



**MAINTENANCE PLAN
FOR
PINNACLE PEAK ROAD DRAINAGE PROJECT**

PCN: 450-06-31

OCTOBER 2011

To: Ms. Bobbie Ohler

Date: October 13, 2011

Flood Control District of Maricopa County

Project: Pinnacle Peak Road Drainage
Project – 99th Ave. to 104th Ave.
FCD 2010C020 PCN 450.06.31

2801 West Durango Street

Project No.: WP# 093386.01

Phoenix, AZ 85009

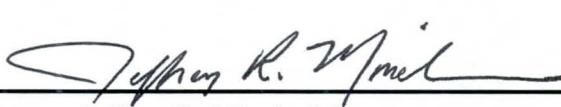
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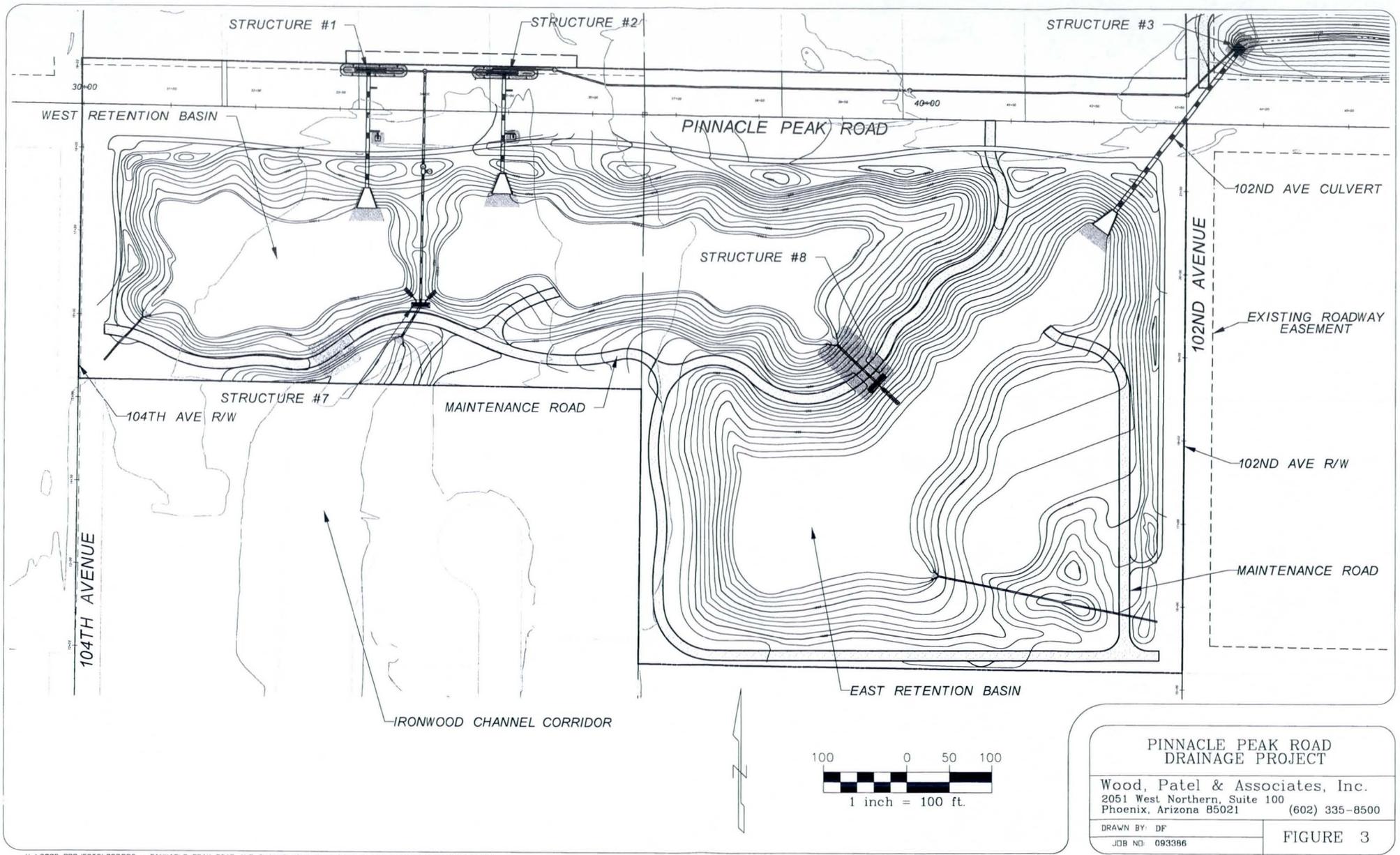
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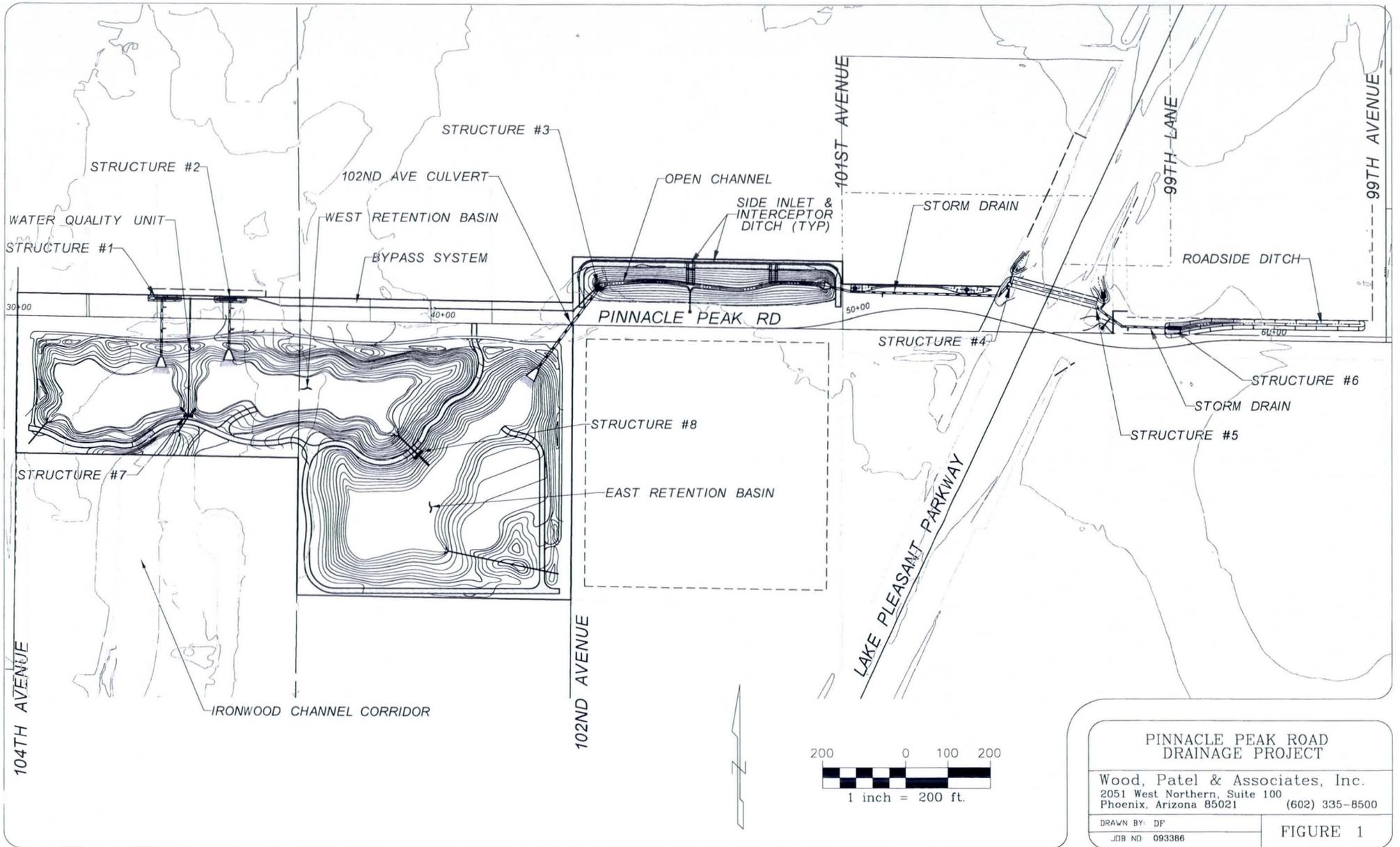
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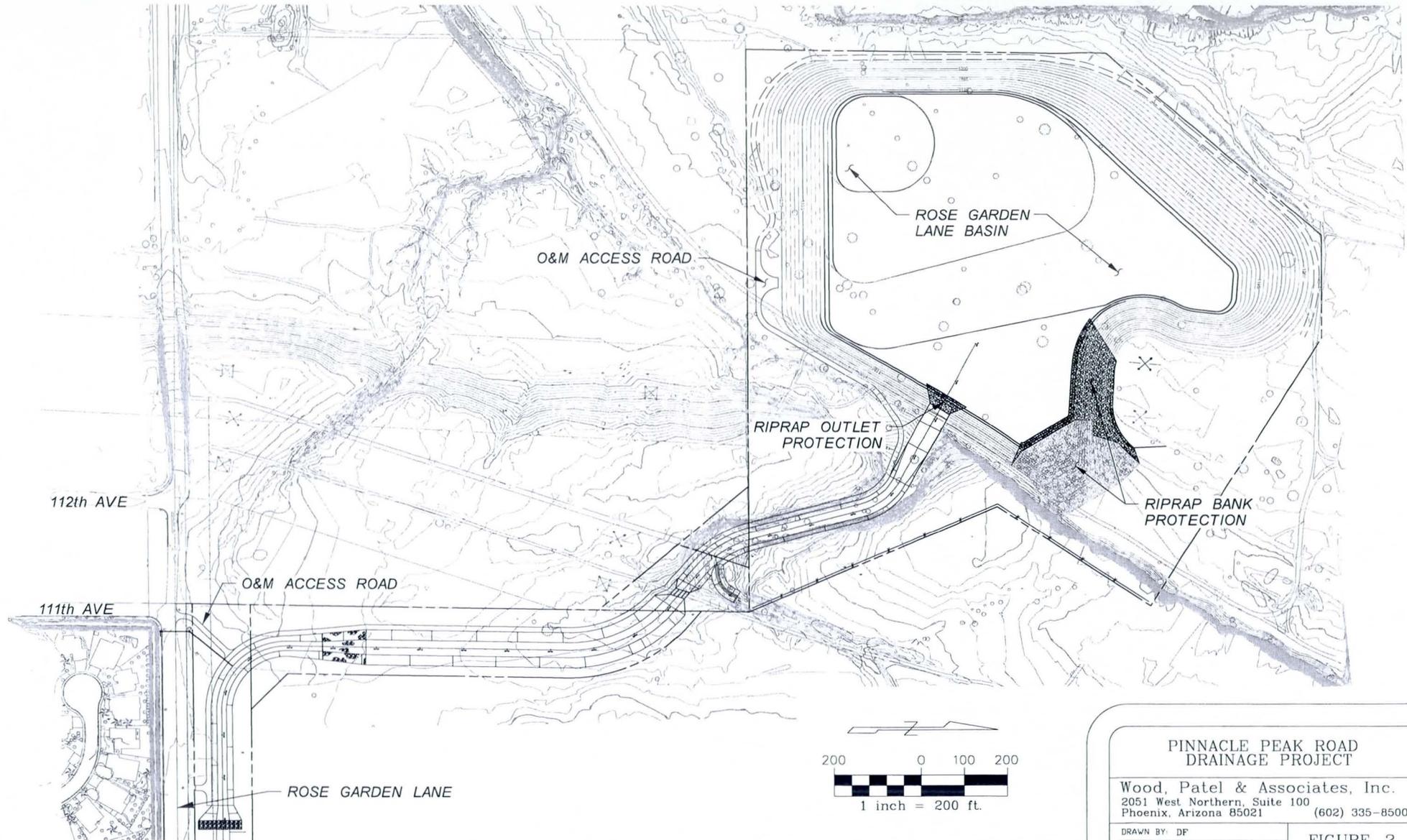
**PINNACLE PEAK ROAD
DRAINAGE PROJECT**

Wood, Patel & Associates, Inc.
 2051 West Northern, Suite 100
 Phoenix, Arizona 85021 (602) 335-8500

DRAWN BY: DF	FIGURE 3
JOB NO: 093386	



PINNACLE PEAK ROAD DRAINAGE PROJECT	
Wood, Patel & Associates, Inc. 2051 West Northern, Suite 100 Phoenix, Arizona 85021 (602) 335-8500	
DRAWN BY: DF JOB NO: 093386	FIGURE 1



**PINNACLE PEAK ROAD
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DRAWN BY: DF	FIGURE 2
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DRAINAGE PROJECT**

CONTRACT FCD 2010C020

PCN 450.06.31

October 2011

WP #093386

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EXPIRES: 9/30/12

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EXPIRES: 9/30/12

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1.0 PURPOSE

In order to ensure a storm drain, channel and basin system that will function according to the intent of its design, a post-construction maintenance program that calls for regular and periodic maintenance of the various components of the systems is required. This document is intended to serve as a guide for maintenance personnel to perform the required proper maintenance of the Pinnacle Peak Road Drainage Project (PPRDP)

The PPRDP Maintenance Plan is divided into two parts and furnished in Appendix A and Appendix B. Appendix A contains the maintenance activities for the storm drain, channel and basin elements while Appendix B contains the maintenance plan for the landscaping elements of the project.

This document provides general guidance regarding anticipated maintenance activities required for the project and provides general guidelines for conducting maintenance activities for the elements of the PPRDP. The guidelines and activities noted in this report are specific for this project only.

This report does not supersede any standard operating procedures established by the City of Peoria (COP), Flood Control District of Maricopa County (District), or the Maricopa County Department of Transportation (MCDOT). All maintenance activities conducted by the COP, District, or MCDOT shall comply with all existing and applicable national, state, and local codes, safety standards (OSHA), and protocols. The COP and the District have already established Best Management Practices (BMP's) that are implemented to meet stormwater quality requirements as part of the National Pollution Discharge Elimination System (NPDES) program. By way of reference, those applicable BMP's are incorporated into this report.

2.0 LOCATION & DESCRIPTION

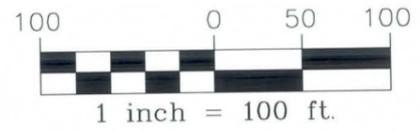
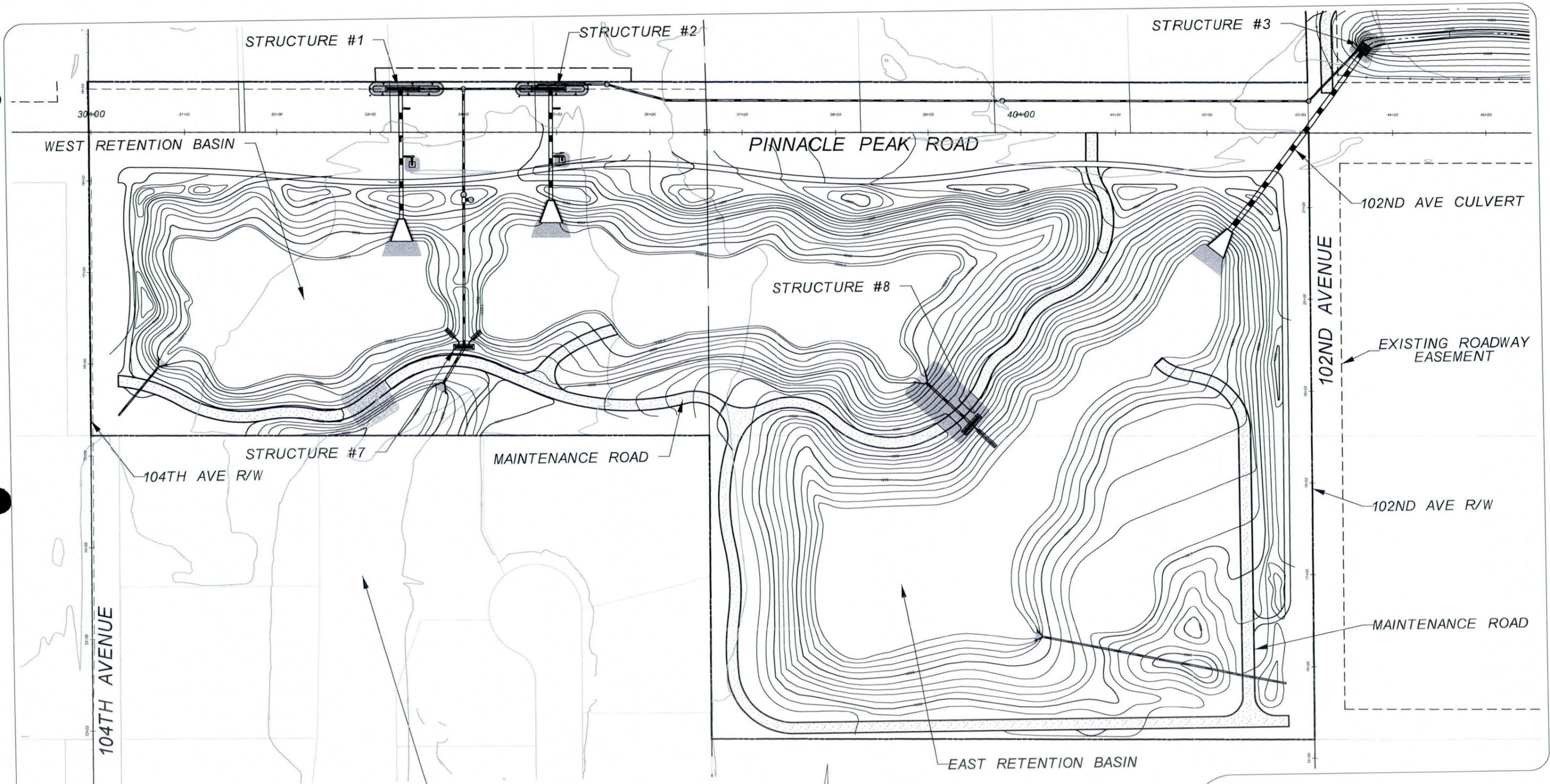
Pinnacle Peak Road is an east-west aligned roadway passing through northern Peoria within Maricopa County. The Pinnacle Peak Road Drainage Project limits are from 99th Avenue to 104th Avenue within Township 4 North, Range 1 East, and Sections 8 and 17.

The PPRDP system includes a roadside ditch beginning immediately west of 99th Avenue which conveys flows to a closed conduit system beginning west of 99th Lane. The closed conduit system conveys the flow to a box culvert under Lake Pleasant Parkway (LPP). The closed conduit system continues from the downstream end of the box culvert to 101st Avenue where it transitions back to an open channel to 102nd Avenue. Flow is then conveyed to the southwest under Pinnacle Peak Road within a culvert into a two basin retention system.

The east retention basin is located on a 10 acre parcel at the southwest corner of 102nd Avenue and Pinnacle Peak Road. A second basin, the west basin, is located on a 5 acre parcel adjacent to Pinnacle Peak Road and immediately west of the east basin. This basin serves to collect overland flows from the north as well as to accommodate overflow from the east basin in the design event. The overflow is collected and conveyed to the west basin through a grated spillway structure located between the basins. The basins have a combined storage capacity of 33 acre feet.

A bypass storm drain system intercepts initial base flows at the east and west basin inlets (10 cfs). These flows are conveyed through the west basin in a closed conduit and ultimately into the Ironwood channel corridor. In the design event a peak flow of approximately 19 cfs will flow from the west basin into the downstream Ironwood channel via a grated spillway structure located immediately upstream of the channel. Figure 1 illustrates the project location and drainage systems.

Figure 2 illustrates the location of the Rose Garden Lane retention basin in the Agua Fria River, near 112th Avenue and Deer Valley Road alignments, which was modified with this project. Modifications included deepening the retention basin approximately two feet, adding additional riprap protection along the basin slope downstream of existing and future APS towers, regrading, and increasing the size of the riprap pad at the Rose Garden Lane channel outlet into the basin. Therefore, maintenance of the Rose Garden Lane Basin is included in this report.

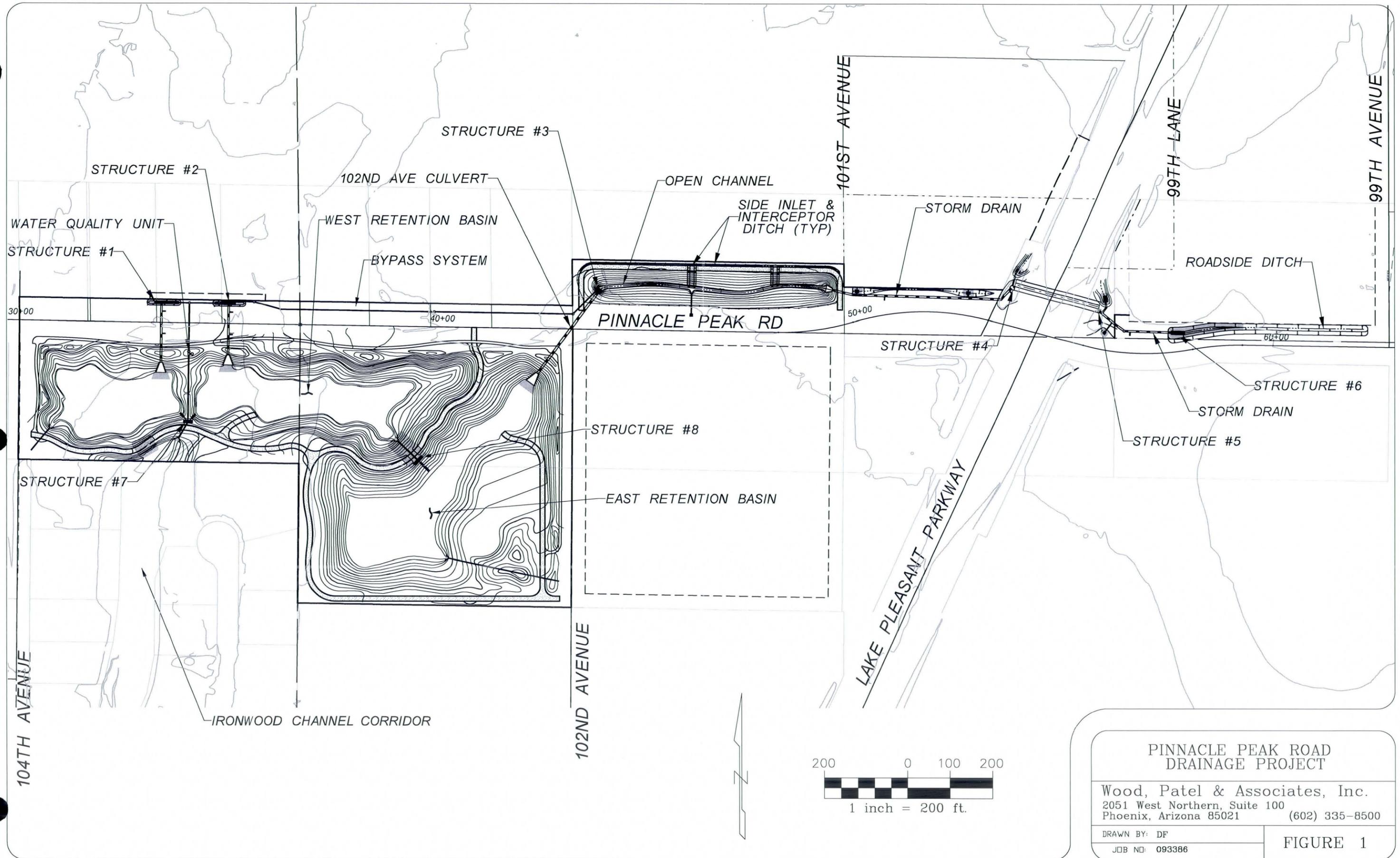


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FIGURE 3



PINNACLE PEAK ROAD
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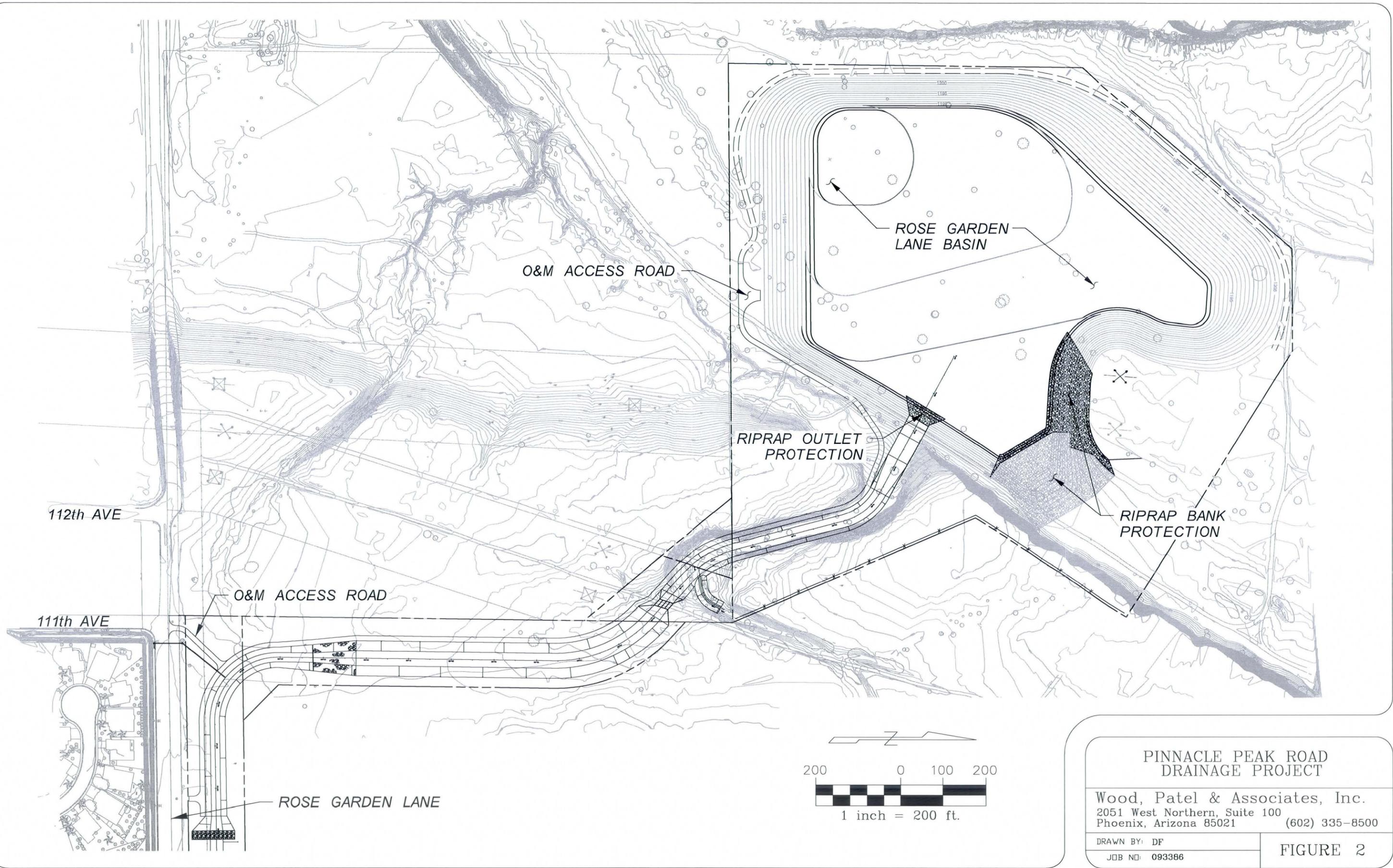
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FIGURE 1

3.0 RIGHT-OF-WAY

The PPRDP is constructed within acquired right-of-way for the project within the City of Peoria and Maricopa County. Drainage right-of-way was acquired for the basins at the southwest corner of Pinnacle Peak Road and 102nd Avenue. The basins can be accessed from Pinnacle Peak Road, 102nd Avenue and 104th Avenues (See Figure 3). The Rose Garden Lane basin can be accessed from Rose Garden Lane at the 111th Avenue alignment.



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FIGURE 2

4.0 SYSTEM COMPONENTS

The PPRDP consists of the following major components, each of which are described below and are shown in Figure 1:

- 1) **Grated Inlet Structure within roadside ditch east of LPP (Structure #6)** – A grated inlet drop structure into a 48-inch storm drain is located within the roadside ditch east of LPP within the Pinnacle Peak Road right-of-way. The raised inlet grates prevent large debris from entering the storm drain as well as prevent unauthorized access. This facility can be accessed directly from Pinnacle Peak Road.
- 2) **Pinnacle Peak Road Storm Drain** - The Pinnacle Peak Road storm drain varies from 48-inch to 54-inch and extends from the channel east of LPP to the channel west of LPP and contains grated inlets to collect off-site runoff at various locations both east and west of LPP. The storm drain can be accessed at the inlet and outlet ends, at manholes east and west of LPP and a junction structure (Structure #4) just west of LPP. The junction structure contains a manhole shaft to provide access.
- 3) **102nd Avenue Culvert** – A 60-inch pipe culvert drains the channel west of LPP to the east retention basin. A drop inlet structure (Structure #3) on the culvert inlet within the channel contains a trash rack cover to prevent large debris from entering the storm drain as well as prevent unauthorized access.
- 4) **East Retention Basin** - The east retention basin can be accessed from Pinnacle Peak Road, 102nd Avenue, and the maintenance road that runs along the basin top. The maintenance road on the eastern side provides access to the basin bottom. The basin contains a perforate PVC bleed-off pipe and a grated inlet structure (Structure #8) for overflow on the western side slope which outlets into the west retention basin.
- 5) **West Retention Basin** – The west basin can be accessed from Pinnacle Peak Road, 104th Avenue, and the maintenance road along basin top, which also provides access to the basin bottom. The basin contains perforate PVC bleed-off pipes and a grated inlet structure (Structure #7) for overflow on the southern side slope, which outlets into Ironwood channel.

- 6) **Grated Inlet Structures at 103rd Drive to West Basin** – Two grated inlet structures (Structures # 1 & 2) are located north of Pinnacle Peak Road in the area of 103rd Drive. The inlet structures collect off-site flow that is conveyed to the west basin through 48-inch pipes.
- 7) **Bypass Storm Drain System** - The bypass storm drain system inlets at Structure #3, runs west to a manhole at 103rd Drive, turns south and runs to a water quality unit south of Pinnacle Peak Road, and outlets into Ironwood channel.
- 8) **Water Quality Unit** - The water quality unit treats the bypass flow and is located between Pinnacle Peak Road and the west retention basin. Appendix C provides maintenance requirements to be provided by the Contractor subsequent to installation.
- 9) **Side Channel Inlets and Collector Ditch** - Collector ditches are located upstream of the channels to collect overland flows and convey them in to side channel inlets which direct these flows into the channels.
- 10) **Rose Garden Lane Retention Basin** - The Rose Garden Lane retention basin can be accessed from Rose Garden Lane at the 111th Avenue alignment and the maintenance road along the top of the basin. The basin bottom can be accessed along the south side of the basin where the side slope is 10 horizontal to 1 vertical. The basin contains loose riprap protection at the Rose Garden Lane channel outlet and along the slope at the northeast corner of the basin.

APPENDIX A

Pinnacle Peak Road Drainage Project Maintenance Plan

Removing obstructions that reduce the ability of water to enter the storm drain system and the removal of accumulated sediment from the system are the primary tasks directed by the maintenance plan. Obstructions tend to collect at the grates and openings of the storm drain, clogging and reducing the area of the inlet opening and preventing the storm drain from operating at its design capacity. Accumulated sediment can reduce the conveyance of the channels, storage capacity of the basins, and accumulate within the storm drain adversely impacting the performance of the entire system.

Routine Inspection and Cleaning

- 1) Inspect and clean as needed, all area inlets and catch basins annually or before the sump is 40% full.
- 2) Stencil catch basins per standard BMP (e.g.: "Rain only in the Drain").
- 3) Inspect and clean as needed, all area inlets and catch basins after major storm events and in known problem areas more than once a year.
- 4) Inspect and clean as needed, all storm drain pipe systems and channels in known problem areas more than once a year.
- 5) Develop flushing schedule of the storm drain based on experience gained over time and from amount of debris and sediment accumulation in the storm drain.
- 6) Culvert inlets and outlets should be inspected for sedimentation buildup that inhibits the flow or alters the grade. Remove any trash that is hung-up on interior culvert walls and sediment that might be deposited in the culverts. Inspect and clean storm drain inlet grates and outlet access barriers as needed.
- 7) Cleaning activities may occur on a year round basis; however, known problem areas shall be targeted prior to the rainy season which correspond to summer monsoon (July through September) and the winter rainy season (November through March).
- 8) Inspect and clean as needed, all storm drain facilities and channels that have been affected by emergency response activities (fire response, hazmat response, etc).
- 9) Remove and transport collected solid waste debris and sediment to landfill.

- 10) Inspect the east, west and Rose Garden Lane retention basin for sediment deposition and debris and clean as needed. If sediment buildup occurs to an average depth of 1 foot or greater, remove sediment using standard practices. Inspect side slopes for erosion and deterioration and repair as needed. Make note of signs of off-road vehicle activity (ATVs, motorcycles, etc.) and damages caused by such activity. Inspect the overflow structures (Structure #7 & #8) for sediment deposition and debris and clean as needed. Inspect the outlet pipes for debris and clogging. Make appropriate repairs if necessary. Inspect basins during major flow events and after drawdown of flood pool.
- 11) Inspect the channels east and west of LPP for sediment deposition and debris and clean as needed. If sediment buildup occurs to an average depth of 1 foot or greater, remove sediment using standard practices. Inspect side slopes for erosion and deterioration and repair as needed. Make note of signs of off-road vehicle activity (ATVs, motorcycles, etc.) and damages caused by such activity. Make appropriate repairs if necessary. Inspect channels during and after major flow events.
- 12) Routinely inspect and clean, as needed, key structures including: Structure #1 (West Grated Inlet), Structure #2 (East Grated Inlet), Structure #3 (Grated Drop Inlet), Structure #4 (LPP Box Extension, West), Structure #5 (LPP Box Extension, East), and Structure #6 (Grated Inlet). Structure #5 can be accessed from Structure #4. The locations of these structures are shown on Figure 1. Remove debris and sediment accumulation from the invert of these structures.
- 13) Routinely inspect and clean, as needed, the water quality unit per the maintenance manual in Appendix C.
- 14) Inspect and clean as needed headwall safety railings and access barriers. Check structural integrity of railings and barriers and bolts. Paint as needed.
- 15) Conduct storm drain video survey on an annual basis
- 16) Check for illicit discharges to the storm drains, catch basins, and inlets as part of the routine annual condition survey.
- 17) Inspect all gates and roads at least once each year, and replace posts and appurtenances, as needed. Repairs should be made as soon as possible to continue to protect the property against unauthorized access.

- 18) All gates should be closed and, when appropriate, locked.
- 19) Maintain the access road along the channels and basins in drivable condition. Remove any obstructions to the passage of vehicles and add fill as needed to prevent ponding of water. Shoulder erosion within 1 foot of any designated maintenance road more than 8" wide and 12" deep shall be repaired. Any sheer drop offs of more than 4" shall be repaired. Any depressions in the roadway of more than 4" inches deep within an area of less than 24" inches across and any settlement of more than 6" inches over an area of less than 12 feet across shall be repaired.
- 20) Concrete shall be visually inspected for spalls, cracks, misalignment, or structural breakage. Spalls in concrete deeper than 1-inch and cracks more than 0.25 inch, misalignments of more than 0.5 inch, and any structural breakage shall be measured and repaired.
- 21) Exposed joints shall be visually inspected. Any joints where the sealing compound or joint filler is missing shall be repaired with materials similar to that used in the original construction. Any joints found to have opened more than 1-inch shall be measured and promptly repaired.
- 22) Inspect structures for the evidence of vandalism. The surface shall be cleaned of any markings or, if necessary, markings shall be covered with paint specified in Section 790 of the Special Provisions. If concrete components have been damaged or broken, make concrete patching and repairs to restore the original form and function. It is extremely important to quickly re-establish concrete cover over steel reinforcing bars so that corrosion does not take place. If steel corrosion has occurred, further chipping of concrete may be needed to get to un-corroded zones before patching is done.
- 23) All railing shall be visually inspected and repaired or replaced if it is damaged or improperly removed. All painted surfaces shall be cleaned and painted when rust starts to appear or the paint system shows signs of peeling or heavy oxidation. Paint shall be in accordance with Section 530 of the Special Provisions. Bent railing should be returned to the original shape unless the bending is major. Be watchful for cracks in the coating if bending is done and repair the coated surfaces. If railing needs to be replaced make sure that it matches Detail 1, sheet L4.06 of the As-Built construction drawings.
- 24) The east and west Pinnacle Peak Road retention basin and all channel bank slopes should be physically inspected and observations made for any rills. Any rills in the banks of more than 4"

inches deep should be filled with gravel mulch and re-compacted and regraded to match the as-built basin geometry.

- 25) After flow events within the Agua Fria River, the Rose Garden Lane basin should be inspected and any erosion to the basin banks should be repaired with native material, re-compacted to 95 percent (ASTM D698) and regraded to match the as-built basin geometry.
- 26) Any head-cutting into the basin banks should be repaired with native material, re-compacted to 95 percent (ASTM D698) and regraded to match the as-built basin geometry.
- 27) Barbless wire fencing along the east boundary of the Rose Garden Lane basin shall be visually inspected and repaired or replaced if it is damaged or improperly removed. Replaced fencing should match ADOT Standard Detail 12.10, Type 1.

Solid Waste Best Management Practices

- 1) Provide a referral and follow-up process between drainage systems operation and maintenance and illicit connection and illegal dumping investigation staff for problems found in the field.
- 2) Document any unusual flows observed during inspection (particularly dry weather flows) and the follow-up actions/referrals.
- 3) Check catch basins, inlets, channels, and basin site for signs of illegal dumping. Remove dumped wastes as appropriate. Post "No Dumping" signs if required.

Staff/Contractor Training and Coordination

- 1) Provide a referral and follow-up process between drainage systems operation and maintenance and illicit connection and illegal dumping investigation staff for problems found in the field.
- 2) Provide staff training for drainage systems operation and maintenance personnel at least once a year with emphasis on controlling storm water pollution through storm drain operation and maintenance.
- 3) Include provisions for stormwater pollution prevention in contract specifications for conducting drainage systems operation and maintenance.

Record Keeping and Evaluation

- 1) Maintain records tracking all cleaning activities. The records shall show when and which facilities have been inspected and cleaned. Spill and illegal dumping incidents and responses to both incidents shall also be documented and tracked.
- 2) Review the records annually to critique the effectiveness of drainage systems operation and maintenance activities. Modifications of drainage systems operation and maintenance activities shall be identified in the annual individual work plans.
- 3) Document any unusual flows observed during inspection (particularly dry weather flows) and the follow-up actions/referrals.

Operational Improvement, Structural Retrofit and Design Changes

- 1) Review the drainage systems operation and maintenance program annually and if needed, identify operational improvements, opportunities for structural retrofit and design changes.
- 2) Operation and maintenance provisions shall be included in planning and design phases of Capital Improvement Projects (for retrofit) to ensure that stormwater quality issues are considered in the design of drainage systems.

APPENDIX B

Landscaping Maintenance Plan

1.0 GENERAL

1.01 SCOPE

- A Provide all supervision, labor, materials, equipment and transportation required for continuous landscape maintenance, complete as specified.

1.02 QUALITY ASSURANCE

A Requirements of Regulatory Agencies:

1. Perform all work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such work.
2. Provide for all inspections and permits required by Federal, State, and local authorities in furnishing, transporting, and installing of all agricultural chemicals.
3. The County Agricultural Commissioner's Office must, by law, be given a monthly record of all herbicides, insecticides and disease control chemicals used.

B Applicable Standards: Apply standards as described in the following:

Arizona Nursery Association Current Standards

C Work Force:

1. The landscape maintenance provider shall have a full-time foreman assigned to the job. He shall have a minimum of four years experience in landscape maintenance supervision, with experience or training in entomology, pest control, soils, fertilizers and plant identification.
2. The landscape maintenance provider's labor force shall be thoroughly familiar and trained in the work to be accomplished and perform the task in a competent, efficient manner acceptable to the City of Peoria (City).
3. The work force shall be directly employed and supervised by the foreman. The work force shall be under supervision at all times. Notify the City of all changes in supervision.
4. The landscape maintenance provider's labor force shall have proper identification at all times and be uniformly dressed in a manner satisfactory to the City.

1.03 SUBMITTALS

Submit to the City for approval, two (2) copies each of the following items:

- A Schedule: Schedule of maintenance operations and monthly status report including list of all equipment and materials proposed to be used for the job and watering schedule.

- B Restricted Weed, Pest, and Disease Control Application Recommendations: Written application recommendation by a licensed agricultural pest control advisor for all weed, pest and disease controls restricted by the Director of Agriculture proposed for this work.
- C Licenses and Insurance: All licenses and insurances required by the City, the State, or Federal government pertaining to this work.
- D Chemicals: Monthly record of all herbicides, insecticides and disease control chemicals used for the project.
- E Site Conditions: Initial documentation of site conditions (included existing planting and irrigation system) with corrective recommendations, if any, and cost and schedule for corrections.
- F Maintenance Manual: Include in a single, 3-ring binder a landscape maintenance manual containing an indexed collection of all schedules, records and permits listed above, as well as a documentation of condition of planting, irrigation, and landscaping at each site visit recording plant materials which are damaged or dying, if any.

1.04 SCHEDULING & COORDINATION

- A Hours: Perform all maintenance during hours mutually agreed upon between the City and the maintenance provider.
- B Work Force: Work force shall be present at the project site as necessary to perform specified maintenance in accordance with the approved maintenance schedule.
- C Site Visits: Visit the site once a month for general maintenance. Frequency of site visits should be re-evaluated at the time of every visit as to whether or not the site needs to be visited more frequently.

2.0 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A Fertilizers:

Sierra Chemical Company
 1001 Yosemite Drive
 Milpitas, CA 95035
 (408) 263-8080

B Herbicides:

Chevron Chemical Company
 575 Market Street
 San Francisco, CA 94105
 (415) 894-0880

Rhone-Poulenc Chemical Company

Agro Chemical Division
P.O. Box 125
Mon Mouth Junction, NJ 08852
(201) 297-0100

Ciba-Geigy Corporation
Agricultural Division
P.O. Box 1830
Greensboro, NC 27419
(919) 292-7100

Elanco Products Company
740 S. Alabama St.
Indianapolis, IN 46285
(317) 261-3638

The DOW Chemical Company
P.O. Box 1706
Midland, MI 48640
(517) 636-0236

3M Company-Agri Chemicals Project
3M Center, Bldg. 223-6SE
St. Paul, MN 55144
(317) 261-3000

2.02 MATERIALS

- A General: The maintenance provider, unless otherwise indicated, shall provide all materials and equipment.
- B Water: As available from the City. Transport as required.
- C Fertilizers:
1. Tightly compressed slow-release and long lasting complete fertilizer tablets bearing manufacturer's label of guaranteed analysis of chemicals present.
 2. Balanced, once-a-season application controlled-release fertilizers with a blend of coated prills, which supply controlled-release nitrogen, phosphorus and potassium, and uncoated, rapidly soluble prills containing nitrogen and phosphorus.
- D Herbicides, Insecticides, and Fungicides: Best quality obtainable with original manufacturers' containers, properly labeled with guaranteed analysis. Use non-staining materials.
- E Replacement Tree Guys, Stakes, Ties and Wires: Match existing materials on the site (Provide detail(s) in 8-1/2 in. x 11 in. format if necessary).

2.03 EQUIPMENT

- A General: Use only the proper tool for each job. Maintain tools in sharp, properly functioning condition. Clean and sterilize pruning tools prior to usage.
- B Insect/Disease Prevention: Take measures to prevent introduction of insect or disease-laden materials onto the site.

3.0 GENERAL PLANT CARE

3.01 PREPARATION

- A Protection:
 1. Protect new planting areas from damage.
 2. Provide temporary protection fences, barriers and signs as required for protection. Posts and signs may need to be put up where people are driving or walking through the site.
 3. Maintain public access to trail segments and sidewalks. Evaluate if additional barriers such as fencing are needed to prevent people driving or walking through the site resulting in damage to the landscaping.
- B Replacements:
 1. Immediately treat or replace plants that become damaged or injured as a result of Maintenance Provider's operations or negligence, as directed by City, at no cost to the City.
 2. Replacement plants shall match size, condition and variety of plants replaced.

3.02 PLANTING

- A Watering Basins:
 1. Maintain watering basins around plants so that enough water can be applied to establish moisture through major root zones.
- B Weed Control:
 1. All areas between plants, including watering basins, shall be weed free.
 2. Use only recommended and legally approved herbicides to control weed growth.
 3. Avoid frequent soil cultivation that destroys shallow roots and breaks the seal of pre-emergent herbicides.

C Fertilization:

1. Recently installed plant materials: Verify from City month of actual completion date of planting installation including amount and type of applied fertilizers.
2. Established plant materials: Do not use complete fertilizers unless soil test shows specific nutrient deficiencies.

D Pruning:

1. Prune trees to select and develop permanent scaffold branches that are smaller in diameter than the trunk or branch to which they are attached, which have vertical spacing of from 18 to 48 inches and radial orientation so as not to overlay one another.
2. Prune trees to eliminate diseased or damaged growth, narrow V-shaped branch forks that lack strength and to reduce toppling and wind damage by thinning out crowns.
3. Prune trees to maintain growth within space limitations, maintain a natural appearance and to balance crown with roots.
4. No stripping of lower branches ("raising up") of young trees will be permitted.
5. Retain lower branches in a "tipped back" or pinched condition with as much foliage as possible to promote caliper trunk growth (tapered trunk). Cut lower branches flush with the trunk only after the tree is able to stand erect without staking or other support.
6. Do primary pruning of deciduous trees during the dormant season. Prune damaged trees or those that constitute health or safety hazards at any time of year as required.
7. Make all cuts clean and close or flush with the trunk, without cutting into the branch collar. "Stubbing" will not be permitted. Cut smaller branches flush with trunk or lateral branch. Make larger cuts (1 in. in diameter or larger) parallel to shoulder rings, with the top edge of the cut at the trunk or lateral branch.
8. Branches too heavy to handle shall be precut in three stages to prevent splitting or peeling of bark. Make the first two cuts 18 in. or more from the trunk to remove the branch. Make the third cut at the trunk to remove the resulting stub.
9. Do not prune or clip shrubs into balled or boxed forms.
10. Take extreme care to avoid transmitting disease from one infected plant to another. Properly sterilize pruning tools before going from one infected plant to all other plants.

E Staking and Guying of Trees:

1. Inspect stakes and guys at least every three (3) months to check girdling of trunks or branches, and to prevent rubbing that causes bark wounds. Eyescrews in specimen tree trunks are preferred to looped wire and hose.
2. Remove existing stakes or guys when trees attain a trunk caliper of 4 inches. Recommend replacement to City if trees are still unstable at this time.
3. Conform to the recommended industry standard procedures of staking and guying and as specified in the construction documents.

F Replacement of Plants: Immediately bring to the City's attention, all dead plants and those in a state of decline. Replacement plants shall be of a size, condition and variety acceptable to City, to be paid for by the City unless due to negligence of the Maintenance Provider.

Salvaged trees that die shall be replaced in like size and kind with a tree from the City of Peoria's salvaged tree nursery if available. Transport and transplant of the tree shall be paid for by the City unless tree loss was due to negligence of the Maintenance Provider. If no salvaged trees are available from the City of Peoria, the tree will be replaced by a tree of a size, condition, and variety acceptable to the City, to be paid for by the City unless due to Maintenance Provider negligence.

G Maintenance of Existing Plantings to Remain:

1. General: Conform to applicable paragraphs regarding pruning, watering, spraying and fertilizing of new plant materials as specified in this section.
2. Tall Pot Trees: Remove chicken wire cage from around individual tall pot trees when the tree bark is no longer tender and had become "rough". This is expected to occur when the Palo Verde, Ironwood and Mesquite tall pot trees have achieved a caliper of 2-1/2" at a height 1-foot above the ground. Desert Willow tall pots will achieve toughened bark approximately when the tree has achieved a caliper of 1-3/4" at a height 1-foot above the ground.
3. Symptoms: Be alert to symptoms of construction damage to existing plantings as evidenced by wilting, unseasonal or early flowering or loss of leaves, and insect or disease infestation due to declining vigor.
4. Notification: Submit in writing of evidences of declining vigor immediately upon discerning the problem. Take appropriate interim measures to mitigate the severity of the problem as specified in this section.
5. Proposal: Submit written proposal and cost estimate for the correction of all conditions before proceeding with permanent correction work.

3.03 GROWDCOVERS

- A Watering: Check for moisture penetration throughout the root zone at least once a month. Water as frequently as necessary to maintain healthy growth of groundcovers.
- B Weed Control:
 - 1. Control weeds, preferably with selective systemic herbicides.
 - 2. Minimize hoeing of weeds in order to avoid plant damage.
- C Fertilization:
 - 1. Recently installed plant materials: Verify with City actual completion date of planting installation and rate of prior application of fertilizers.
 - 2. New plant materials: Do not use complete fertilizers unless soil test shows specific nutrient deficiencies.
 - 3. Established Plant Materials: Do not use complete fertilizers unless soil test shows specific nutrient deficiencies.
- D Replacement: Replace dead and missing plants after obtaining City's agreement to pay for replacement. Damages due to Maintenance Provider's negligence shall be paid for without charge to the City.

3.04 HYDROSEED – (LIMITED AREAS, NOT CITY OF PEORIA MAINTAINED)

- A Watering: Initial watering of seeded areas will be done to maximize growth of seedlings. The Maintenance Provider shall water and perform soil preparation and reseeding as required to maintain a fully established stand of plants. The method of watering shall be the Maintenance Provider's responsibility. The Maintenance Provider may utilize an alternate hydroseed irrigation system to water those seed mix areas, which can be watered, by the system if approved and agreed upon by the City.
- B Protective Devices: Protective devices shall be provided as required to protect seeded areas from traffic. The Maintenance Provider shall repair and reseed areas damaged by traffic, erosion or poor germination and reseed to obtain successful germination based on the supplier's specified germination rates and species used.
- C Weed Control:
 - 1. Control weeds, preferably with selective systemic herbicides.
 - 2. Minimize hoeing of weeds in order to avoid plant damage.

3.05 INSECTS, PESTS, AND DISEASE CONTROL

- A Inspection: Inspect all plant materials for signs of stress, damage and potential trouble from the following:
1. Presence of insects, moles, gophers, ground squirrels, snails and slugs in planting areas.
 2. Discolored or blotching leaves or needles.
 3. Unusually light green or yellowish green color than normal green color of trees.
- B Personnel: Only licensed, qualified, trained personnel shall perform spraying for insect, pest and disease control.
- C Application:
1. Spraying for insect, pest and disease control shall be done only by qualified, trained personnel.
 2. Spray with extreme care to avoid all hazards to any person or pet in the area or adjacent areas.

4.0 IRRIGATION SYSTEM

4.01 GENERAL

- A Existing Damaged/Faulty Irrigation Items: Repair all damaged or faulty irrigation items documented at initial site visit. City shall approve estimate of costs for repairs prior to starting work.
- B Maintenance Provider Damages to System: Repair without charge to City all damages to system caused by Maintenance Provider's operations. Do all repairs within one (1) watering period.
- C Non-Maintenance Provider Damages to System: Report promptly to City all accidental damage not resulting from Maintenance Provider's negligence or operations.
- D Rainy Season Operation: Do not run the irrigation system during rainy season. Set and program automatic controllers for seasonal water requirements.
- E Soil Moisture Monitoring: Once a month, use a probe or other acceptable tool to check the moisture of representative plants' rootballs as well as its surrounding soil.

4.02 CLEANING AND MONITORING THE SYSTEM

- A Irrigation System Flushing: At least twice yearly remove end cap from each system and flush pipe lines of grit, dirt and gravel.
- B Pump Filter and Strainer Cleaning: Clean pump filter and strainer once a year and as often as necessary to keep the irrigation systems free of sand and other debris.
- C Irrigation System Monitoring: Continually monitor the irrigation systems to verify that they are functioning. Make program adjustments required by changing field conditions.

5.0 GENERAL MAINTENANCE

5.01 CLEANING

- A Landscape Waste and Mulch: Sweep walkways and trails. Remove all pruned materials, clippings, and leaves from the site. Remove any dead trees or shrubs found on site including capping off the water to the removal location. Landscape waste, including pruned material, clippings, leaves, removed vegetation, or other organic waste shall be composted at a location approved by the City of Peoria to be reused rather than disposed of at off-site landfills.
- B Trash: Pick-up and dispose of trash throughout the basin site.
- C Maintenance Containers: Remove from the site containers and evidence of maintenance activities.
- D Site Disturbance: Re-grade, rake out, and clean up any disturbed areas due to people driving or walking through the site. Posts and signs may need to be put up where people are driving or walking through the site. Evaluate if additional barriers such as fencing are needed to prevent damage to the landscaping resulting from people driving or walking through the site.

APPENDIX C

**Water Quality Unit Maintenance Manual
(To Be Inserted Post Construction
BaySaver Example Attached)**

BaySaver[®] Separation System

Maintenance Manual



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BaySaver® Separation System Maintenance Manual

One of the advantages of the BaySaver Separation Systems is the ease of maintenance. Like any system that collects pollutants, the BaySaver Separation Systems must be maintained for continued effectiveness. Maintenance is a simple procedure performed using a vacuum truck or similar equipment. The systems were designed to minimize the volume of water removed during routine maintenance, reducing disposal costs.

Contractors can access the pollutants stored in the manholes through two 30" manhole covers. This allows them to gain unobstructed access to the bottom of the manholes. There is no confined space entry necessary for inspection or maintenance.

Vacuum hoses can reach the entire sump area of both manholes to remove sediments and trash. The entire maintenance procedure typically takes from 2 to 4 hours, depending on the size of the system and the capacity of the vacuum truck.

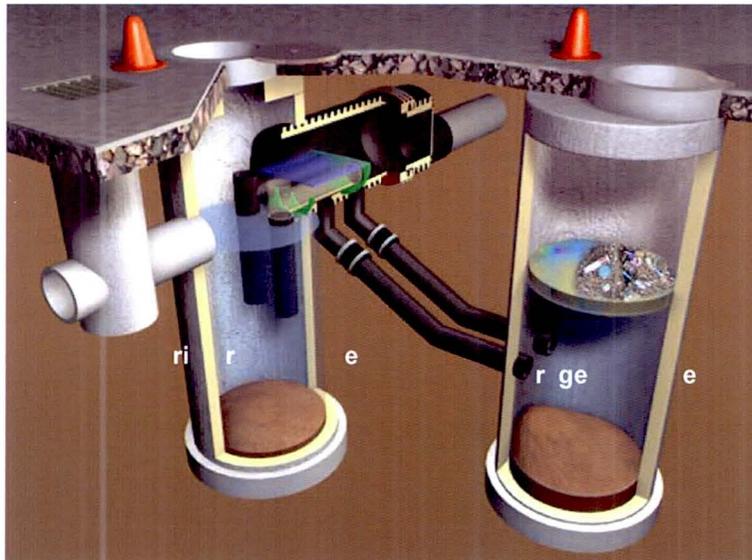
Local regulations may apply to the maintenance procedure. Safe and legal disposal of pollutants is the responsibility of the maintenance contractor. Maintenance should be performed only by a qualified contractor.

Inspection and Cleaning Cycle

Periodic inspection is needed to determine the need for and frequency of maintenance. You should begin inspecting as soon as construction is complete and thereafter on a quarterly basis. Typically, the system needs to be cleaned every 12 months.

The cycle may be less than 12 months if there is a chance that excessive oils, fuels or sediments will accumulate. That is why periodic inspection is important.

Figure 1: BaySaver System with stored pollutants in manholes



BaySaver® Separation System Maintenance Manual

Determining When to Clean

The system needs to be cleaned when 2 feet (0.6 meters) of sediment is accumulated at the bottom of either structure or when visual inspection shows a large accumulation of debris or oil.

Measuring Sediment Depth

You can determine the sediment depth by lowering a pole into the manhole until it hits the sediment and measuring the distance from the bottom of the pole to the water line mark on the pole. If this is less than 6 feet (1.8 meters), the system needs to be cleaned.

Summary

- You can access the pollutants through the 2 manhole covers.
- You can see the entire floor/sump area of each manhole from the surface.
- There is no confined space entry for inspection or maintenance.
- During maintenance, you can transfer water from the primary to the storage manhole, minimizing the amount of water for disposal.

Finding Information

- For the **manhole capacities** for the BaySaver models, **American standards**, see page 3.
- For the **manhole capacities** for the BaySaver models, **metric standards**, see page 4.
- For the **maintenance procedure**, see page 6.
- To see an **animated maintenance procedure**, visit our web site at www.baysaver.com.

Figure 2: Storage manhole with floating debris and oils



BaySaver® Separation System Maintenance Manual

**Table 1: BaySaver Separation System Manhole Storage Capacities
(American Standards)**

BaySaver Separation System Size	Total System Capacity	Sediment Capacity	Floatable Capacity
Inches	Gallons / (ft ³)	Yards ² / (ft ²)	Gallons / (ft ³)
1/2 K			
48 x 48	1122 / (150)	1.41 / (38)	187 / (25)
48 x 60	1445 / (193)	1.78 / (48)	239 / (32)
48 x 72	1830 / (245)	2.26 / (61)	307 / (41)
1K			
48 x 48	1503 / (201)	1.86 / (50)	277 / (37)
48 x 60	1922 / (250)	2.37 / (64)	359 / (48)
48 x 72	2438 / (326)	3.00 / (81)	456 / (61)
3K			
60 x 60	2348 / (314)	2.90 / (78)	441 / (59)
60 x 72	2865 / (383)	3.56 / (96)	539 / (72)
60 x 84	3478 / (465)	4.30 / (116)	651 / (87)
5K			
72 x 72	3381 / (452)	4.19 / (113)	636 / (84)
72 x 84	3994 / (534)	4.93 / (133)	748 / (100)
72 x 96	4697 / (628)	5.81 / (157)	883 / (118)
84 x 96	5311 / (710)	6.56 / (177)	995 / (133)
10K			
120 x 120	9395 / (1256)	11.63 / (314)	1758 / (235)

BaySaver® Separation System Maintenance Manual

Table 2: BaySaver Separation System Manhole Storage Capacities (Metric Standards)

BaySaver Separation System Size	Total System Capacity	Sediment Capacity	Floatable Capacity
Millimeters	(m ³)	(m ³)	(m ³)
1/2 K			
1219.2 x 1219.2	4.25	1.08	0.71
1219.2 x 1524.0	5.47	1.36	0.91
1219.2 x 1828.8	6.94	1.73	1.16
1K			
1219.2 x 1219.2	5.69	1.42	1.05
1219.2 x 1524.0	7.28	1.81	1.36
1219.2 x 1828.8	9.23	2.29	1.73
3K			
1524.0 x 1524.0	8.89	2.21	1.67
1524.0 x 1828.8	10.85	2.72	2.04
1524.0 x 2133.6	13.17	3.28	2.46
5K			
1828.8 x 1828.8	12.80	3.20	2.41
1828.8 x 2133.6	15.12	3.77	2.83
1828.8 x 2438.4	17.78	4.45	3.34
2133.6 x 2438.4	20.10	5.01	3.77
10K			
3048.0 x 3048.0	35.57	8.89	6.65

BaySaver® Separation System Maintenance Manual

Figure 3: *Storage manhole containing diesel fuel before pollutant removal:*

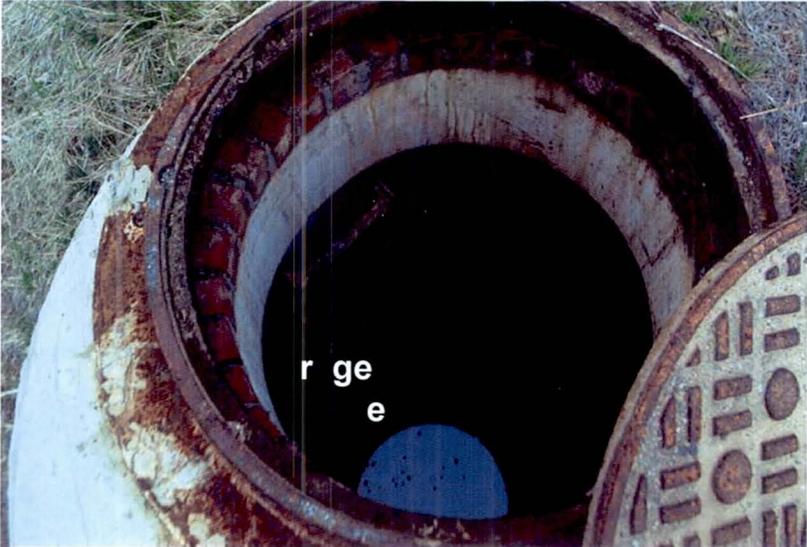
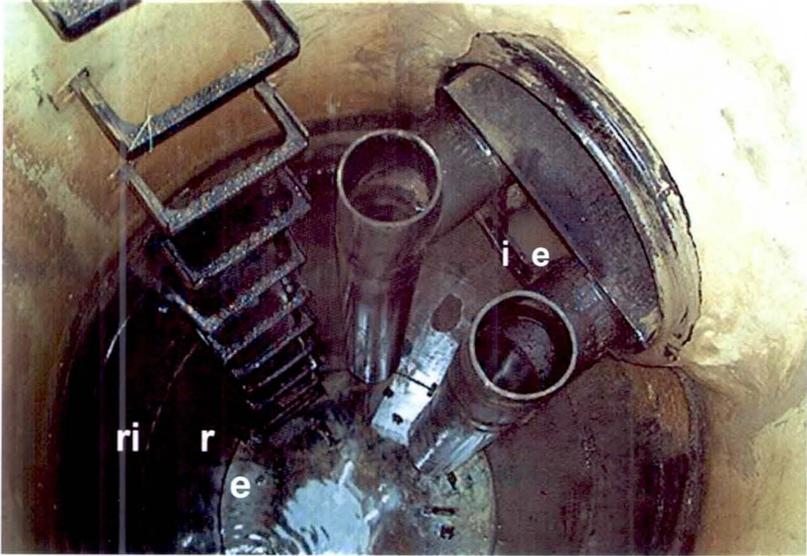


Figure 4: *Primary manhole with BaySaver unit after pollutant removal*



BaySaver® Separation System Maintenance Manual

Maintenance Instructions

Note: For each BaySaver System, there are 2 manholes to clean: the **primary manhole** and **storage manhole**.

1. Remove the manhole covers to provide access to the pollutant storage.
2. **Storage manhole:** Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment.
3. **Storage manhole:** Use a high pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. **Primary manhole:** Use a submersible pump to pump the bulk of the water from the primary manhole into the clean storage manhole:
 - a. Keep the pump intake below the water surface.
 - b. Stop pumping when the water surface is one (1) foot above the accumulated sediments.
5. **Primary manhole:** Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment.
6. **Primary manhole:** Use a high pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
7. **Primary manhole:** Fill the cleaned primary manhole with water until you have a depth of 8 feet (or 2.44 meters).
8. **Storage manhole:** Top off the storage manhole with water until you have a depth of 8 feet (or 2.44 meters).
9. Replace the two manhole covers.
10. Dispose of the polluted water, oils, sediment and trash at an approved facility.
 - Local regulations prohibit the discharge of solid material into the sanitary system. Check with the local sewer authority for authority to discharge the liquid.
 - Many places treat the pollutants as leachate. Check with local regulators about disposal requirements.

Important: Additional local regulations may apply to the maintenance procedure.

Figure 5: Vacuum truck and high pressure hose



6

How can you tell the primary from the storage manhole?

The **primary manhole** has the BaySaver unit with the T-pipes (see Figure 4).

The other manhole is the **storage manhole** (see Figure 3).

If you need further assistance or have any questions, please call **1-800-229-7283** or visit www.baysaver.com/system6.html