval shall be obtained from TMWA Backflow Prevention Group before a backflow prevention assembly, which was installed for service protection, can be removed or relocated. Relocation, inspections and tests of the relocated assembly shall be completed as noted in the TMWA Backflow Prevention Installation Requirements and Standards and this policy.

## INSTALLATION LOCATION

The location of backflow prevention for service protection shall be designated by the TMWA Backflow Prevention Group. The normal installation locations are listed below, however a retrofit situation or any special circumstances listed below (or not listed) may cause an exception to the norm.

TMWA shall require of any water customer with backflow prevention designated as service protection, that is not installed immediately after the meter, or point of connection:

- a. An annual certification stating that no connections or taps have been made between the meter, or point of connection, and the backflow prevention.

## SPECIAL CIRCUMSTANCES

The backflow prevention assembly for all water services to a premise shall be installed at the meter or point of connection to TMWA's main if any of the following apply:

- If an auxiliary water supply or non potable water supply (recycled, ditch, well, surface, etc.) is on the premises.
- If entry to any portion of the premises is not available for inspection by TMWA.
- If any customer cannot or will not allow an on-premises inspection of his private internal water system.
- If all conditions for an internal installation as noted in the TMWA Backflow Prevention Installation Requirements and Standards or this policy are not met, including approval by TMWA Backflow Prevention Group for an internal installation.

## DOMESTIC, IRRIGATION

- Domestic Service: immediately downstream of the meter effective 9/1/98.
- Irrigation Service: immediately downstream of the meter.

## FIRE SERVICES

### FIRE SYSTEM DEFINITIONS

The following definition system is used by TMWA for determining the appropriate installation location for backflow prevention on a private fire protection system for new or existing services. It is not to be confused with the NFPA fire system classification system.

1. Type A System-Single Fire Service follows all of the following characteristics:
  - a. A single fire service line (one point of connection to TMWA's main) serves one fire suppression system in one building with one riser and
  - b. The fire suppression system is not directly or indirectly connected to any other fire suppression system and
  - c. this is not a looped system and
  - d. there are no fire hydrants on this fire service line and
  - e. the length (of the fire service line) between the point of service connection on TMWA's main and the riser and backflow prevention installation location in the building is less than 150 feet and
  - f. TMWA Backflow Prevention Group has approved an internal installation and
  - g. All requirements for internal installations are met.
2. Type B system-defined as any configuration of fire service not designated as Type A system. Type B systems may include, but are not limited to, the following characteristics:
  - a. multiple points of connection to TMWA's main.
  - b. looped systems with one point of connection.
  - c. one fire service line provides water suppression to more than one building.
  - d. the fire service line is greater than 150 feet from point of connection to the backflow prevention.
  - e. fire hydrants are on the fire service line.

#### LOCATION REQUIREMENTS

The location for the backflow prevention shall be determined by TMWA for each project.

For all backflow prevention assemblies that are required by TMWA for service protection, the preferred location of the backflow prevention assembly shall be immediately inside the property being served. The rationale for this requirement is that TMWA loses control of water quality once water passes into the customer's system. On the other hand, TMWA is aware that locating the backflow prevention assembly at the fire system riser provides easier accessibility for testing and maintenance purposes, and may provide some freeze protection benefits. For these reasons the following standards shall be used in the location of backflow prevention assemblies:

#### TYPE A SYSTEMS

Internal installations will be accepted for the fire suppression systems defined by TMWA Backflow Prevention Group as a Type A system. All requirements for internal installation as described in the TMWA Backflow Prevention Installation Requirements and Standards and this policy shall be met. If, in the opinion of TMWA, these requirements for internal installations have not been met, TMWA will require corrections to the installation or may require the backflow prevention assembly be moved to an exterior location just inside the property line.

#### TYPE B, C & D SYSTEMS

The backflow prevention assembly is required at the point of connection (immediately inside the customer's property line) for these systems. All requirements for installation as described in the TMWA Backflow Prevention Installation Requirements and Standards and this policy shall be met.

1. DC's may be installed above ground in a freeze proof enclosure, or in an underground vault properly designed for drainage.
2. RP's shall be installed above ground in a freeze proof enclosure properly designed for drainage.
3. On request from the water customer, rather than an RP at the property line, TMWA will consider allowing a double check valve assembly at property line accompanied by RP's inside the facility at the glycol loops. The RP installations shall meet all requirements for an internal installation.

## **SECTION 4      RETROFIT PROCEDURE FOR EXISTING SERVICE CONNECTIONS**

As directed by the District Health Department, TMWA shall review all existing water service connections to assess the degree of hazard within a premise to designate the required backflow prevention. All existing domestic, irrigation and fire service connections will be reviewed. The retrofit program will be carried out:

- through mailings to specific water customers,
- during remodels, tenant improvements, expansions, or construction projects or
- through other methods deemed necessary by TMWA.

### **REMODELS, TENANT IMPROVEMENTS, OTHER CONSTRUCTION**

Retrofits which are initiated in conjunction with a building permit for remodels, tenant improvements, building additions, etc. may not require the detailed survey discussed below. TMWA Backflow Prevention Group will review the construction project and water use and will determine the appropriate type of backflow assembly and location. These retrofits shall be completed during the course of the construction project and are required for continuing water service. Water services that are not required to be upgraded with backflow prevention as a result of this construction will be retrofitted at a later time.

### **NON CONSTRUCTION RELATED RETROFITS**

TMWA will contact other customers for retrofit of their domestic, irrigation and fire water services without the stimulus of a construction project. Upon being contacted by Sierra, a water customer of an existing service connection may have two options (and will be notified of the available options):

1. The water customer shall install the required backflow prevention in conformance with NAC 445A and TMWA policy, and per TMWA Backflow Prevention Installation Requirements and Standards. Backflow prevention, commensurate with the degree of hazard per NAC 445A, shall be installed for service protection if one of more of the following characteristics exist:
  - Premise with complex plumbing arrangements which make it impractical to assess whether cross connection hazards exist,
  - Premise with a repeated history of cross connections being established or reestablished,
  - Premise where cross connections are unavoidable, or not corrected, or where there is a high potential for change in the plumbing system.
2. If the customer wishes to install backflow protection internal to his plumbing system, or if petition is being made with TMWA to lower the level of backflow prevention for service protection, the customer shall contract with a Cross Connection Specialist to perform a detailed survey of the premise. TMWA strongly encourages customers to conduct cross-connection control surveys to provide internal protection.



- a. The survey will list the hazards associated with the water use on the premise and will recommend the proper level of backflow prevention for these hazards for internal protection. The survey will also list backflow prevention requirements for service protection.
- b. A copy of the survey will be forwarded by the specialist to TMWA Backflow Prevention Group.
- c. TMWA will evaluate this survey; review, approve or change requirements and locations for internal protection; and may make additional requirements for internal protection.
- d. Having a survey performed will not eliminate, and may not reduce the service protection requirement designated by NAC 445A or TMWA Policy.
- e. The retrofit will be carried out as noted in this section under Retrofit Steps.

## RETROFIT STEPS

After it has been determined which step above will be followed, the following is a brief description of the next steps in the retrofit.

1. The type of backflow prevention for service protection and its location will be determined by a member of TMWA's Backflow Prevention Group. The level of protection listed in NAC 445A will be the requirement for service protection. Any water use not listed in this detail will be reviewed on a case by case basis for service protection requirements.
  - If TMWA assess that no hazard exists with the current water use and no service protection is required:
    - a. A periodic review will be made of this premise to reevaluate level of hazards
    - b. TMWA will document the reasons for not requiring service protection.
2. TMWA recognizes the hardships that may be imposed on a customer through this retrofit program. Therefore, the schedule for implementation of the backflow prevention improvements may be flexible, provided TMWA, after any necessary consultation with the District Health Department, determines there is no immediate risk. TMWA and the customer will jointly agree on a completion date. General timeframes for completion of installation follow:
  - a. Where TMWA identifies a contaminant (health) hazard, service protection shall:
    - be completed within 90 days or
    - In accordance with an alternate schedule acceptable to TMWA.
  - b. Where TMWA identifies a pollutant (non health) hazard, service protection shall be completed in accordance with a schedule acceptable to TMWA.
2. After the final determination is made, an agreement letter will be made between TMWA and the water customer describing in detail the improvements to be made and a schedule by which the improvements shall be completed.

3. If the retrofit is not completed at the agreed upon time, the water service may be terminated after the notification steps listed in Enforcement Action, Water Service Termination, unless the customer receives an approval from TMWA Backflow Prevention Group for an extension.

## **SECTION 5      REQUIREMENTS FOR RETROFITS**

### **GENERAL BACKFLOW PREVENTION REQUIREMENTS**

As a general rule, retrofit installations shall be per the requirements in this policy and the TMWA Backflow Prevention Installation Requirements and Standards. This section shall contain only items which may be exceptions only for retrofits to the installation requirements described in Section 3, General Backflow Prevention Requirements, and to the TMWA Backflow Prevention Installation Requirements and Standards.

If, in the original utility plans for the project, a backflow prevention assembly was called for but not installed, the backflow prevention assembly as called for on the utility plans shall be installed.

### **APPROVED ASSEMBLIES**

Regarding any presently existing backflow prevention assembly which was a USC approved assembly at the time of installation, but is not currently on a USC Approved Assemblies list: As long as the assembly passes the annual AWWA functional test, has been maintained and/or repaired to meet original factory working conditions, and is commensurate with TMWA's assessed degree of hazard, the assembly will be accepted as an approved assembly for service protection. It shall be replaced with an approved assembly at the point when it is either moved or can no longer meet the specifications listed above.

### **REDUCED LEVEL OF SERVICE PROTECTION**

This section is applicable to domestic and fire water services. TMWA recognizes that, on occasion during a retrofit, the installation of the proper backflow prevention assembly may be difficult due to space, drainage constraints or the physical configuration of the water customer's premise. In these situations, at the water customer's request, TMWA may consider, in consultation with the District Health Department, a reduced level of protection. As a requirement for a reduced level of service protection the water customer shall commit in writing to the following:

1. In the event a water customer request a reduced level of service protection, the owner accepts liability for installing the pollutant (non health) hazard level type of assembly to protect against a contaminant (health) hazard.
2. The water customer shall have a Cross Control Connection Specialist perform a detailed cross-connection survey of the premise as noted in the section titled Procedure for Retrofit of Existing Services.
3. The customer shall complete installation of internal protection improvements as outlined in the survey and approved by TMWA to provide a level of protection commensurate with the assessed degree of hazard.
4. TMWA will require the water customer to maintain an aggressive, on going internal backflow prevention program.
5. The backflow prevention for internal protection shall be installed per TMWA

Backflow Prevention Installation Requirements and Standards and this policy, inspected by TMWA Backflow Prevention Group, maintained or repaired to original factory working condition, and tested by a certified tester at an interval to be determined by TMWA.

6. An increased frequency of testing of service protection assemblies as determined by TMWA may be required.
7. For reduced service protection on a domestic service some additional requirements are noted in the Domestic Service, Backflow Prevention Options, noted below.
8. For reduced service protection on a fire system some additional requirements are noted in the Fire Service, Backflow Prevention Options, noted below.
9. Records detailing the internal protection, the repair and maintenance, and tests shall be maintained by the water customer and will be submitted to TMWA on an annual basis.
10. Each year, a written re-certification shall be required of the owner or property manager containing details regarding the following items. After receipt and review of the certification, TMWA's Backflow Prevention Group shall then determine if the reduced service protection is still adequate. Should the level of service protection not be adequate for the level of hazard, the water customer shall be required to upgrade the service protection backflow prevention assembly to the proper type as a requirement for continued water service. The following will be included in the re-certification:
  - Changes in tenancy,
  - Changes in water use,
  - Plumbing changes
  - Use of non potable water
11. TMWA shall require reasonable access to the premise to conduct an initial cursory survey and periodic re-evaluations to determine if the internal protection is adequate to protect TMWA distribution system.
12. TMWA may also require the customer have additional detailed surveys performed by a Cross Connection Specialist.

## INSTALLATION LOCATION

### *SPECIAL CIRCUMSTANCES*

The backflow prevention assembly for all water services to a premise shall be installed at the meter or point of connection to TMWA's main if any of the following apply:

- If a water customer's premises has internal cross connections that cannot be permanently corrected or controlled
- If a water customer's premises has intricate internal plumbing and piping
- If the water service laterals between the point of connection and the water use cannot be located or defined to the satisfaction of TMWA
- If any conditions listed in the section General Backflow Prevention Requirements,

Installation Location Requirements, Special Considerations apply.

### *DOMESTIC SERVICES*

Backflow prevention shall be as close as possible to the meter.

TMWA may consider allowing the backflow prevention assembly to be located internally at the water riser if physical space is limited for an exterior installation, if proof is provided that no lateral taps exist prior to the proposed installation location inside the building, and if all requirements are met for an internal installation including sufficient access to the assembly for testing and maintenance purposes

### *IRRIGATION SERVICES*

Backflow prevention shall be immediately downstream of the meter. Installations shall be per the TMWA Backflow Prevention Installation Requirements and Standards and this policy.

### *FIRE SERVICES*

Backflow prevention shall be as close as possible to the service connection. The fire hydrants, number of fire risers and the fire department pumper connection will be a consideration during placement of the backflow prevention assembly.

TMWA may consider allowing the backflow prevention assembly to be located internally at the fire system riser if physical space is limited for an exterior installation, if proof is provided that no lateral taps exist prior to the proposed installation location inside the building, and if all requirements are met for an internal installation including sufficient access to the assembly for testing and maintenance purposes

## **TYPES AND METHODS OF BACKFLOW PREVENTION**

### *DOMESTIC BACKFLOW PREVENTION OPTIONS*

#### **1. DOUBLE CHECK VALVE IN LIEU OF REDUCED PRESSURE PRINCIPLE ASSEMBLY**

With approval of TMWA, the District Health Department a DC may be used in lieu of an RP. All requirements noted above in the section titled Reduced Level of Service Protection shall be met by the water customer. In addition, the DC requires a minimum of semi-annual testing and a possible higher level of testing as directed by TMWA or the District Health Department. This substitution may be considered for retrofit situations only under the following exclusive conditions:

- a. Where retrofit of an RP induces pressure losses which renders the existing domestic system inoperable and there is not space for installation of a pump. The owner of the domestic system shall submit to TMWA calculations and a detailed flow and pressure report to substantiate this claim. The calculations and report shall be provided by a licensed plumber or engineer.
- b. Where safety or drainage problems exist with the installation of an RP which

cannot be reasonably corrected. The owner of the system shall provide a written report from his contractor or engineer which details the problems or logistics of installing the RP.

## IRRIGATION SERVICES

### STOP AND WASTE VALVES

NAC 445A.67255 specifically defines stop and waste valves as a potential source of contamination to a distribution system and prohibits their use upstream of a backflow prevention assembly. Any existing irrigation system with a stop and waste valve between the meter (or point of connection) and the backflow prevention assembly shall be changed to meet current TMWA Backflow Prevention Requirements and Standards as a requirement for continued water service.

### ATMOSPHERIC VACUUM BREAKERS

TMWA may accept the use of the existing atmospheric vacuum breakers (AVB) as system protection if it can be demonstrated that:

1. the AVB is functioning properly:
  - the air inlet opens when water supply is shut off
  - the air inlet closes when water supply is turned on
2. the AVB is installed correctly including
  - being installed at the proper height and
  - with the proper shut off and drain system
3. no stop and waste valve is installed upstream of the AVB.

At the time that this AVB no longer passes the test it shall be replaced with an assembly approved for service protection.

### DOUBLE CHECK VALVE

TMWA may accept the use of the existing double check (DC) as system protection if it can be demonstrated that:

1. the DC passes the periodic functional test
2. the DC is installed correctly including
  - the proper shut off and drain system
3. no stop and waste valve is installed upstream of the DC.

At the time that this DC no longer passes the test it shall be replaced with an assembly approved for service protection.

## FIRE SERVICES

### REGULATORY REQUIREMENTS AND WATER QUALITY ISSUES

NAC 445A requires that all fire sprinkler systems be equipped with a backflow prevention assembly. The type of backflow prevention assembly is based upon the NFPA Classification of the particular fire sprinkler system and will be designated by a TMWA Backflow Prevention Group member.

TMWA has nearly 2000 fire protection service accounts. Based upon the results of early surveys, many of these fire protection services are not equipped with proper backflow prevention assemblies. Proper backflow prevention assemblies are testable double check valve assemblies (DC), or testable reduced pressure principle assemblies (RP) or air gap.

Based upon the water quality findings of the American Water Works Association Research Foundation (AWWRF), there is no doubt that fire sprinkler systems constitute a contaminant (health) hazard to TMWA's distribution system and shall be equipped with appropriate backflow prevention assemblies. However, since installation of a backflow prevention assembly will reduce the water pressure and may affect sprinkler performance, care must be exercised when installing backflow prevention, to not jeopardize a critical public safety requirement while providing for a public health concern. That fire sprinkler system must continue to perform hydraulically during a fire event. Therefore, any retrofit shall equally address public health (backflow prevention) and public safety (maintaining reliable fire flow).

Other issues that are a concern in retrofitting existing fire sprinkler systems are inadequate space and, in the case of reduced pressure principle assemblies, no drainage system or an inadequate drainage system necessary to handle full discharge from the relief valve. Another issue encountered in TMWA's backflow prevention program includes the safety issue of installing a reduced pressure principle assembly near electrical equipment. Safety requirements dictate that a reduced pressure principle assembly be installed away from electrical equipment.

## FIRE SYSTEM BACKFLOW PREVENTION OPTIONS

### 1. NO BACKFLOW PREVENTION ASSEMBLY

TMWA specifies that all fire services be equipped with backflow prevention assemblies consistent with NAC 445A. Based upon the water quality data presented in the AWWRF study and the potential acute and chronic health effects associated with backflow from fire sprinkler systems, the "no backflow prevention option" is not an option

### 2. INSTALLATION OF REQUIRED BACKFLOW PREVENTION

This shall be per the requirements listed in the section titled General Backflow Prevention Requirements.

### 3. DELAYED INSTALLATION OF DOUBLE CHECK VALVES

In situations where the retrofit is extremely difficult due to space limitations or where the backflow prevention assembly adversely affects sprinkler system operation, TMWA will consider a lengthening of the installation schedule under the following conditions:

- a. That the existing system is equipped with at least a non-testable single check valve.
- b. That the owner of the system shall submit a report prepared by a licensed fire system contractor or engineer which adequately describes the space or hydraulic problems and provides the flow and pressure requirements of the Fire Department.
- c. That the owner of the premise consent to a prescribed plan and schedule for

eventual retrofit of the fire sprinkler system with a double check valve assembly and a tank-pump installation if necessary for pressure and flow. Such plan and schedule shall be with the approval of the District Health Department and the jurisdictional fire department.

4. DOUBLE CHECK VALVE IN LIEU OF REDUCED PRESSURE PRINCIPLE ASSEMBLY

With approval of TMWA, the District Health Department, and the jurisdictional Fire Department, a DC may be used in lieu of an RP on certain NFPA Class 4,5, & 6 fire sprinkler systems. All requirements noted above in the section titled Reduced Level of Service Protection shall be met by the water customer. In addition, the DC requires a minimum of semi-annual testing and a possible higher level of testing as directed by TMWA or the District Health Department. This substitution may be considered for retrofit situations only under the following exclusive conditions:

- a. Where retrofit of an RP induces pressure losses which renders the existing fire system inoperable and there is not space for installation of a pump. The owner of the fire system shall submit to TMWA calculations and a detailed flow and pressure report to substantiate this claim. The calculations and report shall be provided by a licensed fire system contractor or engineer. A letter from the Fire Department listing required pressures and flows shall be provided to TMWA.
- b. Where safety or drainage problems exist with the installation of an RP which cannot be reasonably corrected. The owner of the system shall provide a written report from his fire system contractor or engineer which details the problems or logistics of installing the RP



## **SECTION 6      CONSTRUCTION WATER & FIRE HYDRANT USAGE**

### **CONSTRUCTION WATER DEFINITION**

Backflow prevention is required by TMWA on all methods of using potable water for construction. During the course of construction for a particular premise, water may be used for various construction activities. Such activities include water used for dust control, site grading and compaction, on-site mixing of concrete and cement, water used for the pressure testing of pipes, and water used in the cleaning of tools and equipment.

### **CONSTRUCTION WATER SUPPLY**

Several options available for construction water are as follows.

#### ***TRUCK FILL SITES***

TMWA discourages the use of potable water for construction purposes and encourages the use of non potable supplies for construction water needs, particularly water used for dust control. To this end, TMWA has worked with the construction community and has developed a mix of potable and non-potable of construction water fill stations strategically located around the community. Each station is equipped with metering and appropriate backflow prevention equipment. TMWA encourages contractors and developers to utilize these stations and arrangements can be made with TMWA for their use.

#### ***TEMPORARY CONSTRUCTION WATER METER***

If in fact a customer or developer requires construction water specifically at its construction site, then the owner/developer may request a temporary construction water service utilizing potable water from TMWA's distribution system. Temporary construction water service shall require metering, will be billed at the appropriate rate deemed by TMWA, shall be equipped with appropriate backflow prevention equipment which shall be tested by a Certified Tester, and shall be retired by the customer/developer at the end of the project. TMWA's backflow prevention group will specify the appropriate level of backflow prevention equipment on a case by case basis.

#### ***PERMANENT DOMESTIC OR IRRIGATION WATER METER***

Another source of potable construction water is to use the permanent domestic or irrigation water service for that property. The meter box shall be set to subgrade in the final permanent location, the permanent backflow prevention assembly installed (with a hosebib at the downstream end of the backflow prevention assembly), inspected by TMWA Backflow Prevention Group, and tested by a Certified Tester. At the end of the construction project, the only change required is for the developer to remove the hose bib from the end of the backflow prevention assembly and contact the TMWA billing department to change the name on the account. All installation requirements and inspections shall be performed as noted in TMWA Backflow Prevention Installation Requirements and Standards and this policy.

## **FIRE HYDRANT AND FIRE WATER SERVICE USE**

At no time shall a private entity utilize water from a public or private fire hydrant or from a fire sprinkler water service inside a facility for any purpose other than fire fighting. TMWA shall designate the approved water supplies that shall be utilized by private entities (including contractors) for construction, or any, purposes.

Any municipal agency that uses water from a private or public fire hydrant or other water outlet shall:

1. Have written approval from TMWA for use of water from this non metered supply.
2. Have an approved Air Gap on each vehicle or equipment being filled from the hydrant.

Have the air gap on those vehicles and equipment approved by TMWA Backflow Prevention Group before water fill.

## **SECTION 7**

## **CERTIFIED BACKFLOW ASSEMBLY TESTERS**

### **TESTER CERTIFICATION**

Persons wishing to perform tests on backflow prevention assemblies in Nevada shall have a California Nevada American Water Works Association (AWWA) Backflow Prevention Assembly Tester Certification pursuant to NAC 445A. Certification requires passing a tester class resulting in a certificate from the California Nevada section of the AWWA. Re-certification shall be obtained every three years or per the latest version of the USC Manual of Cross Connection Control.

All testers who perform tests on backflow prevention assemblies which provide service protection for TMWA shall be on the List of CA-NV AWWA Certified Testers. The District Health Department maintains this list. Any individual wishing to be placed on the tester's list should contact the Environmental Engineer, District Health Department. The District Health Department will place a tester on the list if AWWA certification has been obtained and if business licenses have been obtained from Reno, Sparks, and Washoe County. The tester's name will be automatically removed from the list if proof of re-certification has not been provided by the tester to the District Health Department.

TMWA reserves the right to remove any tester from the approved list for TMWA testing due to non performance reasons or for performing the tests in a method not consistent with TMWA's requirements.

### **TESTER RESPONSIBILITIES AND TESTING REQUIREMENTS**

1. TMWA requires the tester to attend a yearly seminar presented by TMWA to review TMWA policy and standards. This is a requirement for the tester to remain eligible to perform tests for TMWA water customers. The tester will be notified of the time and place for this review.
2. TMWA's test form shall be used for backflow prevention assemblies installed for service protection for fire, domestic, and irrigation water services. At the request of the tester, TMWA will provide this form on a diskette. The form on the diskette has no TMWA logo. The tester may insert his own logo.
3. All data on the test form shall be legible and complete, otherwise the form will be returned to the tester for completion.
4. If the water meter number is not provided on the test form, the tester shall obtain a copy of the bill for the specific water service from the customer and attach this to the test form.
5. A successful, operational function test by a tester shall be completed and is due to TMWA within seven (7) days after the assembly is installed and water service is set and/or water service is established. Water service will be terminated after the meter is set if this requirement is not met.
6. Any tester who conducts tests of backflow prevention assemblies which protect fire service connections shall also be a licensed fire system contractor or work under the

direct supervision of a licensed fire system contractor. This directive is per the Health Agency.

7. TMWA Backflow Prevention Group members will perform tests on backflow prevention assemblies throughout the year on a random basis as a quality control measure.
8. TMWA may request the tester perform the test in the presence of a TMWA Backflow Prevention Group member.
9. TMWA may conduct periodic spot checks of a tester's work using the tester's own gage.
10. NAC 445A.67245 requires all test gages to be calibrated at least annually by a qualified firm capable of such calibration. The calibration certification forms, for any test gage used to test backflow prevention assemblies on TMWA water services, shall be provided to TMWA Backflow Prevention Group annually.
11. Both backflow prevention assemblies on a Detector Check assembly shall be tested. Designate the test for the bypass assembly as such on the test form. Read the bypass meter and record it on the test form.
12. Place in the comment field any items such as and including:
  - an incorrectly installed assembly (per TMWA Installation Standards)
  - an assembly which has been modified from the original factory configuration such as having a #1 shut off valve without a test cock or one in which a shut off valve has been detached from the body of the backflow assembly.
  - an installation which has a stop and waste valve between the meter and the assembly
  - an installation which has a water outlet, tap, tee, etc. upstream of the backflow prevention assembly
  - use of a test cock for water supply
  - a fire service which has a tap for non fire services upstream or downstream of the backflow prevention assembly
13. Test criteria for a passing test for an RP:
  - Minimum 2.0 PSID on relief valve opening
  - Minimum 1.0 PSID on check valve 1.
  - Minimum 3.0 PSID buffer between relief valve opening and check valve 1
  - Both shut off valves shall not leak
14. Test criteria for a passing test for a DC:
  - Minimum 1.0 PSID on check valve 1 and check valve 2
  - Both shut off valves shall not leak
15. Test criteria for a passing test for a PVB:
  - The air inlet shall open at a minimum 1.0 PSID
  - Minimum 1.0 PSID on check valve 1
  - Both shut off valves shall not leak

## **SECTION 8      CROSS-CONNECTION CONTROL SPECIALISTS**

### **SPECIALIST CERTIFICATION**

Any person who wishes to conduct Cross Connection Surveys for TMWA water customers shall be a Cross Connection Control Specialist. This certification shall be obtained through either the specialist class presented by the California-Nevada section of AWWA or the USC Foundation for Cross-Connection Control and Hydraulic Research.

TMWA maintains its own list of Cross Connection Control Specialists. Specialists wishing to perform work for TMWA water users shall submit a copy of their certificate, along with copies of business licenses for Reno, Sparks and Washoe County, to TMWA Backflow Prevention Group.

TMWA requires the Cross Connection Control Specialist to attend a yearly seminar presented by TMWA to review TMWA policy and standards. This is a requirement for the specialist to remain eligible to perform surveys for TMWA water customers. The specialist will be notified of the time and place for this review.

TMWA reserves the right to remove any specialist from the list should he/she fail to perform the survey as required by TMWA.

### **SURVEY REQUIREMENTS**

Surveys conducted for TMWA water users shall be complete, well written and concise. Surveys shall include the following minimum information:

1. A clear and complete description of the water service connections at the premises being surveyed including:
  - customer water account number
  - types of services and meter numbers
  - service address
  - owner name and address
  - a copy of TMWA's service map (may be obtained at TMWA)
  - If the water meter number is not provided on the survey, the specialist shall obtain a copy of the bill for the water services from the customer and attach this to the survey.
2. A recommendation for type of backflow prevention for service protection that is consistent with requirements of NAC 445A. Describe potential external and internal installation locations. Describe locations and sizes of drains, and locations of electric panels and/or electric equipment. Describe any logistical problems, such as space problems, meters in driveways, lack of drains, high water tables, water run off problems, etc.
3. A detailed review of the on-site water use and the health or pollutant level hazards associated with such use. List backflow prevention that exists on internal plumbing

hazards. Provide a copy of the last test if the assemblies have been tested.

4. A physical description of the facility and premises including a map showing pertinent data such as buildings and where water services are located in relation to buildings and parking lots, location of the service connection and description of the area immediately around and downstream of the service connection, etc.
5. Note any special factors such as:
  - Auxiliary approved potable water supplies on the premises.
  - Non potable auxiliary water supplies being used (seasonal or year round) on, adjacent to, or close to the premises: recycled, reclaimed, well, ditch, surface water.
  - Actual or possible unauthorized water taps or usage upstream of any backflow prevention assembly for service protection.
  - Existing backflow prevention assemblies, their purpose, general condition, size, manufacturer, model, serial number and any test history.
  - Relationships to other properties relating to services or private mains.
6. Surveys that address internal protection should also include the following:
  - A detailed description of internal plumbing, including existing or potential cross-connections.
  - A recommendation for "internal protection" consistent with industry codes and references including but not limited to: the Uniform Plumbing Code, city building codes, NAC 445A, 'Orange Book', etc.

## **SECTION 9      ENFORCEMENT ACTION**

### **GENERAL**

If, in the opinion of TMWA, and after consultation with the District Health Department, it is found that a customer is not meeting its responsibilities relative to service protection backflow prevention, TMWA may implement enforcement actions. Enforcement may include:

1. Denying or terminating water service to a customer's premises.
2. Requiring the water customer to install backflow prevention, for service protection, commensurate with the degree of hazard on the premise.
3. TMWA may install backflow prevention, for the purpose of service protection, commensurate with the degree of hazard on the premise.

### **BASIS FOR WATER SERVICE TERMINATION**

When TMWA encounters a water use that represents a clear and immediate hazard to the potable water supply that cannot be immediately abated, TMWA will notify the District Health Department and will institute a procedure for discontinuing the water service. Conditions or water uses that create a basis for water service termination shall include, but are not limited to, the following:

1. Direct or indirect cross-connection between TMWA's water system and a sewer line.
2. Unprotected direct or indirect connection between the public water system and an unapproved auxiliary water system.
3. Refusal to install a required backflow prevention assembly. Unapproved delays by the water customer to install backflow prevention assemblies shall constitute such a refusal.
4. Refusal or unapproved delay to test a backflow prevention assembly.
5. Refusal or unapproved delay to repair a faulty backflow prevention assembly.
6. Refusal or unapproved delay to replace a faulty backflow prevention assembly.
7. Unprotected direct or indirect connection between the public water system and a system or equipment containing contaminants.
8. If a backflow prevention assembly has been removed, bypassed or disabled without prior approval from TMWA Backflow Prevention Group.
9. If a cross connection exists that is not controlled commensurate to the degree of hazard as assessed by TMWA Backflow Prevention Group.

### **TERMINATION PROCEDURE**

For condition 1 or 2, the District Health Department will notify TMWA to terminate water service to a customer's premise immediately if the hazard to the potable water supply cannot be immediately abated.

For all other conditions, the District Health Department will notify TMWA to terminate

service to a customer's premise after two written notices described in steps 1 and 2 below have been sent to the water customer specifying the corrective action needed and the time period in which it shall be completed. If the corrective action is not taken by the water customer within the specified time period, then water service may be terminated per the following steps:

1. TMWA shall notify the water customer of the requirements related to backflow prevention (installation, maintenance, relocation, testing, etc.). The customer shall be given ten (10) working days to comply and have inspections completed by TMWA Backflow Prevention Group.
2. TMWA shall send a second notice to the water customer who does not take action on the first notification. The second notice shall allow five (5) working days to comply.
3. TMWA shall send a third notice to the customer which will be a Disconnect Notice to be carried out within 48 hours.
4. TMWA will terminate water supply and lock service valve. The water service will remain inactive until all violations have been corrected, inspected and approved by TMWA and the District Health Department.



## **SECTION 10      PROCEDURE FOR A BACKFLOW OR CROSS CONNECTION INCIDENT**

### **GENERAL**

Whenever backflow occurs (either from backpressure or backsiphonage) the potential exists for contamination of TMWA's distribution system. Backflow incidents may be confined on site to a particular premise or may be more widespread in the event of sudden pressure loss in TMWA's distribution system. The following procedures will be used for responding to either type of backflow incident.

### **BACKFLOW EVENT CONFINED TO A PARTICULAR PREMISE OR PROPERTY**

This type of backflow event may be communicated to the District Health Department or TMWA. The following will be the procedure followed by TMWA for an event isolated to a single property.

1. TMWA Backflow Prevention Group or water production staff will notify the District Health Department of the event and the nature of the event. Based upon the particular circumstances and with consultation with the District Health Department, TMWA may immediately implement one or more of the following actions: water quality testing, flushing of services and mains, boil water order to customers or areas of the system affected by the event. Water service may be terminated to the premise suspected of being the source of the backflow until correction actions are completed.
2. The owner of the premise allowing (or suspected of allowing) the backflow to occur will be required to install or repair and test backflow prevention equipment on the water service. Backflow prevention measures will be specified by TMWA's backflow prevention group. Such backflow prevention equipment will be installed and tested before service is restored.
3. TMWA will require the owner of the premise to complete a detailed cross-connection control survey of the premise by a certified backflow prevention and cross-connection control specialist. TMWA and the District Health Department will determine the scope of the survey and will utilize the survey to determine additional internal backflow prevention measures required of the affected premise.

### **BACKFLOW EVENT CAUSED BY A SYSTEM LOSS OF PRESSURE**

1. TMWA will determine the extent of the incident and notify the District Health Department as soon as possible. After consultation with the District Health Department, a boil water order may be issued by TMWA to the media identifying the area affected by the event and those customers which should immediately boil their domestic water.
2. TMWA will isolate the area affected by the backflow event and will notify the jurisdictional fire department of curtailment of fire protection service to the affected area. TMWA will continue to communicate with affected customers through use of

the media.

3. Immediately after isolating the area affected by the backflow event, TMWA will initiate corrective action to restore service. This will include system repairs, flushing of mains and services and water quality sampling and monitoring.
4. After service is restored (mains and services are fully pressurized and flushed), the boil water order will be lifted upon receiving satisfactory results from water quality testing.

## **SECTION 11      NON POTABLE WATER USAGE & AUXILIARY WATER**

Non potable water includes water from ditches, surface water, unapproved wells, reclaimed water, recycled water, gray water or any non approved water supply.

Any premise on which both TMWA water supply and a non potable water supply exist will be subject to an annual shut down test.

### **TYPE OF BACKFLOW PREVENTION REQUIRED**

- An RP (Reduced Pressure Principle Assembly) backflow prevention assembly is required at the TMWA meter or point of connection on a water service which enters a property in which a non potable water supply is used and in which there are no cross connections between the non potable plumbing and the potable plumbing.
- An Air Gap backflow prevention method is required at the TMWA meter or point of connection for any plumbing system which will have a direct or indirect cross connection between both TMWA water and a non potable water supply.
- For a potable water service which enters a RESIDENTIAL property which is adjacent to a property where non potable water is used for irrigation: SEE SECTION 8A OF TMWA'S ENGINEERING AND CONSTRUCTION STANDARDS FOR SEPARATON AND BACKFLOW REQUIRMENTS.

### **DECLARATION OF USE OF RECLAIMED OR NON POTABLE WATER**

The potential reclaimed water customer will provide to the Backflow Prevention Group a copy of the application for reclaimed water usage within a week after the application has been made.

The potential non potable water customer will provide to the Backflow Prevention Group a written declaration of the intent to use non potable water on the premise where TMWA will supply potable water.

Failure to declare intentions to use reclaimed or non potable water may result in additional expenses to the customer due to TMWA's backflow prevention requirements for potable versus non potable water use.

### **TEMPORARY POTABLE WATER SUPPLY**

TMWA may provide temporary potable water to a system designed to distribute non potable water. The following are requirements for this service to be provided:

1. The water service shall be a separate tap on TMWA's distribution system.
2. The timeframe for the service to be retired shall be provided to TMWA in writing.
3. Backflow prevention shall be through an Air Gap on this temporary water service.

4. When non potable water service is connected to the non potable water system, the TMWA temporary water service shall be retired at the main. A bond shall be provided to TMWA for 150% of the amount estimated to retire the service. The additional 50% shall be considered a security deposit to ensure TMWA's potable service is retired.
5. TMWA will require the water customer to designate a water user supervisor for this premise.

### **SHUT DOWN TESTS**

1. All tests shall be attended by TMWA as purveyor of the potable water.
2. The following requirements shall be followed for a shut down test:
3. Shut down tests of the on site potable and non potable systems shall be performed annually.
4. The customer shall bear all costs of the test. This test is in addition to the periodic (usually annual) functional test of the backflow prevention assemblies on the premises.
5. Performance and coordination of the shut down test shall be the responsibility of the end user of non-potable water supply. End user shall coordinate such tests with TMWA as potable water purveyor, the non potable water purveyor, the water customer's water user supervisor, and the District Health Department.
6. The shut down test director will be TMWA, the District Health Department or the Non Potable water Purveyor.

### **QUALIFICATIONS FOR WATER USER SUPERVISOR**

The Water User Supervisor of a premise shall possess one of the following certifications:

1. USC Cross Connection Control Specialist
2. CA-NV AWWA Cross Connection Control Specialist

### **QUALIFICATIONS FOR DIRECTOR OF SHUT DOWN TEST**

The director of a shut down test shall possess all the following certifications:

1. USC Cross Connection Control Specialist or CA-NV AWWA Cross Connection Control Specialist
2. Currently, AWWA is developing a curriculum and certification related to reclaimed water and/or non potable water. The director should obtain and maintain the certification once that certification has been defined.

### **WATER SERVICE TERMINATION**

If any cross connections are detected between the potable water supply and the non potable water during the shut down test, potable water service will be terminated to the facility immediately and remain off until the cross connection problem is located and removed to the satisfaction of TMWA.

### **AUXILIARY APPROVED WATER SUPPLY**

If TMWA supplies water to a premises with an auxiliary approved water supply, backflow prevention shall be required at the point of connection. TMWA Backflow Prevention Group will specify the required type and location of backflow prevention assemblies for all TMWA water supply.

### **WELL ABANDONMENT**

When a well is abandoned, the owner shall submit to TMWA Backflow Prevention Group a certified copy of the well plugging report prepared by the licensed driller in accordance with NAC 534.420. This report shall be recorded by the District Health Department.

### **REFERENCES TO OTHER SECTIONS OF THIS POLICY**

Enforcement Action

## **APPENDIX A DENTAL FACILITY POLICY**

### **PURPOSE**

The purpose of this policy statement is to define backflow prevention requirements for domestic service protection for dental facilities. This policy statement has been developed based upon a review of current regulations and an in-depth balanced review of other sources of information.

### **REGULATORY REQUIREMENTS**

The installation of backflow prevention assemblies is required on service lines whenever the possibility exists that any source of pollution or contamination could be drawn into the public water system as a result of a backflow incident..

Nevada Administrative Code 445A, clearly defines the responsibility of water purveyors with regard to backflow prevention and cross-connection control. Per NAC 445A.67185, purveyors shall:

1. Ensure that there are no unprotected connections between the supplies of water, systems for the pumping, storage and treatment of water, and distribution system of the public water system and any source of pollution or contamination pursuant to which any unsafe water or other degrading material can be discharged or drawn into the public water system as a result of backsiphonage or backpressure.
2. Develop and carry out a program for the control of cross-connections that is approved by the health authority

Pursuant to the requirements of NAC 445A and direction of the District Health Department, TMWA has implemented a comprehensive backflow prevention program. The program includes detailed backflow prevention reviews of all new customers and all existing commercial customers.

### **BACKFLOW PREVENTION REQUIREMENTS FOR DOMESTIC SERVICES**

#### **NEW SERVICES**

NAC 445A specifies that the backflow prevention assembly to provide service protection for "A dental clinic shall consist of a reduced pressure principle assembly." This RP shall be installed immediately after the water meter and prior to any water uses or connections.

#### **EXISTING SERVICES**

Backflow prevention shall be installed immediately after the water meter and prior to any water uses or connections.

For retrofit purposes on existing services: TMWA may consider a reduction in service protection from an RP to a DC if all the following conditions are met:

- if the water customer uses contained water systems with no direct or indirect connection to potable water supply,
- if the water customers agree to meet all requirements listed in Requirements for Retrofit, Reduced Level of Service Protection.

## DISCUSSION

The required installation of backflow prevention assemblies often becomes a heated and controversial issue with many water customers. Customers may object to the installation of testable backflow prevention assemblies due to costs, their own interpretation of what constitutes a cross-connection or health hazard, or a sense that they are already over burdened with too many regulations. The issue of health agencies and water utilities requiring backflow protection on the water services to dental offices is no different. This discussion will summarize the various points of view and TMWA's rationale when it comes to backflow prevention and cross-connection control for dental facilities.

Many in the dental industry believe that requiring backflow prevention devices in dental offices utilizing testable backflow prevention assemblies to be unjustified. They may also object based upon their perception that a non-testable check valve built into various water using equipment is sufficient to prevent backflow. The American Dental Society (from an April 1996 policy statement) also sets forth the following reasons:

1. The Centers for Disease Control and Prevention have not identified any evidence of a public health risk due to this theoretical phenomenon.
2. Bloodborne viruses cannot reproduce outside their living host and therefore, unlike bacteria and fungi, cannot multiply in water.
3. Most dental offices do not use cuspidors, and cuspidors currently manufactured include an air gap.
4. Dental instruments with cross-connections to water systems are neither designed nor intended to ever be immersed in patient fluids.
5. The amount of fluid that could theoretically be aspirated is miniscule, and would be quickly diluted in the public water supply.
6. If water flow is disrupted for any reason, such as in the event of backsiphonage, the dental worker would automatically discontinue use of the instrument and attempt to resolve the problem.
7. Current trends within the dental profession are towards dental units with contained water systems (not connected to the public water system).
8. Cost benefit analyses demonstrate that the expected returns from these safety requirements are negligible when weighed against the cost.

From a water purveyor's perspective, TMWA's response to the above discussion points is as follows:

- Regarding point 1: Backflow is a common phenomenon. Every day in the U.S. water utilities experience backflow events due to broken water mains, pump failures, and from backpressure from cross-connections to non-potable customer sources.

- Regarding points 2, 3 and 4: Water purveyors are concerned about all actual and potential sources of pollution and contamination on the customers side of the water meter. Relative to dental offices, there is concern pertaining to the use of toxic chemicals in film developing operations and microbiological contamination from the use of the following devices: autoclaves, steam lines, grinding units, in-line filtering systems, water flushed cuspidors, water/air syringes, water cooled handpieces, and vacuum pumps. Water purveyors are concerned about all sources of microbial contamination, not just bloodborne pathogens. This concern is evident in the dental industry as well. In December 1995, the ADA's Board of Directors adopted a standard of 200 colony forming units as the maximum microbe load in water emitted from air/water syringes, handpieces and similar equipment in dental facilities.
- Regarding points 2, 3 and 4: Another source of potential contamination from dental offices include potential microorganisms from biofilm buildup in the very small diameter lines used in dental equipment. From the March 1997 Clinical Research Associates Newsletter, colony forming units increase exponentially in dental equipment. The following numbers were cited: @ the dental chair junction box 10,000 cfu/ml; @ the dental chair control center 400,000 cfu/ml; @ the sterile handpiece 100,000 cfu/ml; @ the non-sterile air/water syringe 200,000 cfu/ml. These numbers are alarming from a water purveyor's perspective when the allowable number in drinking water is 500 cfu/ml (from the Total Coliform Rule under the Safe Drinking Water Act).
- Regarding point 5: From the water purveyor's perspective, the use of the community's water supply to "dilute" even minuscule amounts of backflow is unacceptable. The "solution by dilution" argument can not be accepted if one considers immune compromised customers may be severely affected by a very small amount of contaminated water.
- Regarding point 6: It is not prudent for water purveyors to assume that dental personnel will recognize a backflow event and will curtail usage of water using dental equipment.
- Regarding point 7: Some dentists are now using contained water systems. This option may eliminate the need for internal backflow prevention devices on equipment that formerly utilized the public water supply. However, it would not eliminate the need for service protection backflow prevention assemblies if other water using equipment such as vacuum pumps, x-ray machines, autoclaves, etc. are still connected to the public water supply.
- Regarding point 8: Cost/Benefit analysis is not the sole criteria when establishing health and safety regulations, particularly drinking water regulations. Health risk to all segments of the population must be considered as well.

## SUMMARY

Due to the public health concerns cited above and regulatory requirements, TMWA requires service protection as defined in this section for dental offices.

TMWA strongly encourages dental clinics to implement proactive internal cross-connection control programs.





## **APPENDIX B SERVICE CONNECTIONS TO MULTI-UNIT COMMERCIAL BUILDINGS**

### **PURPOSE**

The purpose of this policy statement is to define backflow prevention requirements for domestic service protection for multi unit complexes that are water customers of TMWA. This policy statement has been developed based upon a review of current regulations.

### **BACKGROUND**

TMWA has many customers whose premises consists of large buildings serving multiple tenants with one water service. These include, but are not limited to, multi-tenant office buildings, warehouses, and strip malls. Although in many instances an individual tenant's domestic water use may not constitute a pollutant or contaminant level hazard, when the number of units are considered along with a potential wide variety of uses, the risk associated with cross-connections from non-potable sources increases significantly. This risk is further exacerbated by the transient nature of tenancy and changing water use which is difficult, if not impossible, to monitor by the water supplier.

The inherent cross-connection risks and changing water use hazards associated with buildings serving multiple tenants are recognized by NAC 445A, Public Water System Regulations: to the degree that for any building where the business activity and water use cannot be reasonably identified, service protection is required in the form of a reduced pressure principle assembly (RP). In addition, many of the business activities commonly found in multi-unit facilities have been identified in the regulations as requiring a contaminant (health) level of service protection.

Therefore, the multi-tenant facility presents a contaminant (health) degree of hazard to the community's (TMWA's) water supply. For these regulatory reasons and for the risks cited above to TMWA's distribution system, the following are reasonable backflow prevention requirements for the domestic services serving such facilities.

### **BACKFLOW PREVENTION REQUIREMENTS FOR DOMESTIC SERVICES**

#### **NEW SERVICES**

An approved reduced pressure principle backflow prevention assembly (RP) shall be required on all new services.

#### **EXISTING SERVICES**

For existing service connections, the following criteria will apply:

1. If, in the original utility plans for the project, a backflow prevention assembly was called for but not installed, the backflow prevention assembly as called for on the

utility plans shall be installed.

2. If a multi-unit facility is undergoing an expansion, remodel, or tenant improvement of a unit, then an RP shall be required on the domestic service as close as possible to the meter and before the first lateral take-off.
3. If a cursory survey by TMWA, or a detailed survey by a Cross Control Specialist, on a multi-unit facility indicates a contaminant or pollutant hazard, then an RP shall be required on the domestic service as close as possible to the meter and before the first lateral take-off, rather than on the individual water line to that tenant.
4. If a survey conducted on a multi-unit facility indicates no contamination or pollution level hazard, then no backflow prevention assembly for service protection would be required immediately. Each year, a written re-certification shall be required of the owner or property manager. After receipt and review of the certification, TMWA's Backflow Prevention Group shall then determine if service protection is required. The following will be included in the re-certification:
  - Changes in tenancy
  - Changes in water use
  - Plumbing changes
  - Use of non potable water

## **APPENDIX C     RESIDENTIAL FIRE SPRINKLER SYSTEMS**

### **BACKGROUND**

Local fire department jurisdictions may require the installation of fire sprinkler systems for certain single family homes. Single family homes that are far removed from a hydrant, a fire station, or because of their size or nature, may require the installation of such a system.

Based on discussions with the District Health Department and the Reno and Sparks Fire Departments, the owner or developer of a single family residence requiring a fire sprinkler system may elect:

- to install a non-testable single check valve or
- to install a backflow prevention assembly (double check valve assembly or a reduced pressure backflow prevention assembly).

Installation requirements for both are described below.

### **SINGLE CHECK INSTALLATION REQUIREMENTS**

1. Chemical additives or antifreeze shall not be in the system.
2. All piping shall be approved for potable water service.
3. The end of the fire main shall be plumbed into a water closet, to have water flow due to water usage.
4. A single check valve shall be installed at the fire riser. The valve shall be a Grinnell Number 3300 or equal.
5. Dead end branches in the fire suppression system shall be as short as possible and not to exceed 40 feet.
6. On-site storage is not allowed for fire suppression.

### **BACKFLOW PREVENTION ASSEMBLY REQUIREMENTS**

1. The backflow prevention assembly shall meet all requirements for installation noted in the TMWA Backflow Prevention Installation Requirements and Standards and this policy.
2. The type of assembly and location will be designated by TMWA Backflow Prevention Group.
3. The installation shall be inspected by TMWA Backflow Prevention Group.
4. The backflow prevention assembly shall be tested on installation and annually thereafter.
5. The backflow prevention assembly shall be maintained in factory working condition.

## **REFERENCES TO OTHER SECTIONS OF THIS POLICY**

Attached at Appendix D is a letter from the District Health Department reiterating the above requirements.

**APPENDIX D            HEALTH DEPARTMENT MEMO: RESIDENTIAL  
FIRE SPRINKLER REQUIREMENTS**

**CITY OF RENO**

**CITY OF SPARKS**





## **APPENDIX E    UNIFORM PLUMBING CODE: INTERNAL BACKFLOW PREVENTION REQUIREMENTS**

Refer to Chapter 6 of the UPC, Water Supply and Distribution, for internal backflow prevention requirements, for the adopted version specific to the city or jurisdiction in question.

Backflow prevention and cross connection requirements are detailed in sections 602 through 603.

**APPENDIX F    NAC 445A EXCERPT**

**NEVADA ADMINISTRATIVE CODE**

Containing All Permanent Regulations of State Agencies  
Adopted under chapter 233B of NRS  
Classified, Arranged, Revised, Indexed and Published  
(Pursuant to NRS 233B.062 to 233B.065 inclusive)  
by the  
**LEGISLATIVE COUNSEL**  
**STATE OF NEVADA**

Please direct any questions or suggestions  
pertaining to NAC to:  
Legislative Counsel Bureau  
Capitol Complex  
Carson City, Nevada 89701-4747  
(702) 687-6830

**AUTHORITY:** NRS 439.200, 445A.855, 445A.860, 445A.863, 445A.880

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**PUBLIC WATER SYSTEMS**

Design, Construction, Operation and Maintenance

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**CHAPTER 445A  
WATER CONTROLS  
PUBLIC WATER SYSTEMS**

Design, Construction, Operation and Maintenance

**NAC 445A.6553 "Air gap" defined.** "Air gap" means a physical separation between a point of free-flowing discharge from a pipe that supplies liquid to an open or nonpressurized vessel and the overflow rim of that vessel which is:

1. At least twice the effective diameter of that pipe or, if the pipe is affected by side walls, at least three times the effective diameter of that pipe; and
2. In no case less than 1 inch.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65535 "Air release valve" defined.** "Air release valve" means a valve that is placed at a high point of a pipeline for the automatic release of air to prevent air binding and the buildup of pressure.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65555 "Approved backflow testing laboratory" defined.** "Approved backflow testing laboratory" means:

1. The Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California; or
2. Any other person or entity who the health authority determines:
  - (a) Is competent and possesses the necessary facilities to investigate and evaluate assemblies for the prevention of backflow;
  - (b) Adheres to the procedures for testing and certification set forth in the American Water Works Association Standards; and
  - (c) Is independent of any manufacturers of assemblies for the prevention of backflow.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65575 "Atmospheric vacuum breaker" defined.** "Atmospheric vacuum breaker" means a vacuum breaker that contains an air inlet valve, a check seat and one or more air inlet ports, in which:

1. The flow of water causes the air inlet valve to close the air inlet ports; and
2. When the flow of water stops:
  - (a) The air inlet valve falls and forms a check valve against backsiphonage; and
  - (b) The air inlet ports open to allow air to enter and satisfy the vacuum.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65585 "Auxiliary supply of water" defined.** "Auxiliary supply of water" means a supply of water or system for the supply of water which is available to the premises of a customer of a public water system, other than the supply or system of the public water system established to provide water to the premises, including another public water system or any natural source of water.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65605 "Backflow" defined.** "Backflow" means a hydraulic condition in which a relative difference in pressures causes a nonpotable liquid, gas or other substance to flow into a potable water system.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6561 "Backpressure" defined.** "Backpressure" means an elevation in the downstream pressure of a piping system above the supply pressure which:

1. Is caused by pumping, air pressure, steam or the elevation of piping; and
2. Could cause a reversal in the normal direction of flow at a particular point.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65615 "Backsiphonage" defined.** "Backsiphonage" means a backflow that results when a reduction in the pressure of a water system causes a subatmospheric pressure to exist at a particular site in the water system.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6569 "Certified backflow prevention assembly tester" defined.** "Certified backflow prevention assembly tester" means a person who is certified by the California/Nevada section of the American Water Works Association to test assemblies for the prevention of backflow.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65695 "Check valve" defined.** "Check valve" means a valve designed to open in the direction of normal flow and close with the reversal of normal flow.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65725 "Class 1 fire sprinkler system" defined.** "Class 1 fire sprinkler system" means a fire sprinkler system that:

1. Has a direct connection to a water main and no physical connection to any source of pollution or contamination;
2. Uses no pumps, tanks or reservoirs; and
3. Uses no antifreeze or other additives of any kind.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6573 "Class 2 fire sprinkler system" defined.** "Class 2 fire sprinkler system" means a fire sprinkler system that:

1. Has a direct connection to a water main and no physical connection to any source of pollution or contamination;
2. Has a booster pump installed at the connection to the water main;
3. Uses no tanks or reservoirs; and
4. Uses no antifreeze or other additives of any kind.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65735 "Class 3 fire sprinkler system" defined.** "Class 3 fire sprinkler system" means a fire sprinkler system that:

1. Has a direct connection to a water main;
2. Uses no antifreeze or other additives of any kind; and
3. Uses one or more of the following:

(a) An elevated tank for the storage of water.

- (b) A pump that takes suction from a tank or covered reservoir located above ground.
- (c) A pressure tank.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6574 "Class 4 fire sprinkler system" defined.** "Class 4 fire sprinkler system" means a fire sprinkler system that:

1. Has a direct connection to a water main;
2. Has available an auxiliary supply of water which is located on the premises or within 1,700 feet of a pumping connection for the system; and
3. Uses no antifreeze or other additives of any kind.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65745 "Class 5 fire sprinkler system" defined.** "Class 5 fire sprinkler system" means a fire sprinkler system that has a direct connection to a water main and:

1. An interconnection with an auxiliary supply of water, including, without limitation:

(a) A prohibited water well;

(b) A water system used for industrial purposes; or

(c) A pump that takes suction from a river, pond or reservoir; or

2. Uses antifreeze or another additive.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6575 "Class 6 fire sprinkler system" defined.** "Class 6 fire sprinkler system" means a fire sprinkler system that:

1. Is combined with a water system used for industrial purposes; and

2. Has a direct connection to a water main and no physical connection to any other supplies of water, except that the system may have gravity storage or a pump that takes suction from a tank.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65795 "Contamination" defined.** "Contamination" means an impairment of water quality by chemical substances or biological organisms which the health authority determines to be sufficient to create a risk or threat to the public health.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6581 "Cross-connection" defined.** "Cross-connection" means an unprotected connection or structural arrangement, whether actual or potential, between a public water system and any other source or system, through which it is possible to introduce into any part of the public water system any used water, industrial fluid, gas or substance other than the potable water intended to supply the system. The term includes any bypass arrangements, jumper connections, removable sections, swivel or change-over devices or other temporary or permanent devices through which or because of which backflow can occur.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65855 "Double check detector check assembly" defined.** "Double check detector check assembly"

means an assembly composed of a line-sized double check valve assembly and a bypass that contains a water meter and another double check valve assembly.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6586 "Double check valve assembly" defined.** "Double check valve assembly" means an assembly that:

1. Is composed of two independently acting, approved check valves;
2. Has tightly closing, resilient seated shutoff valves attached at each end;
3. Is fitted with properly located, resilient seated test cocks; and
4. Has been tested and approved, in accordance with American Water Works Association Standard C510, by an approved backflow testing laboratory.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.65945 "Fire sprinkler system" defined.** "Fire sprinkler system" means a system of piping which is connected to a public water system and has sprinklers that automatically discharge water over the area of a fire.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.66055 "Health authority" defined.** "Health authority" means the officers and agents of the district board of health of the health district in which the area of service of a public water system is located or, if none, the officers and agents of the health division.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6623 "Pollution" defined.** "Pollution" means an alteration of the chemical, physical, biological or radiological integrity of water that:

1. Impairs the quality of the water to such an extent that the impairment adversely and unreasonably affects those aesthetic qualities which would have made the water desirable for domestic use; and
2. Does not impair the quality of the water to such an extent that the health authority determines that the impairment creates a risk or threat to the public health.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6625 "Pressure vacuum breaker" defined.** "Pressure vacuum breaker" means a vacuum breaker that:

1. Contains an independently operating, internally loaded approved check valve and an independently operating, loaded air inlet valve located on the discharge side of the approved check valve; and
2. Is equipped with properly located, resilient seated test cocks and tightly closing, resilient seated shutoff valves which are attached at each end of the assembly.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6631 "Reduced pressure detector assembly" defined.** "Reduced pressure detector assembly" means an assembly designed to protect against pollution and contamination which is composed of a line-sized, reduced pressure principle assembly and a bypass that contains a water meter and another reduced pressure principle assembly.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.66315 "Reduced pressure principle assembly" defined.** "Reduced pressure principle assembly" means an assembly that:

1. Contains:

- (a) Two independently acting approved check valves; and
  - (b) A hydraulically operating, mechanically independent pressure relief valve that is located between the approved check valves and below the upstream check valve;
  - 2. Has properly located, resilient, seated test cocks and tightly closing, resilient, seated shutoff valves at each end of the assembly;
  - 3. Is designed to protect against pollution and contamination under conditions of backsiphonage or backpressure; and
  - 4. Has been tested and approved, in accordance with American Water Works Association Standard C511, by an approved backflow testing laboratory.
- (Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.66375 "Service connection" defined.** "Service connection" means:

- 1. The point of connection between a public water system and the water system used by a customer of the public water system, at which the public water system loses its authority and control over the water;
  - 2. If a meter is installed at a connection between a public water system and the water system used by a customer of the public water system, the downstream end of the meter; or
  - 3. At a park for mobile homes or recreational vehicles, the riser for water service.
- (Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6643 "Stop and waste valve" defined.** "Stop and waste valve" means a valve installed in a meter box or valve box that allows a supply of water to a service line to be shut off and subsequently allows water from pipelines in the building or other property where the water is used to drain into the meter box or valve box.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6648 "Supplier of water" defined.** "Supplier of water" means a person or other entity, including a governmental entity, which owns or operates a public water system.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67185 Cross-connections and backflow: General requirements.** A supplier of water shall:

- 1. Ensure that there are no unprotected connections between the supplies of water, systems for the pumping, storage and treatment of water, and distribution system of the public water system and any source of pollution or contamination pursuant to which any unsafe water or other degrading material can be discharged or drawn into the public water system as a result of backsiphonage or backpressure.
- 2. Develop and carry out a program for the control of cross-connections that is approved by the health authority. Except for a program that has been approved by a health authority before February 20, 1997, a program for the control of cross-connections must:
  - (a) Be submitted to the health authority for its approval no later than:
    - (1) January 1, 1999; or
    - (2) Eighteen months after the public water system begins operation, whichever is later.
  - (b) Include:
    - (1) A schedule for implementation.



(2) A plan for inspecting the properties served by the public water system to determine the potential risk of cross-connection and backflow.

(3) A plan for testing and tracking all primary assemblies for the prevention of backflow which are intended to protect the public water system upstream from a service connection. The plan must provide for the annual testing of those assemblies and for the retention of records from that testing.

(4) A list of the particular assemblies for the prevention of backflow which may be used in the public water system or on service connections to the public water system.

(5) A list of the measures the supplier of water will take to enforce the program if any customers of the system fail to comply with the program.

(c) Ensure compliance with NAC 445A.67185 to 445A.67255, inclusive.

(d) Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, comply with the provisions of:

(1) The Uniform Plumbing Code;

(2) Recommended Practice for Backflow Prevention and Cross-Connection Control; and

(3) The Manual of Cross-Connection Control.

If there is any conflict between any of the provisions described in this paragraph, the most stringent of those provisions prevails.

(Added to NAC by Bd. of Health, eff. 2-20-97)

#### **NAC 445A.6719 Cross-connections and backflow: Assemblies for prevention of backflow.**

1. Each service connection must have an assembly for the prevention of backflow, of a type that is commensurate with the degree of hazard that exists on the property of the customer of a public water system. Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, the assembly may consist of any one of the following, as listed in the order of least to most protection:

(a) A double check valve assembly.

(b) A reduced pressure principle assembly.

(c) An air gap.

2. A reduced pressure principle assembly may be substituted for a double check valve assembly, and an air gap may be substituted for a reduced pressure principle assembly.

3. With the approval of the supplier of water:

(a) A double check detector check assembly may be substituted for a double check valve assembly; and

(b) A reduced pressure detector assembly may be substituted for a reduced pressure principle assembly.

4. A double check valve assembly or double check detector check assembly may be used only for protection against pollution.

5. A reduced pressure principle assembly or reduced pressure detector assembly may be used for protection against pollution or contamination, but a reduced pressure principle assembly must not be used for protection against sewage or reclaimed wastewater.

6. An assembly for the prevention of backflow must not be composed solely of a single check valve.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67195 Cross-connections and backflow: Minimum types of protection for particular service connections.** Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, or authorized by the health authority, the minimum type of protection from cross-connection required for a service connection to:

1. A public building or any building:
  - (a) That contains a hotel, motel, casino, condominium or town house, or any apartments;
  - (b) Used for commercial purposes where a specific business activity has not been identified; or
  - (c) In which one or more sewage pumps or sewage ejectors have been installed, consists of a reduced pressure principle assembly.
2. A building that:
  - (a) Has multiple stories and booster pumps or elevated tanks to distribute potable water; or
  - (b) Exceeds 40 feet in height, as measured from the service connection to the highest water outlet, consists of a double check valve assembly.
3. A class 1, class 2 or class 3 fire sprinkler system consists of a double check valve assembly.
4. A class 4, class 5 or class 6 fire sprinkler system consists of a reduced pressure principle assembly.
5. A hydronic heating system that contains any chemical additives consists of a reduced pressure principle assembly.
6. A baptismal font of a church consists of a reduced pressure principle assembly.
7. A facility for bottling beverages consists of a reduced pressure principle assembly.
8. A brewery consists of a reduced pressure principle assembly.
9. A cannery, facility for the processing of food, packing house or rendering facility consists of a reduced pressure principle assembly.
10. A facility for cold storage consists of a reduced pressure principle assembly.
11. A dairy processing facility consists of a reduced pressure principle assembly.
12. A restaurant or other facility in which food is served consists of a reduced pressure principle assembly.
13. A dental clinic consists of a reduced pressure principle assembly.
14. A hospital, medical building or clinic consists of a reduced pressure principle assembly.
15. A convalescent home or nursing home consists of a reduced pressure principle assembly.
16. A sanitarium consists of a reduced pressure principle assembly.
17. A morgue, mortuary or facility for conducting autopsies consists of a reduced pressure principle assembly.
18. A laboratory, including, without limitation, a laboratory of a teaching institution or another biological or analytical facility, consists of a reduced pressure principle assembly.
19. A facility of a school, college or university consists of a reduced pressure principle assembly.
20. A facility for the production of motion pictures consists of a reduced pressure principle assembly.

21. A facility for the publishing or printing of a newspaper consists of a reduced pressure principle assembly.
  22. A veterinary clinic, pet shop or facility for grooming pets consists of a reduced pressure principle assembly.
  23. A laundry or dry cleaning facility consists of a reduced pressure principle assembly.
  24. A dyeing facility consists of a reduced pressure principle assembly.
  25. A facility for mechanical, chemical or electrochemical plating consists of a reduced pressure principle assembly.
  26. Any portable spraying or cleaning equipment consists of an air gap.
  27. A pool or spa consists of a reduced pressure principle assembly.
  28. A park for mobile homes or recreational vehicles consists of a reduced pressure principle assembly.
  29. A facility located on a waterfront, including, without limitation, a fishery, fish hatchery, dock or marina, consists of a reduced pressure principle assembly.
  30. A facility for the production of power consists of a reduced pressure principle assembly.
  31. A facility for the production, storage or transmission of oil or gas consists of a reduced pressure principle assembly.
  32. A facility that handles, processes or stores radioactive materials or substances consists of a reduced pressure principle assembly.
  33. A facility for processing sand or gravel consists of a reduced pressure principle assembly.
  34. A system for storm drainage, the collection of sewage or the distribution of reclaimed wastewater consists of an air gap.
  35. A facility in which:
    - (a) Water is used to manufacture, store, compound or process chemicals for industrial purposes;
    - (b) Chemicals are added to water used in the compounding or processing of products;
    - (c) Chemicals are added to the supply of water; or
    - (d) The supply of water is used for the transmission or distribution of chemicals,consists of a reduced pressure principle assembly.
  36. A facility for the manufacture of aircraft or missiles consists of a reduced pressure principle assembly.
  37. A facility for the manufacture, repair or washing of motor vehicles consists of a reduced pressure principle assembly.
  38. A facility for the manufacturing or processing of film consists of a reduced pressure principle assembly.
  39. A facility for the manufacturing of ice consists of a reduced pressure principle assembly.
  40. A facility for the manufacturing, processing or cleaning of metal consists of a reduced pressure principle assembly.
  41. A facility for the manufacturing of natural or synthetic rubber consists of a reduced pressure principle assembly.
  42. A facility for the manufacturing of paper or paper products consists of a reduced pressure principle assembly.
  43. Any other facility for manufacturing, processing or fabricating consists of a reduced pressure principle assembly.
- (Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67205 Cross-connections and backflow: Minimum types of protection for service connection to auxiliary supply of water or irrigation system.** Except as otherwise provided in NAC 445A.67185 to 445A.67255, inclusive, the minimum type of protection required for a service connection to:

1. An auxiliary supply of water must consist of a double check valve assembly or reduced pressure principle assembly, as determined by the supplier of water and approved by the health authority.
  2. An irrigation system, including a system for irrigating median strips, must consist of:
    - (a) A pressure vacuum breaker or double check valve assembly, as determined by the supplier of water and approved by the health authority; or
    - (b) Except as otherwise authorized by the health authority, if facilities have been installed for pumping, injecting or applying fertilizers, pesticides or other hazardous systems, a reduced pressure principle assembly.
- (Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6721 Cross-connections and backflow: Minimum types of protection for other service connections; resolution of conflicting requirements; imposition of more stringent requirements.**

1. The health authority shall determine, on a case-by-case basis, the minimum type of protection from cross-connection required for any type of service connection which is not specified in NAC 445A.67185 to 445A.67255, inclusive.
  2. If there is any conflict between any of the provisions of NAC 445A.67185 to 445A.67255, inclusive, regarding the type of protection from cross-connection required for a particular type of service connection, the most stringent of those provisions prevails.
  3. The health authority or supplier of water may impose requirements regarding the installation and use of assemblies for the prevention of backflow which are more stringent than the provisions of NAC 445A.67185 to 445A.67255, inclusive.
- (Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67215 Cross-connections and backflow: Service connection to fire sprinkler system.**

1. A supplier of water shall ensure that:
    - (a) An appropriate assembly for the prevention of backflow is installed at each service connection between the public water system and a fire sprinkler system; and
    - (b) The assembly is:
      - (1) Tested upon installation; and
      - (2) Maintained and tested, and the results of those tests logged, annually.
- The testing required by this subsection must be conducted by a certified backflow prevention assembly tester.
2. An assembly for the prevention of backflow installed on a service connection between a public water system and a fire sprinkler system must:
    - (a) Be of such a type and installed in such a manner that the assembly:
      - (1) Protects the public water system; and
      - (2) Does not interfere with the capability of the fire sprinkler system, as engineered, to protect the safety of persons in the public or private facility in which the fire sprinkler system is located; and
    - (b) Prevent any pollution or contamination of drinking water, by any nonpotable water contained in the fire sprinkler system, which may be caused by any backpressure or

backsiphonage that may occur during normal or abnormal operation of the fire sprinkler system or the public water system.

3. The supplier of water shall determine the type of assembly required on a particular service connection between the public water system and a fire sprinkler system based upon the degree of risk posed by the fire sprinkler system to the supply of potable water, considering the chemical and biological contents of the fire sprinkler system, the materials used to construct the fire sprinkler system and the possibility that backflow will occur.

4. Any reduced pressure principle assembly or reduced pressure detector assembly used on a service connection between a public water system and a fire sprinkler system must not have any holes drilled in the check valve clappers.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6722 Cross-connections and backflow: Design of fire sprinkler system.**

The designer of a fire sprinkler system shall ensure that, based upon the placement of any reduced pressure principle assembly or reduced pressure detector assembly:

1. An antifreeze loop or the total line of the fire sprinkler system is able to accommodate the thermal expansion of any antifreeze; or

2. If necessary, an expansion tank is provided to accommodate the thermal expansion of any antifreeze.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67225 Cross-connections and backflow: Conditions to provision of service to certain fire sprinkler systems.** If any backflow involving a fire sprinkler system threatens a public water system, the supplier of water shall require, as a condition to the provision of service to the fire sprinkler system:

1. The installation of an assembly for the prevention of backflow in accordance with the requirements of NAC 445A.67215.

2. An analysis to determine how the assembly will affect the pressure and rate of flow of water available to the fire sprinkler system.

3. The modification of the fire sprinkler system, and the riser and water service lateral for the fire sprinkler system, in such a manner as necessary to ensure adequate fire flow.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6723 Cross-connections and backflow: Installation of air gap.** Except as otherwise authorized by the health authority, if an air gap is installed on a service connection:

1. The air gap must be located as closely as practicable to the service connection, on the opposite side of the service connection from the public water system.

2. All piping from the service connection to the receiving tank must be above grade and visible.

3. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the air gap.

4. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67235 Cross-connections and backflow: Installation of reduced pressure principle assembly.** Except as otherwise authorized by the health authority, if a reduced pressure principle assembly is installed on a service connection:

1. The reduced pressure principle assembly must be installed:
    - (a) In a horizontal and level position, except that the reduced pressure principle assembly may be installed in a vertical position if the assembly has been:
      - (1) Specifically designed for operation in that position; and
      - (2) Tested and certified to be suitable for operation in that position by an approved backflow testing laboratory.
    - (b) As closely as practicable to the service connection, on the opposite side of the service connection from the public water system.
    - (c) Above ground and, to the extent possible, not less than 12 inches nor more than 36 inches above the finished grade, as measured from the bottom of the assembly.
    - (d) At a site with adequate drainage, or with drain piping, for any fluid that is discharged when the assembly is activated.
    - (e) In such a manner that no part of the assembly will be submerged during normal conditions of operation and weather.
    - (f) In such a manner as to be readily accessible for maintenance and testing.
  2. The reduced pressure principle assembly must not be installed below grade, in any subsurface vault, or in any vault, chamber or pit where there is any potential that the relief valve could become submerged.
  3. The reduced pressure principle assembly must have a free-flowing drain with an air gap.
  4. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the reduced pressure principle assembly.
  5. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.
  6. The reduced pressure principle assembly may be installed indoors if the installation complies with subsections 1 to 5, inclusive, and has a clearance of:
    - (a) At least 12 inches on top;
    - (b) At least 24 inches on the side with test cocks; and
    - (c) At least 12 inches on the other sides.
- (Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6724 Cross-connections and backflow: Installation of double check valve assembly.** Except as otherwise authorized by the health authority, if a double check valve assembly is installed on a service connection:

1. The double check valve assembly must be installed:
  - (a) In a horizontal and level position, except that the double check valve assembly may be installed in a vertical position if the assembly has been:
    - (1) Specifically designed for operation in that position; and
    - (2) Tested and certified to be suitable for operation in that position by an approved backflow testing laboratory.
  - (b) As closely as practicable to the service connection, on the opposite side of the service connection from the public water system.
  - (c) Above ground and, to the extent possible, not less than 12 inches nor more than 36 inches above the finished grade, as measured from the bottom of the assembly.
  - (d) In such a manner as to be readily accessible for maintenance and testing.

2. There must be no type of outlet, tee, tap, take-off or connection to or from the service line between the service connection and the double check valve assembly.
  3. Expansion tanks or pressure relief valves must be provided as appropriate for the potential threat of water hammer and thermal expansion.
  4. The double check valve assembly may, if above-grade installation is impracticable and the health authority approves of the installation, be installed in a below-grade vault in such a manner that:
    - (a) The top of the double check valve assembly is not more than 8 inches below grade.
    - (b) There is:
      - (1) At least 12 inches of clearance between the bottom of the vault and the bottom of the double check valve assembly;
      - (2) At least 24 inches of clearance between the side of the vault and the side of the double check valve assembly with test cocks; and
      - (3) At least 12 inches of clearance between the side of the vault and the other sides of the double check valve assembly.
    - (c) To the extent warranted by climatic conditions, the double check valve assembly is protected from freezing.
    - (d) The vault has adequate drainage to prevent the accumulation of water, which drains to daylight, to free-draining soil or to a sufficient amount of gravel placed under the vault to provide for free drainage and prevent the accumulation of water under the vault. A vault that does not have an integrated bottom must be placed on a layer of gravel which is not less than 3 inches deep.
    - (e) The vault is protected from vandalism.
    - (f) The vault is not located in an area subject to vehicular traffic.
  5. The double check valve assembly may be installed indoors if:
    - (a) The installation complies with subsections 1 to 4, inclusive; and
    - (b) The double check valve assembly has a clearance of:
      - (1) At least 12 inches on top;
      - (2) At least 24 inches on the side with test cocks; and
      - (3) At least 12 inches on the other sides.
- (Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67245 Cross-connections and backflow: Duties of certified backflow prevention assembly tester.** A certified backflow prevention assembly tester shall:

1. Perform his field testing of assemblies for the prevention of backflow in accordance with the provisions of the Manual of Cross-Connection Control.
  2. Use, for the testing of reduced pressure principle assemblies, double check valve assemblies and pressure vacuum breakers, a differential pressure gauge that has:
    - (a) A differential range of at least zero to 15 psi; and
    - (b) Graduations of not more than 0.2 psi.
  3. Ensure that his testing equipment:
    - (a) Is calibrated to the manufactures' specifications not less than annually; and
    - (b) Has all necessary hoses and fittings.
- (Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.6725 Cross-connections and backflow: Use of vacuum breakers.**

1. An atmospheric vacuum breaker or pressure vacuum breaker may be used only for protection against pollution or contamination under conditions of backsiphonage.
2. If an atmospheric vacuum breaker is used:

(a) The vacuum breaker must be installed not less than 6 vertical inches above the highest point of the downstream piping.

(b) Any associated shutoff valve must be installed upstream from the vacuum breaker.

(c) The vacuum breaker must not be subjected to operating pressure for more than 12 hours in any 24-hour period.

(d) Flow from the protected fixture must be to the atmosphere.

3. If a pressure vacuum breaker is used, the vacuum breaker:

(a) Must be installed:

(1) Upstream from the terminal shutoff valve; and

(2) Not less than 12 vertical inches above the highest point of the downstream outlet, valve or piping.

(b) Must not be installed at a location where backpressure will occur.

(Added to NAC by Bd. of Health, eff. 2-20-97)

**NAC 445A.67255 Cross-connections and backflow: Restrictions on use of certain valves and piping assemblies.**

1. A stop and waste valve must not be used on a service line.

2. If a valve or piping assembly, including a frost-free riser, has an opening that is subject to flooding, the valve or piping assembly must not be used on a service line unless:

(a) The valve or piping assembly is adequately protected by an assembly for the prevention of backflow; and

(b) If the piping assembly is a frost-free riser, the riser is equipped with appropriate valves and a connection for the introduction of compressed air, pursuant to which water may be purged and the system prepared for winter.

(Added to NAC by Bd. of Health, eff. 2-20-97)



## **APPENDIX G    TMWA BACKFLOW PREVENTION INSTALLATION REQUIREMENTS AND STANDARDS DOCUMENT**

Installation Requirements and Standards are available from the TMWA Backflow Prevention Group on request.

## APPENDIX I – EAGLE CANYON PARK

# Eagle Canyon Park

## 1.1 SITE LOCATION

The estimated irrigation demand for the Eagle Canyon Park is 243 gpm, and the estimated total annual demand is 66 acre-feet. Irrigation demands are based on metered water use data and historical evapotranspiration (ET) data collected at the Sparks Tree Farm located at Baring Boulevard and McCarran Boulevard. Site irrigation will occur during an 8-hour night period.

### Site Information:

| Property          | Physical Address     | Latitude/ Longitude       | Township/ Range/ Section |
|-------------------|----------------------|---------------------------|--------------------------|
| Eagle Canyon Park | 400 Eagle Canyon Dr. | 39°39'25"N<br>119°43'17"W | NE 1/4 S34.T21N.R20E     |

## 1.2 SITE DESCRIPTION

Eagle Canyon Park is located on the northern side of Eagle Canyon Drive approximately ½ a mile west of Pyramid Lake Highway. To the south of Eagle Canyon Park is Desert Winds Park, which will also use effluent for irrigation. To the north and east of the park is open land that may eventually be developed for residential or commercial use. To the west and southwest of the park are residential areas. The topographic map of Eagle Canyon Park is shown in Figure I 3. Eagle Canyon Park has slopes ranging from approximately 0% to 2%. Below is an entire section for the soil characteristics, which are also outlined in Figure I 2. Eagle Canyon Park is identified in the Flood Insurance Rate Map as Zone AO (flood depths of 1 to 3 feet) and Zone X (Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood). The effluent irrigation plan of Eagle Canyon Park is shown in Figure I 4 while the planting and landscaping plan is shown in Figure I 5.

### Effluent Demands:

| Property         | Total Area (Acre) | Irrigated Area (Acre) | Acre-Feet per Year | Nighttime Demand (gpm) | Daytime Demand (gpm) | Total (gpm) | Average (mgd) |
|------------------|-------------------|-----------------------|--------------------|------------------------|----------------------|-------------|---------------|
| Gator Swamp Park | 4.35              | 3.5                   | 16.6               | 70                     | 0                    | 70          | .03           |

### 1.3 SOILS

The Soil Conservation Service describes the geology of the southern Washoe County area as follows (SCS, 1983). The soil characteristics of Eagle Canyon Park are shown in Figure I 2.

- 120 - **Doten Silty Clay, 0 to 2 percent slopes.** This very deep, moderately well drained soil is on lake terraces. It formed in alluvium derived from mixed rock. The average annual precipitation is about 8 to 10 inches; the average annual air temperature is 48 to 50 degrees F. Typically the surface layer is grayish brown silty clay about 7 inches thick. The underlying material to a depth of 60 inches is grayish brown and averages clay and silty clay. Typically this soil cracks opens at the surface when dry.

Permeability of this Doten soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is ponded or very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. The soil is subject to rare flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks. In some areas, this soil is ponded for long periods during spring.

Present vegetation in most areas is mainly black greasewood, shadescale, and bottlebrush squirreltail.

- 1160 - **Jowec silty clay loam.** This very deep, well-drained soil is on low lake terraces. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is light brownish gray silty clay loam about 2 inches thick. The subsoil is dark yellowish brown clay loam about 18-inches thick, and the lower part to a depth of 60-inches is stratified loam and sandy loam. Included in this unit are Mellor solids on lower terraces; Turria soils, which are drainageways and are subject to occasional flooding; and Haybourne soils on higher alluvial fan skirts.

The permeability of this Jowec soil is slow. Available water capacity is high. Effective rooting depth is more than 60 inches. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to shallow flash flooding during storms of unusually high intensity.

Present vegetation is mainly big sagebrush and spiny hopsage.

The soils listed above are the natural soil in the area. During the construction of the parks, there was disruption of this soil and possibly the importation of other material. Because of this, it is difficult to predict the conditions of the soil that may influence ponding, runoff and infiltration.

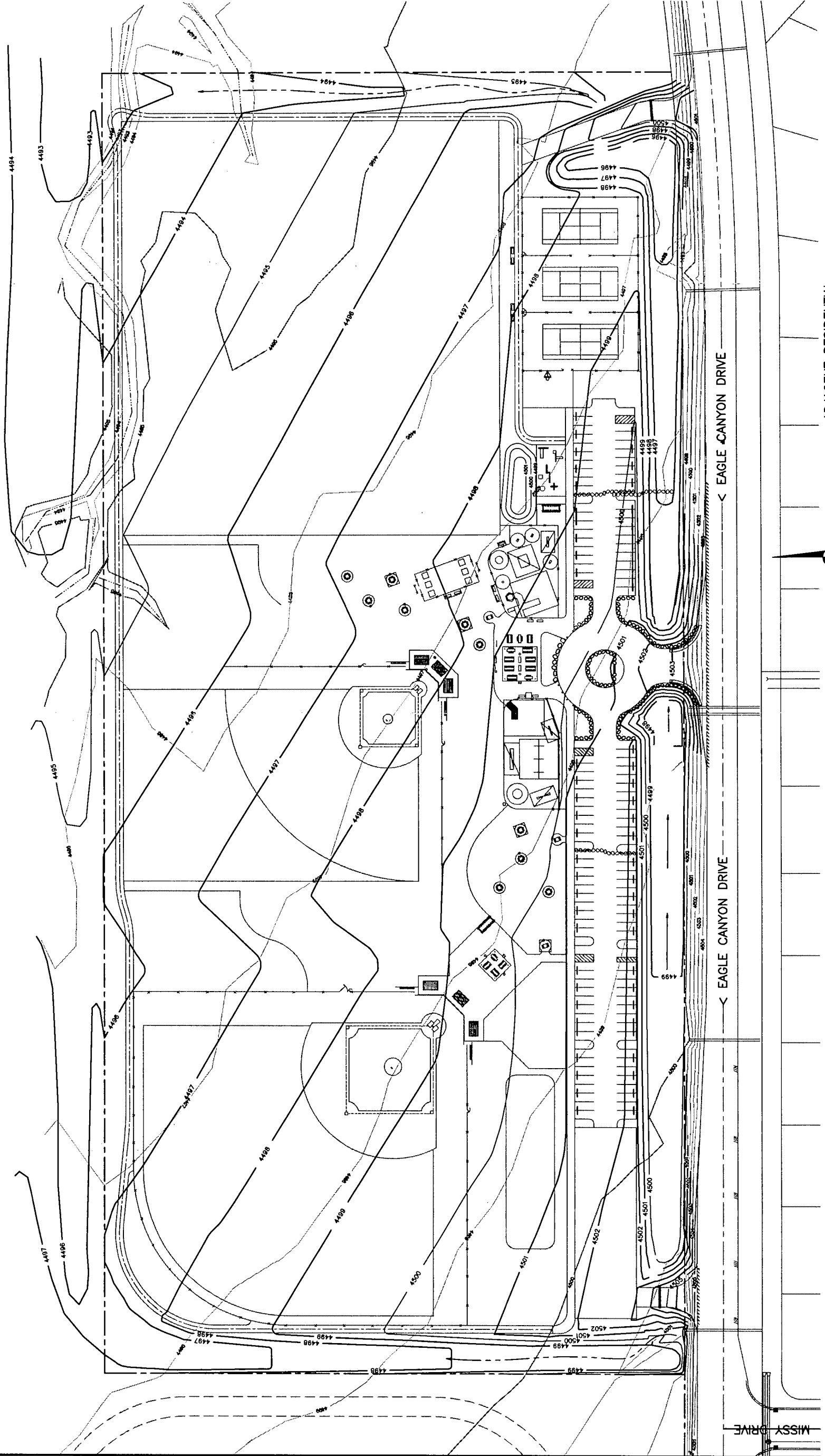
### 1.4 PROCEDURES

The park irrigation control system will control the time and duration of park irrigation. This system controls a set of valves independent of the master valve at the service connection. In case of an emergency the system should be shut down at the gate valve that connects the system to the main water supply. This gate valve has been called out in the site plans and in the detail sheet(s) for the meter/PRV vault.

Eagle Canyon Park does not have electricity in its vault. As long as TMWRF pumps are operating the site will still be able to irrigate. However, power failure to the irrigation system controllers will dictate the parks' ability to irrigate. Figure I 4 shows the location of the meter vault and valves.

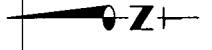






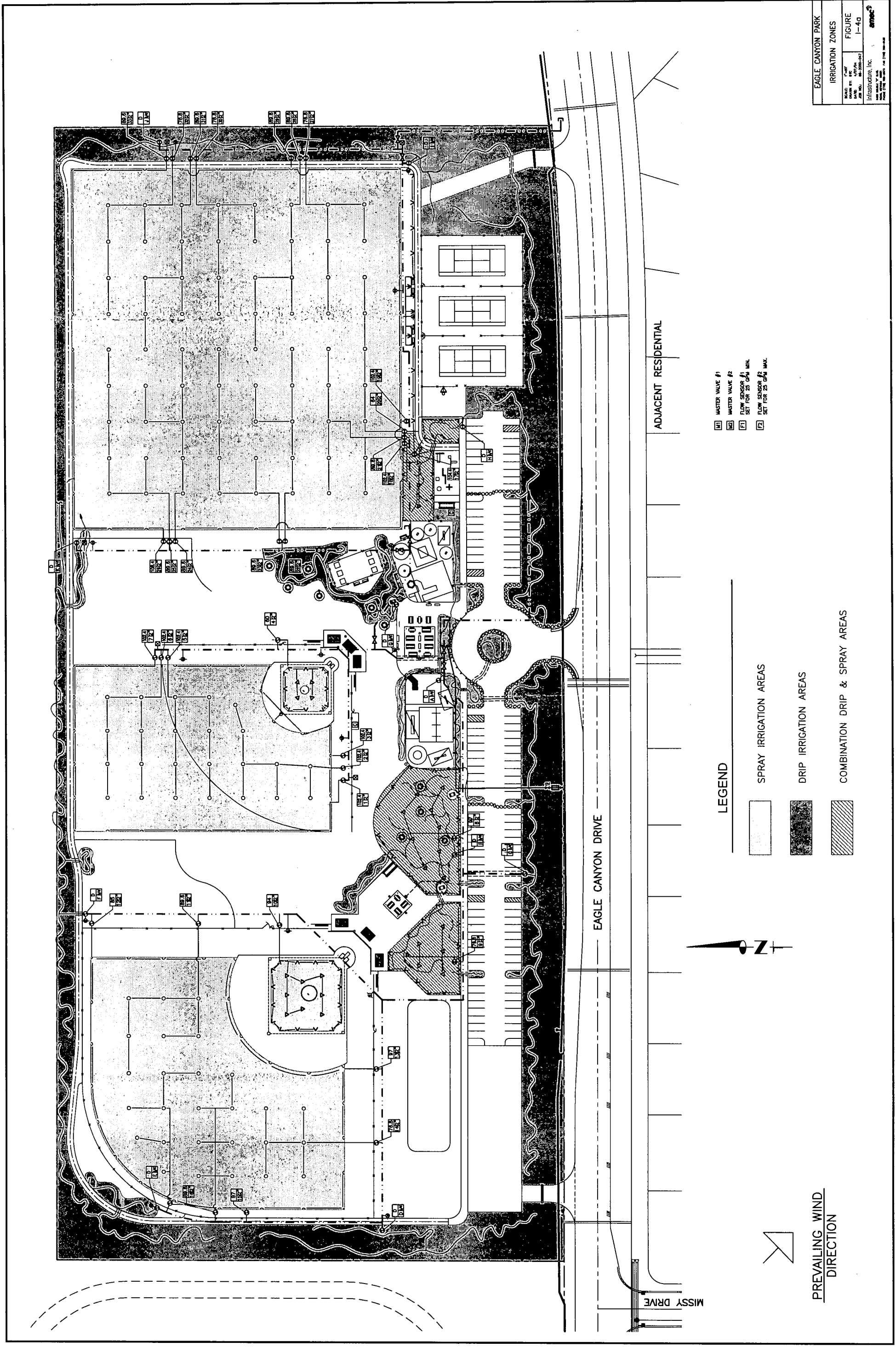
LEGEND

- EXISTING TOPO
- PROPOSED GRADING PER GRADING PLAN DONE BY CFA ENGINEERING

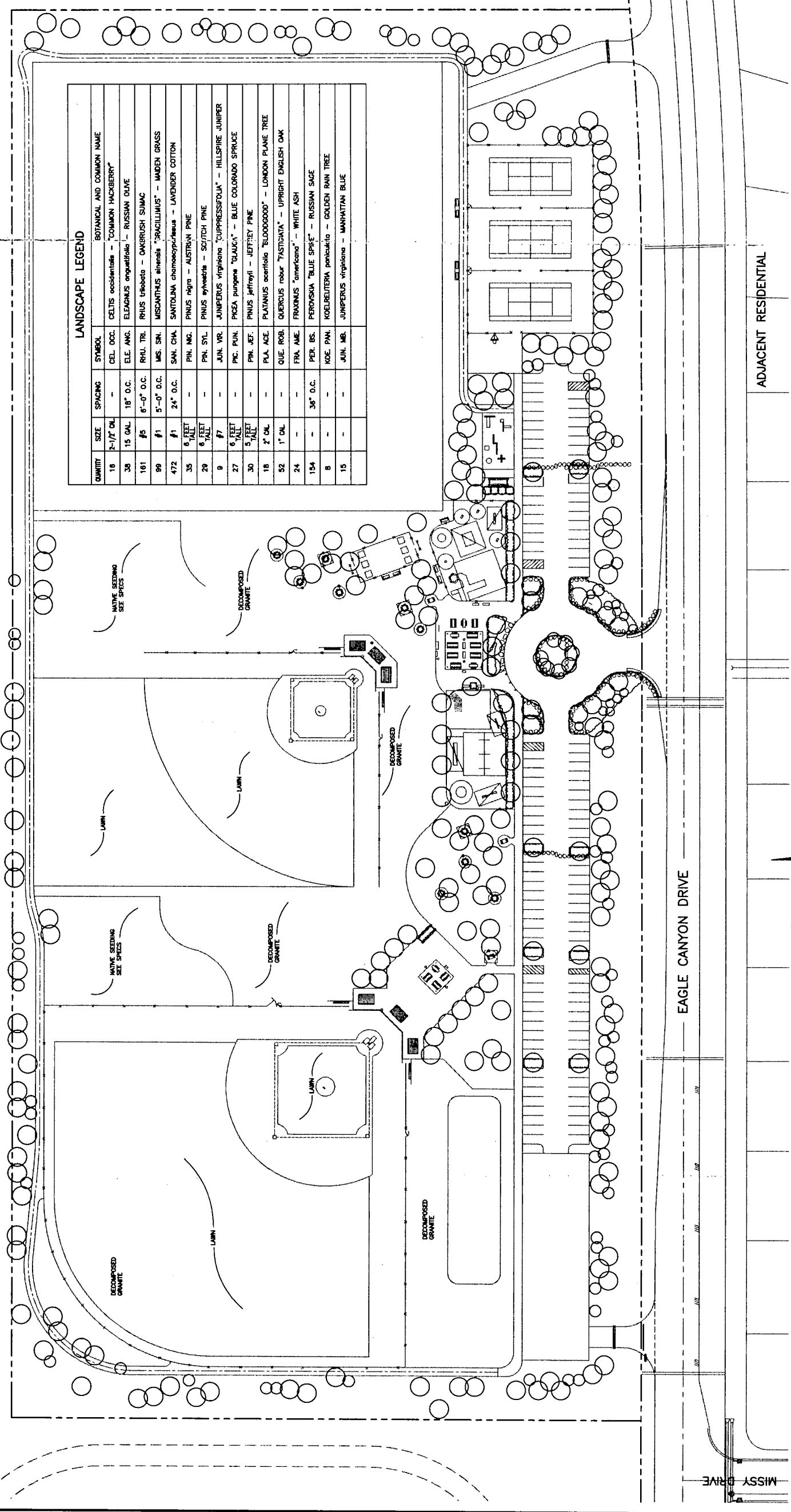


|   |          |
|---|----------|
| EAGLE CANYON PARK                       |          |
| TOPOGRAPHIC MAP                         |          |
| FIGURE                                  | 1-3      |
| DATE                                    | 06/04/04 |
| BY                                      | 06/04/04 |
| CHECKED                                 | 06/04/04 |
| APPROVED                                | 06/04/04 |
| Infrastructure, Inc.                    |          |
| 10000 N. 10th Ave., Suite 100           |          |
| Phoenix, AZ 85020                       |          |
| Tel: (602) 998-8888 Fax: (602) 998-8889 |          |





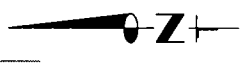
NATIVE SEEDING  
SEE SPECS



| LANDSCAPE LEGEND |             |            |        | BOTANICAL AND COMMON NAME |   |
|------------------|-------------|------------|--------|---------------------------|---|
| QUANTITY         | SIZE        | SPACING    | SYMBOL | CEL. DEC.                 |   |
| 18               | 2-1/2" O.C. | -          |        | CEL. DEC.                 | CELTIS occidentalis - "COMMON HACKBERRY"                    |
| 38               | 15 GAL      | 18" O.C.   |        | ELE. ANG.                 | ELEAGNUS angustifolia - "RUSSIAN OLIVE"                     |
| 161              | #5          | 6"-0" O.C. |        | RHU. TRI.                 | RHUS typhelata - "DAKOTIAN SUMAC"                           |
| 99               | #1          | 5'-0" O.C. |        | MS. SN.                   | MISCANTHUS sinensis "BRACILLIUS" - "MADON GRASS"            |
| 472              | #1          | 24" O.C.   |        | SAN. CHA.                 | SANTOLINA chamaecyparissia - "LAVENDER COTTON"              |
| 35               | 6 FEET TALL | -          |        | PN. ING.                  | PNUS nigra - "AUSTRIAN PINE"                                |
| 29               | 6 FEET TALL | -          |        | PN. STL.                  | PNUS sylvestris - "SCOTCH PINE"                             |
| 9                | #7          | -          |        | JUN. VR.                  | JUNIPERUS virginiana "SUPPRESSIFOLIA" - "HILLSPIRE JUNIPER" |
| 27               | 6 FEET TALL | -          |        | PR. PUN.                  | PRUNUS purpurea "GLAUKA" - "BLUE COLORADO SPRUCE"           |
| 30               | 5 FEET TALL | -          |        | PN. JET.                  | PNUS jeffreyi - "JEFFREY PINE"                              |
| 18               | 2" O.C.     | -          |        | PLA. ACE.                 | PLATANUS acerifolia "BLOODGOOD" - "LONDON PLANE TREE"       |
| 52               | 1" O.C.     | -          |        | QUE. ROB.                 | QUERCUS robur "FASTIGIATA" - "UPRIGHT ENGLISH OAK"          |
| 24               | -           | -          |        | FR. AME.                  | FRAXINUS "americana" - "WHITE ASH"                          |
| 134              | -           | 36" O.C.   |        | PER. BS.                  | PEROVSKIA "BLUE SPIRE" - "RUSSIAN SAGE"                     |
| 8                | -           | -          |        | KOE. PAN.                 | KOELREUTERIA paniculata - "GOLDEN RAIN TREE"                |
| 15               | -           | -          |        | JUN. MB.                  | JUNIPERUS virginiana - "MANHATTAN BLUE"                     |

NOTES

- 1). LANDSCAPING PLAN BASED ON LANDSCAPING DRAWINGS PROVIDED BY CFA, DATED 5/14/1996.
- 2). STAMPED LANDSCAPING PLANS ARE NOT AVAILABLE



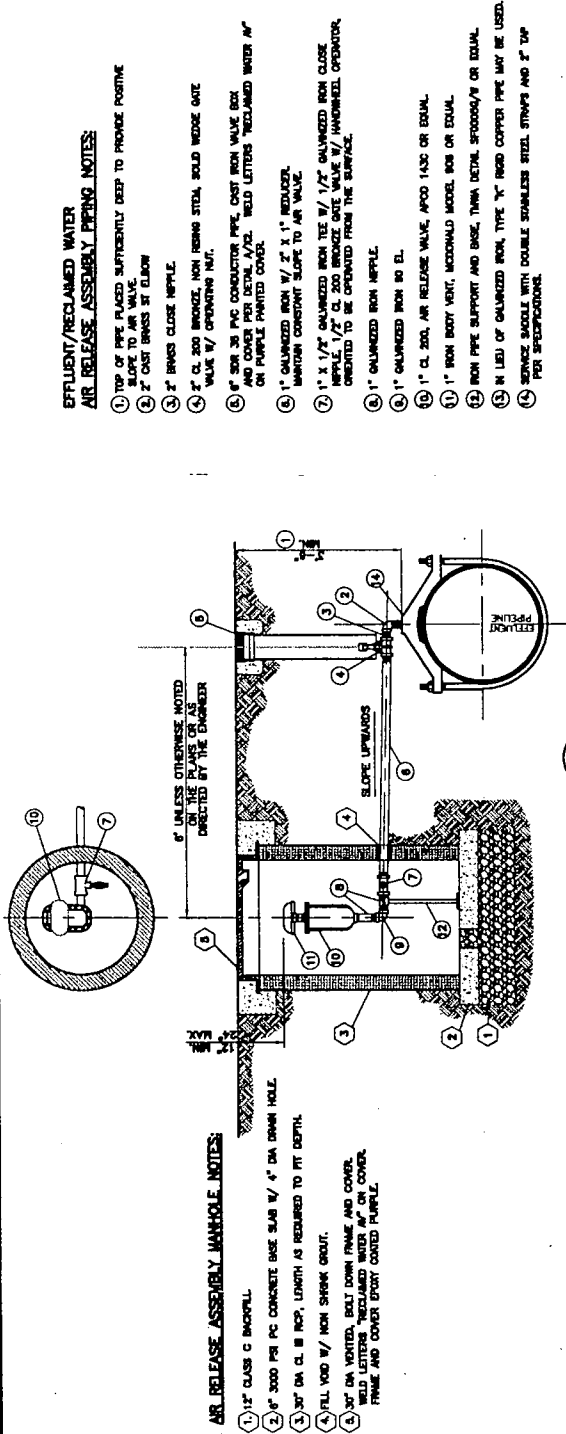
REDUCED DRAWING  
ADJUST SCALE ACCORDINGLY

ADJACENT RESIDENTIAL

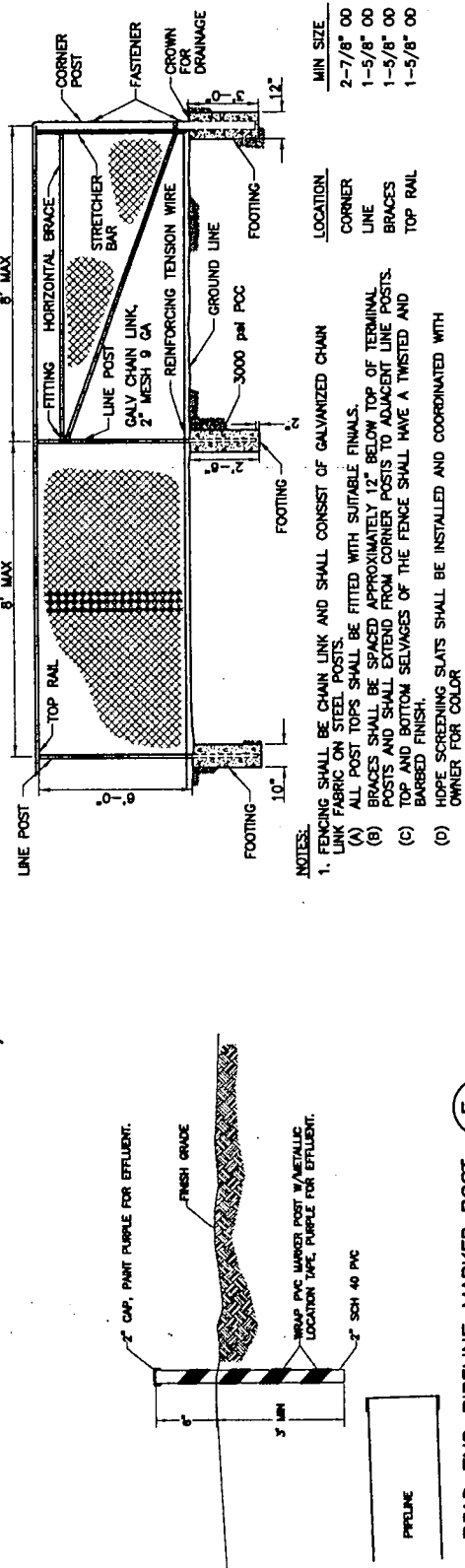
EAGLE CANYON DRIVE

MISSY DRIVE

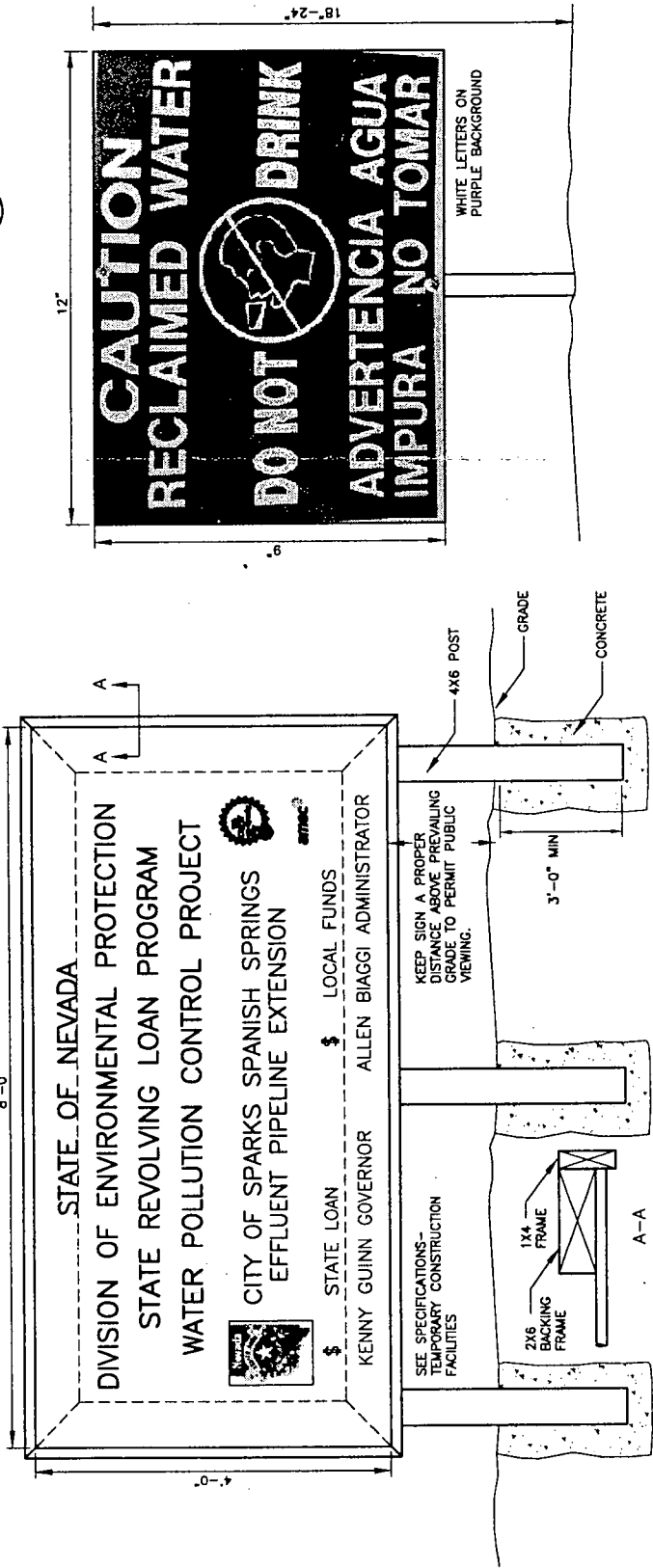




1" COMBINATION AIR RELEASE  
ASSEMBLY  
EFFLUENT/RECLAIMED WATER



| DEAD END PIPELINE MARKER POSI | E   | X2      |
|-------------------------------|-----|---------|
| EFFLUENT/RECLAIMED WATER      | NTS | 0' 0"   |
| 6' CHAIN LINK FENCE           | NTS | J<br>X2 |



PROJECT SIGN DETAIL

H

X2

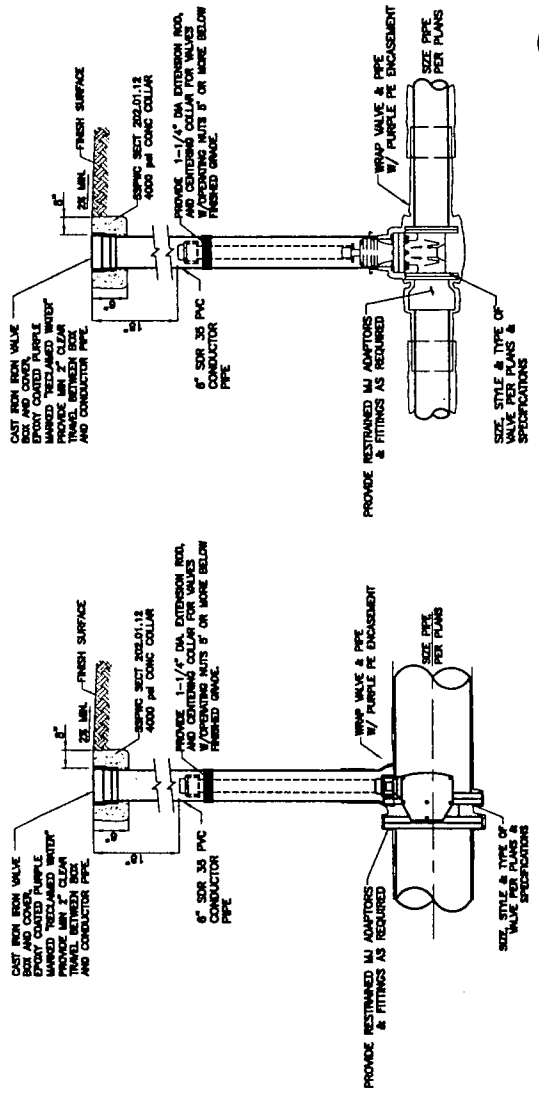
NTS

EFFLUENT WARNING SIGN

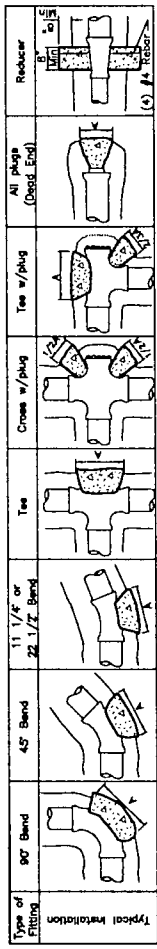
I

X2

NTS

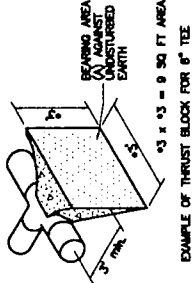


**TYPICAL BURIED BUTTERFLY  
VALVE AND VALVE BOX  
EFFLUENT/RECLAIMED WATER**



TEST PRESSURE 200 PSI  
THRUST BLOCK BEARING AREA (sq ft) "A"

| Type of fitting | 90° Band 45° Band | 22w Band | 11w Band | Dead End | Tee  | Cross w/ plug |
|-----------------|-------------------|----------|----------|----------|------|---------------|
| 3"              | 2.0               | 1.0      | 1.0      | 1.0      | 1.0  | 1.0           |
| 4"              | 3.0               | 2.0      | 1.0      | 2.0      | 2.0  | 2.0           |
| 6"              | 7.0               | 4.0      | 2.0      | 5.0      | 5.0  | 5.0           |
| 8"              | 13.0              | 7.0      | 4.0      | 8.0      | 8.0  | 8.0           |
| 10"             | 21.0              | 11.0     | 6.0      | 15.0     | 15.0 | 15.0          |
| 12"             | 30.0              | 16.0     | 8.0      | 21.0     | 21.0 | 21.0          |



**EXAMPLE OF THRUST BLOCK FOR 6" TEE**

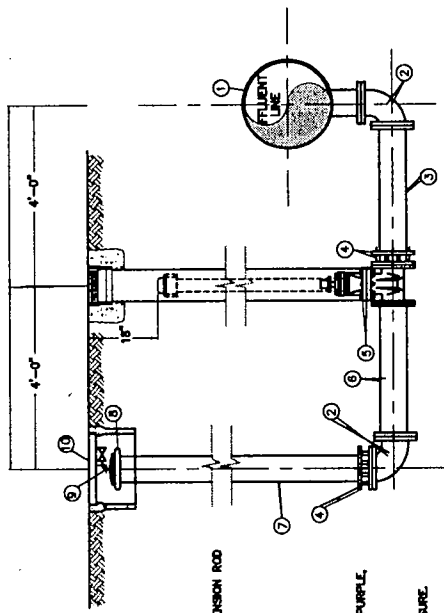
**THRUST BLOCK NOTES:**

- 1) THRUST BLOCKS TO BE CONSTRUCTED OF 3000 psi CONCRETE MINIMUM.
- 2) AREAS GIVEN ARE FOR CLASS PIPE AT TEST PRESSURE AND AN ALLOWABLE SOIL BEARING CAPACITY OF 1,500 POUNDS PER SQUARE FOOT.
- 3) BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL.
- 4) JOINTS, BOLTS, AND FACE PLUGS TO BE KEPT CLEAR OF CONCRETE BY USE OF PLASTIC WRAP. SIDES SHALL BE WOOD FORMED UNLESS OTHERWISE APPROVED BY ENGINEER.
- 5) AT END OF LINES AND AT BLOCKED OFF (PLUGGED) TEES CONSTRUCT A LF PAINTED 2 x 4 BURIED MARKER.

## THRUST BLOCK DETAILS

## MATERIAL LIST

1. 1" EPDM or RJ-44 x 1/2" TEE
2. 6" FLG @ 90 EL
3. 6" FLG @ 200 EL
4. 6" FLG @ 250 EL
5. 6" FLG @ 300 EL
6. 6" RJ-44
7. 6" FLG 6V W/ 6" SDR 35 PVC CONDUCTOR PIPE CAST IRON VALVE BOX AND COVER, MARKED "RECLAIMED WATER", VALVE EXTENSION ROD AND COLLAR, EPDM GASKET COVER PURPLE.
8. 6" CL 200 TO FLS 300
9. 6" CL 200 TO PE x GROOVED SPOOL
10. 6" GROOVED COUPLING W/ CAP TAPPED FOR 1/2" INCH VALVE
11. 6" SALLY THIRD ST. EL. 5" NEPPLE, 5" BRODKE BALL VALVE.
12. 30" x 20" CONCRETE UTILITY BOX, MARKED EFFLUENT, PAINTED PURPLE, SWANAN TO CHRISTI E2A.
13. ALL PIPE TO BE WRAPPED IN PIPE ENCLOSURE.
14. ALL MATERIALS SHALL BE RATED FOR 200 PSI OPERATING PRESSURE.



| FLUSH VALVE ASSEMBLY     | G      |
|--------------------------|--------|
| EFFLUENT/RECLAIMED WATER | X2 NTS |

## **APPENDIX J – DESERT WINDS PARK**

## Desert Winds Park

### 1.1 SITE LOCATION

The estimated irrigation demand for the Desert Winds Park is 25 gpm, and the estimated total annual demand is 5.5 acre-feet. Irrigation demands are based on metered water use data and historical evapotranspiration (ET) data collected at the Sparks Tree Farm located at Baring Boulevard and McCarran Boulevard. Site irrigation will occur during an 8-hour night period.

#### Site Information:

| Property          | Physical Address | Latitude/ Longitude       | Township/ Range/ Section |
|-------------------|------------------|---------------------------|--------------------------|
| Desert Winds Park | 105 Ember Dr.    | 39°38'58"N<br>119°43'07"W | SE 1/4 S34.T21N.R20E     |

### 1.2 SITE DESCRIPTION

Desert Winds Park is located on the northeast corner of Eagle Canyon Drive and Ember Drive approximately ½ a mile west of Pyramid Lake Highway. To the north of Desert Winds Park is Eagle Canyon Park, which also uses effluent for irrigation. To the south, and west of the park are residential areas. To the east of the park is undeveloped land that could be used for either residential or commercial purposes in the future. The topographic map of Desert Winds Park is shown in Figure J 3. Desert Winds Park has slopes ranging from approximately 0% to 2%. Below is an entire section for the soil characteristics, which are also outlined in Figure J 2. Desert Winds Park is identified in the Flood Insurance Rate Map as Zone X (Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood) and Zone AO (Flood depths of 1 to 3 feet). The effluent irrigation plan of Desert Winds Park is shown in Figure J 4 while the planting and landscaping plan is shown in Figure J 5.

#### Effluent Demands:

| Property          | Total Area (Acre) | Irrigated Area (Acre) | Acre-Feet per Year | Nighttime Demand (gpm) | Daytime Demand (gpm) | Total (gpm) | Average (mgd) |
|-------------------|-------------------|-----------------------|--------------------|------------------------|----------------------|-------------|---------------|
| Desert Winds Park | 7.4               | 1.5                   | 5.5                | 25                     | 0                    | 25          | .01           |

### 1.3 SOILS

The Soil Conservation Service describes the geology of the southern Washoe County area as follows (SCS, 1983). The soil characteristics of Desert Winds Park are shown in Figure J 2.

- 140 - **Haybourne loamy sand, 2 to 4 percent slopes.** This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rocks. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F. Typically, the surface layer is pale brown loamy sand about 10 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum to a depth of 63 inches or more is brown, stratified fine sandy loam through coarse sand.

Included in this unit are Greenbrae soils on toe slopes of alluvial fans; Indian Creek soil remnants of higher terraces; and Ince soils, which are wind-blown sand and are on dunes.

Permeability of this Haybourne soil is moderately rapid in the subsoil and moderately rapid to rapid in the substratum. Available water capacity of the soil is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

Present vegetation in most areas is mainly big sagebrush, green ephedra, and Anderson peachbrush.

- 1160 - **Jowec silty clay loam.** This very deep, well-drained soil is on low lake terraces. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is light brownish gray silty clay loam about 2 inches thick. The subsoil is dark yellowish brown clay loam about 18-inches thick, and the lower part to a depth of 60-inches is stratified loam and sandy loam. Included in this unit are Mellor solids on lower terraces; Turria soils, which are drainageways and are subject to occasional flooding; and Haybourne soils on higher alluvial fan skirts.

The permeability of this Jowec soil is slow. Available water capacity is high. Effective rooting depth is more than 60 inches. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to shallow flash flooding during storms of unusually high intensity.

Present vegetation is mainly big sagebrush and spiny hopsage.

The soils listed above are the natural soil in the area. During the construction of the parks, there was disruption of this soil and possibly the importation of other material.

Because of this, it is difficult to predict the conditions of the soil that may influence ponding, runoff and infiltration.

#### 1.4 PROCEDURES

The park irrigation control system will control the time and duration of park irrigation. This system controls a set of valves independent of the master valve at the service connection. In case of an emergency the system should be shut down at the gate valve that connects the system to the main water supply. This gate valve has been called out in the site plans and in the detail sheet(s) for the meter/PRV vault.

Desert Winds Park does not have electricity in its vault. As long as TMWRF pumps are operating the site will still be able to irrigate. However, power failure to the irrigation system controllers will dictate the parks' ability to irrigate. Figure J 4 and L8 show the location of the meter vault and valves.



SPANISH SPRINGS  
HIGH SCHOOL

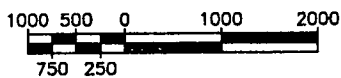
EAGLE CANYON  
PARK

DESERT WIND  
PARK

EAGLE CANYON DRIVE

STATE ROUTE 445 (PYRAMID LAKE HIGHWAY)

SKY RANCH  
PARK



SCALE: 1"=2000'

DESERT WINDS PARK

SITE LOCATION MAP

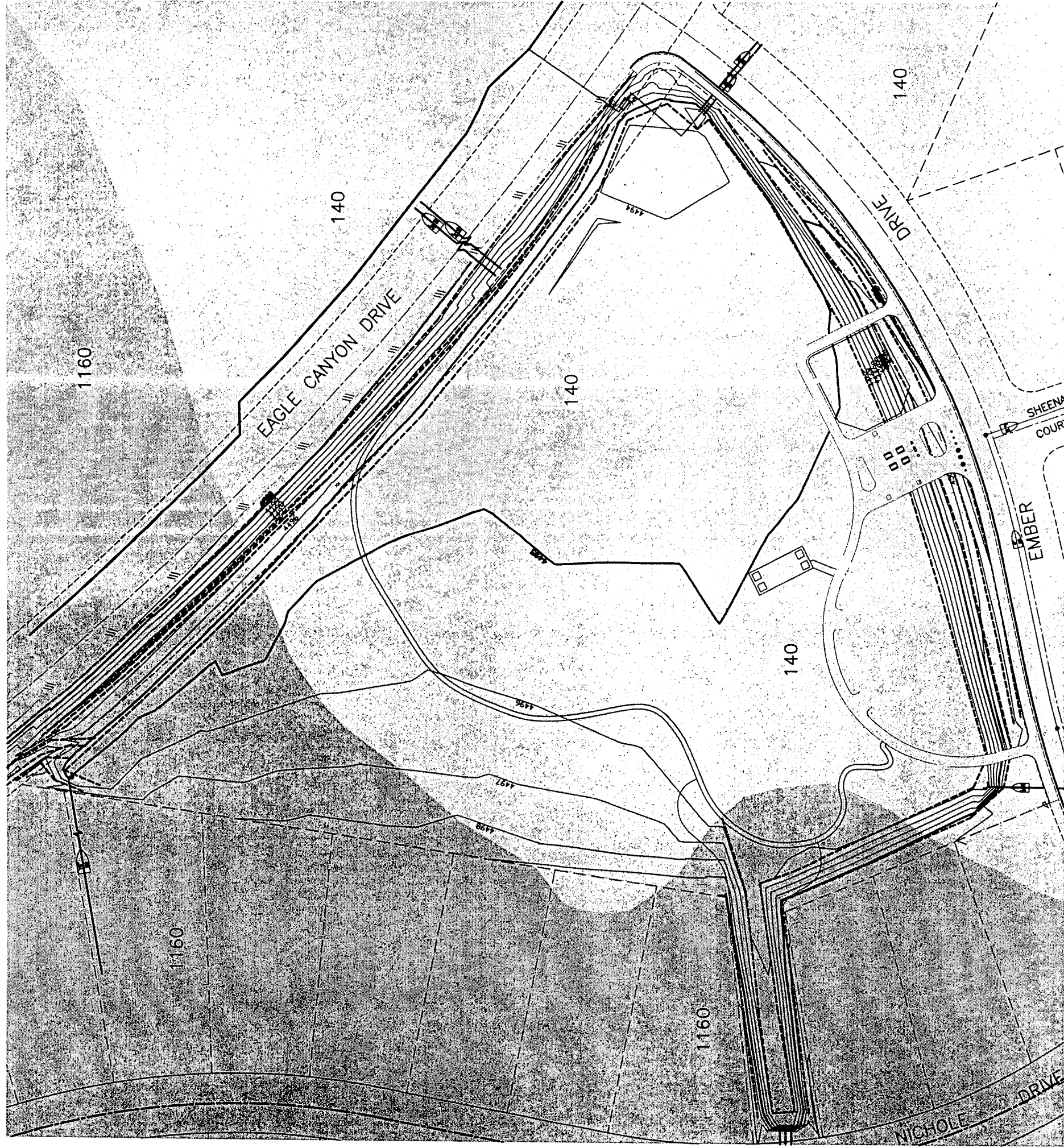
SCALE: 1" = 2000'  
DRAWN BY: DTC  
DATE: 3/15/04  
JOB NO.: 05-2000-047

FIGURE  
J-1

Infrastructure, Inc.



9450 DOUBLE "N" BLVD.  
RENO, NEVADA 89521  
PHONE (775) 786-5873 FAX (775) 786-8138



LEGEND

140

HAYBOURNE LOAMY SAND (2-4% SLOPES)

1160

JOWEC SILTY CLAY LOAM

INFRASTRUCTURE  
INC.  
1150 CORPORATE BLVD.  
SUITE 100  
RENO, NEVADA 89502  
PHONE (775) 788-5873 FAX (775) 788-8138

DESERT WINDS PARK  
SOILS CHARACTERISTICS

WASHOE COUNTY  
ARE. NO. 81-00135  
DATE 1/23/1993


FIG J-2  
SHEET

1150 CORPORATE BLVD. RENO, NV 89502 (702) 858-1150 FAX (702) 858-1180  
cfa  
PLANNERS  
ENGINEERS  
LANDSCAPE ARCHITECTS  
SURVEYORS

| DATE      | DESIGNED BY | DATE SURVEYED |
|-----------|-------------|---------------|
| 1/23/1993 | DK/BL       | 1/23/1993     |
| DATE      | CHECKED BY  | DO            |
| 1/23/1993 | DK/BL       | 1/23/1993     |
| DATE      | APPROVED BY | DO            |
| 1/23/1993 | DK/BL       | 1/23/1993     |
| DATE      | REVISIONS   | BY            |
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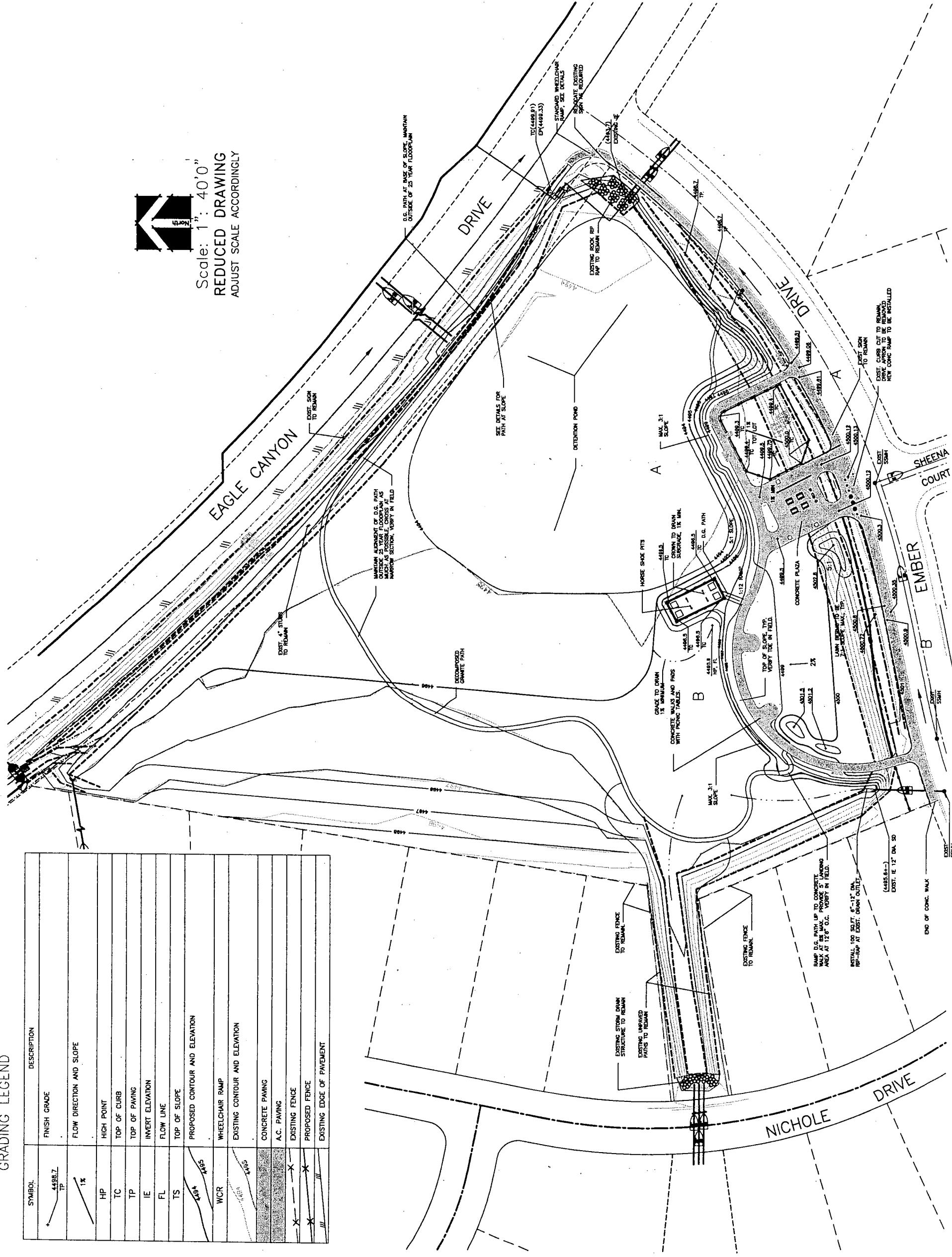
## GRADING LEGEND

| SYMBOL      | DESCRIPTION                    |
|-------------|--------------------------------|
|             | FINISH GRADE                   |
|             | FLOW DIRECTION AND SLOPE       |
| HP          | HIGH POINT                     |
| TC          | TOP OF CURB                    |
| TP          | TOP OF PAVING                  |
| IE          | INVERT ELEVATION               |
| FL          | FLOW LINE                      |
| TS          | TOP OF SLOPE                   |
|             | PROPOSED CONTOUR AND ELEVATION |
| WCR         | WHEELCHAIR RAMP                |
|             | EXISTING CONTOUR AND ELEVATION |
|             | CONCRETE PAVING                |
| A.C. PAVING | A.C. PAVING                    |
|             | EXISTING FENCE                 |
|             | PROPOSED FENCE                 |
|             | EXISTING EDGE OF PAVEMENT      |



Scale: 1" = 40' 0"

**REDUCED DRAWING**  
ADJUST SCALE ACCORDINGLY







PLANTING LEGEND

| SYMBOL  | QUANTITY | BOTANICAL                          | COMMON               | SIZE       | SPACING  |
|---------|----------|------------------------------------|----------------------|------------|----------|
| BerThr  | 114      | Berberis thunbergii                | Japenese Barberry    | #1         | .        |
| HibSyr  | 42       | Hibiscus syriacus 'Red Heart'      | Rose of Sharon       | #2         | .        |
| JunMJ   | 236      | Juniperus chinensis 'Mint Julep'   | Seagreen Juniper     | #1         | .        |
| LonTot  | 55       | Lonicera tatarica 'Arnold Red'     | Tatarian Honeysuckle | #2         | .        |
| MisSin  | 28       | Miscanthus sinensis                | Eulalia Grass        | #1         | .        |
| RhuTri  | 69       | Rhus trilobata                     | Skunk Bush           | #1         | .        |
| .       | .        | .                                  | .                    | .          | .        |
| FesGla  | 200      | Festuca ovina 'Glaucua'            | Blue Fescue          | #1         | 18" o.c. |
| GalGra  | 248      | Gaillardia grandiflora             | Blanket Flower       | 4" POTS    | 18" o.c. |
| ParTri  | 7        | Parthenocissus tricuspidata        | Virginia Creeper     | #1         | Noted    |
| .       | .        | .                                  | .                    | .          | .        |
| CelOcc  | 10       | Celtis occidentalis                | Western Hackberry    | 1 1/2" Cal | .        |
| FraAme  | 42       | Fraxinus americana 'Autumn Purple' | Autumn Purple Ash    | 1 1/2" Cal | .        |
| JunHill | 25       | Juniperus virginiana 'Hillspire'   | Hillspire Juniper    | 4' High    | .        |
| EleAng  | 22       | Elaeagnus angustifolia             | Russian Olive        | 5 Gal.     | .        |
| QueRob  | 5        | Quercus robur                      | English Oak          | 1 1/2" Cal | .        |
| PinNig  | 17       | Pinus nigra                        | Austrian Black Pine  | 4' High    | .        |
| PinSyl  | 14       | Pinus sylvestris                   | Scotch Pine          | 4' High    | .        |

CONSERVATION SEEDING.  
SEE SPECIFICATIONS, TYPICAL

D.C. PATH

HORSESHOE PITS

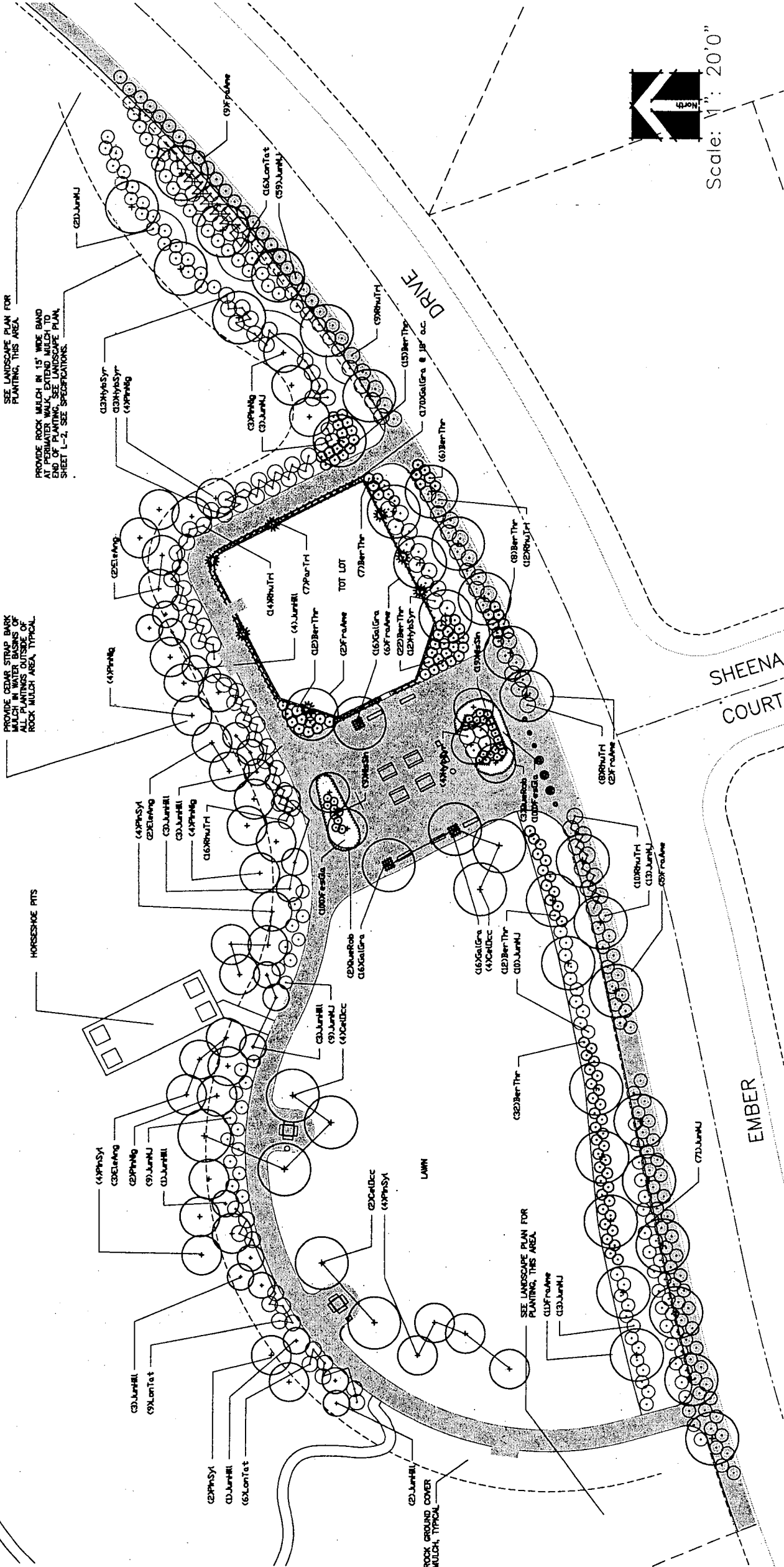
LAWN

ROCK GROUND COVER  
MULCH, TYPICAL

PROVIDE CEDAR STRAP BARK  
MULCH IN WATER BASINS OF  
ALL PLANTINGS OUTSIDE OF  
ROCK MULCH AREA, TYPICAL

SEE LANDSCAPE PLAN FOR  
PLANTING THIS AREA

PROVIDE ROCK MULCH IN 15' WIDE BAND  
AT PERIMETER WALK. EXTEND MULCH TO  
END OF PLANTING. SEE LANDSCAPE PLAN,  
SHEET L-2, SEE SPECIFICATIONS.



Scale: 1" = 20'0"



SHEENA COURT

EMBER

PLANTING PLAN

NEVADA

WASHOE COUNTY

FIG J-5

SHEET

DATE FEB 1995

JOB NO. 81-00135

INFRASTRUCTURE  
INC.  
8440 DOUBLE "N" BLVD.  
RENO, NEVADA 89521  
PHONE (775) 786-9873 FAX (775) 786-9138



DESERT WINDS PARK



PLANNERS \* ENGINEERS \* LANDSCAPE ARCHITECTS \* SURVEYORS

1150 CORPORATE BLVD., RENO, NV 89502 (702) 856-1150 FAX (702) 856-1160

DATE

APPROVED BY

CHECKED BY

DATE

DESIGNED BY

DATE SURVEYED

R. E. NO.

DATE

DATE

DATE

DATE

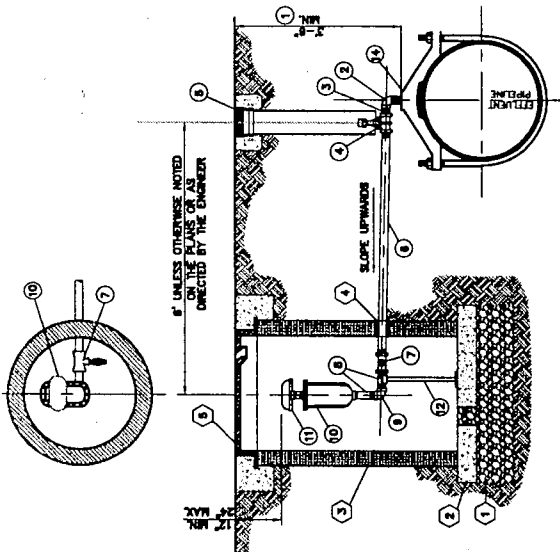
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MARK

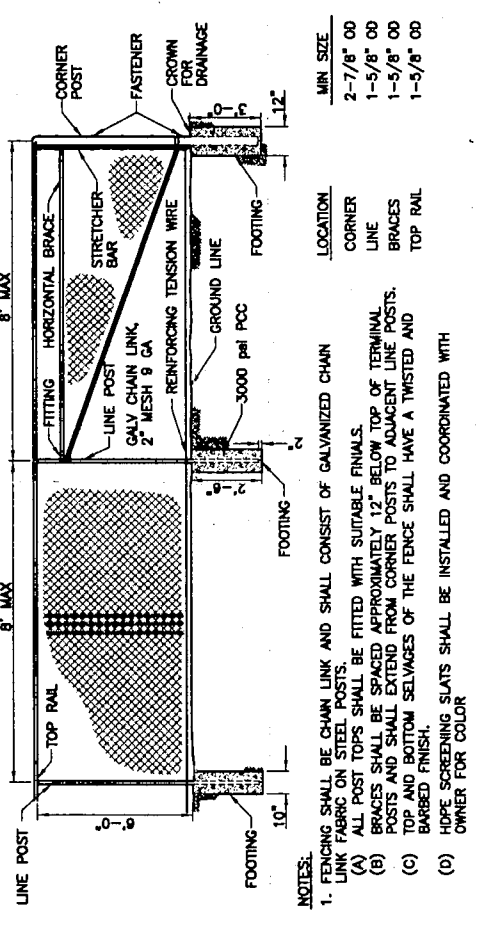
REVISIONS

BY

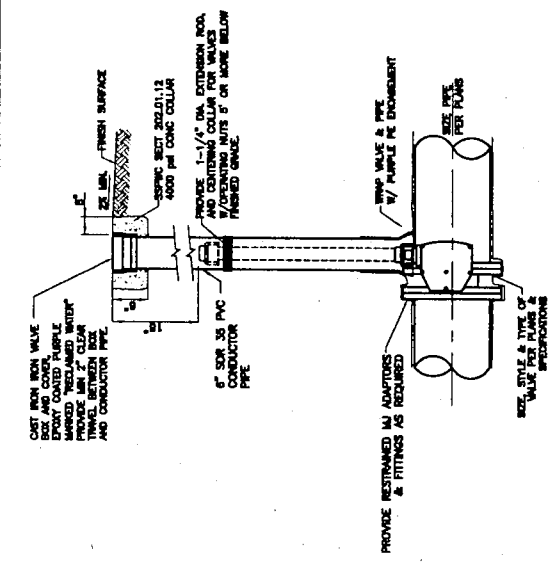
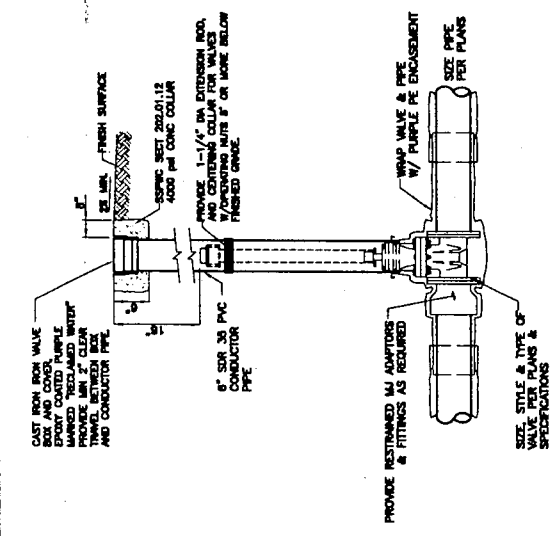












- EFFLUENT/RECLAIMED WATER**
- AIR RELEASE ASSEMBLY PIPING NOTES:**
1. TOP OF PIPE PLACED SUFFICIENTLY DEEP TO PROVIDE POSITIVE SLOPE TO AIR VALVE.
  2. 1" CAST BRASS ST. WELD.
  3. 2" WINGS CLOSE NEPFLA.
  4. 2" CL. 300 BRASS, NON RISING STEEL, WELD WEDGE GATE VALVE W/ OPERATING MIT.
  5. 1" SCH 30 SS CONDUCTOR PIPE, CAST IRON VALVE BOX AND COVER PER AWWA C100, ALL W/ ELEV LETTERS "RECLAIMED WATER A/" ON PUMPLE PAINTED COVER.
  6. 1" GALVANIZED IRON W/ 1/2" REDUCER, WATERTIGHT CONSTANT SLOPE TO AIR VALVE.
  7. 1" x 1/2" GALVANIZED IRON TEE W/ 1/2" GALVANIZED IRON CLOSE VALVE 1/2" CL. 300 BRASS, NON RISING STEEL, WELD WEDGE GATE OPERATED TO BE OPERATED FROM THE SURFACE.
  8. 1" GALVANIZED IRON NEPFLA.
  9. 1" GALVANIZED IRON 90 EL.
  10. 1" SCH. 40 AIR RELEASE VALVE, APOD 1.5CT OR EQUAL.
  11. 1" IRON BOX, VENT, WOODHARD MODEL 806 OR EQUAL.
  12. IRON PIPE SUPPORT AND BASE, THIN DETAIL SP20050/A OR EQUAL.
  13. IN LIEU OF GALVANIZED IRON, TYPE "A" WELD COPPER PIPE MAY BE USED.
  14. SERVICE SADDLE WITH DOUBLE STAINLESS STEEL STRAPS AND 2" DIA. PIPE SPOUTTERHEAD.

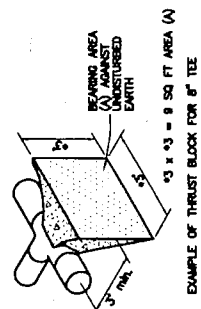


- | NOTES:  | LOCATION | MIN. SIZE |
|---|----------|-----------|
| 1. FENCING SHALL BE CHAIN LINK AND SHALL CONSIST OF GALVANIZED CHAIN LINK FABRIC ON STEEL POSTS.                                    | CORNER   | 2-7/8" 00 |
| (A) ALL POST TOPS SHALL BE FITTED WITH SUITABLE FINALS.   | BRACE    | 1-5/8" 00 |
| (B) BRACES SHALL BE SPACED APPROXIMATELY 12" BELOW TOP OF TERMINAL POSTS AND SHALL EXTEND FROM CORNER POSTS TO ADJACENT LINK POSTS. | LINE     | 1-5/8" 00 |
| (C) TOP AND BOTTOM SELVAGES OF THE FENCE SHALL HAVE A TWISTED AND BARBED FINISH.  | TOP RAIL | 1-5/8" 00 |
| (D) HDPE SCREENING SLATS SHALL BE INSTALLED AND COORDINATED WITH OWNER FOR COLOR  |          |           |



| Type of Fitting      | 90° Bend  | 45° Bend  | 11 1/4" or 22 1/2" Bend   | Tee   | Cross w/ plug   | Tee w/ plug   | All plugs (Depd End)  | Reducer   |
|----------------------|---|---|---|---|---|---|---|---|
| Typical Installation |  |  |  |  |  |  |  |  |

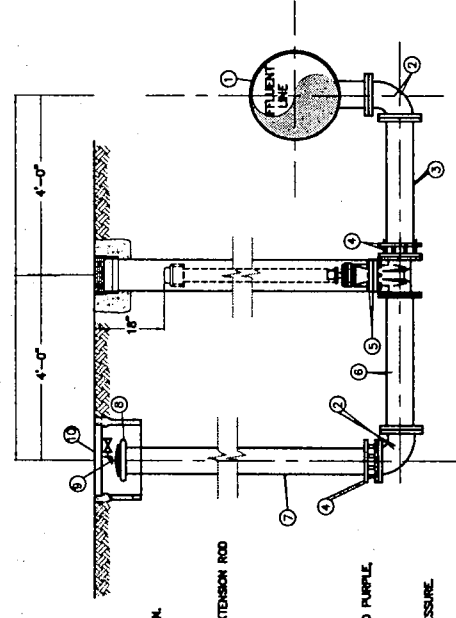
| Type of Fitting | 90° Bend | 45° Bend | 22 1/2° Bend | 11 1/4° Bend | Dead End | Test Weight (lb/kg) | Crack Length (in./mm) |
|-----------------|----------|----------|--------------|--------------|----------|---------------------|-----------------------|
| 3"              | 2.0      | 1.0      | 1.0          | 1.0          | 2.0      | 1.0                 | 1.0                   |
| 4"              | 3.0      | 2.0      | 1.0          | 1.0          | 2.0      | 2.0                 | 1.0                   |
| 6"              | 4.0      | 2.0      | 2.0          | 2.0          | 5.0      | 5.0                 | 5.0                   |
| 8"              | 13.0     | 7.0      | 4.0          | 4.0          | 9.0      | 9.0                 | 9.0                   |
| 10"             | 11.0     | 6.0      | 6.0          | 6.0          | 15.0     | 15.0                | 15.0                  |
| 12"             | 30.0     | 16.0     | 8.0          | 8.0          | 21.0     | 21.0                | 21.0                  |



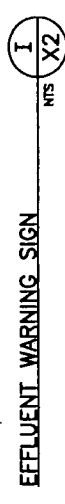
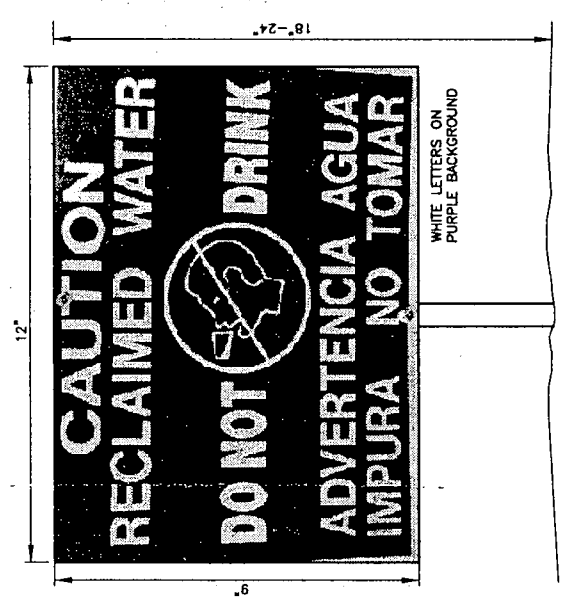
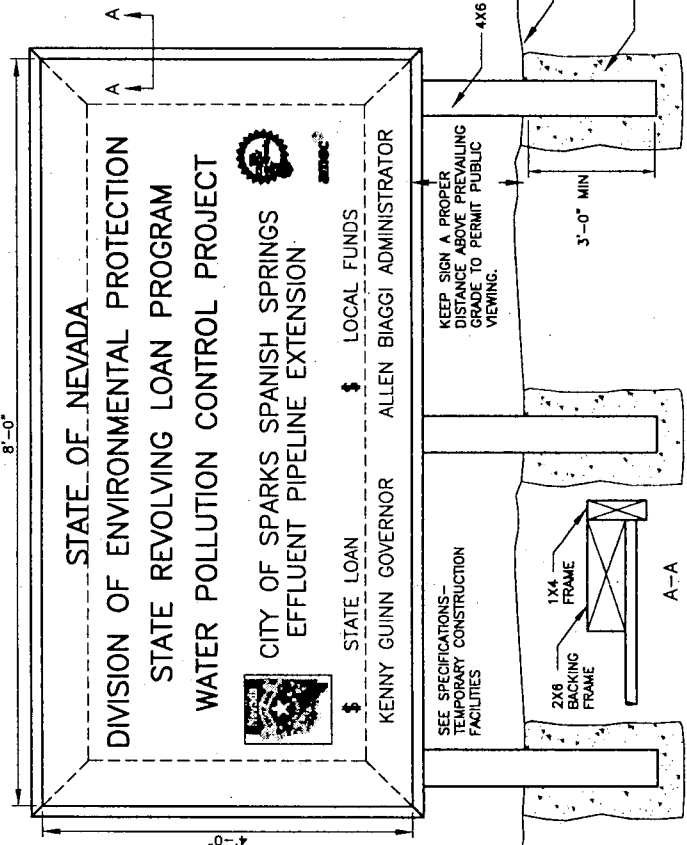
**THRUST BLOCK NOTES:**

- 1) THRUST BLOCKS TO BE CONSTRUCTED OF 3000 psi CONCRETE MINIMUM.
- 2) AREAS GIVEN ARE FOR GLASS PIPE AT TEST PRESSURE, AND AN ALLOWABLE SOIL BEARING CAPACITY OF 1,500 POUNDS PER SQUARE FOOT.
- 3) BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL.
- 4) JOINTS, BOLTS, AND FACE PLUGS TO BE KEPT CLEAR OF CONCRETE BY USE OF PLASTIC WRAP. SIDES SHALL BE WOOD FORMED UNLESS OTHERWISE APPROVED BY ENGINEER.
- 5) AT END OF LINES AND AT BLOCKED OFF (PLUGGED) TEES CONSTRUCT A 1" PAINTED 2" x 4" BURIED MARKER.

**THRUST BLOCK DETAILS**



- ## MATERIAL LIST
- |     |   |
|-----|---|
| 1.  | 8"X20' DI RJ-40 X FLG TEE   |
| 2.  | 6" FLG DI 90 EL   |
| 3.  | 8" CL 200 DI FLG X PE SPOOL LENGTH TO FIT PLUM LOCATION.  |
| 4.  | 8" RJ-FLA   |
| 5.  | 8" FLG OV W/ 30" SDR 30 PVC CONDUCTOR PIPE, CAST IRON<br>FLANGE, COATED "BLACK" WATER, VALVE EXTENSION ROD<br>AND GELAR. PORT COAT OVER PURPLE. |
| 6.  | 8" CL 200 DI FLG SPOOL  |
| 7.  | 8" CL 200 DI PE X GROOVED SPOOL   |
| 8.  | 8" GROOVED COUPLING W/ CAP TAPPED FOR 1/2 INCH VALVE.   |
| 9.  | 8" ONLY THIRD ST EL. 3" NIPPLE, 3" BRONZE BALL VALVE.   |
| 10. | 20' X 30" CONCRETE UTILITY BOX, MARKED EFFLUENT, PAINTED PURPLE,<br>SIMILAR TO CHRISTY B&A.   |
| 11. | ALL PIPE TO BE WRAPPED IN PE PIPE ENCASEMENT.   |
| 12. | ALL MATERIALS SHALL BE RATED FOR 200 PSI OPERATING PRESSURE.  |



## **APPENDIX K – GATOR SWAMP PARK**



## Gator Swamp Park

### 1.1 SITE LOCATION

The estimated irrigation demand for the Gator Swamp Park is 70 gpm, and the estimated total annual demand is 16.6 acre-feet. Irrigation demands are based on metered water use data and historical evapotranspiration (ET) data collected at the Sparks Tree Farm located at Baring Boulevard and McCarran Boulevard. Site irrigation will occur during an 8-hour night period.

#### Site Information:

| Property         | Physical Address | Latitude/ Longitude       | Township/ Range/ Section |
|------------------|------------------|---------------------------|--------------------------|
| Gator Swamp Park | 255 Egyptian Way | 39°39'45"N<br>119°42'36"W | SW 1/2 S26.T21N.R20E     |

### 1.2 SITE DESCRIPTION

Gator Swamp Park is located west of Alyce Taylor School on Egyptian Way. To the north, south, and west of the park are undeveloped areas that may eventually be utilized for residential purposes. To the east is Alyce Taylor Park, which will also utilize effluent for irrigation. The topographic map of Gator Swamp Park is shown in Figure K 3. Gator Swamp Park has slopes ranging from approximately 0% to 2%. Below is an entire section for the soil characteristics, which are also outlined in Figure K 2. Gator Swamp Park is identified in the Flood Insurance Rate Map as Zone AO (flood depths of 1 to 3 feet). The effluent irrigation plan of Gator Swamp Park is shown in Figure K 4 while the planting and landscaping plan is shown in Figure K 5.

#### Effluent Demands:

| Property         | Total Area (Acre) | Irrigated Area (Acre) | Acre-Feet per Year | Nighttime Demand (gpm) | Daytime Demand (gpm) | Total (gpm) | Average (mgd) |
|------------------|-------------------|-----------------------|--------------------|------------------------|----------------------|-------------|---------------|
| Gator Swamp Park | 4.35              | 3.5                   | 16.6               | 70                     | 0                    | 70          | .03           |

### 1.3 SOILS

The Soil Conservation Service describes the geology of the southern Washoe County area as follows (SCS, 1983). The soil characteristics of Gator Swamp Park are shown in Figure K 2.

- 120 - **Doten Silty Clay, 0 to 2 percent slopes.** This very deep, moderately well drained soil is on lake terraces. It formed in alluvium derived from mixed rock. The average annual precipitation is about 8 to 10 inches; the average annual air temperature is 48 to 50 degrees F. Typically the surface layer is grayish brown silty clay about 7 inches thick. The underlying material to a depth of 60 inches is grayish brown and averages clay and silty clay. Typically this soil cracks opens at the surface when dry.

Permeability of this Doten soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is ponded or very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. The soil is subject to rare flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks. In some areas, this soil is ponded for long periods during spring.

Present vegetation in most areas is mainly black greasewood, shadescale, and bottlebrush squirreltail.

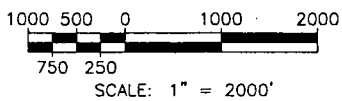
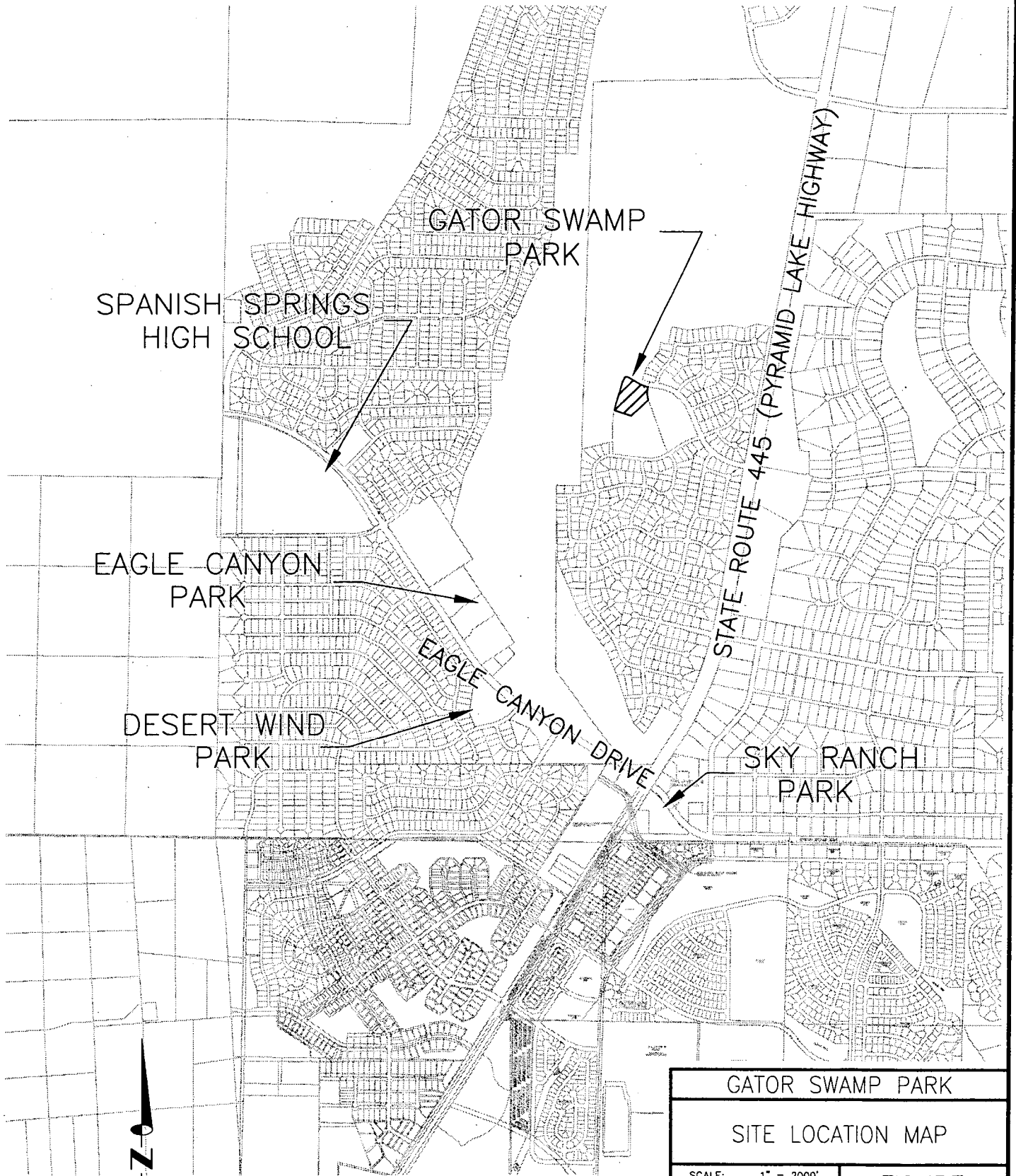
The soils listed above are the natural soil in the area. During the construction of the parks, there was disruption of this soil and possibly the importation of other material. Because of this, it is difficult to predict the conditions of the soil that may influence ponding, runoff and infiltration.

### 1.4 PROCEDURES

The park irrigation control system will control the time and duration of park irrigation. This system controls a set of valves independent of the master valve at the service connection. In case of an emergency the system should be shut down at the gate valve that connects the system to the main water supply. This gate valve has been called out in the site plans and in the detail sheet(s) for the meter/PRV vault.

Gator Swamp Park does not have electricity in its vault. As long as TMWRF pumps are operating the site will still be able to irrigate. However, power failure to the irrigation system controllers will dictate the parks' ability to irrigate. Figure K 4 shows the location of the meter vault and valves.

P:\rnc\2000\05-2000-047\p-sprgs-eff\cadd\temp\gator swamp (alice taylor)\amp drawings\FIG K-1.dwg, 04/07/2004 11:49:46 AM, aulias, 1:1



|  |                   |
|--|-------------------|
| GATOR SWAMP PARK   |                   |
| SITE LOCATION MAP  |                   |
| SCALE: 1" = 2000'  | FIGURE<br>FIG K-1 |
| DRAWN BY: DTC  |                   |
| DATE: 3/15/04  |                   |
| JOB NO.: 05-2000-047   |                   |
| Infrastructure, Inc.   |                   |
| 9450 DOUBLE "R" BLVD.<br>RENO, NEVADA 89521<br>PHONE (775) 786-5873 FAX (775) 786-6138 |                   |
| amec   |                   |

PYRAMID RANCH ESTATES  
UNIT - 5C

GATOR SWAMP PARK

ALYCE TAYLOR SCHOOL

PYRAMID RANCH ESTATES  
UNIT 5B

EGYPTIAN DRIVE

WHITE ROSE DRIVE



REDUCED DRAWING  
ADJUST SCALE ACCORDINGLY

SCALE: 1" = 40'

LEGEND

120 DOTTEN SILTY CLAY (0-2% SLOPES)

INFRASTRUCTURE  
INC.  
4840 DOUGLASS HWY. BLVD.  
SUITE 100  
DALLAS, TEXAS 75246  
PHONE (773) 798-5873 FAX (773) 798-8138

amec

SOIL CHARACTERISTICS

GATOR SWAMP PARK

NEVADA

WASHOE COUNTY

JOB NO. 01-000335

DATE 07/21/93

SHEET

FIG K-2

05

1150 CORPORATE BLVD. RENO, NV 89502 (702) 856-1150 FAX: (702) 856-1180

cfa

PLANNERS  
ENGINEERS  
LANDSCAPE ARCHITECTS  
SURVEYORS

DESIGNED BY DO

DATE SURVEYED

DATE

APPROVED BY

R. E. NO.

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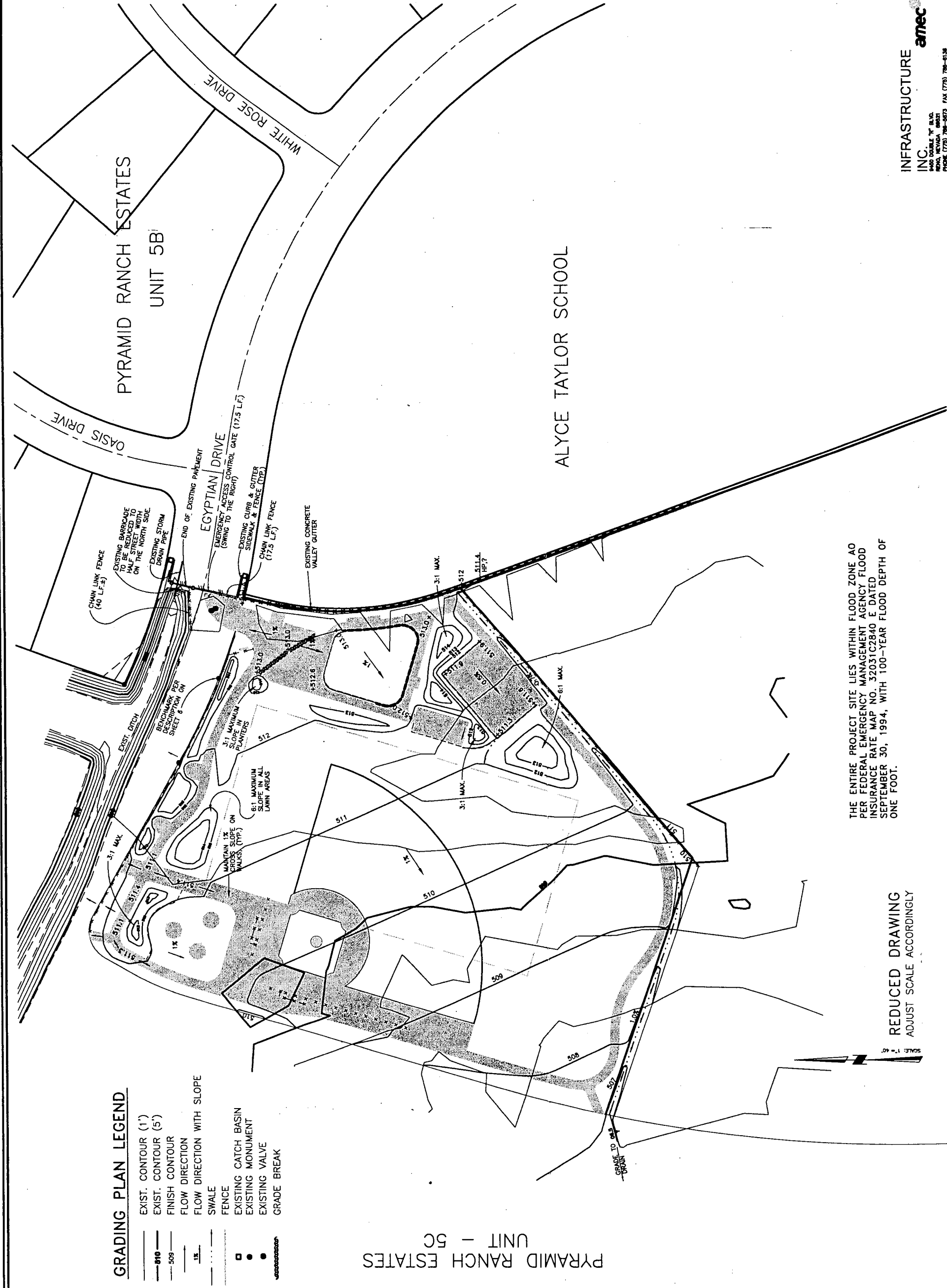
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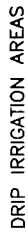
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| SYMBOL | BRAND                                   | MODEL NUMBER                 | G.P.M. | RADIUS | DESCRIPTION                          |
|--------|---|------------------------------|--------|--------|--------------------------------------|
| A      | RAMBERD                                 | T-BRND SERIES T30-1.3 35 PSI | 1.30   | 31"    | ADJUSTABLE-4" POP-UP SPRAY SPRINKLER |
| V      | RAMBERD                                 | T-BRND SERIES T30-2.5 35 PSI | 2.50   | 31"    | ADJUSTABLE-4" POP-UP SPRAY SPRINKLER |
| O      | RAMBERD                                 | T-BRND SERIES T30-5.0 35 PSI | 5.0    | 31"    | ADJUSTABLE-4" POP-UP SPRAY SPRINKLER |
| Ø      | RAMBERD                                 | R-50C                        | 3.5    | 36"    | ADJUSTABLE-3" POP-UP SPRAY SPRINKLER |
| ●      | RAMBERD                                 | R-50C                        | 3.5    | 36"    | ADJUSTABLE-3" POP-UP SPRAY SPRINKLER |
| ⦿      | AUTOMATIC                               | ELECTRIC DROP VALVE          |        |        | SEE SPECS. FOR DESCRIPTION           |
| ⦿      | AUTOMATIC                               | ELECTRIC CONTROL VALVE       |        |        | SEE SPECS. FOR DESCRIPTION           |
| ⦿      | QUICK COUPLER-SAME SIZE AS MAIN         |                              |        |        | SEE SPECS. FOR DESCRIPTION           |
| ⦿      | MANUAL DRAIN VALVE-SAME SIZE AS MAIN    |                              |        |        | SEE SPECS. FOR DESCRIPTION           |
| ⦿      | GATE VALVE-SAME SIZE AS MAIN            |                              |        |        | SEE SPECS. FOR DESCRIPTION           |
| ⦿      | RAMBERD RC-SAT-B+ 24 STATION CONTROLLER |                              |        |        | STRONG BOX MODEL# SB-18 OR ENCLOSURE |
| ⦿      | 1 1/2" METER                            |                              |        |        | SEE SPECS. FOR DESCRIPTION           |
| ⦿      | REDUCED PRESSURE VACUUM BREAKER         |                              |        |        | SEE SPECS. FOR DESCRIPTION           |
| △      | MAINTEN. SCH. 40 SIZE AS SHOWN ON PLAN  |                              |        |        | SEE SPECS. FOR DESCRIPTION           |
| —      | PEPCO DROP TUBING                       |                              |        |        | 3/4" DROP IRRIGATION TUBING          |
| CUU    | RAMBERD COU-J-S                         | CENTRAL CONTROL UNIT         |        |        | 3/4" DROP IRRIGATION TUBING          |
| ⦿      | GATE VALVE                              |                              |        |        | SEE SPECS. FOR DESCRIPTION           |
| ⦿      | CENTRAL CONTROL UNIT                    |                              |        |        | SEE SPECS. FOR DESCRIPTION           |

## IRRIGATION LEGEND

ALYCE TAYLOR SCHOOL

~~PYRAMID RANCH ESTATES~~  
~~UNIT 5B~~

OASIS DRIVE

EGYPTIAN DRIVE

PYRAMID RANCH ESTATES  
UNIT - 5C

EMERGENCY SHUT OFF &  
ISOLATION GATE VALVES  
SEE FIGURE K-6 & K-7  
FOR DETAILS

## DRAINING FOUNTAIN

SCALE: 1" = 40'



INFRASTRUCTURE  
**amec**  
INC.  
4400 W. GARDEN ST. SUITE 200  
RENO, NEVADA 89501  
PHONE (775) 786-8873 FAX (775) 786-8138

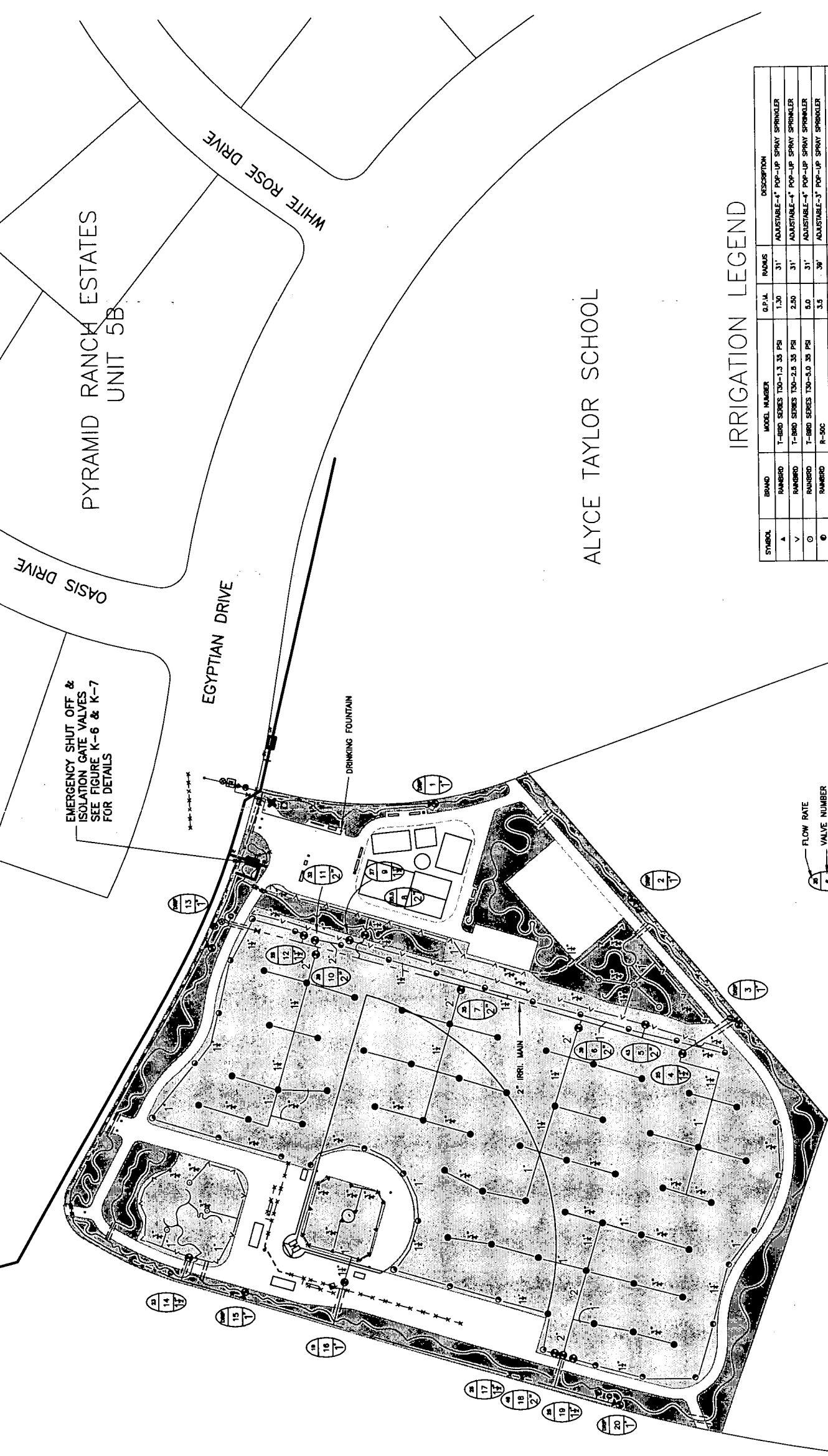
| SYMBOL | BRAND                | MODEL NUMBER                     | O.P.I.A. | RADIUS | DESCRIPTION                          |
|--------|----------------------|----------------------------------|----------|--------|--------------------------------------|
| A      | RAMBERD              | T-880 SERIES 100-1.3 35 PSI      | 1.30     | 31'    | ADJUSTABLE-4" POP-UP SPRAY SPRINKLER |
| V      | RAMBERD              | T-880 SERIES 100-2.5 35 PSI      | 2.50     | 31'    | ADJUSTABLE-4" POP-UP SPRAY SPRINKLER |
| O      | RAMBERD              | T-880 SERIES 100-5.0 35 PSI      | 5.0      | 31'    | ADJUSTABLE-4" POP-UP SPRAY SPRINKLER |
| 0      | RAMBERD              | R-500                            | 3.0      | 30'    | ADJUSTABLE-3" POP-UP SPRAY SPRINKLER |
| 0      | RAMBERD              | R-500                            | 3.5      | 30'    | ADJUSTABLE-3" POP-UP SPRAY SPRINKLER |
| 0      | AUTOMATIC            | ELECTRIC DRIP VALVE              |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | AUTOMATIC            | ELECTRIC CONTROL VALVE           |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | QUICK COUPLER        | SAME SIZE AS MAIN                |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | MANUAL DRAIN VALVE   | SAME SIZE AS MAIN                |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | GATE VALVE           | SAME SIZE AS MAIN                |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | RAMBERD              | ISC-SAT-24 24 STATION CONTROLLER |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | 1 1/2"               | METER                            |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | REDUCED PRESSURE     | VACUUM BREAKER                   |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | MANLINE SCH. 40      | SIZE AS SHOWN ON PLAN            |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | PEPCO DRIP TUBING    |                                  |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | RAMBERD              | DCY-J-SS CENTRAL CONTROL UNIT    |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | GATE VALVE           |                                  |          |        | SEE SPECS. FOR DESCRIPTION           |
| 0      | CENTRAL CONTROL UNIT |                                  |          |        | SEE SPECS. FOR DESCRIPTION           |

IRRIGATION LEGEND

- LEGEND
- SPRAY IRRIGATION AREAS
  - DRIP IRRIGATION AREAS



SCALE: 1"=40'

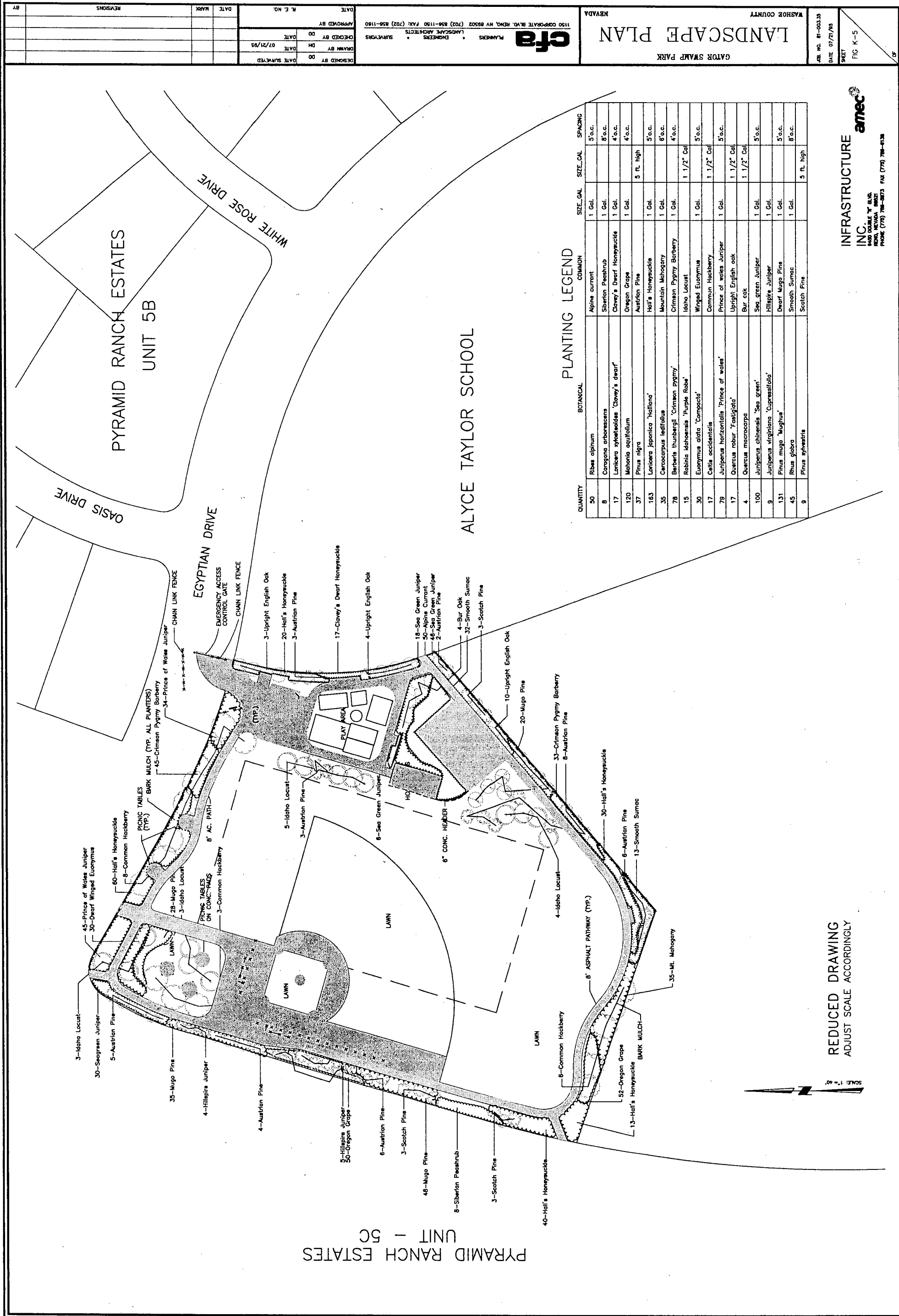


EMERGENCY SHUT OFF &  
ISOLATION GATE VALVES  
SEE FIGURE K-6 & K-7  
FOR DETAILS

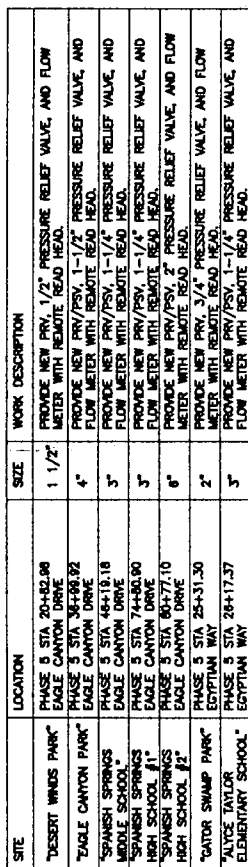
PYRAMID RANCH ESTATES  
UNIT 5B

ALYCE TAYLOR SCHOOL

PYRAMID RANCH ESTATES  
UNIT - 5C







METER AND VALVE VAULT DETAIL

TYPICAL PCC PAVEMENT SECTION

- (1) ALL MATERIALS SHALL BE RATED FOR 200 PSI WORKING PRESSURE MINIMUM.
- (2) CONNECTION TO MAIN OR LATERAL WITH IN TEE AND RJ FITTINGS AS REQUIRED.
- (3) (SEE CHART) RECOMMENDED MINIMUM WALL THICKNESS
- (4) (SEE CHART) IN PIPES N X PE PIPE 3" AND SMALLER MAY BE GALV IRON, BRASS OR TYPE K COPPER.
- (5) (SEE CHART) IN FGA
- (6) (SEE CHART) FLOWMETER WITH REMOTE READ HEAD.
- (7) LIQUID FILLED PRESSURE GAUGE, 0-200 PSIG, 1/2" BALL VALVE.
- (8) LIQUID FILLED PRESSURE GAUGE, 0-100 PSIG, 1/2" BALL VALVE SAMPLE TAP.
- (9) PRECAST JENSEN UTILITY BOX, MODEL 351-468BUI-4.5 W/SUMP KNOCK OUT.
- (10) INSTALL ADJUSTER COVER - EPOXY COATED PURPLE & LABEL WITH RIVETED IDENTIFICATION TAG FOR SPECIFICATIONS, DESIGNED FOR "INCENDIARY" 1250 LOADING.
- (11) 1/2" DIRECT TAP ON BOTTOM OF PIPE, 1/2"x3/4" NEPFLU.
- (12) (SEE CHART) TAP ON SIDE OF PIPE CLOSEST TO RELEASE TAP & BALL VALVE.
- (13) (SEE CHART) TAP ON SIDE OF PIPE CLOSEST TO RELEASE TAP & BALL VALVE.
- (14) (SEE CHART) TAP ON SIDE OF PIPE CLOSEST TO RELEASE TAP & BALL VALVE.
- (15) (SEE CHART) TAP ON SIDE OF PIPE CLOSEST TO RELEASE TAP & BALL VALVE.
- (16) (SEE CHART) TAP ON SIDE OF PIPE CLOSEST TO RELEASE TAP & BALL VALVE.
- (17) (SEE CHART) TAP ON SIDE OF PIPE CLOSEST TO RELEASE TAP & BALL VALVE.
- (18) (SEE CHART) TAP ON SIDE OF PIPE CLOSEST TO RELEASE TAP & BALL VALVE.
- (19) (SEE CHART) TAP ON SIDE OF PIPE CLOSEST TO RELEASE TAP & BALL VALVE.
- (20) (SEE CHART) TAP ON SIDE OF PIPE CLOSEST TO RELEASE TAP & BALL VALVE.



IF SAWCUT IS WITHIN 24" OF EDGE OF PAVEMENT, REMOVE AND REPLACE ENTIRE SECTION.

24" MIN.

SAWCUT FULL DEPTH PARALLEL AND PERPENDICULAR TO TRENCH.

TYPE 2 OR TYPE 3 AC20 PAVEMENT COMPACTED TO 98%.

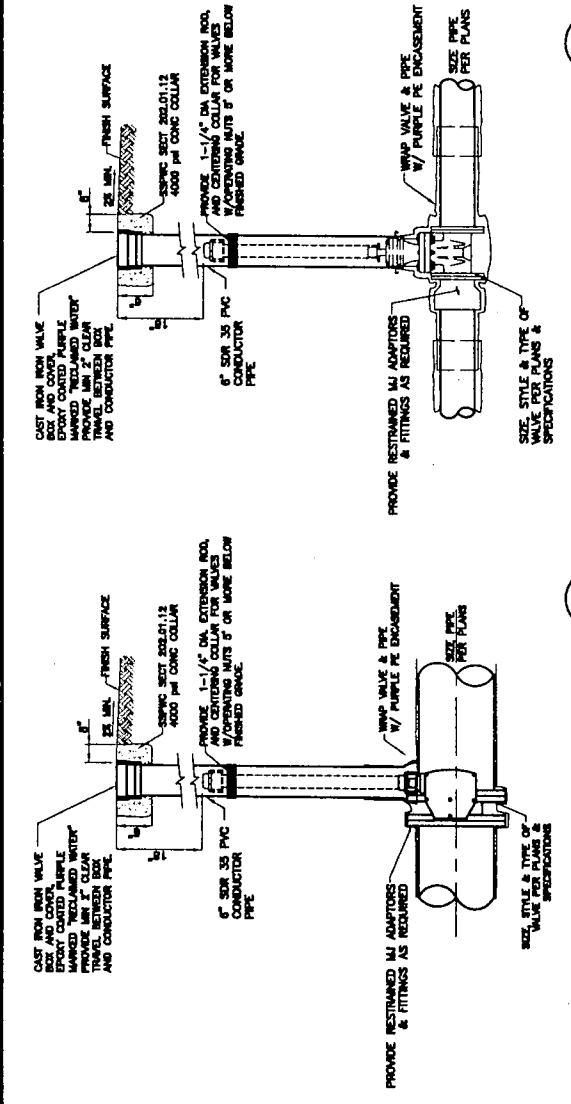
TYPE 2 CLASS 8 ABC COMPACTED TO 95%.

SUBGRADE COMPACTED TO 90%.

9" MIN.

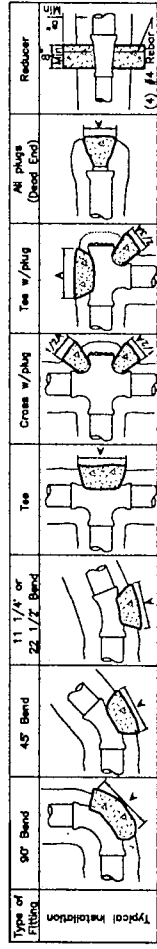
TRENCH EXCAVATION

TYPICAL A.C. PAVEMENT SECTION



**TYPICAL BURIED BUTTERFLY  
VALVE AND VALVE BOX  
EFFLUENT/RECLAIMED WATER**

**TYPICAL BURIED GATE  
VALVE AND VALVE BOX  
EFFLUENT/RECLAIMED WATER**

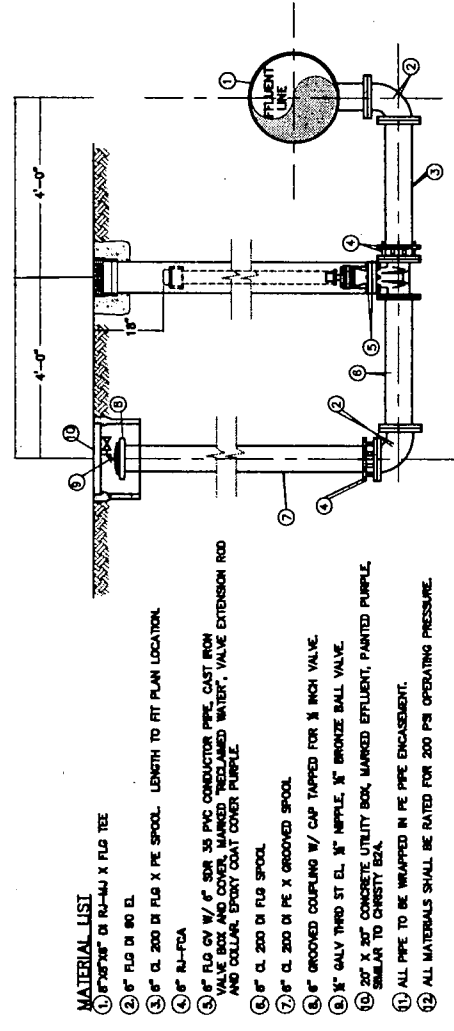


| Type of<br>Friction | 90° Band | 45° Band | 22½° Band | 11½° Band | Dead End | New<br>W/ing | Cross<br>w/ing |
|---------------------|----------|----------|-----------|-----------|----------|--------------|----------------|
| 3"                  | 2.0      | 1.0      | 1.0       | 1.0       | 1.0      | 1.0          | 1.5            |
| 4"                  | 3.0      | 2.0      | 1.0       | 1.0       | 2.0      | 2.0          | 2.0            |
| 6"                  | 7.0      | 4.0      | 2.0       | 2.0       | 5.0      | 5.0          | 5.0            |
| 8"                  | 13.0     | 7.0      | 4.0       | 4.0       | 9.0      | 9.0          | 9.0            |
| Size of<br>pipe     | 10"      | 21.0     | 11.0      | 6.0       | 6.0      | 15.0         | 15.0           |
| 12"                 | 30.0     | 16.0     | 8.0       | 8.0       | 21.0     | 21.0         | 21.0           |

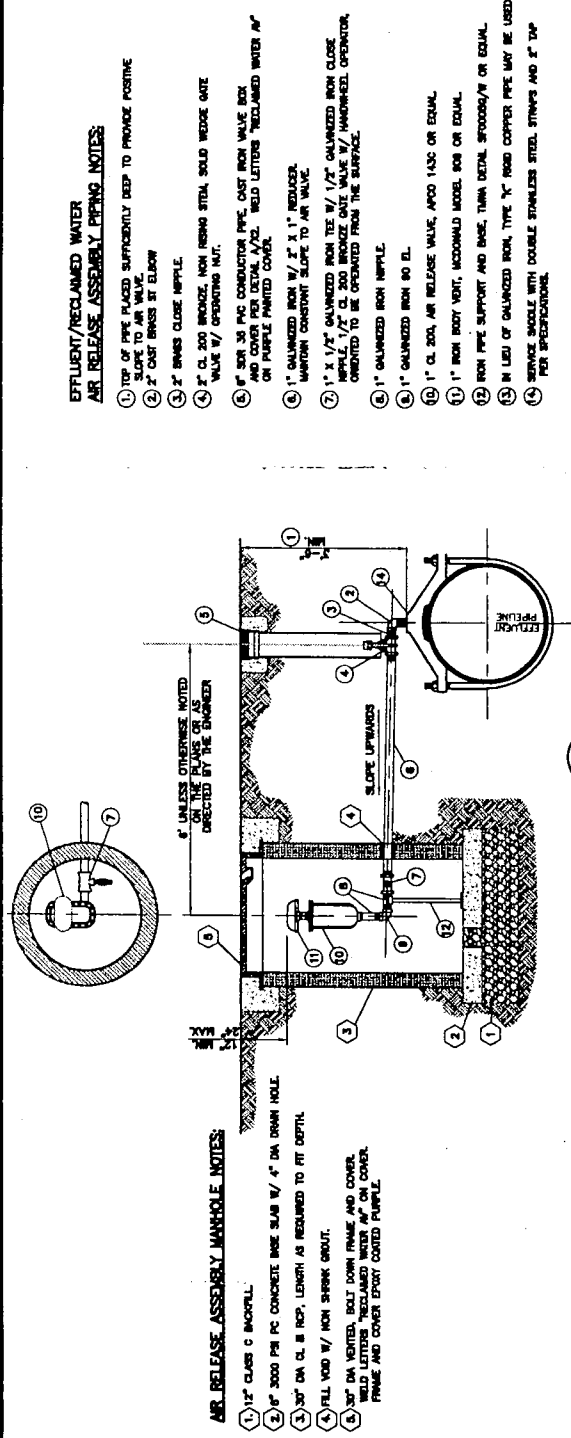
**THRUST BLOCK NOTES:**

- 1) THRUST BLOCKS TO BE CONSTRUCTED OF 3000 psi CONCRETE MINIMUM.
- 2) AREAS GIVEN ARE FOR GLASS PIPE AT TEST PRESSURE, AND AN ALLOWABLE SOIL BEARING CAPACITY OF 1,500 POUNDS PER SQUARE FOOT.
- 3) BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL.
- 4) JOINTS, BOLTS, AND FACE PLUGS TO BE KEPT CLEAR OF CONCRETE BY USE OF PLASTIC WRAP. SIDES SHALL BE WOOD FORMED UNLESS OTHERWISE APPROVED BY ENGINEER.
- 5) AT END OF LINES AND AT BLOCKED OFF (PLUGGED) TEES CONSTRUCT 4 LF PAINTED 2 x 4 BURIED MARKER.

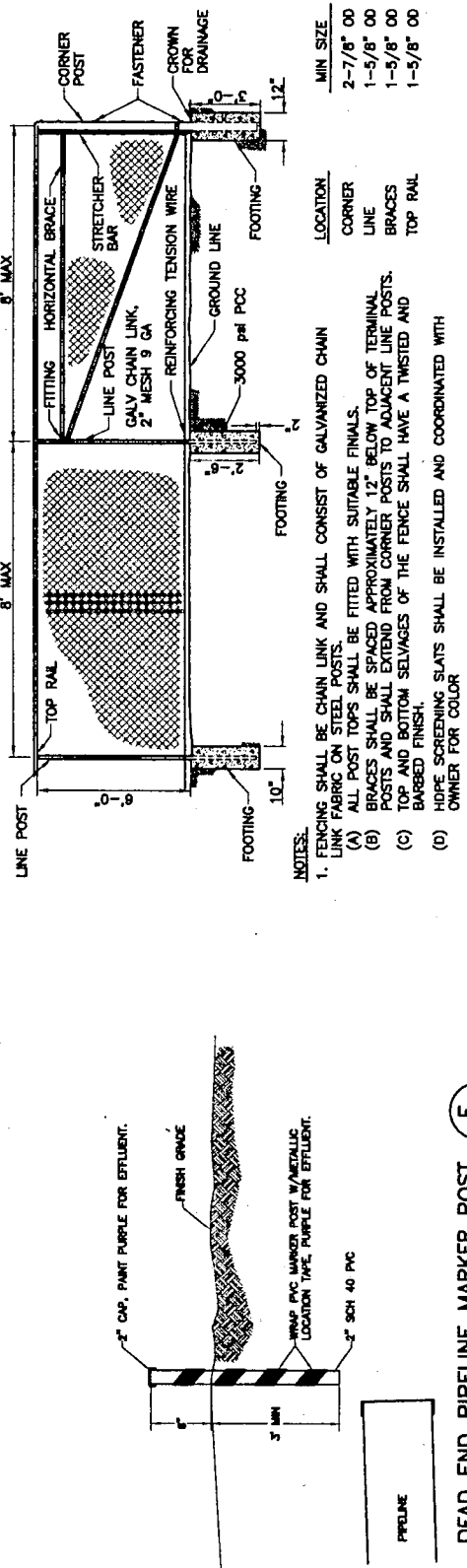
## THRUST BLOCK DETAILS



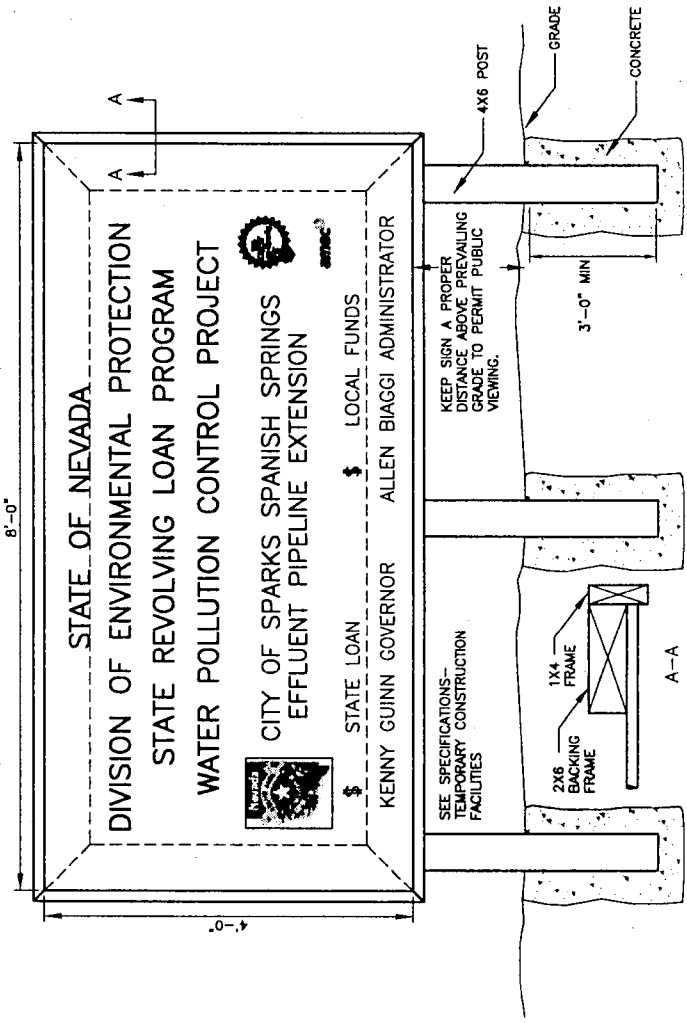
| FLUSH VALVE ASSEMBLY     | G  |
|--------------------------|----|
| EFFLUENT/RECLAIMED WATER | X2 |
| NTS                      |    |



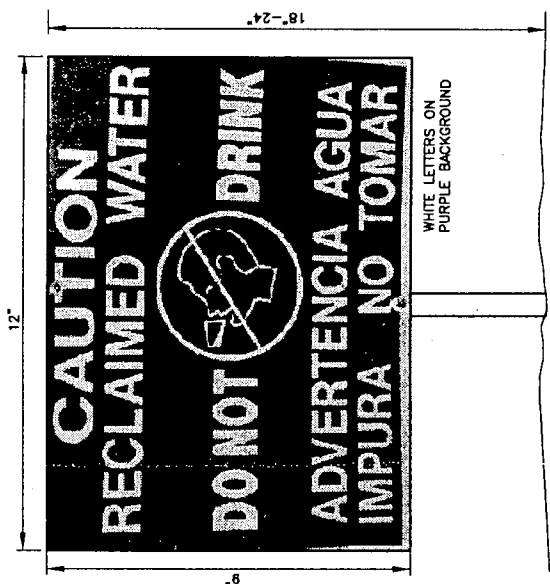
1" COMBINATION AIR RELEASE  
ASSEMBLY  
1/2"=1'-0"  
C X2  
EFFICIENT/RECLAIMED WATER



| DEAD END PIPELINE MARKER POST | E   |
|-------------------------------|-----|
| FEET UFT/RECEIVED WATER       | X2  |
|                               | NTS |



PROJECT SIGN DETAIL



| EFFLUENT WARNING SIGN | I | VS |
|-----------------------|---|----|
|                       |   |    |

**AGREEMENT FOR THE SALE OF TREATED EFFLUENT**  
**User Held Effluent Discharge Permit**

Note: This agreement is applicable to large properties, more than 5 acres that will not be subdivided into smaller properties in the future. The User shall obtain the Effluent Discharge permit for the site(s) and the Effluent Management Plan.

This AGREEMENT is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_, by and among the City of Sparks ("City"), a municipal corporation existing under and by virtue of the laws of the State of Nevada and WASHOE COUNTY PARKS AND RECREATION (USER).

**RECITALS**

1. WHEREAS Sparks City Charter § 2.110 permits the City to provide utilities and fix the rate for such utilities;
2. WHEREAS sewage influent delivered to the Truckee Meadows Water Reclamation Facility (Plant) is usually treated by chemical, biological and aeration processes and then discharged into the Truckee River via the Steamboat Canal as treated effluent;
3. WHEREAS the cities of Sparks and Reno received Permit No. 29973 from the State Engineer on February 15, 1995, with a priority date of February 6, 1976 to appropriate 27.86 cubic feet per second (55.24 acre-feet) per day of treated effluent for agricultural uses;
4. WHEREAS in accordance with Permit No. 29973, and at its own expense, City has completed the infrastructure necessary to construct a Treated Effluent Reuse Distribution System to deliver treated effluent from the Plant to various public and private facilities for use as an irrigation water supply;
5. WHEREAS the USER is in good standing in its state of formation and agrees to notify City immediately if its status in this regard changes;
6. WHEREAS the City is willing to sell and deliver to USER treated effluent under the terms and conditions set forth below;
7. WHEREAS the USER will apply for and obtain an Effluent Discharge Permit and develop an Effluent Management Plan in accordance with State Law from the State of Nevada, Division of Environmental Protection;
8. WHEREAS the USER desires to purchase, accept delivery of, control, and use the quantity of treated effluent provided for below for approved irrigation purposes on the LAZY 5 REGIONAL PARK (SITE), which for purposes of this Agreement shall include the development and continuous maintenance of the approximately 85.0 acres shown on attached Exhibit A under the terms and conditions set forth below in lieu of using water diverted from the Truckee River via the public potable water system (EXISTING SOURCE OF IRRIGATION WATER i.e. Orr Ditch, private well or public potable water system);

9. WHEREAS the USER is the owner of the property where the treated effluent will be used for irrigation;
10. WHEREAS the parties anticipate that the City will enter into agreements with other users of treated effluent, which agreements will contain provisions the same as or substantially similar to those contained herein;
11. WHEREAS the City will finance and construct the Sparks Effluent Reuse System Infrastructure. The USER will compensate the City for the USER's pro-rated share of infrastructure and other costs related to the delivery of treated effluent, as determined by the City and as stipulated herein;

NOW, THEREFORE, in consideration of the foregoing and the mutual promises and undertakings stated herein, the parties agree as follows;

## **SPECIFIC PROVISIONS**

### **I. QUANTITIES OF TREATED EFFLUENT**

A. BASIC QUANTITY: City agrees to sell and deliver and USER agrees to purchase, accept delivery of, control, and beneficially use treated effluent on the site in the amount of:

1. Minimum Annual Demand, 17.33 acre-feet/year, phase 1
2. Maximum Annual Demand, 52.96 acre-feet/year, phase 2
3. Peak Daily Demand,
  - a) Phase 1-Meter A, Night time delivery period, 8 p.m. to 4 a.m., 68.85 gpm.
  - b) Phase 2-Meter B, Night time delivery period, 8 p.m. to 4 a.m., 147.10 gpm.
4. The annual and peak daily demands have been determined by the USER as sufficient to provide the intended irrigation requirements for the site.
5. It is understood that treated effluent is being reserved for the USER according to the Effluent Demand Schedule. Failure to adhere to the Effluent Demand Schedule could result in USER losing the reserved status of any unused treated effluent.
6. In any event, if USER does not put the treated effluent to beneficial use as provided in this Agreement within one year of Service Commencement Date, USER's allocation is subject to resale by City.
7. If USER, at any time after initially applying treated effluent to beneficial use on the site, fails to apply treated effluent on the site for a period of one year, the USER's allocation is subject to resale by the City.

B. SUPPLEMENTAL QUANTITY. As and when City has, in its sole determination, treated effluent available at the Point(s) of Connection shown on attached Exhibit A in excess of the amount needed to satisfy City's delivery obligations under this Agreement and other treated effluent delivery agreements, and

if required by USER, City will sell and deliver to USER such amounts as may then be mutually agreed upon.

1. City will endeavor to notify USER concerning any availability of additional treated effluent should such a situation occur.
2. If permanent delivery of additional treated effluent is desired, a contract amendment for such water must be executed which will be dependent upon availability of treated effluent and pending applications.

C. CONSERVATION INCENTIVE – PERMANENT RELEASE. The parties acknowledge that treated effluent is a finite resource and wish to mutually promote and encourage the conservation of such a limited resource for other possible uses. Therefore, if during the term of this Agreement, USER conserves water or otherwise limits treated effluent usage so as to permanently decrease the level of USER's daily treated effluent demand in the Effluent Demand Schedule (as the same may be amended in accordance with this Agreement), and advises City in writing of the amount of such decreased demand, and if City can deliver such conserved treated effluent to another user, City and USER will thereupon enter into an Amendment to this Agreement whereby USER will permanently release its rights to such conserved treated effluent to City for possible sale by City to another use, USER will be released from its obligations under this Agreement to purchase such conserved treated effluent. Such Amendment shall contain terms and conditions mutually agreed upon between USER and City.

## II. PURCHASE OF TREATED EFFLUENT

A. INFRASTRUCTURE CONNECTION FEE. To compensate the City for the apportioned cost of the infrastructure necessary for the construction and operation of the effluent line, USER, jointly, severally and unconditionally, promises to pay ~~\$118,439.94~~ to the City. The USER may elect to pay the Infrastructure Connection Fee in one lump sum payment prior to effluent delivery or in Monthly installments, amortized over a 20 year period at a fixed interest rate of 4.5 percent per the payment schedule attached as Exhibit B (~~approximate monthly payment of \$ 758.77~~) due on the first business day of each month, one month in arrears. If this Agreement is terminated, the City has the right to sell USERS infrastructure capacity to another USER.

B. METER SERVICE FEE. To compensate the City for the apportioned cost of the annual administration and maintenance cost of the effluent line. USER, jointly, severally and unconditionally, promises to pay a monthly Meter Service Fee of ~~\$74.08~~ per month, ( Phase 1, Meter A-2" meter) and ~~\$185.19~~ per month, ( Phase 2, Meter B-3" meter) 12 months per year. Monthly payments are due on the first business day of each month, one month in arrears. If this agreement is terminated, the City has the right to sell USERS infrastructure capacity to another USER.

C. EFFLUENT USE FEE. Subject to paragraphs herein, and beginning on or about \_\_\_\_\_, 20\_\_, or as soon thereafter as allowed by the distribution pipeline construction, and the issuance of all required permits by any regulatory authority having jurisdiction over the construction and operation of City's effluent reuse system or associated water rights, City agrees to sell up to a maximum

of ~~52.96 acre-feet~~ of treated effluent to USER on an annual basis. USER agrees to purchase from City a minimum of ~~17.33 acre-feet~~ per year as long as this Agreement is in effect. USER agrees to pay a usage rate of \$0.96 per 1,000 gallons of treated effluent rounded up to the next 1,000 gallons with this rate subject to renegotiation every five years. The usage fee is payable on the first business day of each month, one month in arrears.

#### D. RESALE.

1. USER may resell all or a portion of USER's Infrastructure Fee and minimum and maximum annual volume of effluent purchased under this Agreement subject to the approval of the City.
2. The resale terms and Conditions shall be identical to those included in this agreement and as approved by the City.
3. The USER shall provide draft agreements, including the new sub agreement and the revised original agreement, to the City, at least 90 days prior to anticipated execution of the sale.

E. SALE OF SITE. If at any time during the term of this Agreement, USER proposes to sell the SITE, USER shall give the City not less than one-hundred and twenty (120) days prior written notice of its intention and shall consult with the City regarding the proposed sale and possible assignment under this Agreement.

### III. TERM OF AGREEMENT

A. TERM OF AGREEMENT; OPTION TO RENEW. This Agreement shall commence as of the date above written and shall terminate twenty (20) years from that date, although with the written mutual consent of all parties, the Agreement may be renewed for one additional term of five (5) years commencing at the expiration of the initial term provided that USER is not in default. All of the terms and conditions of this Agreement shall apply during the additional term.

### IV. TREATED EFFLUENT DELIVERY

#### A. METERING FACILITIES.

1. Meter Installation. USER shall install a meter and service line as required at an appropriate location and within a Public Utility Easement to measure instantaneous and cumulative flows to the SITE and shall report such flow data to USER quarterly.
2. All service line and meter equipment, materials and workmanship shall be as specified, inspected and approved by the City.
3. USER is responsible for all charges associated with installation of service meter.

#### B. TREATED EFFLUENT DELIVERIES.

1. Time for delivery. City agrees to provide the effluent during the irrigation season beginning on or about April 1 and ending on or about October 31, during the daytime and or nighttime delivery period established in I.A. of each year of the agreement, unless otherwise agreed.

2. Supply Pressure. USER is responsible for increasing or decreasing pressures as required for the USER's system.
3. Supply Shortages. Any system supply shortages due to equipment failures, lack of availability of treated effluent, drought, or water usage curtailments shall be shared by all treated effluent users on a pro-rata basis.
4. System Maintenance. It is understood by both parties that routine system maintenance may require occasional effluent irrigation outside the established daytime and or nighttime delivery period.

C. POINT OF CONNECTION. The treated effluent to be delivered pursuant to this Agreement shall be delivered at the Point(s) of Connection. USER shall be responsible, at its own cost, for distribution and storage of the treated effluent beyond the point of connection. All infrastructure required between the point of connection and the site shall be as specified by the City.

## V. FACILITY PROVISIONS AND OPERATION RESPONSIBILITIES

### A. CITY'S RESPONSIBILITY.

1. City shall be responsible for providing and operating the City's Effluent Distribution System, within public right of way, or public utility easements, in compliance with applicable requirements of Federal, State, City, and local regulatory agencies.
2. City shall be responsible for supplying treated effluent to the Point(s) of Connection which meets or exceeds all applicable Federal, State, City, and applicable regulatory agency quality standards.
3. Upon USER's request, City will make available to USER, NDEP Discharge Monitoring Reports concerning treated effluent.
4. City will notify USER if City becomes aware of any condition under City's control which violates Federal, State, City, or local regulatory agency requirements or discharge standards.
5. City shall be solely responsible for conveying and controlling the treated effluent in compliance with applicable regulatory agency requirements up to and including the Point(s) of Connection.
6. Upon acceptance of this agreement by both parties, the City shall begin preparation of the initial State Discharge Permit application (DPA) and initial Effluent Management Plan (EMP) to supply treated effluent to the SITE.
  - a. The City shall provide the USER with a list of the SITE irrigation system design and other physical data required to complete the DPA and EMP.
  - b. USER shall provide all site specific effluent irrigation system design and physical data, (landscape, irrigation and utility plans, maps, soils data, etc.) required to complete the DP and EMP in a timely manner.
  - c. The USER shall review and approve the DP and EMP prepared by the City.
  - d. Upon completion of the DP and EMP the USER shall submit each to the State for approval.
  - e. The City will provide the initial DPA and EMP within 30 days of receipt of site specific information provided by the USER.

**B. USER'S RESPONSIBILITY.**

1. USER shall be responsible for applying for and acquiring a State Discharge Permit necessary to supply treated effluent to the SITE.
2. USER shall submit to the Nevada Division of Environmental Protection (NDEP) an Effluent Management Plan for its approval. The plan shall convey all information regarding planned operating and management criteria for the treated effluent system. Said plan must be approved by NDEP prior to delivery of treated effluent by City under this Agreement.
3. USER shall be responsible for providing, operating, maintaining, and repairing USER's pipeline, together with all appurtenant facilities, as are necessary to accept, convey, control, and use the treated effluent in compliance with the applicable requirements of Federal, State, City, and local regulatory agencies on USER's owned or controlled lands. USER shall provide further treatment, if necessary, to maintain the quality of the treated effluent as delivered with respect to the applicable Federal, State, City, and local regulatory ordinances and standards. USER also shall provide any additional treatment and/or filtration as required for the USER's specific needs.
4. USER shall notify City if USER becomes aware of any condition under USER's control which violates Federal, State, City, or local regulatory agency requirements or discharge standards.
5. USER shall be responsible for adhering to all conditions of the Discharge Permit and Effluent Management Plan.
6. USER shall be responsible for conveying and controlling, in compliance with applicable regulatory agency requirements, the Discharge Permit and Effluent Management Plan, the treated effluent delivered through USER's pipeline, after the Point(s) of connection. City shall have no responsibility whatsoever relative to USER's pipeline.
7. USER shall notify City within twenty-four (24) hours of any situation that constitutes a material violation of Effluent Management Plan or places USER in non-compliance with the Agreement.
8. USER shall provide to City the name of the company/person responsible for irrigation maintenance on the SITE. USER shall notify City of any changes in responsibility. This company/person shall be knowledgeable in the construction and operation of irrigation systems and the rules and regulations governing the proper use of treated effluent.
9. Required Permits. USER agrees to acquire, comply with and maintain in effect any and all federal, state or local regulatory permits required for them to use treated effluent for irrigation at the SITE. They also agree to cooperate with City in obtaining any regulatory permits that might be required of City relating to this Agreement.
10. Assumption of the Risk. USER agrees to use and manage the treated effluent in a manner consistent with best management practices and any approved effluent management plan and discharge permit in effect. USER understands that they are receiving treated effluent which is not intended for



human consumption and further agree that they assume any and all risks associated with the use of the treated effluent under this Agreement.

#### C. INTERRUPTION OF DELIVERY.

1. City shall not be liable for any failure to deliver treated effluent under the terms of this Agreement due to force majeure. For the purposes of this Agreement, a force majeure is defined as a war, insurrection, riot, flood, drought, earthquake, fire, casualty, act of God, act of the public enemy, quarantine restriction or other effect of epidemic or disease, contamination of water supply or effluent by third parties, freight embargo, order from the Federal Water Master or any other regulatory authority, a lawsuit challenging this Agreement, or any other cause whatsoever except for the City's own voluntary act or failure to exercise reasonable care and diligence in the performance of this Agreement.

2. City's obligation to deliver treated effluent under this Agreement is subject to;

- a) City having the legal right to divert treated effluent; and
- b) the necessary effluent pipeline improvements and appurtenances being constructed, offered for conveyance and accepted.
- c) City may temporarily interrupt or reduce delivery of treated effluent if City determines that such interruption or reduction is necessary or desirable for system emergencies, maintenance or management. Except in emergencies, City shall give 24 hour notice to USER of any such interruption or reduction, the reason for such interruption or reduction, and the estimated duration of such interruption or reduction to the extent the City can. City shall make reasonable attempts to minimize the effect of such interruption or reduction.

#### D. USER ACKNOWLEDGEMENT.

1. USER acknowledges the following:

- a) City's Effluent Distribution System's purpose is to control the biological quality of the treated effluent resulting from the system's operation and to distribute or discharge treated effluent as required under contracts with users or under discharge standards of Federal, State, City, and local regulatory agencies;
- b) Said system is not equipped to detect, treat, or remove harmful chemicals or toxic materials except as required to meet Federal, State, City, and local regulatory agency discharge standards; and
- c) Treated effluent may require filtration prior to application.

E. HOLD HARMLESS. The parties agree to hold City free and harmless from any and all legal liability and/or economic loss which either party may sustain as the result of the quality or quantity of the treated effluent which is delivered to USER by City in compliance with all terms and provisions of this Agreement and all then applicable discharge standards.

#### VI. USE OF TREATED EFFLUENT

A. RULES AND REGULATIONS. All treated effluent delivered pursuant to this Agreement shall be used only on the SITE identified in Exhibit A for irrigation of approved uses in compliance with all applicable rules and regulations of Federal, State, City, and local regulatory agencies including Discharge Permit and Effluent Management Plan. It shall be USER's responsibility to remain current and knowledgeable regarding all such regulations.

B. RECLAMATION REQUIREMENTS. USER shall apply to City's Environmental Engineering Department to obtain discharge permit requirements covering the use of the treated effluent to be delivered and used pursuant to this Agreement. USER shall comply with the provisions of such reclamation requirements.

C. NDEP REQUIREMENTS.

1. USER shall submit to the Nevada Division of Environmental Protection (NDEP) for a Discharge Permit application and an Effluent Management Plan for its approval. CITY, through its Environmental Services Division, will provide information requested by NDEP regarding the wastewater treatment facility, existing discharge permit, effluent management plans, and reclaimed water delivery system. The plan shall convey all information regarding USER's planned operating and management criteria for USER's treated effluent system. USER is solely responsible for obtaining NDEP Discharge Permit and approved Effluent Management Plan, prior to delivery of reclaimed water by CITY under this Agreement.
2. USER shall be liable for any sanctions imposed for use not in conformance with the Discharge Permit and Effluent Management Plan.
3. City may discontinue treated effluent service to any USER not in compliance with the Discharge Permit and Effluent Management Plan.

D. CESSATION OF SERVICE.

1. USER may terminate this Agreement,
  - a) after approved RESALE of USER's Infrastructure Fee and minimum volume of effluent purchased under this agreement as approved by the City,
  - b) for City's failure to comply with Paragraph V.A. herein, and
  - c) by giving at least thirty (30) days written notice.
2. City may suspend delivery of treated effluent to USER under this Agreement due to;
  - a) Natural disaster, power outages, emergencies, war, acts of God, or other conditions beyond City's control. In the event of such suspension of delivery, City will provide USER with as much advance notice as practical under the circumstances. USER acknowledges advance notice for certain State or Federal action may not be given. The notice will provide USER with an estimate of when service will be suspended or interrupted, the extent to which delivery of the treated effluent will be impaired, and the duration of the suspension of service.
  - b) For USER's non-compliance that may result in unhealthy conditions or violations of the Discharge Permit or Effluent

Management Plan suspension of service may be immediately implemented.

c) City shall give USER thirty (30) days written notice of said suspension or termination. USER shall have said time period to cure, correct, or resolve to City's satisfaction the cause for City's termination of the Agreement.

d) Notwithstanding the foregoing, if the default is not curable within the thirty (30) day period, the cure period may be extended to a maximum of one hundred twenty (120) days so long as USER initiates the cure within the original thirty (30) day period and diligently takes and continues action to cure the default. USER acknowledges advance notice for certain State or Federal action may not be given.

e) The Effluent Use Fee will be suspended until delivery of treated effluent is resumed. The Infrastructure Connection Fee will remain in effect until paid in full or this Agreement is terminated.

3. Termination by City. City may terminate the obligations hereunder after approved RESALE of USER's Infrastructure Fee and minimum annual volume of effluent purchased under this agreement as approved by the City and upon thirty (30) days written notice under the following circumstances:

a) USER fails to comply with any federal, state or local laws or permit conditions pertaining to the use of the treated effluent. The City may suspend the Agreement while an environmental prosecution against USER is pending;

b) Use of the treated effluent contaminates any domestic water supply or provides a danger to neighboring properties or residents;

c) USER'S failure to pay any amount within sixty (60) days of its due date;

d) City is unable to provide or economically provide water consistent with federal, state or local laws now or hereafter existing.

e) USER, at any time after initially applying treated effluent to beneficial use on the site, fails to apply treated effluent on the site for a period of one year, the USER's allocation is subject to resale by the City

## GENERAL PROVISIONS

A. NOTICE. Unless written notice of a new designee is sent in accordance with this paragraph, all communications/notices required pursuant to this Agreement shall be in writing and shall be delivered in person or mailed by certified mail, postage prepaid, return receipt requested, to the individuals at the addresses indicated below. Notices that are mailed are deemed received the third day after they have been postmarked by the U.S. Postal Service.

USER NAME \_\_\_\_\_  
PRINCIPAL \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
TELEPHONE \_\_\_\_\_

City of Sparks  
Attn: City Clerk's Office  
P.O. Box 857  
Sparks, NV 89432-0857  
(775) 353-2350

B. INDEMNIFICATION. The parties shall jointly and severally indemnify and hold harmless each other, their officers, officials, employees and agents, from any liability for damage or claims for damage for personal injury, including death, as well as for claims for property or personal damage arising in whole or in part from use of the treated effluent provided under this Agreement. The parties further agree to defend each other, its officers, officials, employees and agents from any and all suits and actions at law or in equity for damage caused, or alleged to have been caused, by reason of use of the treated effluent provided under this Agreement. This provision shall survive termination of the Agreement and shall be binding upon the parties, their legal representatives, heirs, successors and permitted assigns.

C. SEVERABILITY.

1. Each term and provision of this Agreement shall be valid and enforceable to the extent permitted by law. If any term or provision of this Agreement or the application thereof is held to be invalid or unenforceable by a court of competent jurisdiction, the remainder of this Agreement, or the application of such term or provision to circumstances other than those to which it is invalid or unenforceable, shall not be affected.
2. To prevent windfall or unintended consideration, if any term or provision of this Agreement is deemed invalid or unenforceable or enforceable only to a limited extent, the parties agree to negotiate in good faith to adjust any counter performance, condition or corresponding consideration.

D. INTEGRATION. This Agreement, including the Recitals and the Exhibits, all of which are true and correct and incorporated by reference as a part of this Agreement, constitutes the complete and integrated agreement between the parties with respect to the matters recited herein, and supersedes any prior or contemporaneous written or oral agreements or understandings with respect thereto.

E. AMENDMENT/WAIVER. This Agreement shall not be modified, amended, supplemented, rescinded, canceled or waived, in whole or in part, except by written amendment signed by duly authorized representatives of the parties. No waiver of any of the provisions of this Agreement shall be deemed to be a waiver of any other provision, regardless of similarity, and no waiver shall constitute a continuing waiver. Forbearance or failure to declare a default or pursue a remedy shall not constitute a waiver except as provided in this Agreement.

F. ASSIGNMENT. Neither USER nor the City shall assign or delegate the duties under this Agreement to any third party without prior written consent of the other parties which shall not be unreasonably withheld, provided, however, that City may, in its sole discretion, withhold approval of assignment if the potential assignee;

1. lacks the financial capacity, character and credit to fulfill the financial obligations hereunder; or
  2. lacks the experience to manage such facilities in compliance with environmental regulations, including but not limited to, any approved management plan and discharge permit governing the use of the treated effluent and operation of the irrigation system under this Agreement.
- G. **BINDING NATURE.** This Agreement shall be binding on and shall inure to the benefit of the parties to this Agreement and their respective heirs, legal representatives, successors and permitted assigns.
- H. **NO THIRD PARTY BENEFICIARY RIGHTS.** This Agreement is not intended and shall not be construed to provide any person or entity not a party to this Agreement with any benefits or cause of action, or to obligate the parties to this Agreement to any entity or person not a party.
- I. **GOVERNING LAW.** The laws of the State of Nevada shall govern this Agreement without regard to conflicts of laws principles and shall be construed and interpreted in accordance with the laws of the State of Nevada.
- J. **JURISDICTION; VENUE.** Any action or proceeding seeking to enforce any provision of, or based on any right arising out of, this Agreement must be brought against either of the parties in the Second Judicial District Court for the State of Nevada, County of Washoe. Each of the parties consents to the jurisdiction of such court (and of the appropriate appellate court) in any such action or proceeding and waives any objection to venue laid therein.
- K. **CLAIMS.** Pursuant to NRS 268.020, which the parties agree to abide by contractually, all demands and accounts against the City must be presented to the Council, in writing, within six months from the time the demands or accounts become due. No demand or account may be audited, considered, allowed or paid by the City unless this requirement is strictly complied with.
- L. **VIOLATION OF CITY'S ILLEGAL HARASSMENT POLICY.** USER agrees that they will comply with the City's illegal harassment policy (HR-16), which is incorporated by reference and available from the Human Resources Department, when dealing with the City, its officials, officers, employees, and agents pursuant to this Agreement. Violation of this policy shall constitute a material breach of contract.
- M. **DUPLICATE ORIGINALS.** This Agreement may be executed simultaneously in one duplicate original for each party hereto, and is binding on a party only when all parties have signed and received a duplicate original.
- N. **SUBJECT HEADINGS.** The subject headings of the paragraphs and subparagraphs of this Agreement are included for convenience only and shall not affect the construction or interpretation of any of its provisions.
- O. **DRAFTING PRESUMPTION.** The parties acknowledge that this Agreement has been agreed to by all of the parties, that all of the parties have consulted or have had

the opportunity to consult with attorneys with respect to the terms, and that no presumption shall be created against any party as the drafter of the Agreement.

P. ADDITIONAL DOCUMENTS. The parties agree to execute such additional documents and to take such additional action as is reasonably necessary to carry out the purposes hereof.

Q. ATTORNEY'S FEES. In the event of litigation or arbitration arising out of this Agreement, the prevailing party shall be entitled to reasonable attorney's fees and costs to be fixed by the court or by the arbitrator.

R. CAPTIONS; RECITALS. Captions to paragraphs/subparagraphs of this Agreement are for convenience purposes only and are not part of this Agreement. The recitals are incorporated by reference herein.

S. DUE AUTHORIZATION. Each party represents that all required authorizations have been obtained to execute this grant and for the compliance with each and every term hereof. Each person signing this agreement warrants and represents to the other parties that he or she has actual authority to execute this agreement and bind the party for whom he or she is signing.

T. FUNDING. In the event that the governing body appropriating funds for USER fails to obligate the funds necessary to make payments beyond USERS then current fiscal period, this Agreement is subject to termination; however, USERS agree to proceed in good faith to make every effort to see that the funding source continues for the term of this Agreement.

User Representative  
Title

Page 13 of 14

EXHIBIT A- SITE MAP and Point of Connection  
EXHIBIT B- INFRASTRUCTURE FEE CALCULATION and SCHEDULES  
EXHIBIT C- EFFLUENT DEMAND SCHEDULE





April 26, 2004  
Joe Howard, P.E.  
Washoe County Department of Water Resources Utility Services Division  
4930 Energy Way  
P.O. Box 11130  
Reno, NV 89520-0027

**Subject: Washoe County Parks EMP**

**Project No: 05-2000-047**

Dear Joe Howard,

Per your request for additional information for the Washoe County Parks Effluent Management Plan, enclosed is the following:

- 1) Eagle Canyon Park. Enclosed is an irrigation plan we have compiled from the information available to us, including "as built" drawings, field observations, and irrigation plans. We have included a full size copy of the irrigation plan for your use. Also enclosed is a copy of the water service plan done by CFA, dated 5/14/96.
- 2) Gator Swamp Park. Enclosed is an irrigation plan we have compiled from the information available to us, including "as built" drawings, field observations, and irrigation plans. We have included a full size copy of the irrigation plan for your use.
- 3) Desert Winds Park. Enclosed is an irrigation plan we have compiled from the information available to us, including "as built" drawings, field observations, and irrigation plans. We have included a full size copy of the irrigation plan for your use.

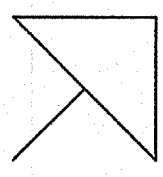
I hope this information is satisfactory and will aid in the approval of the Washoe County Parks and Recreation EMP by Washoe County.

If you have any questions or require additional information, please call me at 786-5873.

Respectfully,

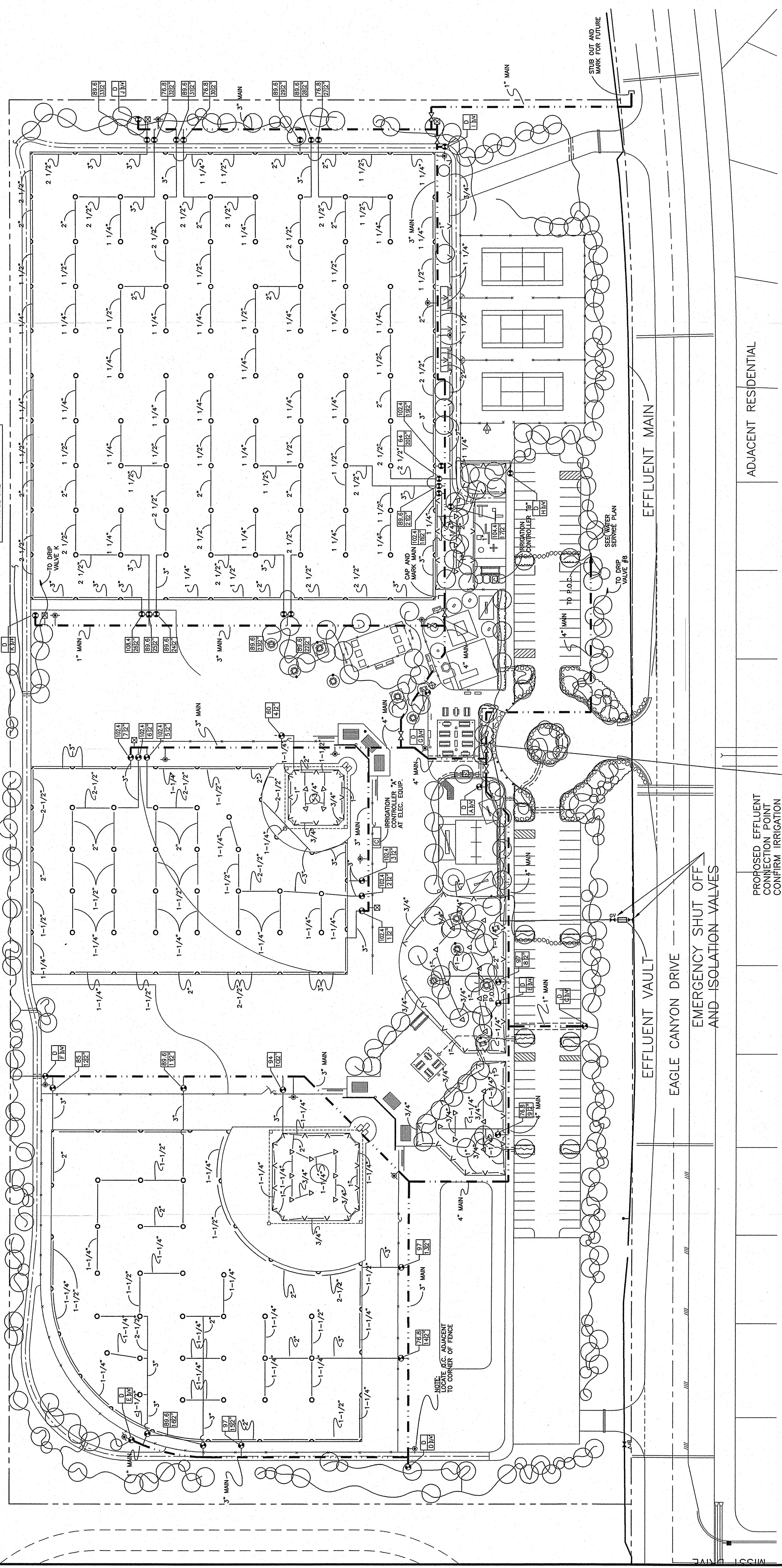
  
Timothy L. Russell, EI

Cc: Tony McMillen



PREVAILING WIND  
DIRECTION

NOTES:  
1. DOMESTIC LINE TO FOLLOW  
IRRIGATION MAIN TO DRINKING  
FOUNTAIN LOCATIONS  
NOTE LOCATION ON AS-BUILTS.  
2. SEE WATER SERVICES PLAN -  
PHASE ONE IS INCLUDED



PROPOSED EFFLUENT  
CONNECTION POINT  
CONFIRM IRRIGATION  
SYSTEM INDEPENDENT  
OF POTABLE WATER  
SYSTEM

EMERGENCY SHUT OFF  
AND ISOLATION VALVES

ADJACENT RESIDENTIAL

EFFLUENT MAIN

EAGLE CANYON DRIVE

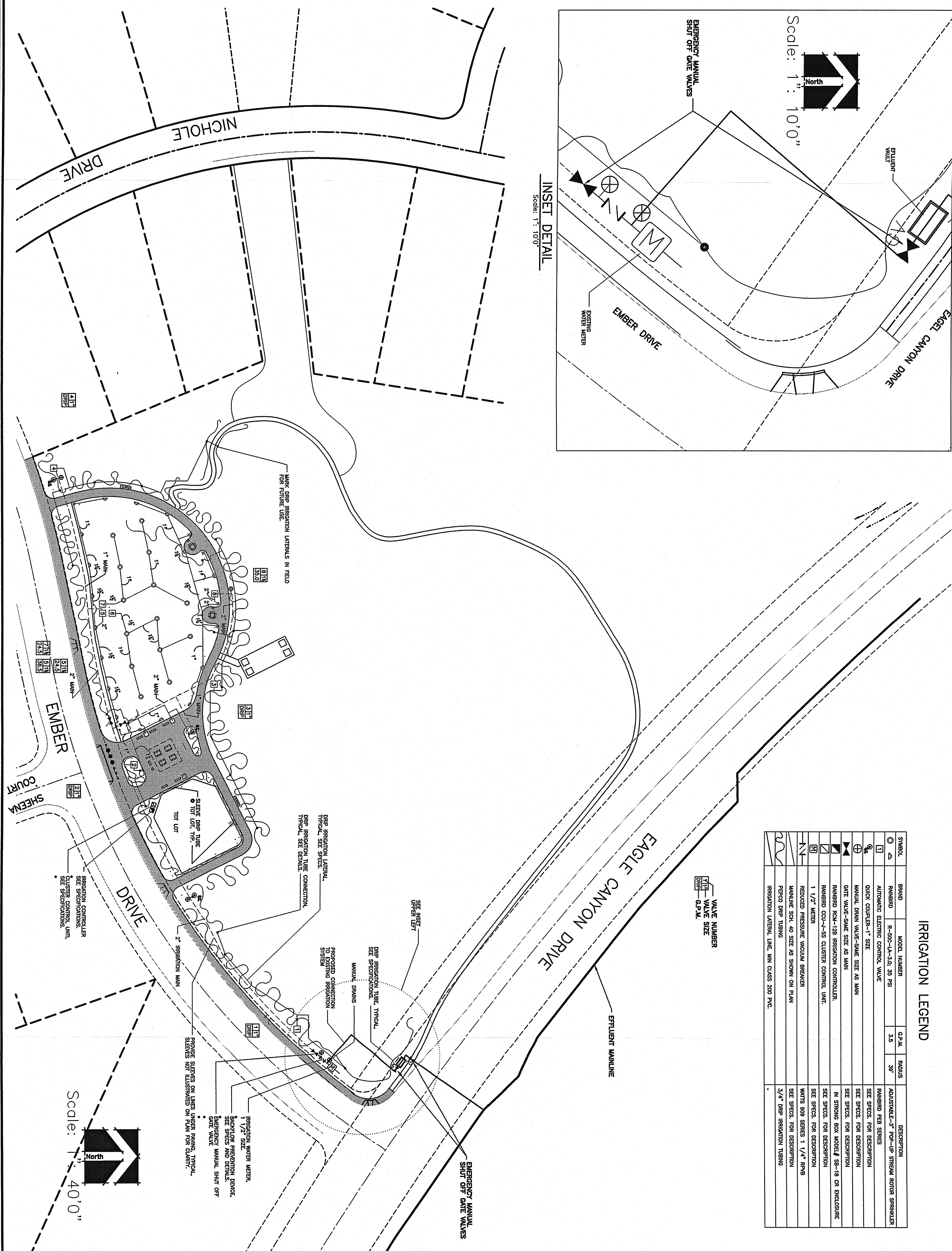
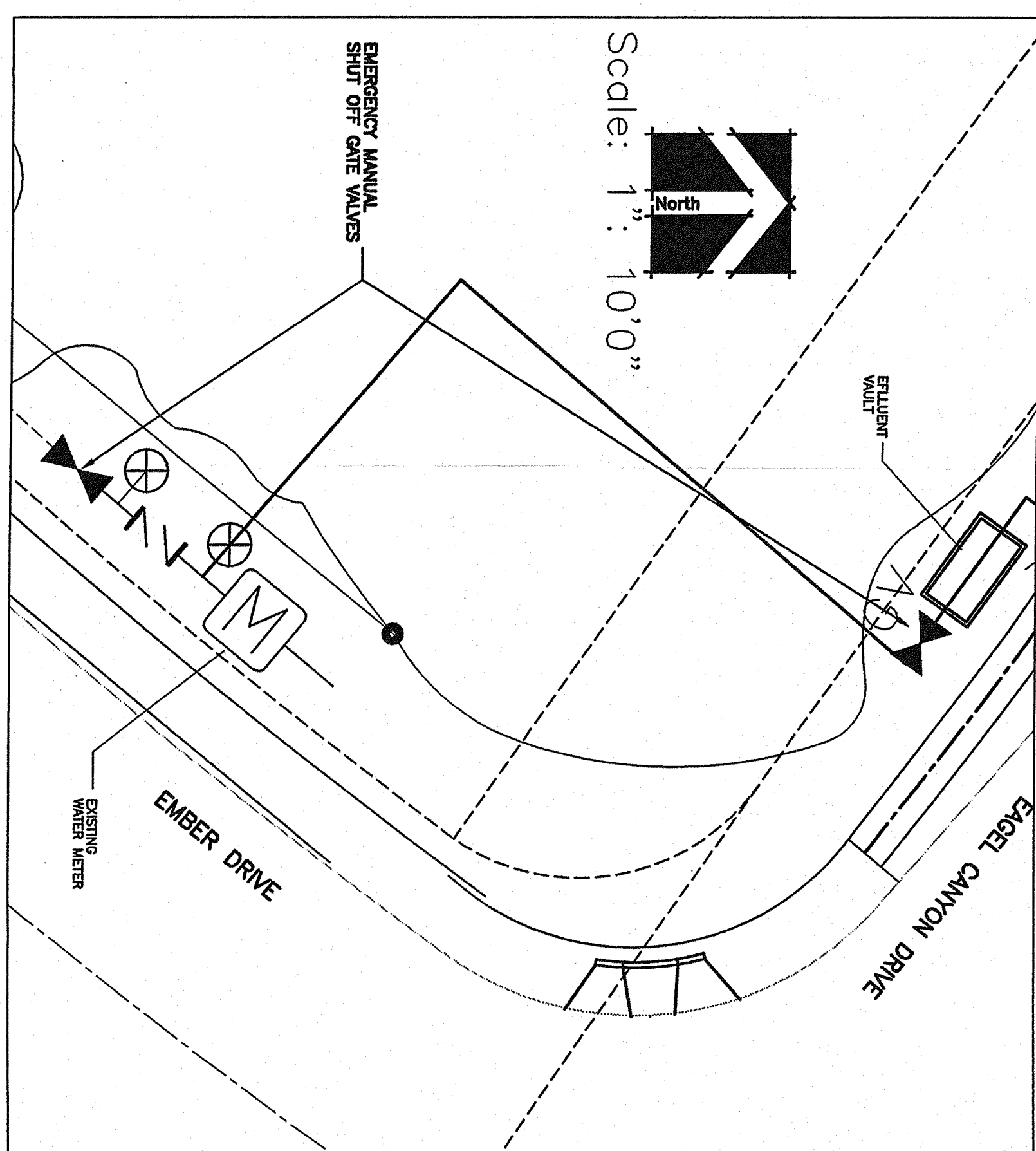
EFFLUENT VAULT

NOTES

- 1). IRRIGATION PLAN BASED ON IRRIGATION DRAWINGS  
PROVIDED BY CFA, DATED 5/14/1996.
- 2). STAMPED IRRIGATION PLANS ARE NOT AVAILABLE

|   |                |
|---|----------------|
| EAGLE CANYON PARK                         |                |
| IRRIGATION PLAN                           |                |
| SCALE: 1"=40'                             | FIGURE 1-4     |
| DRAWN BY: DFC                             | DATE: 05/15/94 |
| CHECKED BY: JFC                           | DATE: 05/15/94 |
| Infrastructure, Inc.                      |                |
| 4400 ROUTE 99, S.W.                       |                |
| PORTLAND, OREGON 97207                    |                |
| PHONE: (503) 253-8833 FAX: (503) 253-4533 |                |





| SYMBOL | BRAND    | MODEL NUMBER   | G.P.A. | ROUS | DESCRIPTION                                  |
|--------|----------|--|--------|------|--|
|        | RAINBIRD | R-300-14-30, 35 PSI  | 3.5    | 30"  | ADJUSTABLE, 3" POP-UP STREAM ROTOR SPRINKLER |
|        |          |  |        |      | RAINBIRD RFB SERIES                          |
|        |          | QUICK COUPLER, 1" SIZE   |        |      | SEE SPECS. FOR DESCRIPTION                   |
|        |          | MANUAL DRAIN VALVE—1/2 SIZE AS MAIN GATE VALVE—SAME SIZE AS MAIN |        |      | SEE SPECS. FOR DESCRIPTION                   |
|        |          | RAINBIRD RGM-128 IRRIGATION CONTROLLER                           |        |      | IN STRONG BOX MODEL # 89-18 OR ENCLOSURE     |
|        |          | RAINBIRD RGM-128S CLUSTER CONTROL UNIT                           |        |      | SEE SPECS. FOR DESCRIPTION                   |
|        |          | 1 1/2" METER   |        |      | SEE SPECS. FOR DESCRIPTION                   |
|        |          | REDUCED PRESSURE VACUUM BREAKER                                  |        |      | WANTS 809 SERIES 1 1/4" RFBG                 |
|        |          | MAINLINE 50H, 40 SIZE AS SHOWN ON PLAN                           |        |      | SEE SPECS. FOR DESCRIPTION                   |
|        |          | PERIOD DRIPIR TUBING   |        |      | 3/4" DRIPIR IRRIGATION TUBING                |
|        |          | IRRIGATION LATERAL LINE, 1/2 SIZE AS SHOWN ON PLAN               |        |      | *  |

### IRRIGATION LEGEND

**INFRASTRUCTURE  
INC.**  
8450 DOUBLE "R" BLVD.  
RENO, NEVADA 89521  
PHONE (775) 788-5873 FAX (775) 788-6138

**amec**

## IRRIGATION PLAN

WASHOE COUNTY

NEVADA

**cfa**

1150 CORPORATE BLVD. RENO, NV 89502 (702) 856-1150 FAX: (702) 856-1160

PLANNERS • ENGINEERS • SURVEYORS

|                   |                |
|-------------------|----------------|
| DESIGNED BY DD/DK | DATE SURVEYED  |
| DRAWN BY DK       | DATE 1/23/1995 |
| CHECKED BY DD     | DATE           |
| APPROVED BY       |                |

B. E. NO

DATE \_\_\_\_\_

## REVISIONS

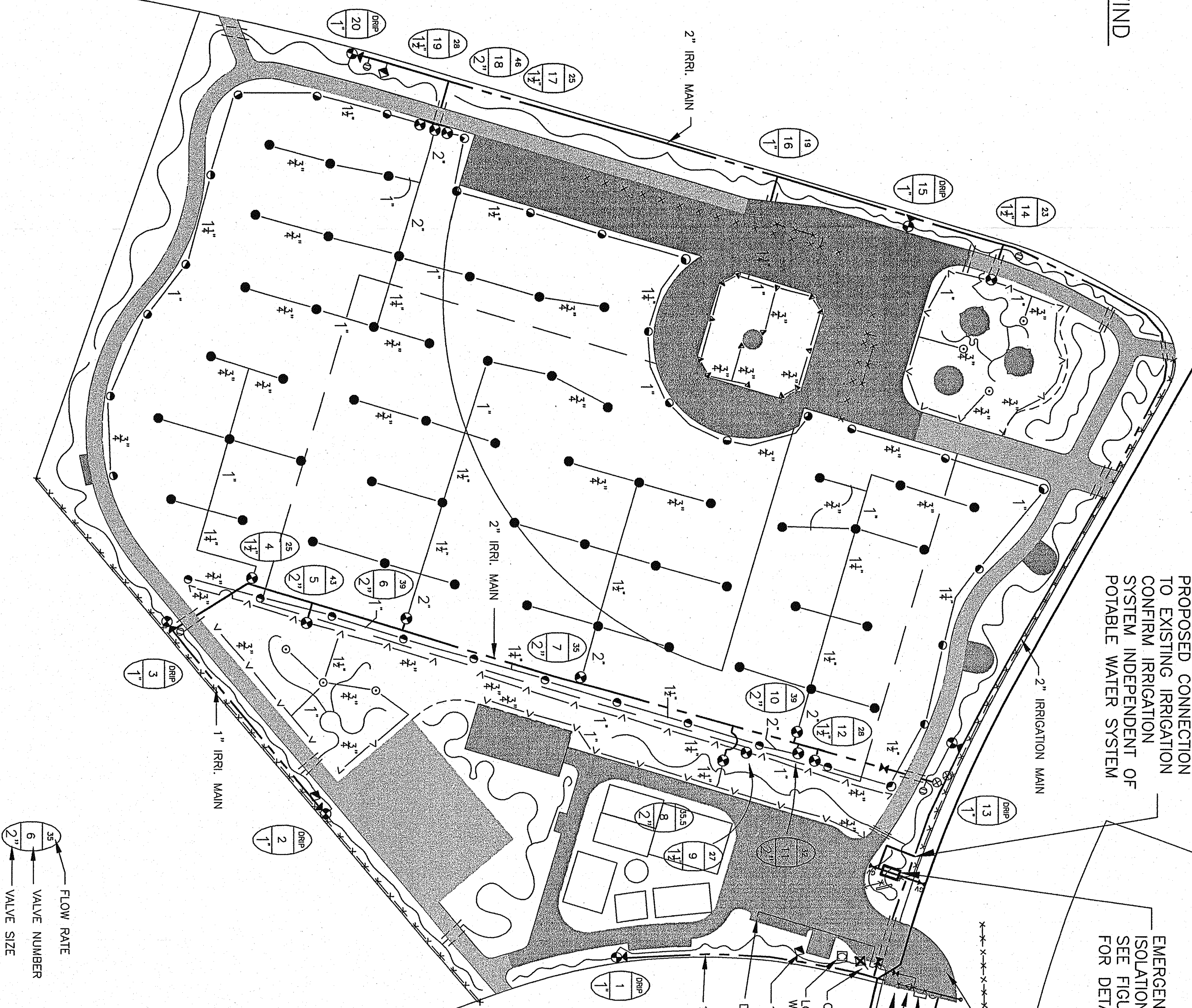
BY



PYRAMID RANCH ESTATES  
 UNIT - 5C

PREVAILING WIND  
 DIRECTION

SCALE: 1" = 40'



PROPOSED CONNECTION  
 TO EXISTING IRRIGATION  
 SYSTEM INDEPENDENT OF  
 POTABLE WATER SYSTEM

EMERGENCY SHUT OFF &  
 ISOLATION GATE VALVES  
 SEE FIGURE K-6 & K-7  
 FOR DETAILS

NOTE: SEE SPECIFICATIONS FOR MASTER VALVE,  
 SENSOR DECODER, FLOW SENSOR, PULSE OUTPUT  
 TRANSMITTER AND PULSE DECODER. PROVIDE ALL  
 EQUIPMENT NEEDED FOR A COMPLETE AND WORKABLE  
 IRRIGATION SYSTEM. THE OWNER'S  
 SYSTEM, TO BE LOCATED AT POC.

ALCYCE TAYLOR SCHOOL

IRRIGATION LEGEND

| SYMBOL | BRAND    | MODEL NUMBER                              | G.P.M. | POUS | DESCRIPTION                           |
|--------|----------|---|--------|------|---------------------------------------|
| ▲      | RAINBIRD | T-BIRD SERIES 130-1.3 35 PSI              | 1.30   | 31'  | ADJUSTABLE-4\" POP-UP SPRAY SPRINKLER |
| ▼      | RAINBIRD | T-BIRD SERIES 130-2.5 35 PSI              | 2.50   | 31'  | ADJUSTABLE-4\" POP-UP SPRAY SPRINKLER |
| ○      | RAINBIRD | T-BIRD SERIES 130-5.0 35 PSI              | 5.0    | 31'  | ADJUSTABLE-4\" POP-UP SPRAY SPRINKLER |
| ●      | RAINBIRD | R-500C                                    | 3.5    | 39'  | ADJUSTABLE-3\" POP-UP SPRAY SPRINKLER |
| ⊙      | RAINBIRD | R-500                                     | 3.5    | 39'  | ADJUSTABLE-3\" POP-UP SPRAY SPRINKLER |
| ⊕      |          | AUTOMATIC ELECTRIC DRIP VALVE             |        |      | SEE SPECS FOR DESCRIPTION             |
| ⊖      |          | AUTOMATIC ELECTRIC CONTROL VALVE          |        |      | SEE SPECS FOR DESCRIPTION             |
| ⊗      |          | QUICK COUPLER-SAME SIZE AS MAIN           |        |      | SEE SPECS FOR DESCRIPTION             |
| ⊘      |          | MANUAL DRAIN VALVE-SAME SIZE AS MAIN      |        |      | SEE SPECS FOR DESCRIPTION             |
| ⊙      |          | GATE VALVE-SAME SIZE AS MAIN              |        |      | SEE SPECS FOR DESCRIPTION             |
| ⊕      |          | RAINBIRD ISC-SAT-91 24 STATION CONTROLLER |        |      | STRONG BOX MODEL# SB-18 OR ENCLOSURE  |
| ⊖      |          | 1 1/2\" METER                             |        |      | SEE SPECS FOR DESCRIPTION             |
| ⊗      |          | REDUCED PRESSURE VACUUM BREAKER           |        |      | SEE SPECS FOR DESCRIPTION             |
| ⊘      |          | MANLINE SCH. 40 SIZE AS SHOWN ON PLAN     |        |      | SEE SPECS FOR DESCRIPTION             |
| ⊙      |          | PERCO DRIP TUBING                         |        |      | 3/4\" DRIP IRRIGATION TUBING          |
| ⊖      |          | RAINBIRD CO-4-SS CENTRAL CONTROL UNIT     |        |      | 3/4\" DRIP IRRIGATION TUBING          |
| ⊗      |          | GATE VALVE                                |        |      | SEE SPECS FOR DESCRIPTION             |
| ⊕      |          | CENTRAL CONTROL UNIT                      |        |      | SEE SPECS FOR DESCRIPTION             |

PYRAMID RANCH ESTATES  
 UNIT 5B

WHITE ROSE DRIVE

OASIS DRIVE

EGYPTIAN DRIVE

PROPOSED DISCONNECTION  
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 POINT FROM EXISTING  
 IRRIGATION

WHITE ROSE DRIVE

OASIS DRIVE

EGYPTIAN DRIVE

PROPOSED DISCONNECTION  
 POINT FROM EXISTING  
 IRRIGATION

WHITE ROSE DRIVE

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PROPOSED DISCONNECTION  
 POINT FROM EXISTING  
 IRRIGATION

WHITE ROSE DRIVE

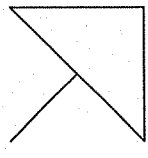
OASIS DRIVE

EGYPTIAN DRIVE

PROPOSED DISCONNECTION  
 POINT FROM EXISTING  
 IRRIGATION

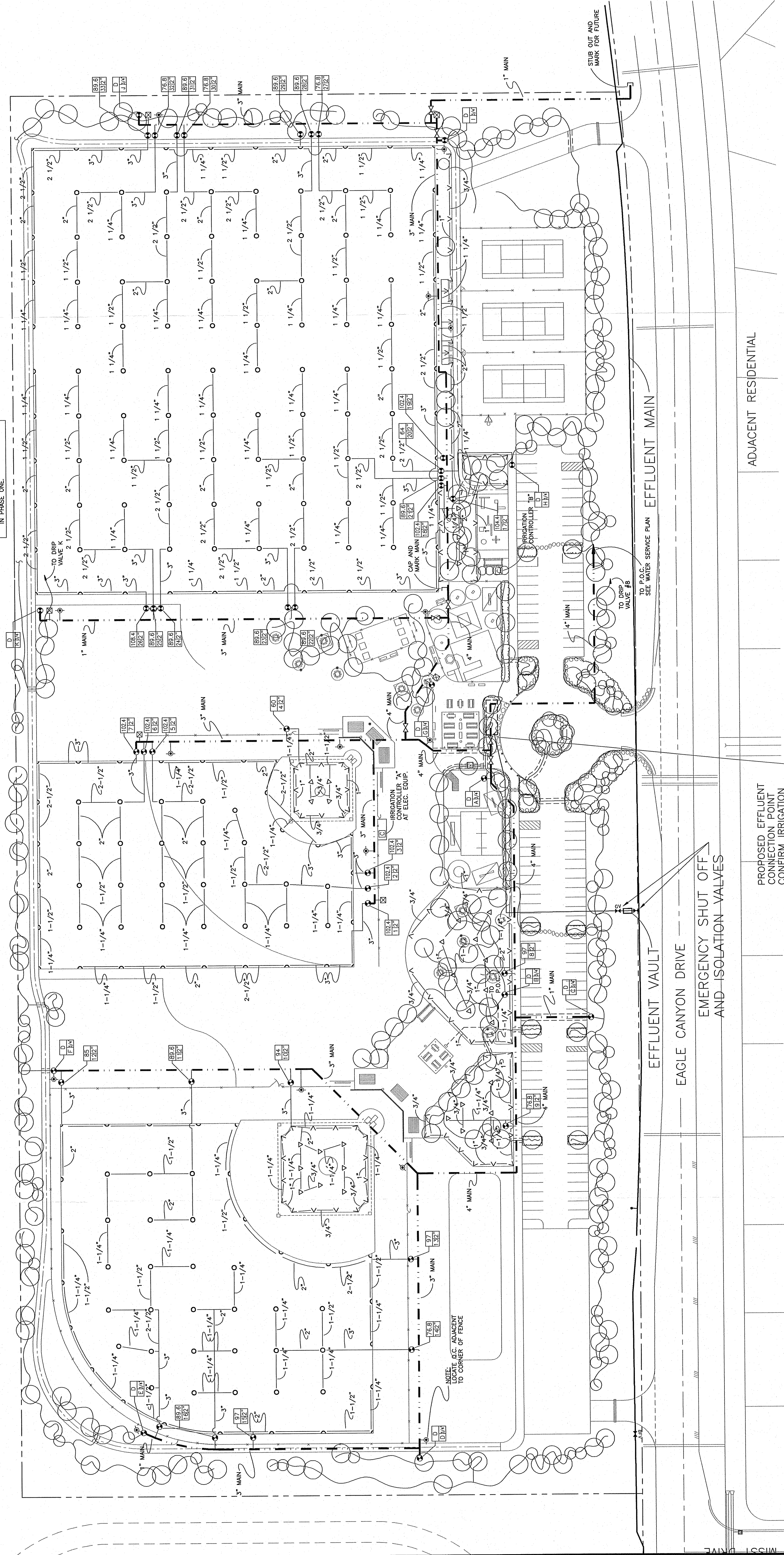
WHITE ROSE DRIVE
 </





PREVAILING WIND  
DIRECTION

NOTES:  
1. DOMESTIC LINE TO FOLLOW  
IRRIGATION MAIN TO DRINKING  
FOUNTAIN LOCATION.  
NOTE LOCATION ON AS-BUILTS.  
2. SEE WATER SERVICES PLAN -  
PHASE ONE IS INCLUDED  
IN PHASE ONE.



NOTES

- 1). IRRIGATION PLAN BASED ON IRRIGATION DRAWINGS  
PROVIDED BY CFA, DATED 5/14/1996.
- 2). STAMPED IRRIGATION PLANS ARE NOT AVAILABLE

PROPOSED EFFLUENT  
CONNECTION POINT  
CONFIRM IRRIGATION  
SYSTEM INDEPENDENT  
OF POTABLE WATER  
SYSTEM

EMERGENCY SHUT OFF  
AND ISOLATION VALVES

EFFLUENT VAULT

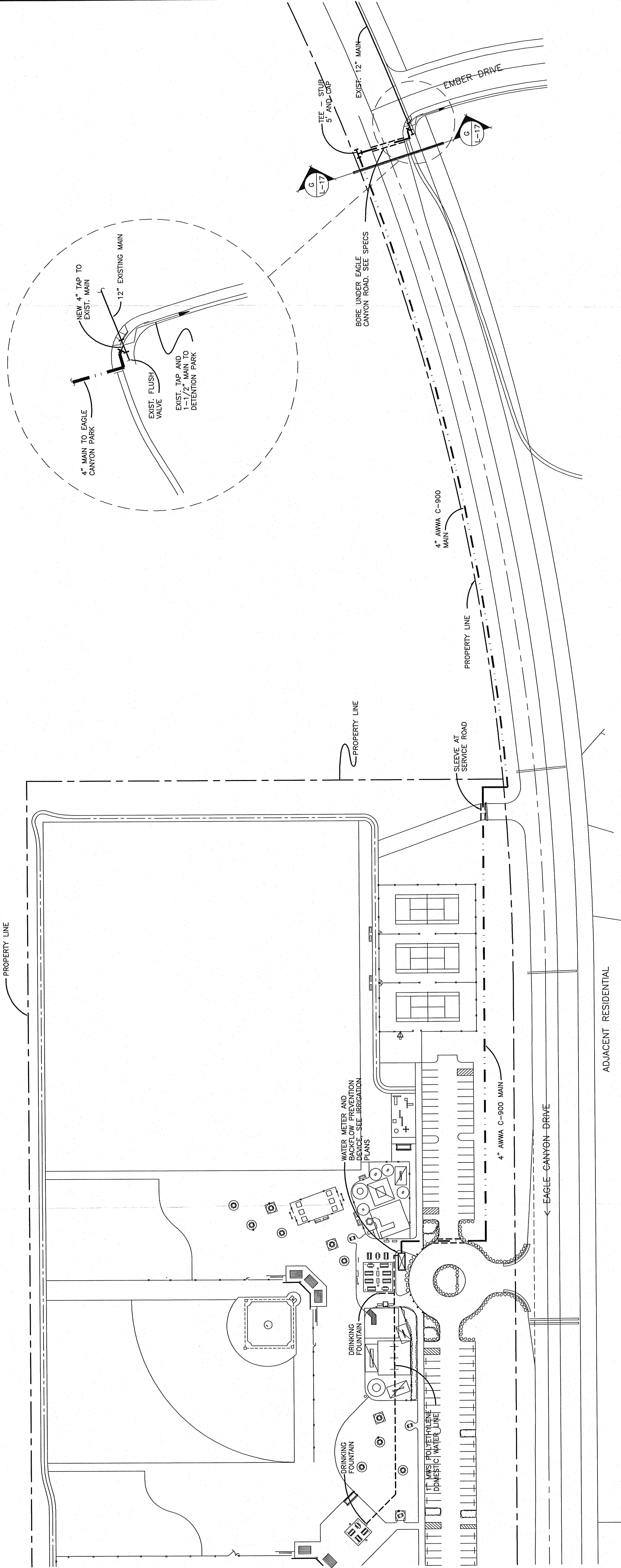
EAGLE CANYON DRIVE

EFFLUENT MAIN

ADJACENT RESIDENTIAL

|  |                      |
|--|----------------------|
| EAGLE CANYON PARK  |                      |
| IRRIGATION PLAN  |                      |
| SCALE: 1"=50'  | FIGURE 1-4           |
| DATE: 05/14/96   | JOB NO.: 05-0000-047 |
| Infrastructure, Inc.   |                      |
| 4400 DUBLIN WAY, SUITE 200<br>DUBLIN, CA 94568-1200<br>PHONE: (925) 835-1000 FAX: (925) 835-1001 |                      |





WATER SERVICE PLAN

1"=60'-0"

ADJACENT RESIDENTIAL



1. ALL CONSTRUCTION SHALL CONFORM TO WASHOE COUNTY STANDARDS.
2. THE WATER SYSTEM SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1992 EDITION. THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION SHALL BE USED TO DEVELOP THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION. THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION SHALL BE USED TO DEVELOP THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION.
3. ALL PIPE PLUGS ARE TO BE EXTENDED 20" BEYOND END OF PAVEMENT, WITH FLUSH VALVES.
4. THE CONTRACTOR SHALL INSTALL A WATER METER BOX. THE CONTRACTOR SHALL DELIVER WATER METER TO WASHOE COUNTY UTILITY. METERS TO BE 3" DIAMETER SIZE, SENSUS W350 TR/PLR.
5. WATER PIPE SHALL BE CLASS 150 PER ANWA C-900.
6. SUBMITTALS FOR ALL WATER PIPE AND APPURTENANCES SHALL BE SUBMITTED AND APPROVED BY WASHOE COUNTY UTILITY DIVISION PRIOR TO CONSTRUCTION.
7. RECORD DRAWINGS SHOWING ELEVATION, LOCATION AND TYPES OF VALVES AND FITTINGS MUST BE PROVIDED TO THE UTILITY DIVISION PRIOR TO ACCEPTANCE.
8. WATER PIPE FITTINGS SHALL D.I. OR C.I. IN ACCORDANCE WITH ANWA C-111 AND C-110 OR C-153.
9. THE CONTRACTOR SHALL MEET FOR A PRECON WITH THE UTILITY DIVISION PRIOR TO STARTING CONSTRUCTION ON THE WATER SYSTEM. THE UTILITY DIVISION INSPECTOR SHALL BE NOTIFIED 24 HOURS PRIOR TO INITIATION OF CONSTRUCTION.
10. WATERLINES SHALL BE CHLORINATED AND FLUSHED IN ACCORDANCE WITH ANWA AND TO THE SATISFACTION OF THE UTILITY DIVISION INSPECTOR PRIOR TO TING INTO THE EXISTING WATER SYSTEM.
11. NEW WATER LINES MUST PASS THE BACTERIOLOGICAL TEST AND THE PRESSURE TEST TO THE SATISFACTION OF THE UTILITY DIVISION INSPECTOR.
12. TIES TO EXISTING WATER LINES MUST BE APPROVED BY THE UTILITY DIVISION INSPECTOR.
13. S.D. CROSSINGS (FROM FINISH GRADE TO TOP OF PIPE) SHALL BE 36" MIN. ALL SAN, SEWER AND CLO. CROSSINGS WITH THE WATER LINE SHALL HAVE A CLEARANCE OF 18" MIN.

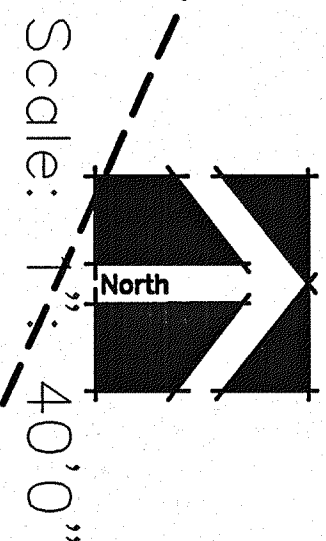
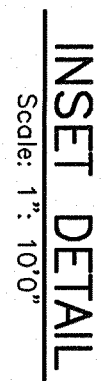
## GENERAL WATER NOTES













**NO SCALE**









| SYMBOL  | BRAND    | MODEL NUMBER  | G.P.M. | ROUHS | DESCRIPTION                                 |
|---|----------|---|--------|-------|---|
|  | RAINBIRD | R-300-L-3.0, 3.5 PSI  | 3.5    | 39"   | ADJUSTABLE-2" POP-UP STREAM MOTOR SPRINKLER |
|  |          | AUTOMATIC ELECTRIC CONTROL VALVE                                  |        |       | RAINFED REB SERIES                          |
|  |          | QUICK COUPLET-1" SIZE   |        |       | SEE SPECS. FOR DESCRIPTION                  |
|  |          | MANUAL DRAIN VALVE-SAME SIZE AS MAIN GATE VALVE-SAME SIZE AS MAIN |        |       | SEE SPECS. FOR DESCRIPTION                  |
|  |          | RAINBIRD ROL-128 IRRIGATION CONTROLLER.                           |        |       | IN STRONG BOX MODEL# 59-118 OR ENCLOSURE    |
|  |          | RAINBIRD ROL-128 IRRIGATION CONTROLLER.                           |        |       | SEE SPECS. FOR DESCRIPTION                  |
|  |          | RAINBIRD ROL-128 IRRIGATION CONTROLLER.                           |        |       | SEE SPECS. FOR DESCRIPTION                  |
|  |          | 1 1/2" METER  |        |       | SEE SPECS. FOR DESCRIPTION                  |
|  |          | REDUCED PRESSURE ACTUAL BREAKER                                   |        |       | WANTS 800 SERIES 1 1/4" BRG                 |
|  |          | MANLINE SOH. 40 SIZE AS SHOWN ON PLAN                             |        |       | SEE SPECS. FOR DESCRIPTION                  |
|  |          | PEPED DRIP TUBING   |        |       | 3/4" DRIP IRRIGATION TUBING                 |
|  |          | IRRIGATION LATERAL LINE, MAIN CLASS 200 POC.                      |        |       |   |

## IRRIGATION LEGEND

VALVE NUMBER  
VALVE SIZE  
G.P.M.  
DRIP

- EFFLUENT MAINLINE

EMERGENCY MANUAL  
SHUT OFF GATE VALVES

EXISTING WATER  
MAIN VERIFY  
LOCATION IN FIELD

DRIP IRRIGATION TUBE, TYPICAL  
SEE SPECIFICATIONS.

## TYPICAL

DRIP IRRIGATION LATERAL,  
TYPICAL SEE SPECS \_\_\_\_\_

DRIP IRRIGATION TUBE CONNECTION  
TYPICAL, SEE DETAILS.

MARK DRIP IRRIGATION LATERALS IN FIELD FOR FUTURE USE.

Diagram illustrating the components of a backflow prevention device assembly:

- IRRIGATION WATER METER, 1 1/2" SIZE.
- BACKFLOW PREVENTION DEVICE. SEE SPECS AND DETAILS.
- EMERGENCY MANUAL SHUT OFF GATE VALVE.

PROVIDE SLEEVES ON LINES UNDER PAVING, TYPICAL, SLEEVES NOT ILLUSTRATED ON PLAN FOR CLAMT.

Scale: 1" = 40' 0"

**INFRASTRUCTURE  
INC.**  
9450 DOUBLE "R" BLVD.  
RENO, NEVADA 89521  
PHONE (775) 788-5873 FAX (775) 788-6138

**amec**

DESERT WINDS PARK

IRRIGATION PLAN

WASHOE COUNTY NEVADA

**cfa** PLANNERS \* ENGINEERS \* SURVEYORS  
LANDSCAPE ARCHITECTS  
1150 CORPORATE BLVD. RENO, NV 89502 (702) 856-1150 FAX: (702) 856-1160

|                      |                   |      |      |           |    |
|----------------------|-------------------|------|------|-----------|----|
| DESIGNED BY<br>DD/DK | DATE SURVEYED     |      |      |           |    |
| DRAWN BY<br>DK       | DATE<br>1/23/1995 |      |      |           |    |
| CHECKED BY<br>DD     | DATE              |      |      |           |    |
| APPROVED BY          |                   |      |      |           |    |
| DATE                 | P. E. NO.         | DATE | MARK | REVISIONS | BY |





## LETTER OF TRANSMITTAL

To: Joe Howard

WASHOE CO. DEP. OF WATER RESOURCES

4930 ENERGY WAY

P.O. BOX 11130

RENO, NV 89520-0027

DATE: 4/26/04

JOB NO: 05-2000-047

RE: Washoe County Parks EMP

**We are sending you:**

- ☒ Attached ☐ Under separate cover via \_\_\_\_\_ the following items:  
☐ Copy of Letter ☐ Prints ☐ Examples ☐ Change Order  
☐

| COPY(S) | DATE    | NO. | DESCRIPTION  |
|---------|---------|-----|--|
| 1       | 4/26/04 |     | IRRIGATION PLANS FOR EAGLE CANYON PARK, GATOR SWAMP PARK, AND DESERT WINDS PARK. WATER SERVICE CONNECTION PLAN FOR EAGLE CANYON PARK |
|         |         |     |  |
|         |         |     |  |
|         |         |     |  |
|         |         |     |  |
|         |         |     |  |
|         |         |     |  |

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- ☒ For your use ☐ Accepted as submitted ☐ Resubmit \_\_\_\_\_ copies for approval  
☒ As requested ☐ Accepted as noted ☐ Submit \_\_\_\_\_ copies for distribution  
☐ For review and comment ☐ Returned for corrections ☐ Return \_\_\_\_\_ corrected prints  
☐ For your approval ☐ Other \_\_\_\_\_

REMARKS:

**RECEIVED**  
APR 26 APR 26 2004  
WASHOE COUNTY  
DEPT. OF WATER RESOURCES

Copy To: Tony McMillen

Prepared By: Tim Russell

IF ENCLOSURES ARE NOT AS INDICATED, PLEASE NOTIFY US IMMEDIATELY

AMEC Infrastructure, Inc.

9450 Double R Blvd. • Reno, NV 89521 • Tel (775) 786-5873 • Fax (775) 786-6138