

1992

AMERICAN WATER WORKS ASSOCIATION
CALIFORNIA/NEVADA SECTION

GUIDELINES FOR DISTRIBUTION
OF NONPOTABLE WATER

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ACKNOWLEDGEMENT

These revised guidelines were developed by the American Water Works Association, California-Nevada Section, Reclaimed Water Committee. This revision reflects the efforts of all of those who have served on the committee during the five year revision process. Those members' contributions are gratefully acknowledged by the three chairmen who have served during this work.

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The committee appreciates the special efforts of Donna Davis, graphic artist for Orange County Water District, who prepared the artwork for the final publication.

-T.H.

FOREWORD

Many communities in the United States are, or soon will be, reaching the limits of their available water supplies. Recent droughts in California have focused the attention of the entire country on the need for water conservation and reuse. Conventional conservation measures may enable communities to defer the need to develop additional water resources for a few years. However, use of nonpotable surface and groundwater supplies along with water reclamation and reuse will be a necessary part of any long-term water management plan.

By definition, nonpotable water is not safe for human consumption. Because of this different quality, it is important that the guidelines contain information which minimizes or eliminates the possible misuse of the water. This special attention is needed to protect the user and is consistent with other similar public health protection principles, such as backflow protection and water-to-sewer line separation.

To fulfill the necessary requirements for the use of nonpotable water, the potable water purveyor and the nonpotable water supplier must establish a cooperative responsibility to obtain and maintain water quality and system separation.

DISCLAIMER

This manual is only a guideline and does not constitute a legal or binding agreement between responsible parties from which liability could occur.

Since the regulatory agencies have jurisdiction over use of nonpotable water, additional specific requirements for individual users as well as for distribution entities may apply.

The AWWA California-Nevada Section has developed and published these guidelines for anyone involved in the use or distribution of nonpotable water. These guidelines are not intended to be used in place of local laws, regulations, or the design by engineers necessary to implement, construct, and use nonpotable water. The AWWA California-Nevada Section assumes no responsibility for the use of these guidelines. Any local agency or water professional using these guidelines should carefully study local circumstances and make additions or deletions as necessary for their individual needs.

**CALIFORNIA - NEVADA
SECTION**

AMERICAN WATER WORKS ASSOCIATION

**GUIDELINES FOR DISTRIBUTION
OF NONPOTABLE WATER**



SECTION 1

INTRODUCTION AND DEFINITIONS

1.1. PURPOSE OF GUIDELINES

The purpose of these guidelines is to provide guidance for planning, designing, constructing, and operating nonpotable water systems delivering reclaimed or other nonpotable water to multiple customers. The guidelines do not address the use of "Gray Water" or on-site treatment systems. However, ideas presented herein can be utilized by gray water or on-site users to protect the public health.

These guidelines are organized in six sections and are followed by appendices. The first section provides a brief introduction to the nonpotable water system. The second, third, and fourth sections provide design criteria for the construction of the offsite transmission, storage, pumping, and other facilities. The fifth section provides design and operating requirements for the water user's on-site facilities. The sixth section provides a description of the system management required to assure continued compliance with applicable State and local laws.

1.2. INTRODUCTION TO THE NONPOTABLE WATER SYSTEM

The nonpotable water systems referred to in these guidelines consist of the pumping, distribution, storage, and other facilities necessary to supply nonpotable water from its source to its point of use on the customer's property. The nonpotable water may be reclaimed water or a surface or groundwater supply not approved for potable water use. In a multiple supply system, potable water and nonpotable water can be used for irrigation and industrial purposes.

1.2.1. Planning Requirements: Any agency considering water reclamation and reuse or use of other nonpotable water supplies should start with a staged planning

program to determine the feasibility of a nonpotable water system. The planning program should involve three stages: preliminary investigations, screening of potential resources and markets, and detailed evaluation of facilities alternatives to serve selected markets, including engineering and economic feasibility, financial analysis, and environmental analysis.

The preliminary investigation stage is a fact-finding phase in which physical, economic, institutional and legal limitations should be identified. All potential sources of nonpotable water and its markets should be identified. The regulatory agencies should be consulted to determine quality requirements for a nonpotable water system. The screening of potential markets should consist of a comparison between the unit costs of potable water and of nonpotable water to the same market. The costs and pricing constraints should be evaluated under both present and future conditions to ensure that initial capital costs do not overshadow long term benefits. Present and future quantity and quality requirements should also be taken into consideration to determine if it is, and will remain, cost-effective to serve users nonpotable water. Reliability of supply, value of reclaimed water nutrients, and social benefits should also be considered, as well as possible savings in the potable system due to the reduced demand on it.

The final stage of the planning program is the detailed evaluation of the selected markets. In this stage, by looking in more detail at the conveyance routes and storage requirements of each alternative system to serve selected markets, refinements to preliminary cost estimates for delivery of nonpotable water can be made. Funding options can be compared, user costs developed, and a comparison made between the unit costs of potable and nonpotable water for each alternative system. It should also be possible to assess in more detail the environmental, institutional, and social aspects of each alternative.

These various planning stages should lead to a conceptual plan which could be the basis for the design and construction of the proposed system.

1.2.2. Water Quality Assumptions: For the purposes of these guidelines, it is assumed that the nonpotable water to be delivered meets the water quality requirements imposed by the regulatory agencies for the planned uses.

The quality of the nonpotable water must be protected from degradation from source to consumer. Inferior or degraded water quality could present public health hazards or not be of suitable quality for its intended use.

1.3 DEFINITIONS

Agency	The distributor of the nonpotable water.
Agency Supervisor	Persons designated by the distributor of nonpotable water who is responsible for operation and maintenance of the nonpotable water distributed system, prevention of cross-connection, and surveillance of all nonpotable water users.
Air-Gap Separation	A physical break between a supply pipe and a receiving vessel. The air gap should be at least double the diameter of the supply pipe, measured vertically above the top rim of the vessel, and in no case less than one inch.
ANSI	American National Standards Institute.
ASTM	American Society for Testing and Materials.
Applicant	Any person or authorized representative, firm, corporation, association, or agency who applies for nonpotable water service. The successful applicant becomes a user.

Application Rate	The rate at which water is applied to an irrigation or construction area, expressed in inches per hour.
Approved Use Area	A site with well defined boundaries, designated in a user permit issued by the agency, to receive nonpotable water for an approved use and in conformance with regulations of all applicable regulatory agencies.
Automatic System	Automatic controllers, valves, and associated equipment required for the programming of effective water application rates when using nonpotable water.
AWWA	American Water Works Association.
Color Codes	Colors specified by the agency to differentiate various types of facilities (e.g.: potable from nonpotable water systems).
Contractor	A person, persons, or firm entering into a legal agreement with the agency or applicant for the performance of work on any portion of facilities subject to these guide lines.
Cross-Connection	An unprotected actual or potential connection between a potable water system used to supply water for drinking purposes and any source or system containing unapproved water. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices, or other devices through which backflow could occur, should be considered to be cross-connections.

Distribution Line	For the purposes of this document distribution lines shall include all pipelines transporting non-potable water including transmission, distribution, and any other piping.
Gray Water	Wastewater other than toilet and/or urinal wastes which is reused on the premise.
Infiltration Rate	The rate at which soil will accept water.
Nonpotable Water	Any water, including reclaimed water, not meeting current potable water standards. Water which is suitable for beneficial uses excluding human consumption. Specifically excluded from this definition is "Gray Water".
Nonpotable Water System	A system serving water that is considered unsafe or aesthetically unacceptable for human consumption.
Offsite Facilities	Agency's nonpotable water facilities up to and including the water meter.
On-site Facilities	User's nonpotable water facilities downstream from the water meter.
Overspray	Water which is transmitted through the air to a location other than for which the direct application of reclaimed water is intended.
Pantone	Color standard system.
POC	Point of Connection.
Ponding	Retention of piped water on the surface of the ground or man-made surface for a period of time following the cessation of an approved reclaimed water use activity such that potential hazard to the public health may result.

Potable Water Water which is pure and wholesome, will not endanger the lives or health of human beings, and conforms to the quality standards of Federal, State and local authorities for human consumption.

Potable Water System A system serving potable water.

PVC Pipe Polyvinyl chloride pipe.

Reclaimed Water Water which, as a result of treatment of domestic wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur. Specifically excluded from this definition is "Gray Water".

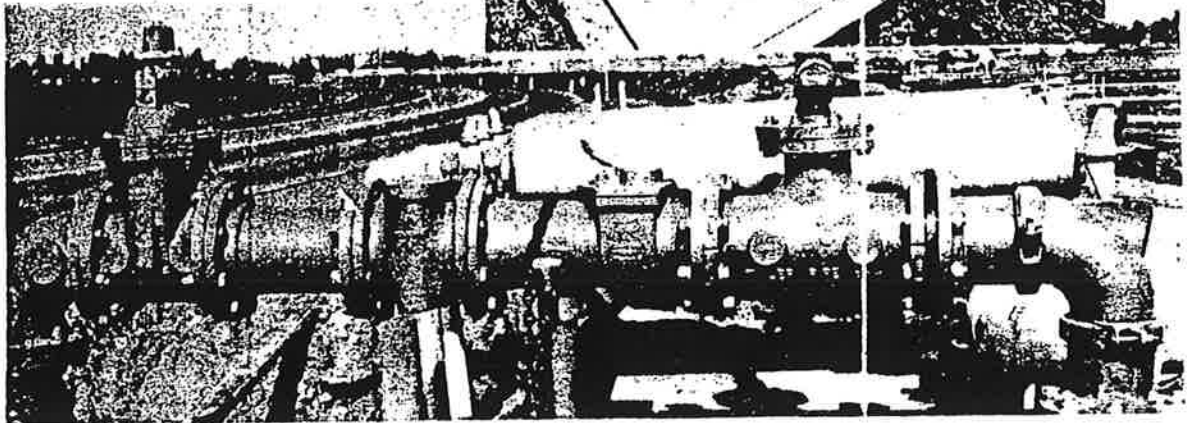
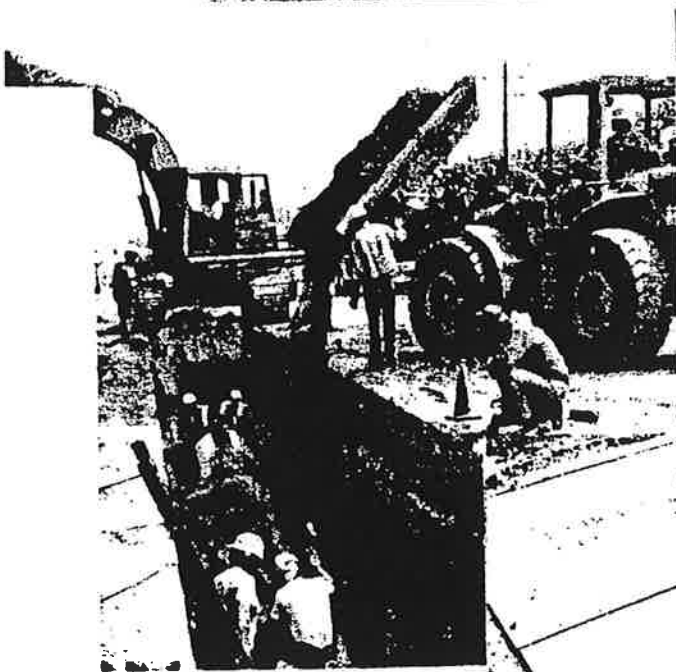
Record (as-built) Drawings Engineering plans that correctly show (1) all on-site and offsite nonpotable water facilities as constructed or modified and (2) all potable water lines and sewage lines.

Reduced Pressure Principle Backflow Prevention Device (RPPD) A backflow preventer incorporating not less than two check valves, an automatically operated differential relief valve located between the two check valves, a tightly closing shut-off valve on each side of the check valve assembly, and equipped with necessary test cocks for testing.

Regulatory Agency Those public agencies legally constituted by the State to protect health and water quality.

Runoff Flow of water along the surface of the ground or other natural or manmade surfaces, including but not limited to pedestrian walkways, streets, playground surfaces, and grassy slopes.

Sealing Water	Independent water supplies to pump seals which provide sufficient sealing pressure and priming.
Spray Irrigation	Application of water for irrigation by spraying.
Unauthorized Discharge	Any release of nonpotable water that violates the regulations of the agency or any applicable Federal, State, or local statutes, regulations, ordinances, and contracts.
User (customer)	Any person, firm, corporation, association or agency receiving nonpotable water service.
User Permit	A permit issued by the agency to the applicant after the satisfactory completion of the procedure set forth in these guide lines. This permit constitutes a service agreement which legally binds the user to all applicable regulatory agencies' requirements.
User Supervisor	A qualified person designated by the user (customer) and approved by the agency who should be responsible for the installation, operation, and maintenance of the user on-site facilities, the prevention of cross-connection, and compliance with the local agency.
Windblown Spray	Dispersed, airborne particles of water transmitted through the air to a location other than that for which the direct application of reclaimed water is approved.



SECTION 2

DISTRIBUTION LINES

This section is intended to provide criteria for protection against the misuse of distribution facilities. Cross-connection control is needed to prevent a nonpotable main from mistakenly being connected to a potable system. Therefore, the location, depth, mode of identification, and types of above-ground appurtenances such as air/vac assemblies, blow-offs, etc., should be studied carefully in order to avoid cross-connections or inappropriate uses.

2.1. PRESSURE

Pressure requirements should be based on system design and practice. In any case, minimum pressure at the user's meter should be maintained at the peak demand hour. It is desirable that a pressure differential of 10 psi or greater be maintained with the potable water supply having the higher pressure.

2.2. MINIMUM DEPTH

The top of the pipe should be a minimum of 36-inches below the finished street grade.

2.3. MINIMUM SEPARATION

Nonpotable water lines parallel to potable water lines should be installed at least ten feet horizontally from and one foot lower than the potable water lines. Nonpotable water lines should cross a minimum of one foot below potable water lines. Where separations cannot be maintained, special construction requirements should be provided in accordance with health department requirements.

2.4. PIPE IDENTIFICATION

2.4.1. General: All new buried distribution piping in the nonpotable water system, including service lines, valves, and other appurtenances should either be colored purple, Pantone 522, and embossed or be integrally stamped/ marked CAUTION: NONPOTABLE WATER - DO NOT DRINK, or CAUTION: RECLAIMED WATER - DO NOT DRINK, or be installed with a purple identification tape, or a purple polyethylene vinyl wrap, color to be Pantone 512.

Existing potable water lines that are being converted to nonpotable use should first be accurately located and tested in coordination with regulatory agencies. If required, the necessary actions to bring the water line and appurtenances into compliance with regulatory standards should be taken. If the existing lines meet approval of the water supplier and regulatory agency, the lines should be approved for nonpotable distribution. If verification of the existing lines is not possible, the lines should be uncovered, inspected, and identified prior to use.

2.4.2. Identification Tape: Identification tape should be prepared with white or black printing on a purple field, color Pantone 512, having the words "CAUTION: NONPOTABLE WATER - DO NOT DRINK", or "CAUTION: RECLAIMED WATER - DO NOT DRINK". The overall width of the tape should be at least three inches in width.



Identification tapes should be installed on the top of the transmission pipe longitudinally and should be centered. The identification should be continuous in their coverage on the pipe and should be fastened to each pipe length no more than ten feet apart. Tape attached to sections of pipe before they are placed in the trench should have flaps sufficient for continuous coverage. Other satisfactory means of securing the tape during backfill of the trench may be used if suitable for the work, as determined by the agency.

Color coded identification (caution) tape differentiating the nonpotable piping from other utility lines should be consistent throughout the service area.

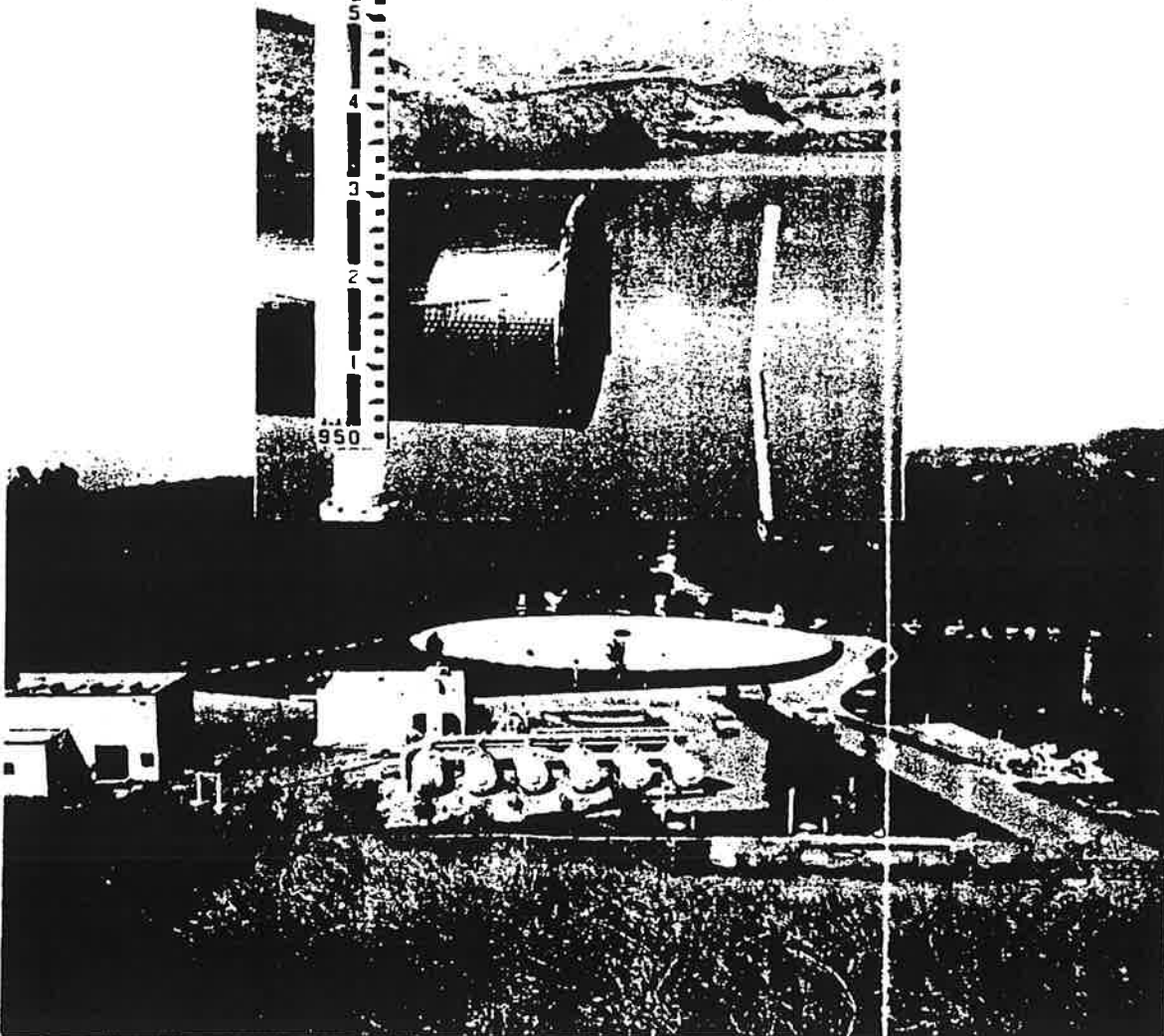
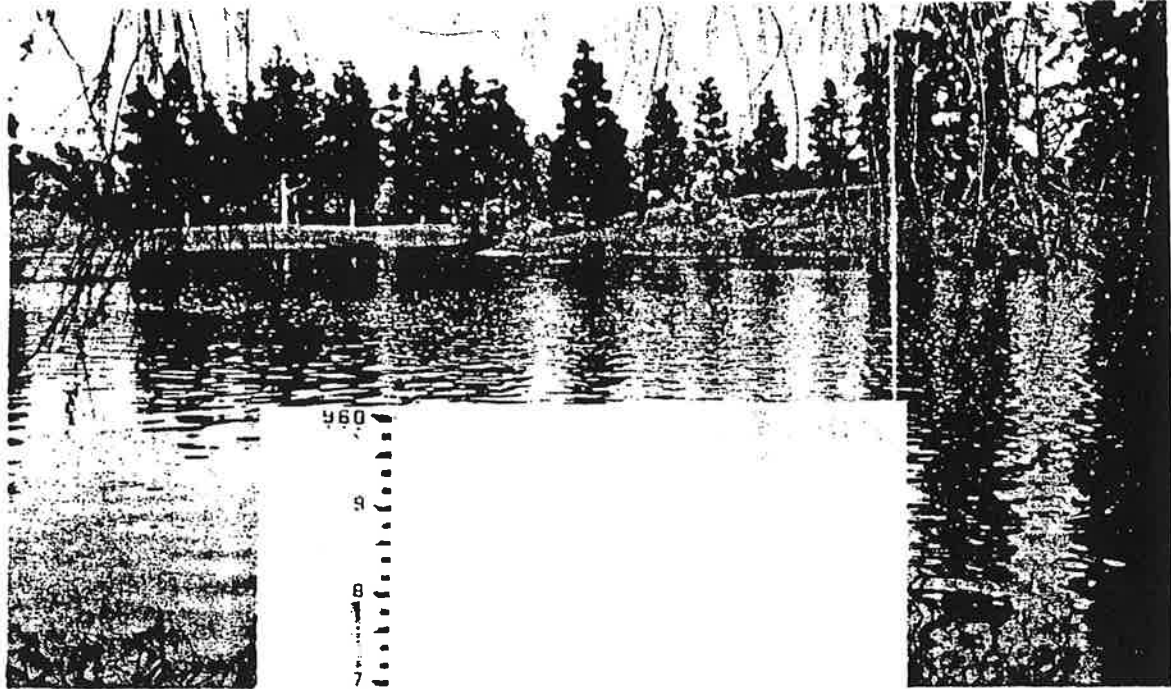
2.5. VALVE BOX AND OTHER SURFACE IDENTIFICATION

2.5.1. General: Valve boxes should be the standard concrete or fiberglass box with a special triangular, heavy-duty cover. All valve covers on offsite nonpotable transmission water lines should be of non-interchangeable shape with potable water covers and with a recognizable inscription cast on the top surface.

2.5.2. Identification: All above ground facilities should be consistently color-coded (purple, Pantone 512) and marked to differentiate nonpotable water facilities from potable water or wastewater facilities.

2.6. BLOW-OFF ASSEMBLIES

Either an in-line type or end-of-line type blow-off or drain assembly should be installed for removing water or sediment from the pipe. The line tap for the assembly should be no closer than 18-inches to a valve, coupling, joint, or fitting unless it is at the end of the line. If there are restrictions on discharge or runoff, the regulatory agencies should be consulted to find an acceptable alternative.



SECTION 3

STORAGE AND SUPPLY

Because there are daily and seasonal imbalances between nonpotable water supply and demand, storage facilities may be needed in the nonpotable water system. In addition to operational storage, when reclaimed water is used as the primary source of supply, there is generally a need for seasonal storage because wastewater treatment is a continuous operation while the majority of reuse applications are seasonal in nature.

3.1. SEASONAL STORAGE

When considering the size of the reservoirs to meet irrigation requirements, open reservoirs may prove to be the most economical alternative. However, algal growth and suspended solids from open reservoirs have been recognized as sources of particles which may clog the sprinkler system. Most sprinkler system control valves and sprinkler heads can readily pass particles which go through a 30-mesh screen. This corresponds to a screen opening of 0.0233 inch or 600 microns. It is recommended that all irrigation water that enters the distribution system from open reservoirs be filtered through a filtration process similar in performance to the filters used at the reclamation plant or, as a minimum, screened through a micro strainer with a 200-mesh screen. The use of a very fine strainer or filter will maximize the suspended solids' removal at central reservoir sites and reduce any special maintenance of the local sprinkler systems.

If nonpotable water is used for filling recreational lakes or for other applications where particulates and turbidity may be troublesome, sand filtration or multimedia filtration may be more appropriate than micro screening. Suggested solutions to control the algal growth include, but are not limited to, covering the reservoir, operating at a low detention time, or adding acceptable chemicals that control growth.

3.2. OPERATIONAL STORAGE FACILITIES

The purpose of operational storage is to provide a continuous supply of water during periods of down time at the treatment plant, meet peak daily fluctuations in water demands, and allow for optimum plant operation. The size of the storage facilities depends on the degree of fluctuation and availability of supplemental supplies. Frequently, the reservoir is constructed to save cost by reducing peak period pumping charges and if there are supplementary sources to meet peak demands, smaller operational storage facilities may be used to control supplies into the distribution system. Operational storage facilities should be sized to hold at least one and one-half to two times the average summer day demand volume.

3.3. EMERGENCY STORAGE AND SUPPLY (includes backup supply)

The distribution system requires supplementary sources to meet its demand in case of a plant upset or main supply interruption. Each system's required storage capacity will be different, depending on the reliability of treatment processes, peak summertime demands, availability of other sources, the proposed reliability of the system, and the ability to recover to normal conditions.

Seasonal or operational storage facilities may be able to meet emergency storage requirements, depending on their storage capacities. If a system is lacking necessary emergency storage capacity, it should have at least one reliable supply source to meet its demand.

3.4. FENCING

Nonpotable water supply reservoirs, which are closed to the public, should be enclosed within a fenced area or other enclosure that will restrict public access. This public safety feature should also minimize potential detrimental effects resulting from vandalism or animals.

3.5. IDENTIFICATION

All storage facilities should be identified by signs containing the words "WARNING: NONPOTABLE WATER - DO NOT DRINK" or "WARNING: RECLAIMED WATER - DO NOT DRINK", and contain the universal symbol for do not drink. The signs should have a purple background, Pantone 512, with high contrast color lettering. An adequate number of signs in English and other primary languages spoken in the area should also be posted on the surrounding fence and at the entrance of each facility.

SECTION 4

PUMPING

Agencies with pumping facilities to distribute nonpotable water should make special provisions to identify the type of water being handled, provide acceptable backflow protection, avoid release of nonpotable water in an uncontrolled manner, and provide for proper drainage of the packing seal water.

4.1. MARKING

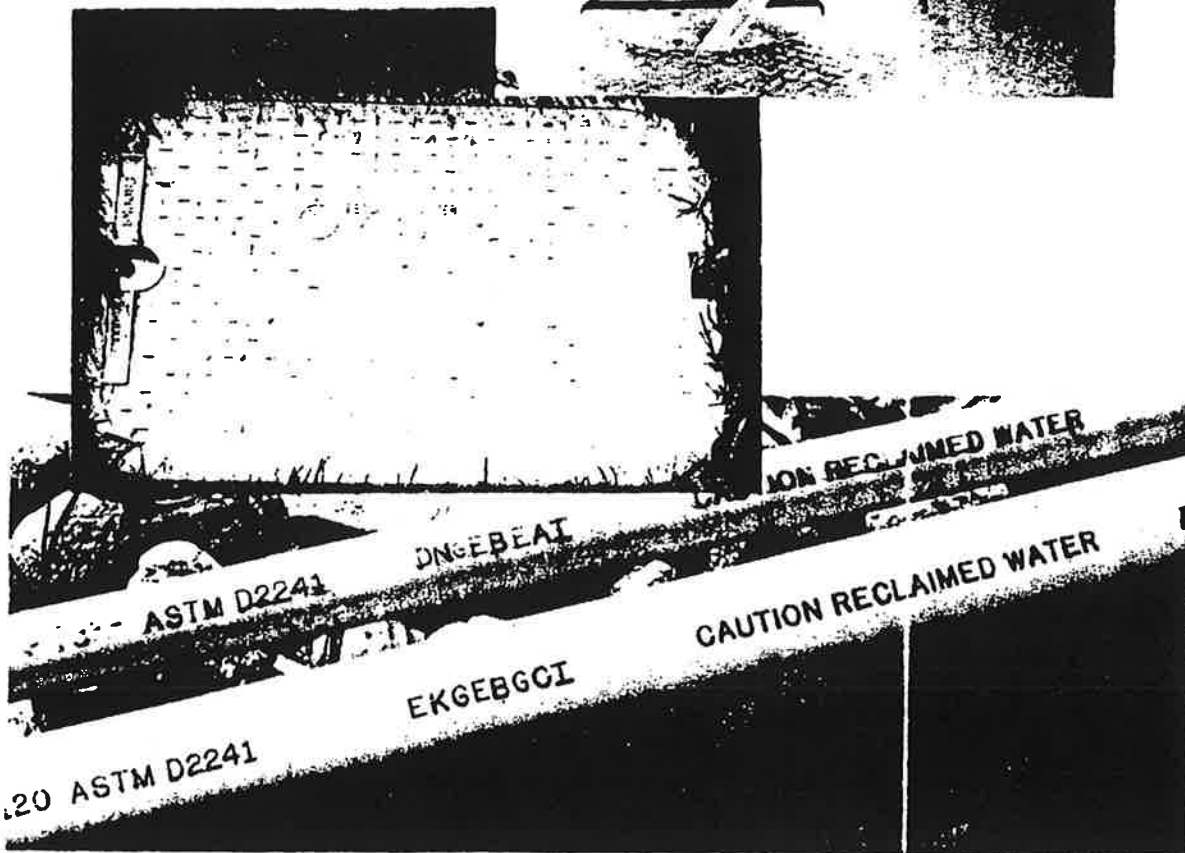
All exposed and above ground piping, fittings, pumps, valves, etc. should be painted purple, Pantone 512. In addition, all piping should be identified using an accepted means of labeling reading, "CAUTION" NONPOTABLE WATER - DO NOT DRINK" or "CAUTION: RECLAIMED WATER - DO NOT DRINK". In a fenced pump station area, at least one sign should be posted on the fence which can be readily seen by all operations personnel using the facility.

4.2. SEALING WATER

Any potable water used as seal water for nonpotable water pump seals should be adequately protected from backflow.

4.3. SURGE PROTECTION

All pumping systems should have proper surge protection facilities to prevent damage resulting from broken piping resulting from water hammer and pressure surges.



SECTION 5

ON-SITE APPLICATIONS

Nonpotable water facilities may require special accessories. Because of suspended matter which may accumulate from open storage or other sources, water strainers may be required before any meter facility or other mechanical type of device such as a pressure-reducing valve. Since irrigation operations are frequently at night, automatic electronic controllers should be used on-site. Backflow prevention is required when a nonpotable water system shares a use area with a potable system. This must be accomplished with the approval of appropriate health agencies. Facility identification is as important as the separation considerations discussed earlier. Pipelines, equipment and irrigated areas should be clearly identified.

5.1. STRAINERS AT METER/POINT OF CONNECTION

5.1.1. General: Depending on the quality of the nonpotable water and type of storage utilized, strainers may be required at the consumer's meter.

5.1.2. Type: Strainers of the following types are generally satisfactory.

A. Wye strainers: Not recommended for below-ground (in vaults) installations.

B. Basket strainers: Suitable for above or below-ground (in vaults) installations.

C. Filter strainers: Normally used above ground on drip irrigation systems.

5.1.3. Placement: Strainers are normally the same size as the line and can be installed either before or after the meter.

A. Before meter: Installation before the meter will protect the meter as well as the on-site system. Maintenance in this case is the responsibility of the water purveyor.

B. After meter: Installation after the meter will not provide meter protection, and maintenance in this case is usually not the responsibility of the purveyor. It should be determined in advance whether there is a potential for debris in the water that would plug the screen in the meter.

Strainers can range in mesh size from 20 to 325. A mesh of 20 to 80 is normally adequate. An analysis of potential debris will aid in prescribing the optimum size. In order to reduce maintenance, material that will not plug on site irrigation nozzles should normally be allowed to pass.

5.2. CONTROLLERS

Controllers are used to automatically open and close on-site distribution valves.

A. They should be fully automatic.

B. They should have multiple starting times that can be selected for any time of day, seven (7) days a week, and should be equipped with moisture sensors to avoid activation during rainy periods.

C. Station durations should be capable of delivering water from one minute to 60 minutes per each start time.

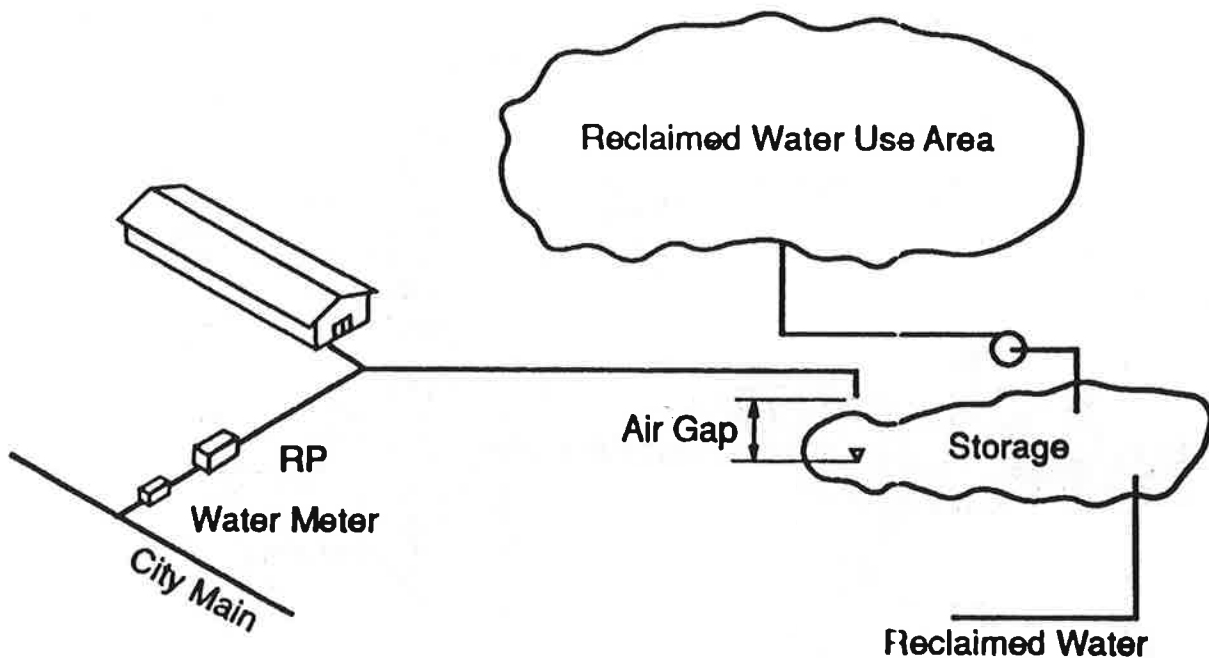
D. An appropriate sized drawing of the area served by the controller should be sealed in a plastic cover and placed in the controller and updated if the system is changed.

E. Controllers of nonpotable water should be color-coded to differentiate the nonpotable water from the potable water in accordance with Section 2.4.1. and Section 2.4.2.

F. Controllers should be labeled inside and outside, warning that the system is utilizing nonpotable water. The labels should also alert the system's owner/maintenance personnel of any important constraints on the operation of the system in accordance with Section 2.4.1. and Section 2.4.2.

5.3. BACKFLOW PROTECTION

If a connection between potable and nonpotable water systems is necessary, an approved air gap must be provided to protect the potable water system.

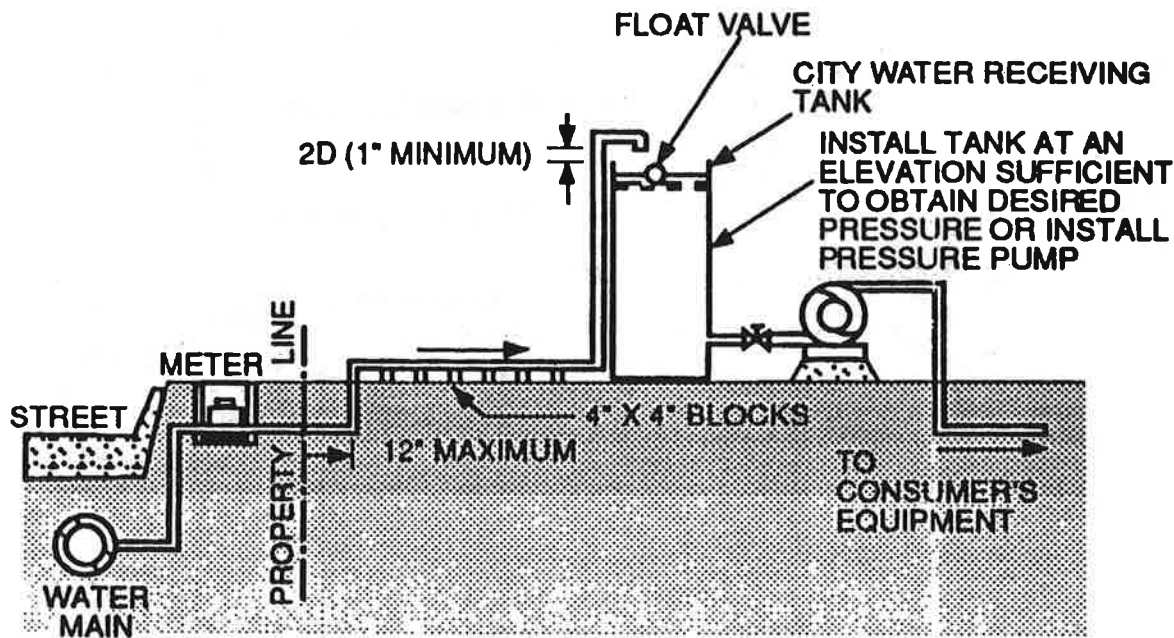


If a premises is supplied with both potable water and nonpotable water, then backflow protection with an approved air gap (AG) must be provided at the potable water service connection. A reduced pressure principle device (RPPD) backflow prevention

device may be provided only when approved by the health department and potable water supplier.

Backflow prevention devices are not normally used on nonpotable water systems. However, an agency should maintain the water quality in a nonpotable distribution system. A backflow prevention device may therefore be needed at a specific meter where on-site exposures would impact the quality of the nonpotable supply. If temporary potable water connections to the nonpotable water system are required, the connections should be protected in the same manner as a permanent connection. Exceptions may be necessary under special circumstances, but in any case, should not be allowed unless approved by the potable water supplier and regulatory agencies.

5.4 PIPE IDENTIFICATION



AIR-GAP SEPARATION

New on-site pipelines should be identified as nonpotable water pipes by using a purple color code, Pantone 522 for pipe and other appurtenances, Pantone 512 for marking tapes, labels, signs, etc., and markings, differentiating them from potable water piping.

All piping and valves must also be appropriately labeled or continuously taped with appropriate identification.

When an existing potable water line is converted to nonpotable usage, the water line should be accurately located and tested in coordination with regulatory agencies. If required, necessary actions should be taken to bring the water line and appurtenances into compliance with regulatory standards. If the existing line meets the approval of the water supplier and regulatory agency, the line should be approved for nonpotable distribution. If verification of the existing line is not possible, the line should be uncovered, inspected, and identified prior to use.

5.4.1. Warning Tape: A warning tape should be installed on pressure and/or non-pressure laterals. A purple tape, Pantone 512, with black or white lettering stating "CAUTION: NONPOTABLE WATER - DO NOT DRINK" or "CAUTION: RECLAIMED WATER - DO NOT DRINK" should be fastened directly to the top of the pipe. The tape should run continuously the entire length of the pipe and should be at least 3-inches in width. It is recommended that the identification tape be locator type marking tape.

5.4.2. Colored Pipe: The use of purple colored pipe, color Pantone 522, or purple polyethylene vinyl wrap, Pantone 512, with the words "CAUTION: NONPOTABLE WATER - DO NOT DRINK" or "CAUTION: RECLAIMED WATER - DO NOT DRINK", printed on the pipe, or tape, is an acceptable alternative. The warning should be stamped on opposite sides of the pipe, repeated every three feet.

5.5. SYSTEM IDENTIFICATION

A nonpotable water system should be identified in such a manner as to differentiate it from a potable water system.

5.5.1. Hose Bibs: Hose bibs should not be allowed on nonpotable irrigation systems. Quick couplers should be used if hose connections are necessary. Fittings should

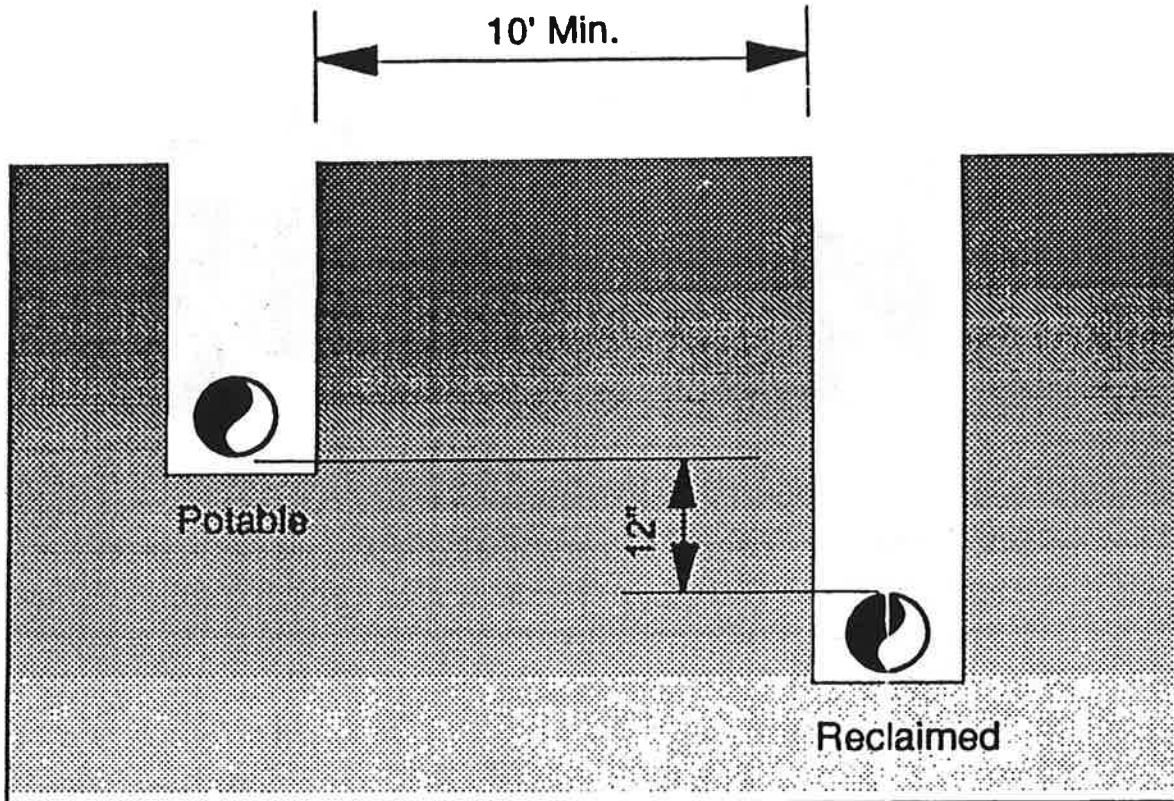
prevent interconnection between the potable and nonpotable systems. Hoses used with the nonpotable system should not be usable with potable water systems. Signs should be used to identify the nonpotable quick coupling. When potable quick couplers are within 60 feet of the nonpotable system, both should be equipped with appropriate signs.

5.5.2. Potable Water System Lines: When potable water is being supplied to an area also being supplied with nonpotable water, the potable water main should also be identified. A warning tape with the words "CAUTION—DRINKING WATER LINE" should be fastened directly to the top of the potable water pipe and run continuously the entire length of the pipe. This tape should be at least 3-inches in width. The color code should differentiate potable water from nonpotable water.

5.6. PROXIMITY OF UTILITIES

5.6.1. Horizontal Separation: A 10-foot separation of the nonpotable water pipe should be maintained at all times between a potable water pipe and/or a parallel sanitary sewer system. If a 10-foot separation is not possible, special construction methods should be considered. Common trench construction should not be permitted. In any event, a minimum of a 4 foot horizontal separation should be maintained.

5.6.2. Vertical Separation: The potable water pipe should be installed a minimum of one foot above the nonpotable water pipe, which in turn, should be installed a minimum of one foot above a sanitary sewer system. If a one foot separation is not possible, the approval for special construction requirements should be obtained from the regulatory agencies.



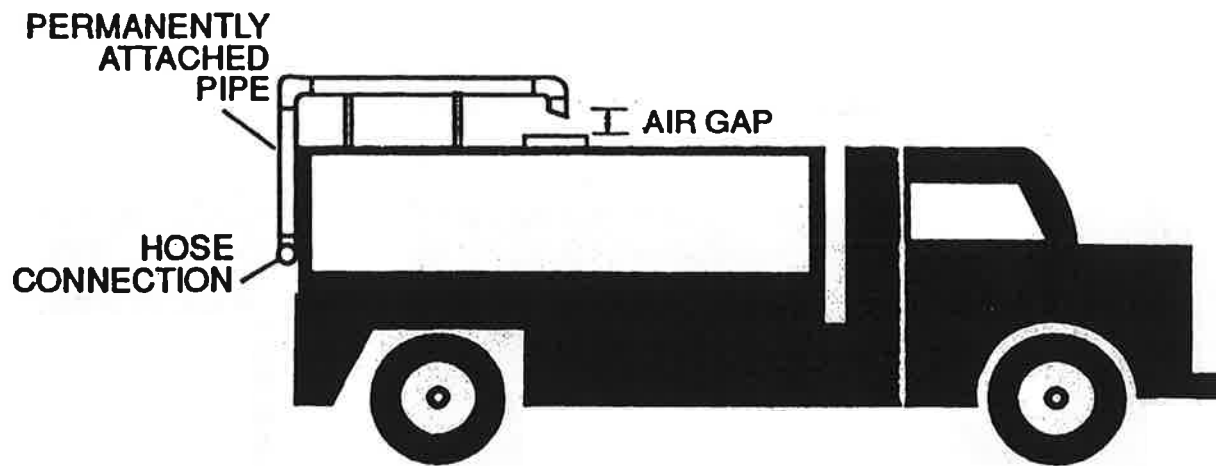
5.7. DRINKING FOUNTAINS/PUBLIC FACILITIES

Potable water drinking fountains and other public facilities should be placed out of the irrigation area in which nonpotable water is used, or otherwise protected.

Exterior drinking fountains and other public facilities should be shown and called out on the construction plans. If no exterior drinking fountains, picnic tables, food establishments, or other public facilities are present in the design area, then it should be specifically stated on the plans that none are to exist.

5.8. CONSTRUCTION WATER

Water trucks, hoses, drop tanks, etc. should be identified as containing nonpotable water and not suitable for drinking.



5.8.1. Permits: The use of nonpotable water for construction purposes requires approval of the appropriate regulatory agencies. Sufficient time should be allowed to acquire the necessary permits prior to beginning construction.

5.8.2. Uses: Nonpotable water used for construction purposes may be used for soil compaction during grading operations, dust control and consolidation and compaction of backfill in nonpotable water, sanitary sewer, storm drain, gas and electric pipeline trenches. Reclaimed water may be suitable for water jetting and consolidation or compaction of backfill in potable water pipeline trenches with health agency approval.

5.8.3. Equipment: Equipment operators should be instructed about the requirements contained herein and the potential health hazards involved with the use of nonpotable water.

Nonpotable water should not be introduced into any domestic water piping system. No unprotected connection should be made between equipment containing nonpotable water and any part of a domestic water system.

5.8.4. Ponds: Ponds used for storage of construction nonpotable water should be fenced and posted to limit public access.

5.9. SPECIFIC PROVISIONS

Some restrictions are placed on the operation of nonpotable water systems as a matter of good practice and to protect public health. The following restrictions applied by the regulatory agencies should be included in the detailed design:

5.9.1. Runoff Conditions: Conditions which directly or indirectly cause a runoff outside of the approved use area are prohibited.

5.9.2. Ponding Conditions: Conditions which directly or indirectly cause ponding outside of or within the approved use area are prohibited.

5.9.3. Overspray Conditions: Conditions which directly or indirectly permit windblown spray or overspray to pass outside of the approved use area are prohibited.

5.9.4. Unapproved Uses: Use of nonpotable water for any purpose other than those explicitly approved in the currently effective user permit issued by the operating agency, and without the prior knowledge and approval of the appropriate regulatory agencies, shall be prohibited.

5.9.5. Reuse/Disposal in Unapproved Areas: Reuse/disposal of nonpotable water for any purpose, including approved uses, in areas other than those explicitly approved in the currently effective user permit issued by the operating agency, and without the prior knowledge and approval of the appropriate regulatory agencies, shall be prohibited.

5.9.6. Cross-Connection: Cross-Connections resulting from the use of a nonpotable water service, whether by design, construction practice, or system operations, shall be prohibited.

5.9.7. Hose Bibs: Hose bibs on nonpotable water systems shall be prohibited. Replacement of hose bibs with quick couplers is recommended. (See 5.5.1)

5.9.8. Food Establishments/Public Facilities: In order to prevent food from being exposed to spray from the irrigation system, nonpotable water irrigation systems should not be installed near food establishments or public facilities such as picnic tables and drinking fountains (see 5.7.).

5.10. IRRIGATION APPLICATION RATE AND PRACTICE

An irrigation system designed with nonpotable water should specify type of sprinkler, placement of sprinkler, type of soil, type of plants, slope, hardscape, etc., to be used so as to prevent runoff, ponding and overspray.

5.10.1. Runoff: Nonpotable water should be applied at a rate that does not exceed the infiltration rate of the soil. The irrigation system should not be allowed to operate for a time longer than the landscape's water requirement. If runoff or ponding occurs before the landscape's water requirement is met, the automatic controls should be reprogrammed with additional watering cycles to meet the requirements and prevent runoff.

5.10.2. Irrigation Period: To the extent possible, the operation of the irrigation system should be during periods of minimal public use of the approved area. Such periods of operation should remain within any general period of nonpotable water irrigation operation specified by the agency.

5.11. EQUIPMENT AND FACILITIES

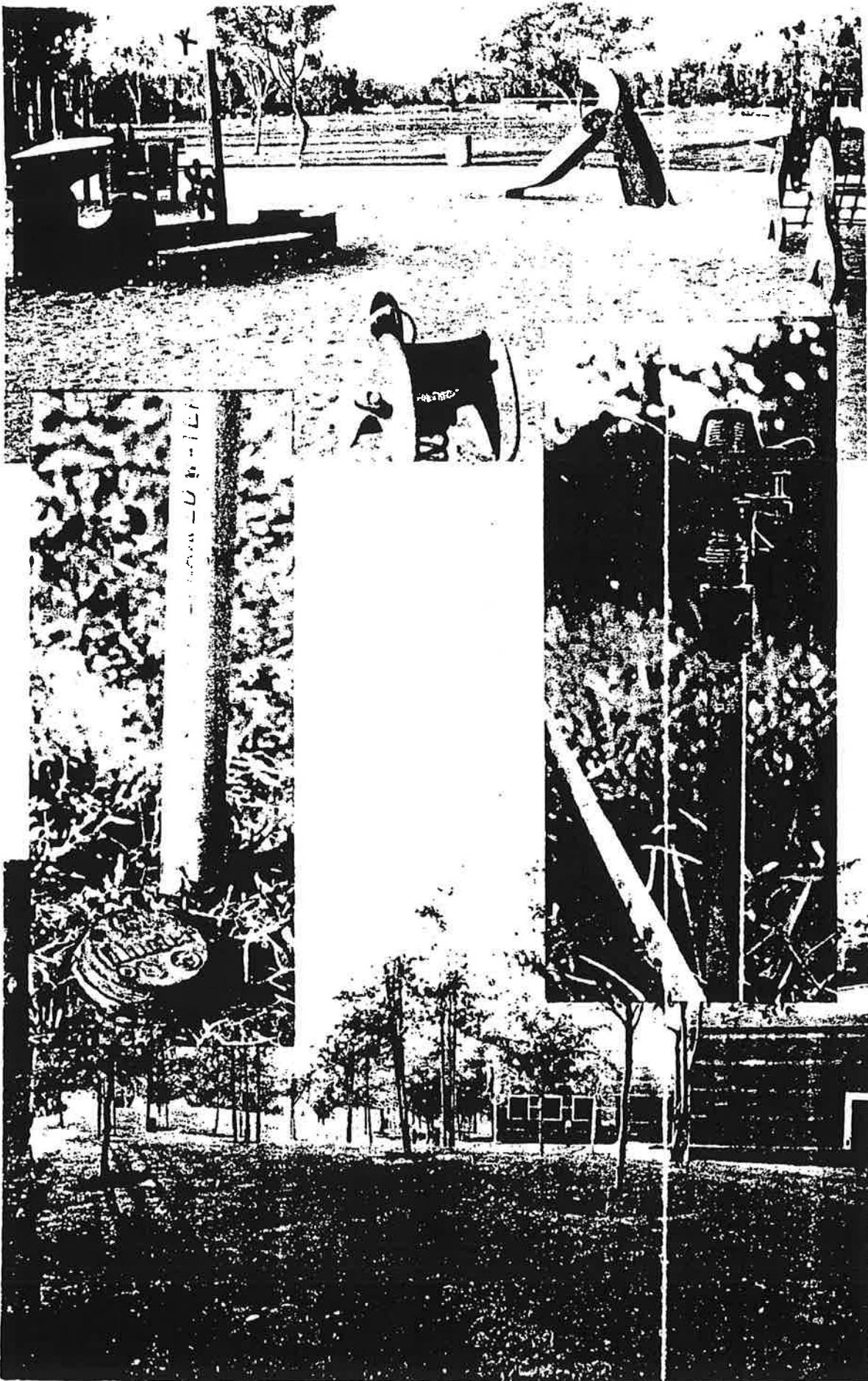
Any equipment or facilities such as tanks, temporary piping or valves, and portable pumps which have been used with nonpotable water should be cleaned and disinfected before removal from the approved use area for use at another job site. This disinfection and cleaning should ensure the protection of the public health in the event of any subsequent use as approved by the agency supervisor and the disinfection process should be performed in his or her presence.

5.12. WARNING SIGNS AND LABELS

Agency warning labels should be installed on designated facilities such as, but not limited to, controller panels and washdown or blow-off hydrants on water trucks, and temporary construction services. The labels should indicate that the system contains nonpotable water that is unsafe to drink.

Where nonpotable water is used for recreational impoundments, warning signs should be installed to notify that the water in the impoundment is unsafe to drink. A detailed plan should be prepared showing placement and spacing of the proposed signs. Where nonpotable water is used for irrigation, warning signs should be installed, and contain as a minimum, 1/2" black or white letters on a purple, Pantone 512, background notifying the public that the water is unsafe to drink.

Warning signs and labels should read "CAUTION: NONPOTABLE WATER - DO NOT DRINK", or "CAUTION: RECLAIMED WATER - DO NOT DRINK", and should be in both English and other language(s) common to the particular area. The signs should include the international system for do not drink.



SECTION 6

SYSTEM MANAGEMENT

Proper system management is crucial to protection of public health. Quality control, use control, operation and maintenance control, cross-connection prevention and assurance against violation of the agency requirements are some of the system management considerations.

6.1. QUALITY CONTROL

All nonpotable water delivered to users from agency facilities should conform to requirements established by the appropriate regulatory agencies.

6.2. CONTROL OF ON-SITE USE

6.2.1. On-site Use Requirements: Only after the appropriate applications have been filed and authorization has been granted by the appropriate agency shall nonpotable water be furnished for the intended uses.

6.2.2. User Supervisor: The user should include in the application for nonpotable water service the following information regarding the individual designated as user supervisor: name, address, and telephone number at which this individual or designated representative can receive messages during "off hours." The agency should approve the designated person, or reject the designation for just cause. It should be the responsibility of the user to notify the agency of a change in designation of the user supervisor. Following such notification, the agency should again perform its evaluation.

The user supervisor should be aware of the entire system within his or her responsibility and of all applicable

conditions of nonpotable water use. The user supervisor should be responsible for the installation, operation and maintenance of pipelines and cross-connection equipment.

6.2.3. Allowed Uses for Nonpotable Water: The uses of nonpotable water include landscape irrigation, agricultural irrigation, construction water, industrial process water, recreational impoundment, etc. Each such use should be considered for approval by the agency on a case-by-case basis.

Determination of allowed uses should be in accordance with the standards of treatment and water quality regulations of the State. The agency may set forth specific requirements as conditions prior to approving any such uses and/or require specific prior approval from the appropriate regulatory agencies.

6.2.4. Emergency Connections to Potable Water Systems: Permanent emergency connections to the potable water system are prohibited. A temporary connection to the potable water system under special emergency conditions may be made only after the agency has received approvals from the water purveyor, State and local health departments. (See 5.3).

6.2.5. Responsibility for Maintenance: Unless otherwise specified, the user is responsible for maintaining all on-site facilities (downstream of the user's service meter). Unless otherwise specified, all on-site facilities are under the ownership of parties other than the agency.

6.3. FACILITIES OPERATION (Also see Appendix A)

6.3.1. On-site Facilities: The user shall be responsible for the operation and surveillance of on-site domestic water distribution and nonpotable water distribution facilities to avoid cross-connections.

6.3.2. Agency Supervisor: The agency should designate an agency supervisor to be responsible for the operation of the offsite distribution system for the surveillance of all users and for the determination of water quality as it relates to compliance with requirements of regulatory agencies. The name and designated function of this individual should be listed by the agency in the service application form and should be kept updated at the agency office.

The agency supervisor should be knowledgeable of the entire system and of all applicable conditions of nonpotable water use. The agency supervisor should be the contact person for the agency in all matters between the user and the agency and between the agency and the regulatory agencies concerning the operation of the nonpotable water system. The agency should require that the user supervisor obtain instruction in the use of nonpotable water, such instruction being provided or approved by the agency.

6.3.3. On-site Nonpotable Water Facilities: The operation and surveillance of all on-site nonpotable water systems facilities should be under the management of the user supervisor designated by the user and approved by the agency. The agency should have the right to enter upon the user's premises during reasonable hours for the purpose of inspecting the nonpotable facilities and their operation. The user should have the following responsibilities in relation to the operation of the on-site facilities:

A. Make sure that all operations personnel are trained in and familiarized with the use of nonpotable water.

B. Furnish the operations personnel with maintenance instructions, controller charts, and record drawings to insure proper operation in accordance with the on-site facilities design.

C. Prepare and submit to the agency required record drawings.

D. Notify the agency of any and all updates or proposed changes, modifications or additions to the on-site facilities. Changes should be approved by the agency and should be designed and constructed according to the requirements, conditions and standards set forth in the agency's requirements.

E. Insure that the nonpotable water facilities remain in accordance with the agency's requirements. (See 5.9).

F. Operate and control the system in order to prevent direct human consumption of nonpotable water and to control and limit runoff. The user should demonstrate responsibility for any and all subsequent uses of the nonpotable water.

G. Report to the agency any and all failures in the nonpotable water system that cause an unauthorized discharge of nonpotable water.

H. Comply with any and all applicable Federal, State and local statutes, ordinances, regulations, contracts and requirements prescribed by the agency. In the event of violation, any charges and penalties may be applied and collected by the appropriate regulatory agency.

I. Install and maintain signs at all facilities.

6.4. NONPOTABLE WATER SYSTEMS

The agency should monitor and inspect the entire nonpotable water system including both on-site and offsite facilities. The agency should conduct system monitoring programs, maintain all systems as deemed necessary, and provide reports as requested by regulatory agencies. The agency, in monitoring, record keeping, and providing reports, should have the right to enter the user's premise during reasonable hours. The purpose of inspecting on-site nonpotable water facilities and areas of nonpotable water use is to assist the user in complying with requirements.

6.5. VIOLATIONS

6.5.1. Determination: The agency should reserve the right to determine whether a violation of the guidelines has resulted from any action or occurrence which is the responsibility of a user. If the violation constitutes a violation of any regulatory agency requirement, the agency should make its determination on behalf of the concerned regulatory agency. If a violation is verified, the agency should notify the user and confirm that it is corrected.

6.5.2. Specific Violations: Specific violations should include those which directly cause noncompliance with any one of the specific prohibitions as listed in the permit issued by the regulatory agency. However, by definition, noncompliance with any condition or conditions of the guidelines of the regulatory agency, whether willingly or by accident, should constitute a violation.

6.5.3. Notification: It should be the responsibility of the user to notify the agency of any and all failures in a nonpotable water system whether or not in the user's opinion the failures resulted in violations. It should also be the responsibility of the user to notify the agency of any and all violations which occur as a result of the user's action, the action of the operations personnel, or any use of the nonpotable water service. If there are any doubts regarding whether a violation has occurred, the user should notify the agency so that a determination can be made.

Notification of failures and violations should be made as soon as possible or, in any event, no later than noon on the next regular working day following the occurrence. Such notification should be made by telephone to the agency supervisor or designated representative.

6.5.4. Corrective Action: If the agency supervisor's investigation results in the determination that a violation has occurred, then it should be the responsibility of the user to initiate corrective action. A timetable for completing the

corrections should be negotiated with the agency supervisor by the user, with the final approval of the agency. Such corrections may involve human factors, such as additional training or procedures modifications, as well as physical alterations to the system.

If corrective actions are required, the user should submit to the agency, in writing, a statement describing the violation or violations, summarizing the corrective action to be taken and setting forth the negotiated timetable. This written submittal should be received by the agency supervisor. Until the corrections are completed and approved by the agency, the use of nonpotable water should continue only to the extent permitted by the agency and other regulatory agencies.

The user should keep a written log of all system failures and violations, including corrective action taken. The log should be reviewed by the agency regularly.

6.5.5. Appeal: If the user believes there is just cause, he or she may appeal the determination of the agency supervisor to the agency. Such appeal should be presented in writing and should state the conditions which the agency supervisor has determined to be a violation and the user's opinion to the contrary. The action of the agency should be final.

6.5.6. Revocation: Failure to permanently cease all violations within the time stated should result in revocation of the user permit by the agency and termination of nonpotable water service.

6.6. PENALTIES

6.6.1. Authority: The agency should retain the authority to assess penalties against any nonpotable water user for just cause as determined by violations against any regulations, ordinances or contracts.

6.6.2. Findings: Depending on the nature of the violation and any resulting corrective action program, the user should be subject to penalty by the agency. Penalties should be assessed only by the agency or its authorized agent and be based on findings as presented by agency staff or as presented in the case of user appeal.

6.6.3. Enforcement: The responsibility for the enforcement of penalty assessments should rest with the agency staff. The staff should employ whatever legal means necessary to ensure that the agency's action is enforced.

APPENDIX A

ADMINISTRATIVE PROCEDURES

A.1. GENERAL

The following describes the required procedure for an applicant to obtain service from the agency for the proposed service area and to obtain approval for construction of facilities to be dedicated for operation and maintenance by the agency.

A.2. PRELIMINARY INVESTIGATION

The user should meet with the agency at the earliest possible date to determine whether the property to be developed is within the agency's nonpotable service boundaries. At this time, the availability of existing facilities should also be reviewed (It should be the responsibility of the user to request confirmation that the agency has sufficient capacity). In some areas, a preliminary feasibility investigation and report may be necessary. The user should file directly with the agency supervisor, a map describing the area to be served, the tentative tract map, plot plans, preliminary prints of streets, construction plans and such other materials as the agency may request for use in its investigation.

A.3. SERVICE APPLICATION

An application for nonpotable water service should be submitted to the agency only after the agency has received a report of preliminary investigation determining the feasibility of the proposed service. Approval for service should be indicated by the agency by issuing a user permit to the applicant. The user permit should come into force only after construction of the subject project is completed and final acceptance has been granted by the agency and approval for service start-up given.

The application for nonpotable water service should be made in writing and signed by the user, who may be the owner or

authorized representative. The application form should be furnished by the agency and should request information concerning the applicant's company, the user's relationship to the subject property as legal owner, tenant, or lessee; the type of nonpotable water use; a boundary description of the property to be served; the purpose for which the properties to be served; the purpose for which the property is to be used; the estimated consumption of nonpotable water; the designation of user supervisor; any special conditions for service pursuant to these guidelines; and periods of intended use of nonpotable water. Certain technical information derived from the design and peculiar to the type of nonpotable water use may also be requested.

Upon receipt of an application, the agency should review the application and make such investigation as deemed necessary. The agency may prescribe specific requirements in writing to the user as to the design of the facilities, the manner of construction, the method of operations and the conditions of service. An evaluation should be performed which will establish that all information included on the form is consistent with the guidelines and the applicable requirements of the regulatory agencies.

A.4. CONTROL OF DESIGN

The agency should approve all nonpotable water system designs.

A.4.1. Offsite Facilities: The design of any portion of the offsite facilities and the preparation of plans and construction specifications should be approved by an engineer registered by the State.

It should be the responsibility of the user to meet with the agency in order to determine what requirements, if any, there may be for phasing stages of nonpotable water distribution line installation. It should also be the responsibility of the user to coordinate its activities with those of the agency in the development of the mainstream portions of the nonpotable water distribution system.

The agency should reserve the right to determine the size of the service connection and should also have the right to determine the kind and size of all appurtenances to the service including pressure reducing valve and water meter. The agency should make the service connection and install the meter with its own personnel or through contracted labor. All pressure reducing valves are to be installed and maintained by the user.

Other design requirements for offsite facilities should be found in the agency's design specifications. AWWA, ANSI and ASTM Standards are to be used for all materials.

A.4.2. On-site Facilities: The design of the on-site facilities and the preparation of plans and construction specifications should be the responsibility of a landscape architect or engineer registered with the State.

In those areas where water is not immediately available for use when the design area is ready for construction, the on-site facilities should nevertheless be designed to use nonpotable water. Provisions should be made and these guidelines followed to allow for connection to the nonpotable water system when it becomes available. In the interim, potable water should be supplied to the on-site facilities through an approved temporary potable water connection. An approved reduced pressure backflow prevention device should be required as long as the on-site facility is using potable water. This device should be provided and installed by the user to the satisfaction of the potable water supplier and the health department.

Only when the agency makes the connection to the nonpotable water system should the user remove the backflow preventer. All points of connection to the agency's offsite facilities should be determined by the agency. The local health department should be notified of all action taken with backflow prevention devices.

The on-site facilities should be designed to meet the peak moisture demand of all plant materials used within the design area and to apply irrigation water in a manner compatible with the infiltration rates of the soil types within the approved use area. Infiltration rates should be included with the design. The irrigation system should be designed to prevent discharge onto areas which are not approved for use and to prevent ponding and/or runoff.

Other design requirements for on-site facilities should be found in the agency's design specifications.

A.4.3. Construction Water Facilities: Service connections for the construction use of nonpotable water should be provided by the agency at locations convenient to the user but at the discretion of the agency. The service should include a valved connection to a nonpotable water distribution main and a water meter whose capacity should be determined by the agency from information supplied by the user in the user permit application. The agency should make the connection to the main and install the meter.

A.4.4. Conversion of Existing Facilities to Nonpotable Water: All facilities converted from a potable to a nonpotable facility should conform to these guidelines. The facilities to be converted should be investigated in detail, including review of any record drawings, preparation of required reports and determinations by the agency of measures necessary to bring the system into full compliance with guidelines.

The plans and specifications for the converted system should be submitted to and reviewed by the agency, State and local health departments.

A.5. EXAMPLE DESIGN AND INSPECTION CONTROL PROCEDURES

The following design and inspection control procedures should be considered as a guideline.

A.5.1.1. Master Development Plan: Before the agency can issue a preliminary will-serve letter for a proposed development, the user should submit two sets of tentative master development plans showing the plan of the proposed nonpotable water system for review and approval by the agency. The agency, when reviewing a preliminary nonpotable water system design for the planned development, should take into consideration the following:

- A. Existing nonpotable water transmission main locations and sizes.
- B. Agency's nonpotable water master development plan.
- C. Agency's design specifications.
- D. Applicant's irrigation requirements.

The agency should return one "red-lined" copy of the reviewed master development plan to the applicant showing any corrections and/or comments. The master development plan, as corrected, should then be considered approved by the agency; however, the user should make the corrections noted and should re-submit two sets of the revised plans to the agency.

A.5.1.2 Improvement Plans: The user should submit to the agency two sets of each of offsite and on-site (individual tract) nonpotable water system improvement plans for review and approval. The agency should return one "red-lined" set of the reviewed improvement plans to the user showing any corrections and/or comments. The user should make the corrections noted, should respond to the agency's comments appropriately and should provide the agency with copies of the required easements to the agency if recorded by separate instrument. Upon completing these requirements to the satisfaction of the agency, the user should bring the original drawings to the agency for signature of approval. Four sets of completely signed and approved nonpotable water system improvement plans

should be furnished to the agency at least two working days before the required pre-construction conference prior to commencing work.

A.5.1.3. Pre-construction Conference: A pre-construction conference should be held at least 24 hours before starting construction. The contractor's working foreman and/or job superintendent, the user's tract superintendent and the agency's engineer and inspector should be present. The purpose of this meeting should be to resolve any questions on agency specification requirements to obtain the contractor's construction procedural schedule, and to disclose and discuss any known circumstances that might affect job installation.

A.5.1.4. Inspection of Work: All work should be subject to inspection by the agency and should be left open and uncovered until approved by the appropriate agency authority.

A.5.1.5. Agency Authority: The agency should at all times have access to the work during construction and should be provided reasonable assistance for ascertaining full knowledge regarding the process, workmanship and character of materials used and employed in the work. No pipe, fittings or other materials should be installed or backfilled until inspected and approved by the agency. The contractor should give due notice to the agency inspector in advance of backfilling as well as all other inspection phases so that proper inspection may be provided. Inspection of the work should not relieve the contractor any obligations to complete the work as prescribed by the agency's standards. Defective work should be made good before any testing or final inspection will be permitted. Any defective work or unsuitable materials may be rejected notwithstanding the fact that such defective work and unsuitable materials had been previously overlooked by the agency. The agency should have the authority to suspend the work wholly or in part for such time as it may deem necessary due to the failure of the contractor to carry out orders given by the agency inspector or to perform any

provisions of the plans and specifications. The contractor should immediately comply with the written order of the agency to suspend the work wholly or in part. The work should be resumed only when methods or defective work are corrected as ordered and approved in writing by the agency.

A.5.1.6. Final Inspection: Before final acceptance, the agency inspector, accompanied by the contractor's superintendent or foreman, should make a final inspection of all work.

A.5.2. GRANTING OF EASEMENT TO THE AGENCY

Prior to the agency's signing the improvement plans for the nonpotable water facilities required to serve the area for which user has requested service from the agency, the user should have prepared, processed, granted, recorded, and conveyed to the agency all easements required by the agency for operating, maintaining, modifying or replacing the facilities. All easements should be recorded with the local county recorder.

A.5.3. DEDICATION OF FACILITIES TO AGENCY

Upon completion and final inspection of all work, the user should file a request for dedication to and formal acceptance of the facilities by the agency. The user should also furnish the agency a report of actual costs of said facilities, a proper bill of sale and record drawings of the facilities. Upon said acceptance, the agency should give approval for the construction of the nonpotable water facilities.

A.5.4. GUARANTEES

The user should be responsible for any and all repairs and replacement to agency facilities for a period of one year from the date of acceptance without expense whatsoever to the agency. In the event the user fails to comply with the aforementioned conditions, the agency is authorized to proceed to have the defects repaired

and made good at the expense of the user who should pay the cost and charges including attorney fees and other incidental costs involved thereof, immediately upon demand.

A.5.5. ISSUING OF USER PERMIT (SERVICE AGREEMENT)

The user permit issued by the agency to the user should constitute a legally binding service agreement between the two parties. The user permit should incorporate these guidelines and any additional requirements prescribed by the agency to ensure continued operation of the nonpotable water system or to protect the public health. The user permit should be issued only upon confirmation by the regulatory agencies. The agency should assign an accounting number to each permit issued.

A.5.6. ESTABLISHING SERVICE CONNECTIONS

Following the completion of construction and/or installation of the nonpotable water facilities and the submittal and approval of record documents, if required, the user should request the agency to install the service connection, accompanied by all requisite fees for installation and connection.

A.5.7. SERVICE START UP

Following final acceptance of the project by the agency, the user should request service start-up. The agency, upon receipt of such request, should apprise the regulatory agencies of the intent to begin service, set the meter, turn on the service, and then confirm such start-up to the regulatory agencies.

APPENDIX B

INSTITUTIONAL ARRANGEMENTS

CALIFORNIA

B.1 OVERVIEW

Ongoing water reclamation and reuse in California has been implemented with relative ease from an institutional standpoint. As the quantity of nonpotable water use increases together with new and emerging applications, institutional implementation of water reuse projects will also become more challenging. The purpose of this Appendix is to generally outline the major potential institutional issues that may need to be investigated and resolved prior to completing a particular nonpotable water program. It is not intended to present solutions but rather is a document to provoke thought. The Appendix includes discussion of contractual requirements, potable water backup systems, water rights, financing sources, agency communications and needs, paralleling issue, and regulatory policy references.

B.2 CONTRACTUAL REQUIREMENTS

A key factor in implementing a water reuse program is the successful negotiation of an acceptable contract for the use of the nonpotable water. Some of the basic points that may be required by supplier and/or user are listed below. The tabulation is not intended to be a required list of items for all agreements, and may not be all-inclusive.

A. Delineation and responsibilities of all parties to the project (i. e. customer, purveyor, system operator, sanitation/reclamation authority, regional funding agency).

B. Description of facilities for delivery and distribution of nonpotable water (including on-site facilities as required, and ownership).

- C. Quantity of nonpotable water to be purchased; including maximum/minimum rates, backup supply rates, project entitlements,**
- D. Quality of water, including numerical objectives, provisions for variation, regulatory compliance.**
- E. Operating obligations of parties,**
- F. Pricing policy, including discount rates to provide incentives, adjustments during contract duration, auditing provisions, impact of potential grants/loans, provisions for avoided energy costs.**
- G. Billing and payment provisions.**
- H. Limitation of use.**
- I. Terms and amendments.**
- J. Limitations on contractual commitments.**
- K. Indemnification**

B.3. POTABLE WATER BACKUP SYSTEMS

Because nonpotable water is distributed for a variety of uses (i.e. recreational lakes, landscape irrigation, etc.) the need for a potable water back-up system should be evaluated on a case by case basis. Two general scenarios provide a beginning point for determining the need and extent of domestic water backup supplies.

In cases where nonpotable water is being used for fire protection, such as in remote areas where an adequate supply of potable water is not available for drinking and fire flow, or where high volume industrial users are using nonpotable water for process water a back-up system with a short response time should be considered. Under these circumstances hydraulic controls should

be included in the system to allow for immediate switching over to potable water in the event of an outage. In this case, the potable supply connection shall be through an air gap separation as specified in Section 5.3, or other means approved by the health department.

In situations where non-potable water is being used for agricultural or landscape uses where outages beyond three days would cause serious plant damage, provisions to allow for conversion should be included. Under this emergency scenario, provisions in the design of the potable and nonpotable distribution systems should be included to allow for a conversion within the three day window. An example would be installing a pair of tee connections on the two pipelines which could be exposed and connected through an air gap as specified in Section 5.3 or other means approved by the health department.

B.4. WATER RIGHTS

In the planning of a nonpotable water system, water rights issues may need to be addressed. When the producer of nonpotable water is not the same entity as the distributor of potable domestic water, the issue as to who should distribute the nonpotable water may best be addressed in a memorandum of agreement or contract.

Such an agreement could also address other topics such as: a) transfer of rights between public authorities; b) rights to downstream diversion of nonpotable water discharge to a watercourse; and c) nonpotable water producer rights until discharged or "abandoned".

B.5. FINANCING SOURCES

Sources for financing nonpotable water projects can be generally divided into two categories, financing for retrofit programs, and financing for new projects.

B.5.1. Local Projects Funding Program - Because retrofitting existing potable water systems with nonpotable water is considered a 'conservation' measure, these projects can seek funding from a variety of State and Federal water conservation grants. The Metropolitan Water District through its "Local Projects" program will often participate in the cost of retrofit projects if it can be confirmed that these projects will reduce the use of domestic water. An additional source of revenue for financing retrofit projects could be obtained by delaying the changeover from domestic water to nonpotable water rates for a fixed period of time. This source of funding does not result in the direct payment of funds, but rather through avoided costs for purchasing treated water, or other treatment costs.

Additional information on local projects program financing can be obtained from the following:

**Local Projects Program
Metropolitan Water District of Southern California
Post Office Box 54153
Los Angeles, CA 90054**

B.5.2. State Funding Sources - In addition to the previously mentioned State and Federal Grant funds which may be available for new projects as well, the cost to fund new projects can be obtained through user fees, connection/capacity charges, bond funds, and/or State loans. The State Water Resources Control Board implemented the Water Reclamation Loan Program established under the Clean Water Bond Laws of 1984 and 1988. Loans can be made for approved projects for up to 20 years at an interest rate equal to one-half of the rate paid by the State on preceding general obligation bonds.

Additional information on nonpotable water project financing can be obtained from the following sources:

Office of Water Recycling
State Water Resources Control Board
P.O. Box 944212
Sacramento, CA 94244-2120

B.6. AGENCY COMMUNICATIONS AND NEEDS

Implementation of a nonpotable water project can involve numerous agencies and/or entities to fulfill particular project responsibilities. The interrelationship of such entities in conceptually depicted on Figure C-1. Communications among involved agencies during the project planning process are vital to its success. Inter-agency memorandums-of-understanding (MOU) or memorandums-of-agreement (MOA) are helpful to formally define each agency's role, rights and responsibilities in project execution.

An MOU among the State Water Resources Control Board, California Department of Health Services and the California Department of Water Resources is currently being promulgated to guide the regulatory implementation of nonpotable water projects. Issues on such projects can also involve various departments within a municipality; therefore, inter-department communications are also suggested. A municipal Fire Department should be consulted whenever nonpotable water is to be proposed for fire protection purposes or other uses involving fire hydrants.

It may be necessary to formulate a new public entity (i. e. joint powers agency, community services district) to effectively implement a nonpotable water project. Legal advice should be obtained in these instances, and also regarding other project institutional needs.

B.7. PARALLELING ISSUE

It has been claimed by certain private water purveyors that distribution of nonpotable water constitutes a duplication of service under Sections 1501 through 1506 of the Public Utility

Code. Under these sections of the Codes, an entity providing water service to an area is due fair compensation when another entity encroaches on the original utilities service territory. The service provided by the second entity must be the same type of service the original entity provided.

The value of compensation in this type of situation could be determined as the value of facilities rendered useless, or reduced in value by loss of earnings resulting from loss of market. However, nonpotable water projects implemented in a water-short area may result in a positive off-setting benefit to the private water purveyor. In water reuse applications involving potential duplication of service, communications should lead to a project of mutual benefit.

B.8. REGULATORY POLICY REFERENCES

The following is a partial list of current references on regulatory policies regarding nonpotable water projects:

- A. California Code Of Regulations, Title 22, Division 4, Chapter 3, "Wastewater Reclamation Criteria".**
- B. California Department Of Health Services - Environmental Management Branch: "Guidelines For Use Of Reclaimed Water".**
- C. California Department Of Health Services - Environmental Management Branch; "Guideline For The Preparation Of An Engineering Report On The Production, Distribution, And Use Of Reclaimed Water".**
- D. California Department Of Health Services - Environmental Management Branch; "Guidelines For The Use Of Reclaimed Water For Construction Purposes".**
- E. California Department Of Health Services - Environmental Management Branch;**

“Demonstration Of Equivalency To Full Title 22 Treatment”.

- F. California Department Of Health Services - Environmental Management Branch; “Criteria For Mosquito Prevention In Wastewater Reclamation Or Disposal Projects”.**
- G. Memorandum Of Agreement Between The Department Of Health Services And The State Water Resources Control Board On Use Of Reclaimed Water.**
- H. California Code Of Regulations, Title 17; “Drinking Water Supplies - Backflow Prevention”.**

APPENDIX C

INSTITUTIONAL ARRANGEMENTS

NEVADA

C.1. OVERVIEW

Water reclamation, reuse and the use of raw water is on the increase in Nevada due to constraints on the drinking water supply. As the quantity of nonpotable water use increases together with new and emerging applications, institutional implementation of water reuse projects will also become more challenging. The purpose of Appendix C is to generally outline the major potential institutional issues that may need to be investigated and resolved prior to completing a particular nonpotable water program. It is not intended to present solutions but rather to provoke thought. Appendix C includes a discussion of the following topics:

- a. Contractual Requirements
- b. Potable Water Backup Systems
- c. Water Rights
- d. Financing Sources
- e. Agency Includes and Needs
- f. Regulatory Policy References
- g. Design References

C.2. CONTRACTUAL REQUIREMENTS

Most of the potable water used in Southern Nevada is from the Colorado River. The amount of Colorado River water available is based on consumptive use, which is defined as diversions less return flows. After the water is used and treated it becomes available for reuse as nonpotable water. The reuse reduces the returned flow to the river and decreases the diversion capability by the amount of the reuse. If the reuse substitutes for a use that would otherwise be met with potable water there is no loss in total supply.

A key factor in implementing a water reuse program is the successful negotiation of an acceptable contract for the use of the nonpotable water. Some of the basic points that may be required by supplier and/or user are listed below. The tabulation is not intended to be a required list of items for all agreements, and may not be all-inclusive.

- A. Delineation and responsibilities of all parties to the project (i. e. customer, purveyor, system operator, sanitation/reclamation authority, regional funding agency).**
- B. Description of facilities for delivery and distribution of nonpotable water (including on-site facilities as required, and ownership).**
- C. Quantity of nonpotable water to be purchased; including maximum/minimum rates, backup supply rates, project entitlements,**
- D. Quality of water, including numerical objectives, provisions for variation, regulatory compliance.**
- E. Operating obligations of parties,**
- F. Pricing policy, including discount rates to provide incentives, adjustments during contract duration, auditing provisions, impact of potential grants/loans, provisions for avoided energy costs.**
- G. Billing and payment provisions.**
- H. Limitation of use.**
- I. Terms and amendments.**
- J. Limitations on contractual commitments.**
- K. Indemnification**

L. Conservation incentives

M. Seasonal requirements

C.3. POTABLE WATER BACKUP SYSTEMS

Because nonpotable water is distributed for a variety of uses (i.e. recreational lakes, landscape irrigation, etc.) the need for a potable water back-up system should be evaluated on a case by case basis. Two general scenarios provide a beginning point for determining the need and extent of domestic water backup supplies.

In cases where nonpotable water is being used for fire protection, such as in remote areas where an adequate supply of potable water is not available for drinking and fire flow, or where high volume industrial users are using nonpotable water for process water a back-up system with a short response time should be considered. Under these circumstances hydraulic controls should be included in the system to allow for immediate switching over to potable water in the event of an outage. However, consideration should be given to health department requirements which prohibit converting nonpotable water piping to potable water without special pipeline connection requirements.

In situations where non-potable water is being used for agricultural or landscape uses where outages beyond three days would cause serious plant damage, provisions to allow for conversion should be included. Under this emergency scenario, provisions in the design of the potable and non-potable distribution systems should be included to allow for a conversion within the three day window. An example would be a potable water connection to a non-potable water reservoir with a suitable air gap.

C.4. WATER RIGHTS

In the planning of a nonpotable water system, water rights issues may need to be addressed. When the producer of nonpotable water is not the same entity as the distributor of potable domestic water, the issue as to whom should distribute the nonpotable

water should be negotiated. Resolution of this issue may best be addressed in a memorandum of agreement or contract.

**Such an agreement should also address other topics such as:
a) transfer of rights between public authorities; and b) rights to downstream diversion of nonpotable water discharge to a water-course.**

In the State of Nevada, all wastewater effluent is a water of the State and a permit must be obtained to place this resource into use. Under state law the owner of the treatment works must obtain the primary permit for the storage of water and a secondary permit must be obtained by the user.

Additional information on water rights for nonpotable water use can be obtained from the following sources:

- 1) Department of Conservation and Natural Resources
Division of Water Resources
State Engineers Office
123 W. Nye Lane
Carson City, Nevada 89710**
- 2) Nevada Revised Statutes, Chapter 533**

C.5. FINANCING SOURCES

Financing for nonpotable water projects may be available through the State Revolving Loan Fund. Information on nonpotable water project financing can be obtained from:

**Department of Conservation and Natural Resources
Division of Environmental Protection
Bureau of Wastewater Treatment Services
123 W. Nye Lane
Carson City, Nevada 89710**

C.6. AGENCY COMMUNICATIONS AND NEEDS

Implementation of a nonpotable water project can involve numerous agencies and/or entities to fulfill particular project responsibilities. The interrelationship of such entities is conceptually depicted on Figure C-1. Communications among involved agencies during the project planning process are vital to its success.

It is the policy of the Nevada Division of Environmental Protection (NDEP) to oversee and regulate the distribution of reclaimed wastewater and the regulatory agency responsible for distribution of raw water systems is the Consumer Health Protection Services.

An Effluent Management Plan must be submitted to the NDEP for review and approval before any reclaimed wastewater use may begin. It is the future goal of the NDEP to permit all treatment works which use, store or transfer reclaimed wastewater.

Issues on nonpotable water projects can also involve various departments within a municipality; therefore, inter-department communications are also suggested. A municipal Fire Department should be consulted whenever nonpotable water is to be proposed for fire protection purposes or other uses involving fire hydrants.

State Regulatory Agencies with jurisdiction over nonpotable water reuse include:

- 1) Nevada Division of Environmental Protection
Bureau of Wastewater Treatment Services
123 W. Nye Lane
Carson City, Nevada 89710
- 2) Consumer Health Protection Services
Health Division
Department of Human Resources
505 East King
Carson City, Nevada 89710

C.7. REGULATORY POLICY REFERENCES

The following is a partial list of current references on regulatory policies regarding nonpotable water projects:

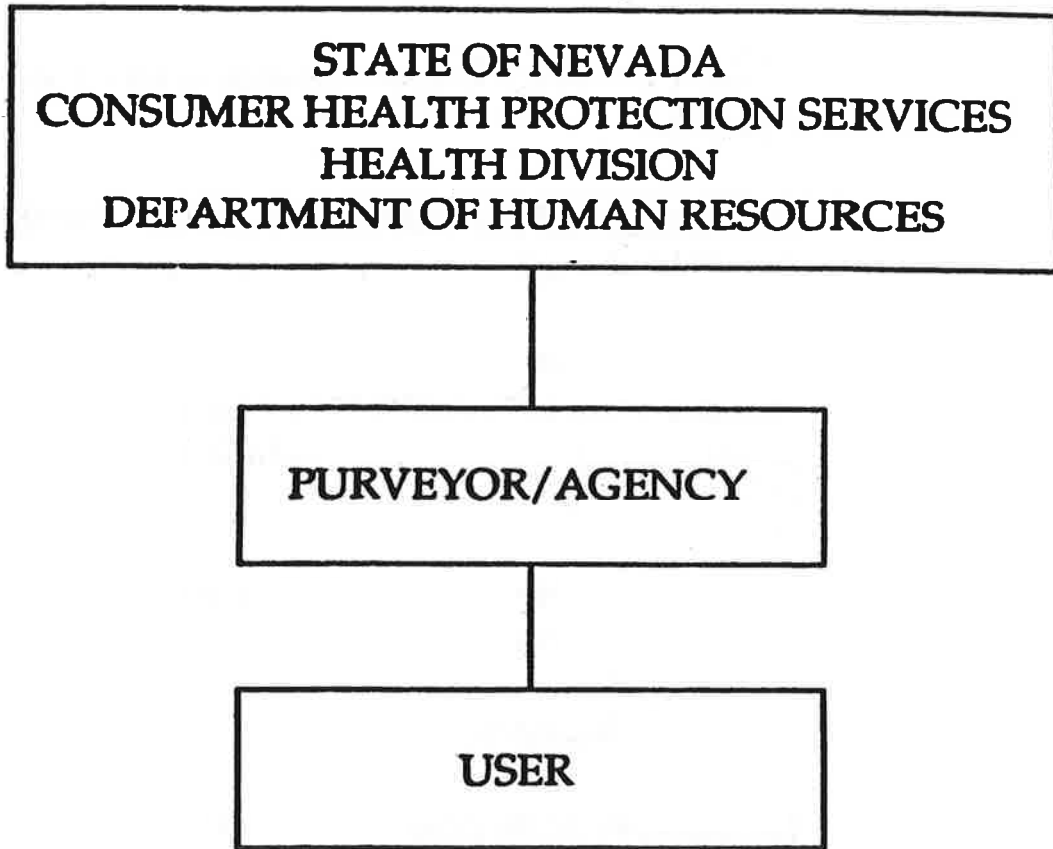
- 1. Nevada Division of Environmental Protection; "GUIDELINES FOR WASTEWATER TREATMENT PLANT EFFLUENT REUSE", Final Draft - April 11, 1990.**
- 2. Draft Amendment to the Nevada Administrative Code 445.1555 "Reuse of Effluent by Irrigation".**
- 3. Nevada Department of Environmental Protection; Memorandum on Requirements for Effluent Management Plan, dated March 21, 1991.**
- 4. Nevada Administrative Code 445**
- 5. Nevada Revised Statute 445**

C.8. DESIGN REFERENCES

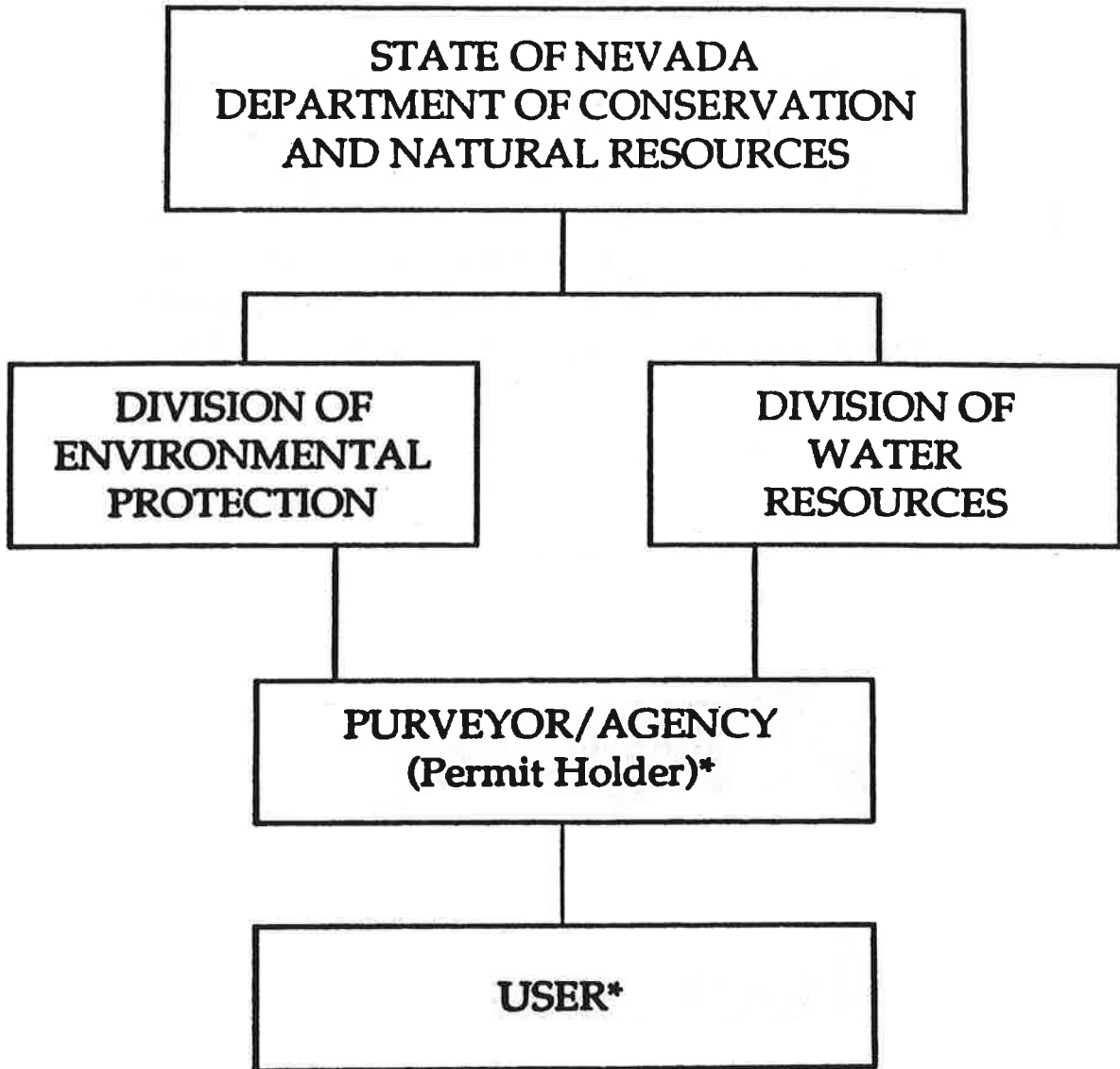
In addition to design criteria and details which may be applicable with the local agency, the following reference materials should be used as design references:

- 1. Water Pollution Control Federation Manuals of Practice.**
- 2. Recommended Standards for Sewage Works (Ten State Standards).**
- 3. Nevada Administrative Code 445.180 Design and Construction of Treatment Works, and Nevada Administrative Code 445 Public Water System Construction.**
- 4. U.S. Environmental Protection Agency Technology Transfer Manuals.**
- 5. AWWA Standards.**
- 6. Standard Specifications for Public Works Construction.**

RAW WATER



RECLAIMED WATER

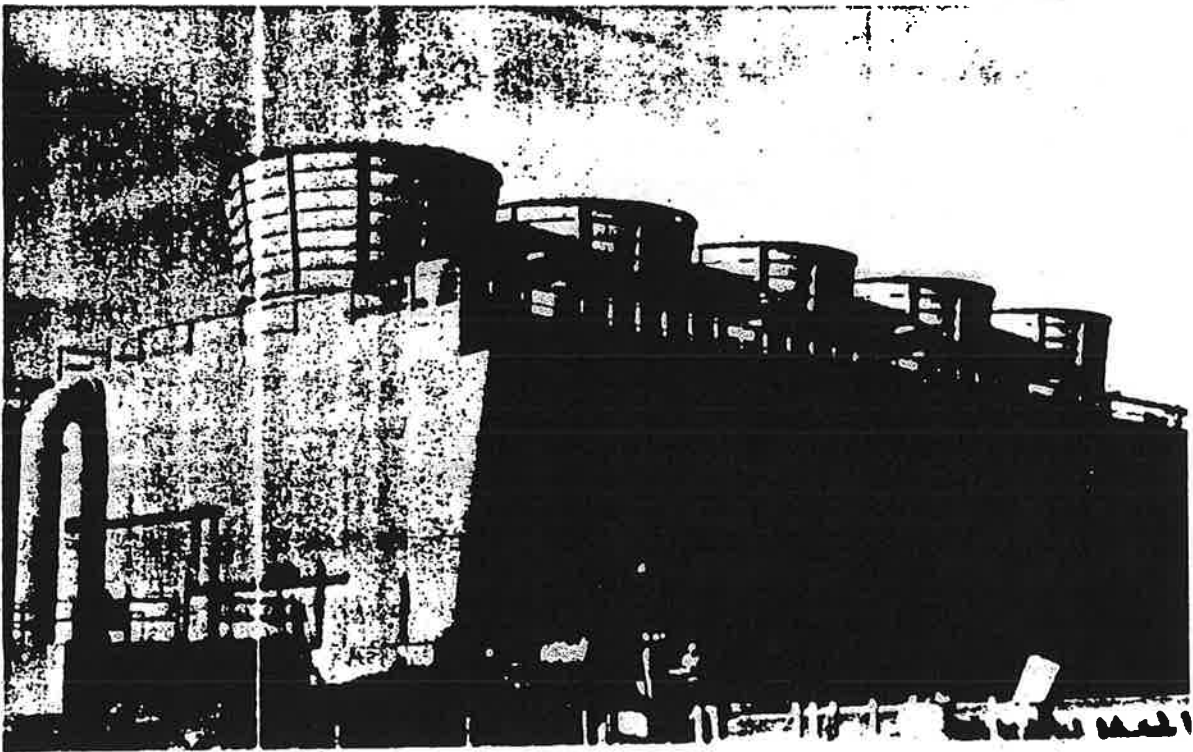


*Users may be permit holders

APPENDIX D

OTHER USES FOR NONPOTABLE WATER

This section deals with nonpotable water uses which are currently under development, or uses which are currently in use in limited situations. While these uses are currently not universally approved, or a part of every nonpotable system, they constitute applications which are being considered for full or increased implementation, and should be considered when performing planning and evaluation of nonpotable water distribution systems.



D.1. COOLING TOWER SUPPLY WATER

In industrial applications cooling towers typically rely on domestic water supplies to provide make-up water. This application requires a continuous supply of water, and after use either discharges that water in the form of steam, or backwashes the cooling system into the sanitary sewer system, or other approved means.

Since this water is not consumed by people at any point in its use, reclaimed water or other suitable nonpotable water should be considered for this application. Several communities have existing applications of this type, specifically Glendale, CA, and Burbank, CA. At the Chevron refinery in Oakland, CA reclaimed water is now proposed to be used in large industrial cooling tower applications. Because this use of nonpotable water is not specifically weather, or seasonally dependent, it provides a continuous year round market for reclaimed water.

D.2. COMMERCIAL/INDUSTRIAL BUILDING INTERIOR USE

Evaluations of water use patterns in commercial office buildings has indicated that an estimated 70 to 80% of the domestic water used by these facilities is used for flushing toilets, urinals, and priming floor drain trap primers. Several projects are currently underway to use reclaimed water for these purposes. Orange County Water District, Fountain Valley, CA, and the Las Virgenes Water District, Calabasas, CA and the Irvine Ranch Water District, Irvine, CA have constructed administrative office buildings with dual plumbing systems. The Irvine Ranch Water District has undertaken an even more aggressive program toward implementing this type of use. The Irvine Ranch Water District has facilitated the construction of several high-rise office towers (six floors and higher) with dual plumbing systems for using reclaimed water for flushing toilets, urinals, and priming floor drain trap primers. It is estimated that there will be as many as twenty-four such buildings prior to ultimate buildout.

All of these applications share several common features.

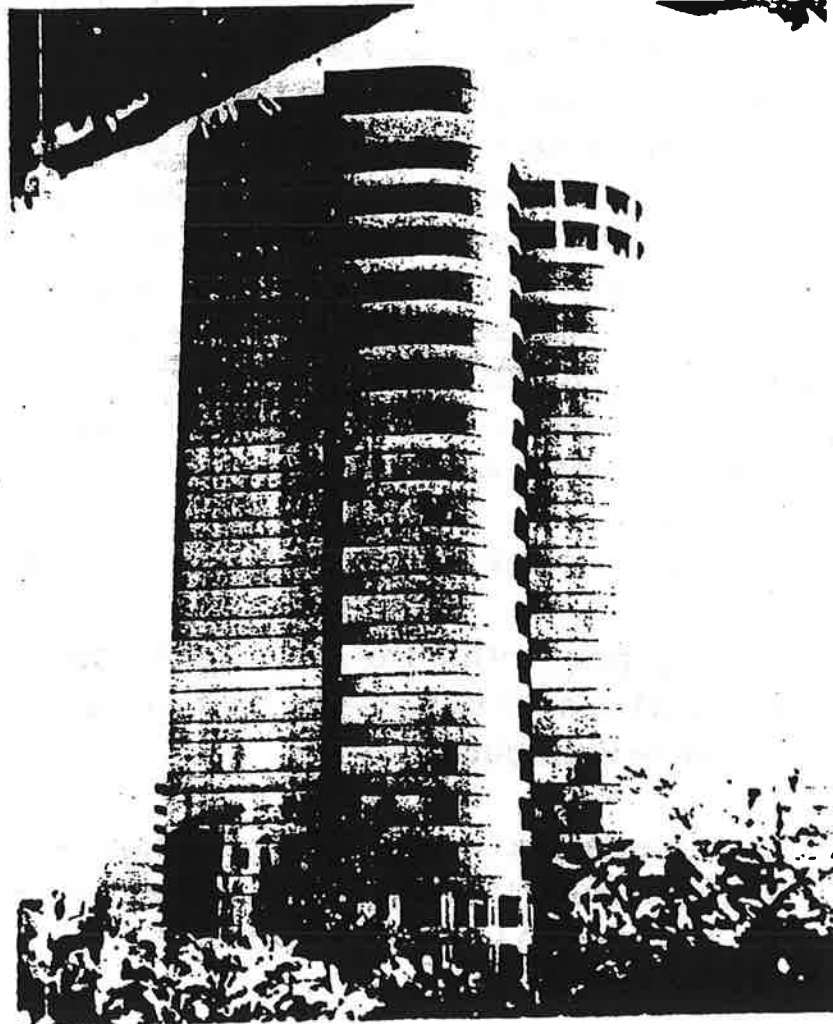
A. All piping within the buildings is copper piping installed in accordance with the requirements of the Uniform Plumbing Code.

B. All reclaimed water piping is wrapped with reclaimed water warning tape, which is colored purple, and imprinted with warning statements.

C. All reclaimed water system control valves are locking lever handle ball valves. These valves are equipped with locks which are installed after the system is checked for cross-connections, and placed into service, with local and state health department approval.

D. Warning signs are installed in the opening of the valve access panels installed in the wall, a Spanish language version is also installed on the inside of the valve access door. Warning signs are also installed in the equipment rooms to notify maintenance personnel that the equipment is handling reclaimed water and certain safety precautions should be followed.

E. An interior separation is installed inside the wall to make sure that the reclaimed water and domestic water pipes are shielded from each other, and to further mitigate potential inadvertent cross connections.



F. Signs are installed in the bathrooms indicating to the users that the facility is equipped with reclaimed water for flushing toilets and urinals as a water conservation measure.

G. In addition to the various physical features of this system, annual testing procedures, and a comprehensive management plan are put into place.

The use of reclaimed water for flushing toilets and urinals, and priming floor drain traps in commercial buildings could provide significant water savings, but will require extensive coordination between state and local health agencies, cognizant building authorities, local builders, engineers, affected trade unions, and Regional Water Quality Control Board. While these are specialized applications within an overall water reclamation system, they should be evaluated as part of the system planning, to determine the extent to which these applications are feasible for the particular reclamation agency.

D.3. FIRE FIGHTING

Since fire fighting water supplies are typically considered stand-by capacity because the use of this capacity is limited to situations where there is a fire, many agencies have begun evaluating the feasibility of shifting this load to the nonpotable water supply system. This use has the advantage of shifting the fire flow demand to the nonpotable system, thus reducing the size of the domestic water distribution pipelines, pump stations, and storage reservoirs. However users who have not provided for this demand on the nonpotable system may have to duplicate many of the domestic water distribution system components. This application of nonpotable water should be pursued in areas where the cost of expanding domestic water supplies is prohibitive based on the potential domestic water use such as rural areas, areas on the outskirts of development, or where a readily available source of nonpotable water exists.

