

MIRAVAL
SPECIFIC PLAN
CO23-96-1

Adopted by Ordinance #1998-41 June 16, 1998
Amendment Resolution 2006-332 Approved 12/12/06
Original document revised 12/06

RESOLUTION NO. 2006- 332

A RESOLUTION OF THE BOARD OF SUPERVISORS OF PIMA COUNTY;
RELATING TO ZONING IN CASE **CO23-96-01 MIRAVAL SPECIFIC PLAN**
LOCATED ON THE EAST AND WEST SIDES OF LAGO DEL ORO PARKWAY
SOUTH OF PINAL/PIMA COUNTY BOUNDARY; AMENDING THE SPECIFIC
PLAN SET FORTH IN ORDINANCE NO. **1998-41**.

The Pima County Board of Supervisors finds and declares that:

1. On June 7, 1996, the owner(s) of approximately 232 acres applied for a rezoning from RH, GR-1, and TR to SP (Specific Plan);
2. On May 6, 1997, the Pima County Board of Supervisors approved the Miraval Specific Plan, subject to standard and special conditions;
3. On June 16, 1998, the Board of Supervisors adopted Ordinance No. 1998-41, as recorded in Docket 10824 Page 1039, rezoning the approximately 232 acres shown on the attached Exhibit A map and described in specific plan case Co23-98-01 and memorializing the standard and special conditions;
4. On June 10, 2006, the owner(s) of 66.5 acres, which are Development Areas A, E, and G of the specific plan site as shown on Exhibit B (portions of tax parcels 222-02-0250, 222-02-062C, 222-02-062E, 222-02-0840), applied for a modification (non-substantial change) of the specific plan;
5. On August 1, 2006, the Board of Supervisors approved a modification (non-substantial change) of the specific plan for Development Areas A, E, and G as shown on the attached Exhibit B map subject to conditions; the amended conditions are applicable to the area shown on Exhibit B; and
6. The Miraval Specific Plan Section VI-I, Page VI-6 states the Specific Plan shall be administered and enforced in accordance with the provisions of the Pima County Zoning Code.

Now, therefore, be it resolved by the Pima County Board of Supervisors that:

Section 1. The Pima County Board of Supervisors hereby amends the Miraval Specific Plan to read as follows:

Page IV-1

IV. DEVELOPMENT REGULATIONS

...

B. Definitions

...

“Resort Villa: An individual, extended stay, pedestrian oriented, commercial resort unit having no attached parking or motor vehicle access and designed in such a way that it can be integrated into the facilities and operations of the resort. The units may be attached or detached, may include full kitchens and may be individually owned, leased, or rented.”

Page IV-2

IV. DEVELOPMENT REGULATIONS

...

E. Development Area Categories

1. Resort (Development Areas A, E, G)

a) Permitted Uses:

1. Resort;
2. Diagnostic and Residential Treatment Facility;
3. Golf Course and Maintenance Facilities;
4. Longevity Housing;
5. Accessory Structures;
6. Private Stable;
7. Resort Villa.

b) *Nonresidential development Standards:*

(1) Minimum ~~Lot~~ Site Area: None

(2) Minimum ~~Yard~~ Site Requirements:

- a) Front: Twenty feet;
- b) Side: Seven feet each;

- c) Rear: Twenty-five feet.
- d) Individual Resort Villa parcels: None.
- (3) Building Height Limitations:
 - a) Maximum Height: Twenty-four feet.
- (4) Parking: in accordance with Pima County Zoning Code;
- (5) Maximum Building Coverage: 60 percent.
Maximum Building Coverage within individual Resort Villa parcels: 100 percent. ...

Section 2. The Pima County Board of Supervisors hereby restates and amends, with additions shown underlined, the specific plan conditions of Ordinance No. 1998-41 for Development Areas A, E, and G of Miraval Specific Plan as shown on Exhibit B as follows:

1. Recording of a covenant holding Pima County harmless in the event of flooding.
2. Recording of the necessary development related covenants as determined appropriate by the various County agencies.
3. Provision of development related assurances as required by the appropriate agencies.
4. Prior to the preparation of the development related covenants and any required dedication, a title report (current to within 60 days) evidencing ownership of the property shall be submitted to the Department of Transportation, Real Property Division.
5. No building permits shall be issued based on the specific plan until all applicable specific plan requirements are satisfied and the Planning Official issues a Certificate of Compliance.
6. Transportation conditions:
 - A. A traffic study for the specific plan and Catalina area shall be provided by the property owner (s) for review and approval by the Pima County Department of Transportation and Flood Control District (DOT/FCD). The limits of study and scope of work shall be determined by DOT/ FCD. The results of the study will be used to establish the need for roadway improvements by the property owner(s) to area roads impacted by the specific plan development. The design, phasing and construction of any required roadway improvements will be subject to DOT/FCD review and approval.
 - B. All public or private drainage structures and roadways shall conform to Pima County Road and Street Standards. Design criteria including right-of-way widths, typical cross-sections, design speeds, paving, utility locations, design roadway slopes, access control, bike paths, pedestrian ways or sidewalks shall be subject to review and approval by DOT/FCD.

paving, utility locations, design roadway slopes, access control, bike paths, pedestrian ways or sidewalks shall be subject to review and approval by DOT/FCD.

7. Flood Control conditions:

A. All internal drainage improvements and any external drainage improvements required to mitigate drainage impacts caused by development of the specific plan as determined by required drainage studies shall be constructed at no cost to Pima County.

B. A conservation easement in favor of the Pima County Flood Control District (FCD) shall be recorded for the regulatory floodplain of the Canada del Oro Wash (CD) within 90 days of the adoption of this ordinance. The conservation easement shall require that the floodplain of the CDO shall remain in its present, existing natural state, with the exception that riparian vegetation or wetland enhancement may be allowed. Riparian vegetation enhancement or development shall require a floodplain use permit from the FCD.

C. A master drainage study shall be submitted for review and approval, which addresses the impacts, to propose and existing floodplains and infrastructure, and which identifies needed on and off site improvements, as well as identifying base flood elevations at the time the required master plat and/or development plan is submitted. Channel and drainage design shall be addressed and a meeting prior to submittal is recommended.

D. A riparian habitat mitigation plan is required for disturbance of Important Riparian Habitat and shall be completed by the master developer at the plat and/or development plan stage.

8. Wastewater Management condition:

The property owner or his agent must secure approval from the Pima County Department of Environmental Quality to use private on-site sewage disposal systems within the subject parcels. The Department of Environmental Quality will determine the time at which this project must connect to the existing public sewer.

9. Parks and Recreation condition:

A. A public trail access easement for the bed of the Canada del Oro Wash (CDO) shall be granted within 90 days of the approval of the specific plan.

B. A public trail easement 15 feet in width from Lago del Oro Parkway to the CDO, as previously described and agreed upon to be granted within the same time period.

C. The property owner shall provide a 50-foot corridor on the south bank of the CDO for future linear park development as an easement at first, with the property owner providing an agreement to dedicate a 50-foot corridor to Pima County within five years of the date of the Board of Supervisors' approval of the specific plan or at the time a master plat is submitted and approved, whichever occurs first. Pima County shall grant the property owner unrestricted access and recreation use across this dedicated strip.

D. All easements shall be granted within 90 days of the approval of this specific plan. The costs of surveying the easements shall be borne by the property owner.

E. Pima County shall work with the property owner to develop and implement an appropriate signage program for the trails that cross the subject area, with costs to be borne by Pima County.

10. The Miraval Specific Plan is restricted to no more than 226 dwelling units for the entire specific plan site. Development Area F shall not exceed 200 dwelling units and Development Area C shall not exceed 26 dwelling units. The specific plan shall be restricted to nonresidential development suitable for operation with a septic system until such time as sewer service is available to the site.

11. Prior to ground modification activities, an on-the-ground archaeological survey and appropriate mitigation measures shall be conducted on the subject property. A cultural resources mitigation plan for any identified archaeological sites on the subject property shall be submitted at the time of, or prior to the submittal of any tentative plat or development plan. The mitigation plan shall be prepared and reviewed as described in the Pima County Site Analysis Requirements.

12. All areas which are within one mile of the Coronado National Forest boundary shall be designated and reserved as natural open space.

13. An approved master plat shall be required prior to the approval of any subdivision plat or development plan or the issuance of a permit based on this specific plan. Prior to submittal of the master plat, this specific plan is subject to approval by the Planning Official, with the written concurrence of the directors of the Transportation and Flood Control District, Parks and Recreation, and Wastewater Management departments, of a master platting and improvements phasing schedule for the entire specific plan. This schedule shall reference the master studies necessary for preparation of the master plat and shall identify the necessary improvements and dedications (including roads, sewer, drainage, trails and open space).

14. Golf course irrigation shall be from a renewable water supply such as effluent, reclaimed water or Central Arizona Project water. Where effluent or reclaimed water is not physically available or cannot reasonably be made available, ground water use for golf course irrigation is permitted provided the ground water consumption by the golf course is offset when practicable through Central Arizona Project water replenishment or recharge (18.59.030.A.1).

15. Building heights shall be limited to 24 feet.

16. All buildings and walls shall be subject to the landscaping standards and finish, color and materials standards of subsection 18.77.040.E (Scenic Routes).”

17. Environmental Planning condition: The exotic and invasive plant species identified below shall be prohibited from Miraval Specific Plan Development Areas A, E and G, except inside the private units and yards of the resort villas.

Fountain grass (Pennisetum setaceum)

Buffelgrass (Pennisetum ciliare)

Johnson grass (Sorghum halapense)

Giant reed (Arundo donax)

Common crabgrass (Digitaria sanguinalis)

Pampas grass (Cortaderia selloana)

Red brome (Bromus rubens)

Mediterranean grass (Schismus spp.)

Tree of heaven (Ailanthus altissima)

African sumac (Rhus lancea)

Russian olive (Eleagnus angustifolia)

Salt cedar/Tamarisk (Tamarix pertandra & T. ramosissima)

Bermuda grass (Cynodon dactylon) excluding sod hybrid Bermuda

Lovegrasses (Eragrostis spp.) excluding Plains lovegrass (Eragrostis intermedia)

African rue (Peganum harmala)

Iceplant (Mesembryanthemem crystallinum)

Arabian Grass (Schismus arabicus)

Natal Grass (Melinis repens (-Rhynchelythrum repens)

Aquatics

Eurasian Watermilfoil (Myriophyllum spicatum)

Giant Salvinia (Salvinia molesta)

Hydrilla (Hydrilla verticillata)

Water hyacinth (Eichhornia crassipes)

Section 3.

1. No building permits shall be issued based on the rezoning approved by Ordinance 1998-41, as amended by this resolution until conditions 1 through 17 are satisfied for Development Areas A, E, and G as shown on Exhibit B and the Ordinance 1998-41 conditions 1 through 16 for the remaining area shown on Exhibit A, and the Planning Official issues a Certificate of Compliance.

2. The Miraval Specific Plan conditions may be amended or waived by resolution of the Board of Supervisors in accordance with Chapter 18.90 of the Pima County Zoning Code.

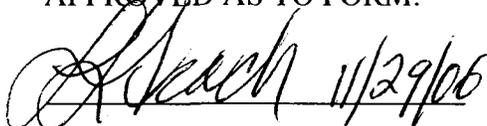
RESOLVED by the Board of Supervisors of Pima County, Arizona, this 12th day of
December, 2006.


Chairman of the Board of Supervisors
DEC 12 2006

ATTEST:


Clerk, Board of Supervisors

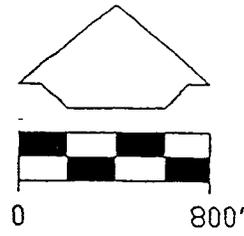
APPROVED AS TO FORM:


Civil Deputy County Attorney


Executive Secretary, Planning & Zoning Commission

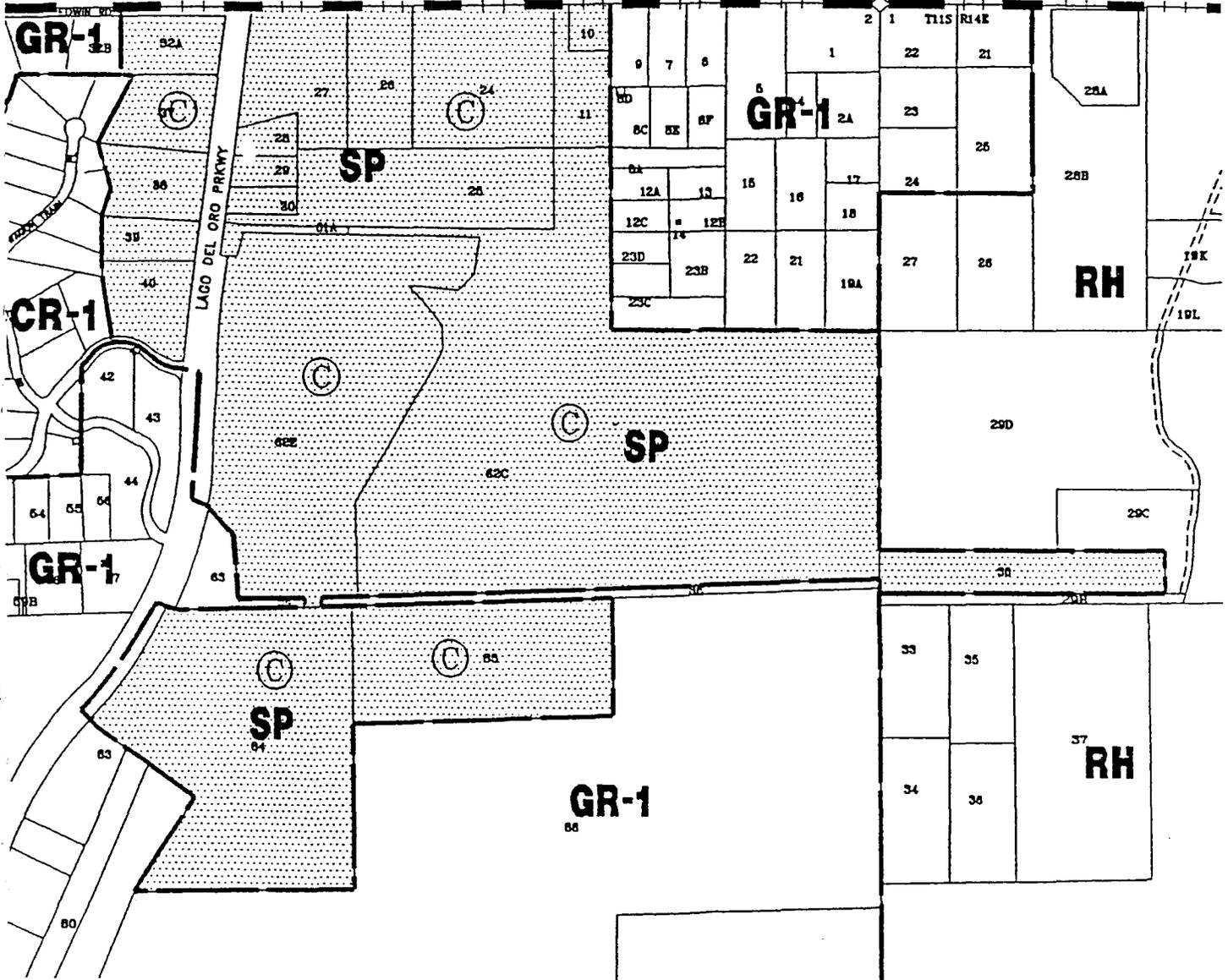
Exhibit A

AMENDMENT NO. 21 BY ORDINANCE NO. 1998-41
TO PIMA COUNTY ZONING MAP NO. 520 TUCSON, AZ.
PORTION OF SECTIONS 1 AND 2 OF T11S R14E.



ADOPTED 6-16-98 EFFECTIVE 6-16-98

PINAL COUNTY



J. Maggiano
EXECUTIVE SECRETARY PIMA COUNTY PLANNING AND ZONING COMMISSION

© NO BUILDING PERMITS WITHOUT CERTIFICATE OF COMPLIANCE
FROM RH, GR-1, & TR 231.21ac±
(RH 6.43ac±, GR-1 207.46ac±, TR 17.32 ac±)
sp-MAY 18, 1998

C07-89-2
C023-96-1

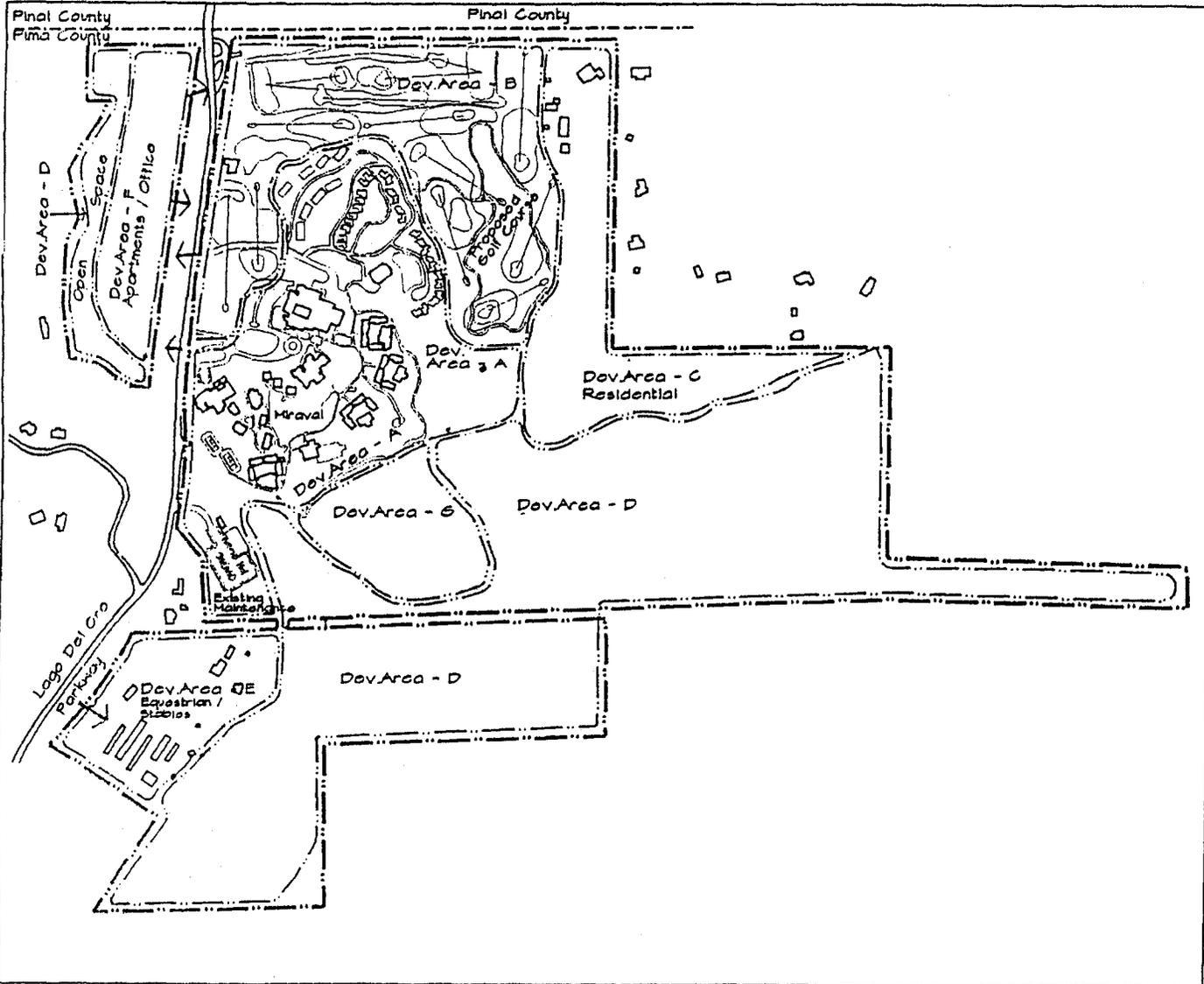
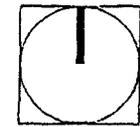


EXHIBIT III-C.2:
Land Use Plan

LEGEND

 Existing Structures

0 500' 1000'

 **THE PLANNING CENTER**
450 W. PASEO REDONDO, SUITE 202
TUCSON, AZ 85701 (520) 623-6144

MIRAVAL
SPECIFIC PLAN



P0230
PIMA CO CLERK OF THE BOARD
PICKUP
TUCSON AZ 85701

ORDINANCE NO. 1998- 41

AN ORDINANCE OF THE PIMA COUNTY BOARD OF SUPERVISORS; RELATING TO ZONING; ADOPTING THE MIRAVAL SPECIFIC PLAN; AND AMENDING PIMA COUNTY ZONING MAP 520.

The Pima County Board of Supervisors finds and declares that:

1. On June 7, 1996, the owners of approximately 232 acres (the "property") applied for a rezoning from RH, GR-1 and TR to SP; and
2. On May 6, 1997, the Pima County Board of Supervisors approved the Miraval Specific Plan (the "specific plan"), which rezoned the property.

Now, therefore, be it ordained by the Pima County Board of Supervisors:

Section 1. That the Specific Plan is hereby adopted, subject to the following conditions:

1. Recording of a covenant holding Pima County harmless in the event of flooding.
2. Recording of the necessary development related covenants as determined appropriate by the various County agencies.
3. Provision of development related assurances as required by the appropriate agencies.
4. Prior to the preparation of the development related covenants and any required dedication, a title report (current to within 60 days) evidencing ownership of the property shall be submitted to the Department of Transportation, Real Property Division.
5. No building permits shall be issued based on the specific plan until all applicable specific plan requirements are satisfied and the Planning Official issues a Certificate of Compliance.
6. Transportation conditions:
 - A. A traffic study for the specific plan and Catalina area shall be provided by the property owner(s) for review and approval by the Pima County Department of Transportation and Flood Control District (DOT/FCD). The limits of study and scope of work shall be determined by DOT/FCD. The results of the study will be used to establish the need for roadway

1 improvements by the property owner(s) to area roads impacted by the
2 specific plan development. The design, phasing and construction of any
3 required roadway improvements will be subject to DOT/FCD review and
4 approval.

5 B. All public or private drainage structures and roadways shall conform to
6 Pima County Road and Street Standards. Design criteria including right-of-
7 way widths, typical cross-sections, design speeds, paving, utility locations,
8 design roadway slopes, access control, bike paths, pedestrian ways or
9 sidewalks shall be subject to review and approval by DOT/FCD.

10 7. Flood Control conditions:

11 A. All internal drainage improvements and any external drainage
12 improvements required to mitigate drainage impacts caused by
13 development of the specific plan as determined by required drainage
14 studies shall be constructed at no cost to Pima County.

15 B. A conservation easement in favor of the Pima County Flood Control
16 District (FCD) shall be recorded for the regulatory floodplain of the
17 Canada del Oro Wash (CDO) within 90 days of the adoption of this
18 ordinance. The conservation easement shall require that the floodplain of
19 the CDO shall remain in its present, existing natural state, with the
20 exception that riparian vegetation or wetland enhancement may be allowed.
21 Riparian vegetation enhancement or development shall require a floodplain
22 use permit from the FCD.

23 8. Wastewater Management condition:

24 The property owner or his agent must secure approval from the Pima County
25 Department of Environmental Quality to use private on-site sewage disposal
26 systems within the subject parcels. The Department of Environmental Quality will
27 determine the time at which this project must connect to the existing public sewer.

28 9. Parks and Recreation conditions:

29 A. A public trail access easement for the bed of the Canada del Oro Wash
30 (CDO) shall be granted within 90 days of the approval of the specific plan.

31 B. A public trail easement 15 feet in width from Lago del Oro Parkway to the
32 CDO, as previously described and agreed upon to be granted within the
33 same time period.

34 C. The property owner shall provide a 50-foot corridor on the south bank of
35 the CDO for future linear park development as an easement at first, with
36 the property owner providing an agreement to dedicate a 50-foot corridor
37 to Pima County within five years of the date of the Board of Supervisors'
38 approval of the specific plan or at the time a master plat is submitted and
39 approved, whichever occurs first. Pima County shall grant the property
40 owner unrestricted access and recreation use across this dedicated strip.

41 D. All easements shall be granted within 90 days of the approval of this
42 specific plan. The costs of surveying the easements shall be borne by the
43 property owner.

1 E. Pima County shall work with the property owner to develop and
2 implement an appropriate signage program for the trails that cross the
3 subject area, with costs to be borne by Pima County.

- 4 10. The Miraval Specific Plan is restricted to no more than 226 dwelling units for the
5 entire specific plan site. Development Area F shall not exceed 200 dwelling units
6 and Development Area C shall not exceed 26 dwelling units. The specific plan
7 shall be restricted to nonresidential development suitable for operation with a
8 septic system until such time as sewer service is available to the site.
- 9 11. Prior to ground modification activities, an on-the-ground archaeological survey and
10 appropriate mitigation measures shall be conducted on the subject property. A
11 cultural resources mitigation plan for any identified archaeological sites on the
12 subject property shall be submitted at the time of, or prior to the submittal of any
13 tentative plat or development plan. The mitigation plan shall be prepared and
14 reviewed as described in the Pima County Site Analysis Requirements.
- 15 12. All areas which are within one mile of the Coronado National Forest boundary
16 shall be designated and reserved as natural open space.
- 17 13. An approved master plat shall be required prior to the approval of any subdivision
18 plat or development plan or the issuance of a permit based on this specific plan.
19 Prior to submittal of the master plat, this specific plan is subject to approval by
20 the Planning Official, with the written concurrence of the directors of the
21 Transportation and Flood Control District, Parks and Recreation, and Wastewater
22 Management departments, of a master platting and improvements phasing schedule
23 for the entire specific plan. This schedule shall reference the master studies
24 necessary for preparation of the master plat and shall identify the necessary
25 improvements and dedications (including roads, sewer, drainage, trails and open
26 space).
- 27 14. No grading or construction permits for the golf course shall be issued until the
28 applicant provides Pima County with a plan for recharging and recovering cap
29 water or effluent. Golf course irrigation shall be from a renewable water supply
30 such as effluent, reclaimed water or CAP water. Where effluent or reclaimed
31 water is not physically available or cannot reasonably be made available, ground
32 water use for golf course irrigation is permitted provided the ground water
33 consumption by the golf course is offset when practicable through CAP water
34 replenishment or recharge (18.59.030.A.1).
- 35 15. Building heights shall be limited to 24 feet.
- 36 16. All buildings and walls shall be subject to the landscaping standards and finish,
37 color and materials standards of subsection 18.77.040.E (Scenic Routes).
- 38
39

40 **Section 2.** That the Miraval Specific Plan, attached as Exhibit A (which has not been recorded but
41 may be viewed at the office of the Pima County Development Services Department - Planning
42 Division), is hereby adopted, subject to amendment by the specific plan applicant of Exhibit A, as
43 necessitated by Board of Supervisors' action.
44

1 **Section 3.** That the Legal Description of the Miraval Specific Plan is hereby shown in Attachment
2 B to this ordinance and incorporated herein by this reference.

3
4
5 **Section 4.** That Pima County Zoning Map 520 is hereby amended to the SP zone as shown on
6 the entitled "Amendment # 21 to Pima County Zoning Map 520", contained in Attachment
7 C to this ordinance and incorporated herein by this reference.

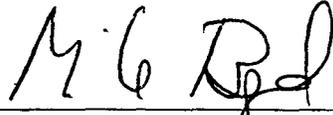
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9
10 **Section 5.** That this ordinance shall become effective on the day the last of the following occurs:

- 11
12 A. The Planning Official's certification that the Specific Plan document has been
13 revised to accurately reflect the amendments set forth by the Board of Supervisors.
14 B. The Planning Official's certification that the Surveyed Boundaries Map accurately
15 reflects the specific plan as approved.
16 C. Thirty-one days after the date the Chairman of the Board of Supervisors signs this
17 ordinance.
18

19
20 **Section 6.** Not more than 60 days after the Chairman of the Board of Supervisors signs this
21 ordinance, the Developer shall submit to the Planning Official the revised Specific Plan document
22 and an approvable Surveyed Boundaries Map.
23

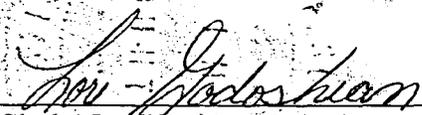
24
25 PASSED AND ADOPTED by the Board of Supervisors of Pima County, Arizona, this

26
27 16th day of June, 1998.

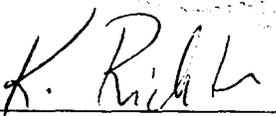
28
29
30 
31 _____
32 Chairman, Board of Supervisors

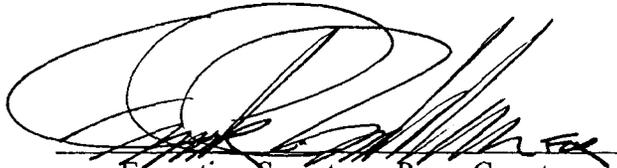
33 Date: JUN 16 1998

34
35
36 ATTEST:

37 
38 _____
39 Clerk, Board of Supervisors

40 APPROVED AS TO FORM:

41 
42 _____
43 Civil Deputy County Attorney

44 
Executive Secretary, Pima County
Planning and Zoning Commission

ATTACHMENT A
TO
MIRAVAL SPECIFIC PLAN

Attachment A is the Miraval Specific Plan document approved by the Pima County Board of Supervisors on May 6, 1997. The document is not recorded but may be viewed at the office of the Pima County Development Services Department, Planning Division, at the following address:

**County-City Public Works Building
201 N. Stone Avenue, 2nd Floor
Tucson, Arizona**

ATTACHMENT B
TO
MIRAVAL SPECIFIC PLAN

222-01-0300
222-02-0100
222-02-0110
222-02-0240
222-02-0250
222-02-0260
222-02-0270
222-02-0280
222-02-0290
222-02-0300
222-02-031A
222-02-032A
222-02-0370
222-02-0380
222-02-0390
222-02-0400
222-02-062C
222-02-062E
222-02-0840
222-02-0850

ATTACHMENT C
TO
MIRAVAL SPECIFIC PLAN

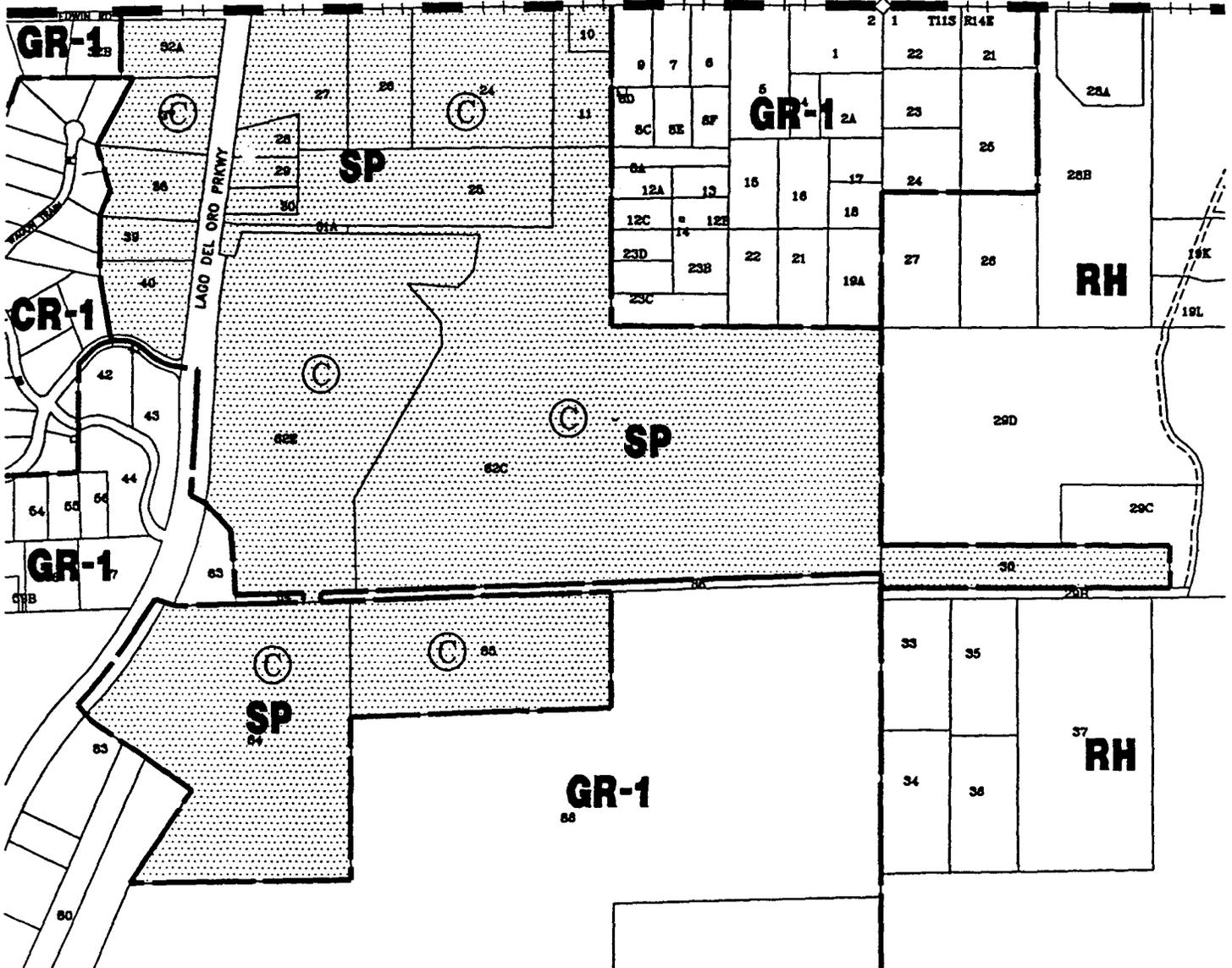
AMENDMENT NO. 21 BY ORDINANCE NO. 1998-41
 TO PIMA COUNTY ZONING MAP NO. 520 TUCSON, AZ.
 PORTION OF SECTIONS 1 AND 2 OF T11S R14E.



0 800'

ADOPTED 6-16-98 EFFECTIVE 6-16-98

PINAL COUNTY



J. Mazzucco

EXECUTIVE SECRETARY PIMA COUNTY PLANNING AND ZONING COMMISSION

© NO BUILDING PERMITS WITHOUT CERTIFICATE OF COMPLIANCE
 FROM RH, GR-1, & TR 231.21ac±
 (RH 6.43ac±, GR-1 207.46ac±, TR 17.32 ac±)
 sp-MAY 18, 1998

CO7-89-2
 CO23-96-1

Miraval Specific Plan

Prepared for:

Planning Division
Pima County Development Services Department
201 North Stone Avenue, 2nd Floor
Tucson, Arizona 85701

and

NextHealth
16600 N. Lago del Oro Parkway
Tucson, Arizona 85739

Prepared by:

The Planning Center
450 West Paseo Redondo
Suite 202
Tucson, Arizona 85701
(520) 623-6146

and

Rick Engineering
3443 N. Campbell Ave.
Tucson, Arizona 85719
(520) 795-1000

Co23-96-1

Final_{3/05}

Amended_{12/06} based on Reso. 2006-332

For Clarification of Material
Contained in this Report
Contact:

THE PLANNING CENTER
Michael Grassinger, Regional Manager
450 West Paseo Redondo
Suite 202
Tucson, Arizona 85701
Tel. (520) 623-6146
Fax (520) 622-1950

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I. INTRODUCTION

Miraval is a planned resort community, comprised of resort, residential, professional offices and support services, and recreational activity. Located in northern Pima County, the approximately 231-acre site straddles Lago del Oro Parkway between the Pinal County line and the Cañada del Oro Wash.

The Specific Plan project area includes portions of Township 11 South, Range 14 East, Sections 1 and 2. The legal description and Pima County Assessor tax parcel numbers are provided in Appendix A and B.

A large portion of the buildings and infrastructure described in this Specific Plan are already in place on the site. The uses currently on-site are Sierra Tucson, a diagnostic residential treatment facility for addiction and behavioral disorder treatment and the Miraval sanatorium.

This plan focuses on optimizing the site by enhancing the existing facilities and creating more recreational amenities. Natural open space and environmental preservation are considered amenities, and are of paramount importance in creating the Miraval experience.

The following Specific Plan was prepared in accordance with Pima County Zoning Code, Chapter 18.90, Specific Plans (revised 5/95); Chapter 18.91, Rezoning Procedures; and Pima County Site Analysis Requirements (revised 5/95).

II. SITE ANALYSIS AND INVENTORY

A. Existing Land Uses

1. Site Location in Regional Context:

The site encompasses approximately 231 acres straddling the Lago del Oro Parkway, just south of the Pinal County line. It is currently zoned TR Transitional and GR-1 Rural Residential. The majority of the site is in Township 11 South, Range 14 East, Section 2; Pima County, Arizona; with a small portion of the site in the adjacent Section 1. (see Exhibit II-A.1: Regional/Vicinity Map)

2. Existing Land Uses on Site:

A portion of the site operates as Sierra Tucson, a substance-abuse and addiction treatment and rehabilitation center. This use is permitted through Conditional Use Permits No. C00050935 for a Drug and Alcohol Treatment Center and No. C00050938 for Eating Disorders, both dated May 9, 1991.

Currently onsite are 175,000 square feet of buildings, including the diagnostic and residential treatment facilities, the eating disorder facility, an arrival center, a personal services center, patient and guest rooms, and related amenities and support services.

A house, a manufactured home, and equestrian facilities are also currently onsite. (see Exhibit II-A.2: Existing Land Uses).

The existing Comprehensive Plan categories on the site are:

RT Resource Transition
Resource Conservation
C0.3 Low Intensity Urban, 0.3 RAC
C1.2 Low Intensity Urban, 1.2 RAC
D Medium Intensity Urban

(see Exhibit II.A.3 Pima County Comprehensive Plan - Canada del Oro Subregion)

3. **Surrounding Property within 1/4 Mile Radius:**

a. Existing zoning within 1/4 mile radius of the site. (see Exhibit II-A.3: Existing Zoning)

North: Pinal County General Rural Zoning.

East: RH Rural Homestead.

West: GR-1 Rural Residential and CR-1, Single Residence.

South: GR-1 Rural Residential, RH Rural Homestead, and SR Suburban Ranch.

b. Existing Land Use within 1/4 mile radius of the site. (see Exhibit II-A.2, Existing Land Uses)

North: Vacant; Sierra Tucson Onsite Facility (in Pinal County).

East: Vacant; low density single family residences.

West: Vacant; low density single family residences.

South: Low density single family residences, horse stables and corrals, and a small unpaved airstrip.

Running through the southern half of the site is a narrow strip that was intended to be an easement for equestrian access to the State Land east of the subject property. NextHealth now owns a small portion of this strip, providing a linkage to the southern portion of the property.

The airstrip to the south of the site is currently only used occasionally for landing ultralight aircraft.

c. Building Heights:

No buildings within 1/4 mile of the site exceed two stories.

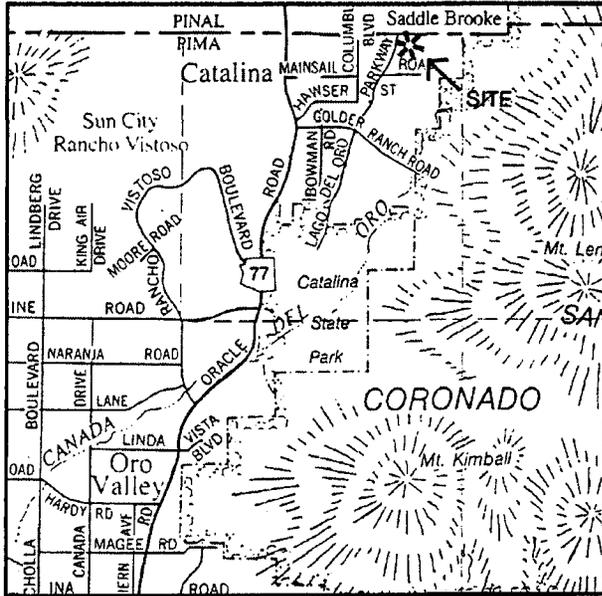
d. Pending Rezonings within 1/4 mile:

As of February 26, 1996, there are no pending rezonings within 1/4 mile of the site according to Pima County Planning and Development Services.

4. Well Sites

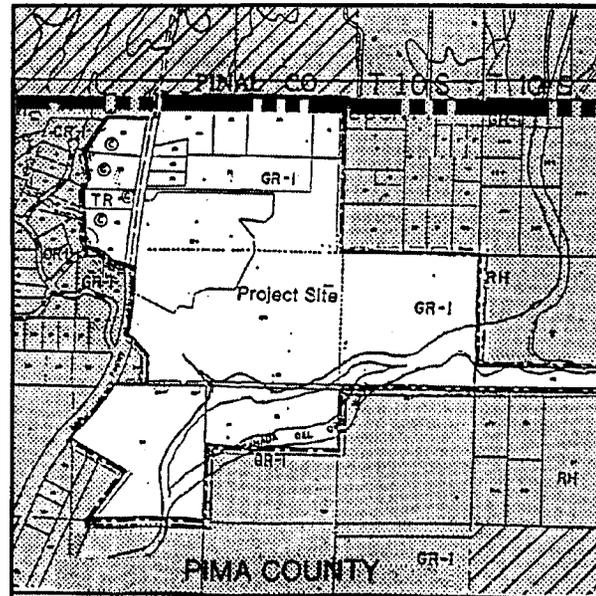
There are no wellsites within 100 feet of the site.

EXHIBIT II-A.1:
Regional / Vicinity Map



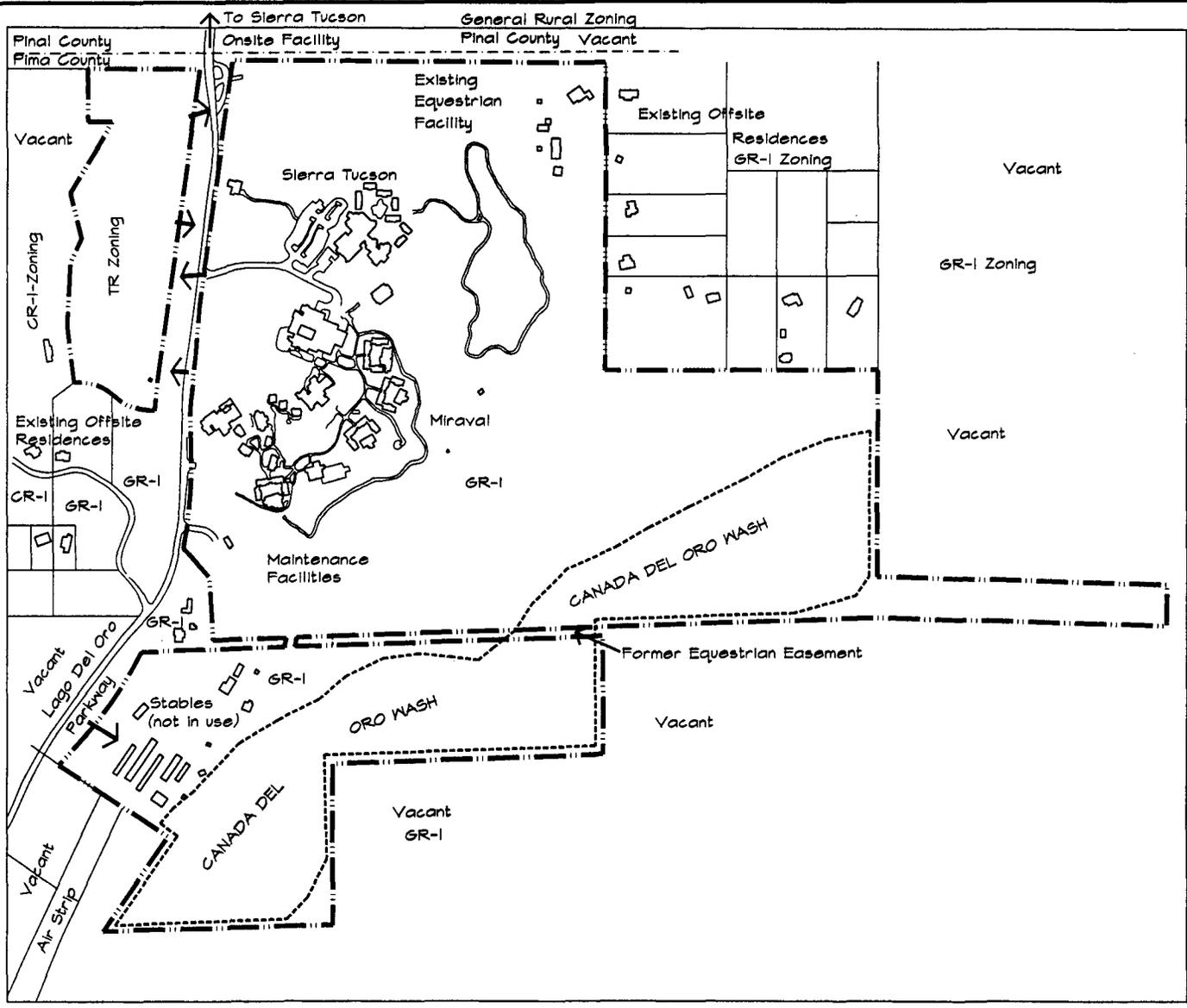
Regional Map

Vicinity Map



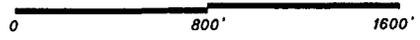
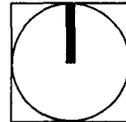
MIRAVAL
SPECIFIC PLAN

EXHIBIT II-A.2:
Existing Land Uses



LEGEND

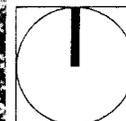
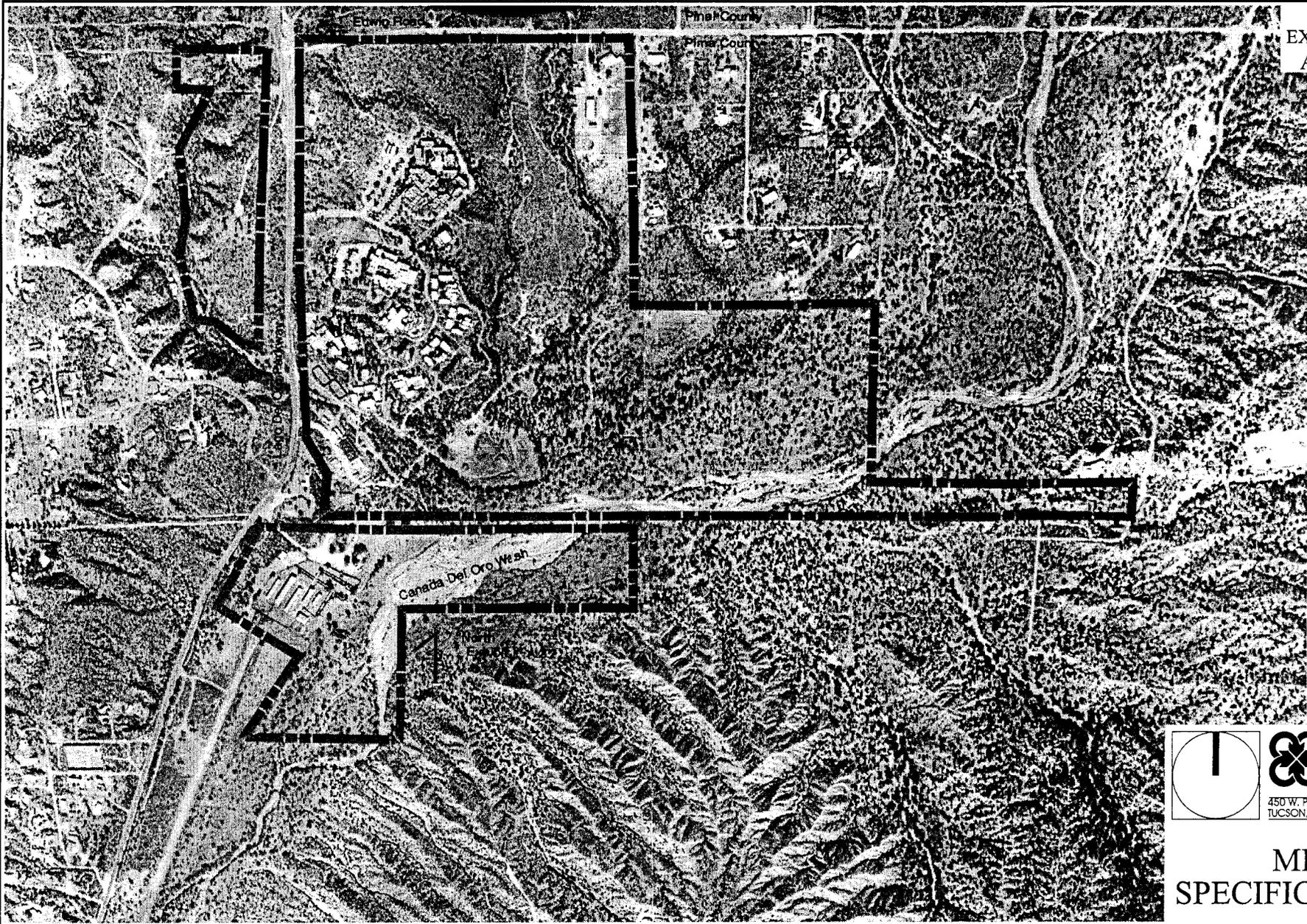
-  Existing Structures
-  Canada Del Oro Wash 100 year FEMA Floodway

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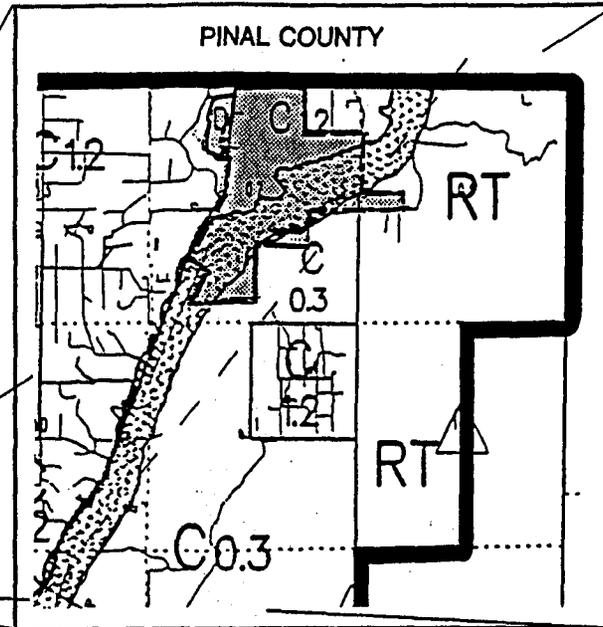
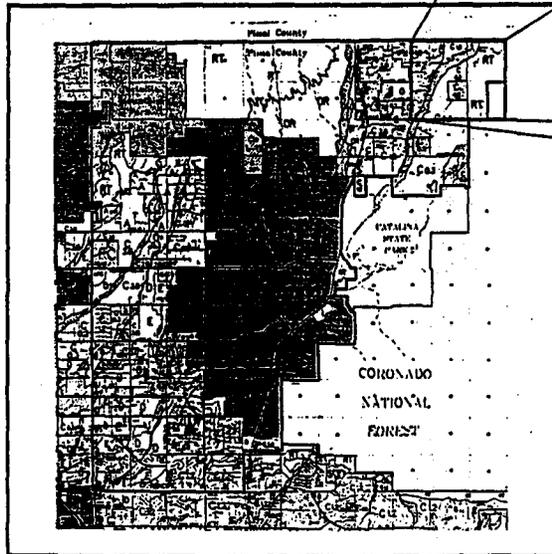
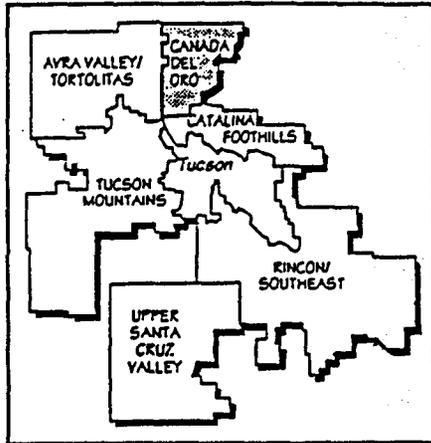
EXHIBIT II-A.2.2:
Aerial Photo



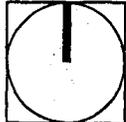
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EXHIBIT II-A.3
**Pima County
 Comprehensive Plan-
 Canada del Oro Sub-region**

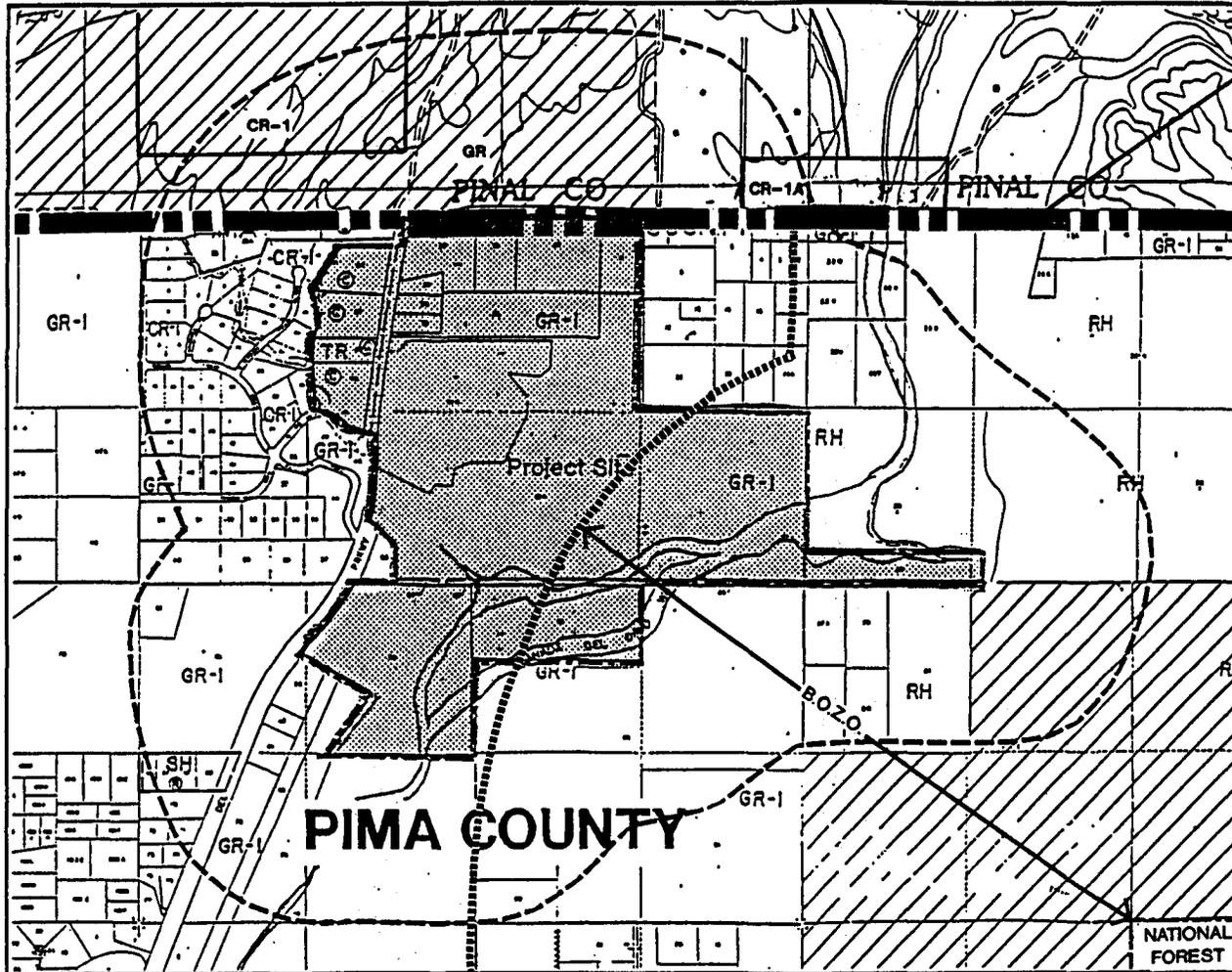


-  Medium Intensity Urban
-  Low Intensity Urban
1.2 RAC
-  Low Intensity Urban
0.3 RAC
-  Resource Transition
-  Resource Conservation
-  Project Site

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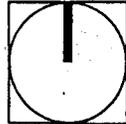
**MIRAVAL
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EXHIBIT II-A.4
Existing Zoning



LEGEND

-  Rural Homestead
-  Single Residence
-  Rural Residential
-  Transition Zone
-  Project Site
-  1/4 Mile Radius
-  One Mile Radius
(Bozo)

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B. Topography

1. Topographic Characteristics:

- a) Restricted Peaks and Ridges:
There are no restricted peaks or ridges on the site.
- b) Rock Outcrops:
There are no rock outcrops on the site.
- c) Slopes of 15% or greater:
There are several areas on the site where the slope exceeds 15%. Most of these areas are on the northern half of the site, especially along the western boundary of the site and the area around the intersection of Lago del Oro Parkway and the Pinal County line. Other steep sloping areas are found along the southwestern edge of the existing buildings, and in the far eastern portion of the site. These areas are mapped in Exhibit II-B.1, Topography.
- d) Other Significant Topographic Features:
The Cañada del Oro wash runs across the southern edge of the property.

2. Average Cross-Slope:

The average cross slope of the subject parcel is 8.4%. It was calculated using the following formula:

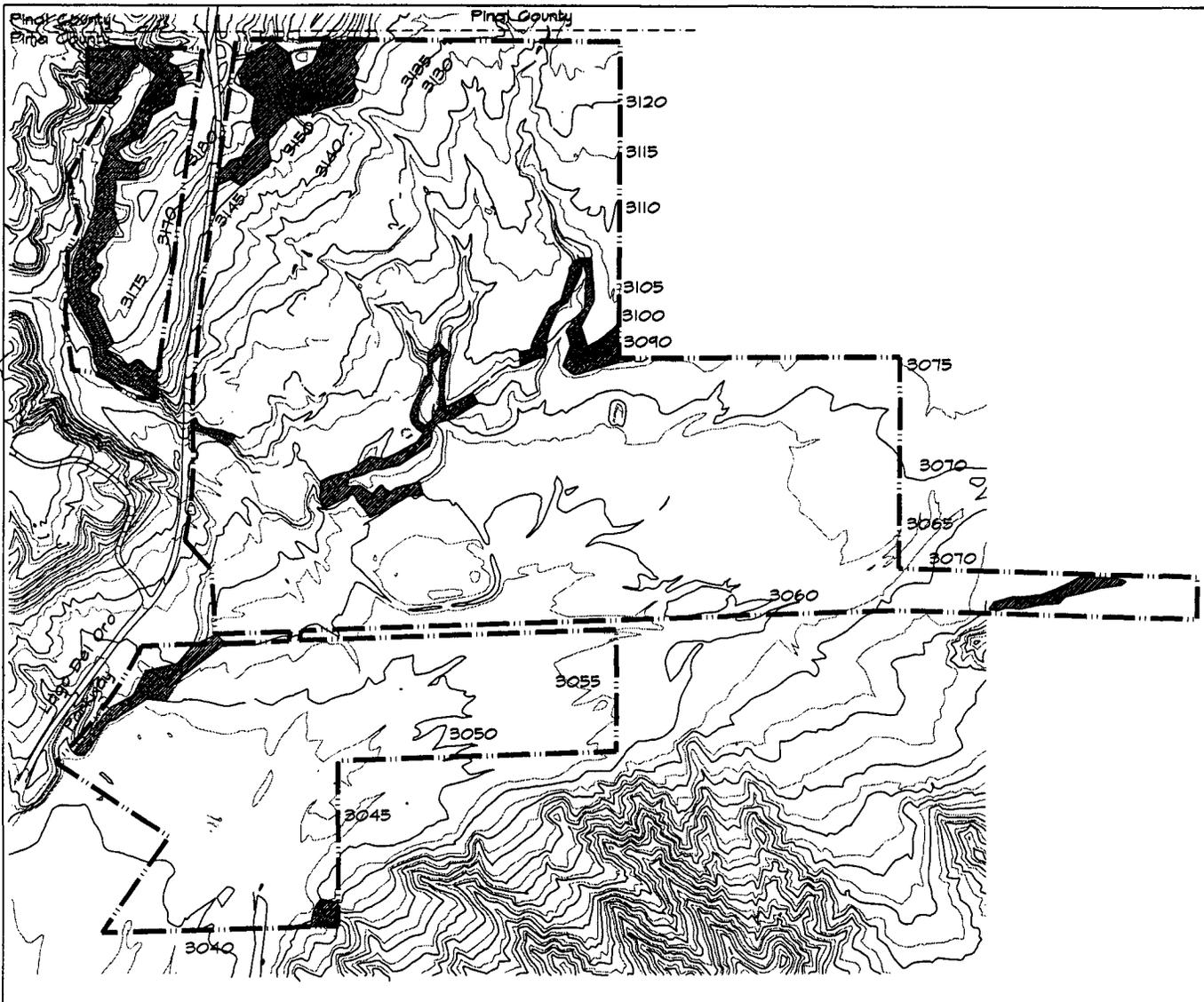
I = Contour line interval
L = Length of contour lines
A = Area in acres

$$\text{Average Cross-Slope} = \frac{I * L * 0.0023}{A}$$

I = 10
L = 78,192.94'
A = 231 acres

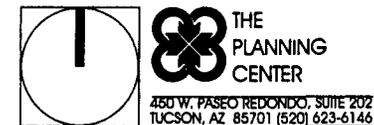
$$\frac{10 * 78,192.94 * 0.0023}{231} = 7.8\%$$

EXHIBIT II-B.1:
Topography



LEGEND

-  Slopes 15% & Greater
- Contour Interval - 5'



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C. Hydrology

1. Offsite Watershed:

There are seven offsite watersheds that impact this site from the north and east (see Exhibit II-C.1).

Six of the watersheds impact the site at the north property line and flow to the south. The watershed contributing areas vary from 7 to 200 acres with 100-year discharges ranging from 36 cfs to 740 cfs.

The six watersheds that flow north to south are tributary watersheds to the Cañada del Oro Wash, which is the seventh watershed. The Cañada del Oro Wash enters the site at the eastern property boundary and traverses the site along the southern property boundary.

The portion of the site west of Lago del Oro Parkway is located within a balanced basin, however the runoff is released directly to the Cañada del Oro, a major wash by definition.

2. Offsite Features that may Affect or be Affected by the Site:

The offsite watersheds are primarily natural and there are no significant natural or man-made drainage features that will affect or be affected by this project.

3. Upstream Watersheds with 100 Year Discharges Greater than 100 cfs:

Other than the Cañada del Oro wash, only four of the offsite watersheds generate 100-year peak flows that are large enough to be considered a regulatory discharge ($Q > 100$ cfs). Area A has a contributing area of 55 acres with a 100-year peak flow of 240 cfs at the north property line. Wash A leaves the site then re-enters at the western property line via an existing box culvert. The peak flow at the culvert is 740 cfs. Area C has an offsite watershed of 33 acres and generates 160 cfs at the northern property line in a 100-year storm. Area D has an area of 40 acres and a 100-year runoff of 180 cfs at Concentration Point D1 (See Exhibit II-C.1).

4. Onsite Hydrology:

The onsite hydrology is separated into two parts; the Cañada del Oro and the tributaries to the Cañada del Oro.

Cañada del Oro

- a. The estimated 100-year peak flow is between 10,000 and 15,000 cfs. The floodplain is mapped on Exhibit II-C.4. Due to the volume of the discharge, a 250 foot Erosion Hazard Setback is required by Pima County for areas without bank protection.
- b. The areas of sheet flooding are delineated as floodway fringe, with an estimated depth of 2-3 feet.
- c. The floodway and the floodway fringe are federally mapped and shown on FEMA "Floodplain Boundary and Floodway Map" 040073 0003, September 6, 1989.
- d. The peak discharge for the Cañada del Oro in the 100-year event increases 1000 to 1500 cfs while traversing the specific plan area .

Tributaries to the Cañada del Oro

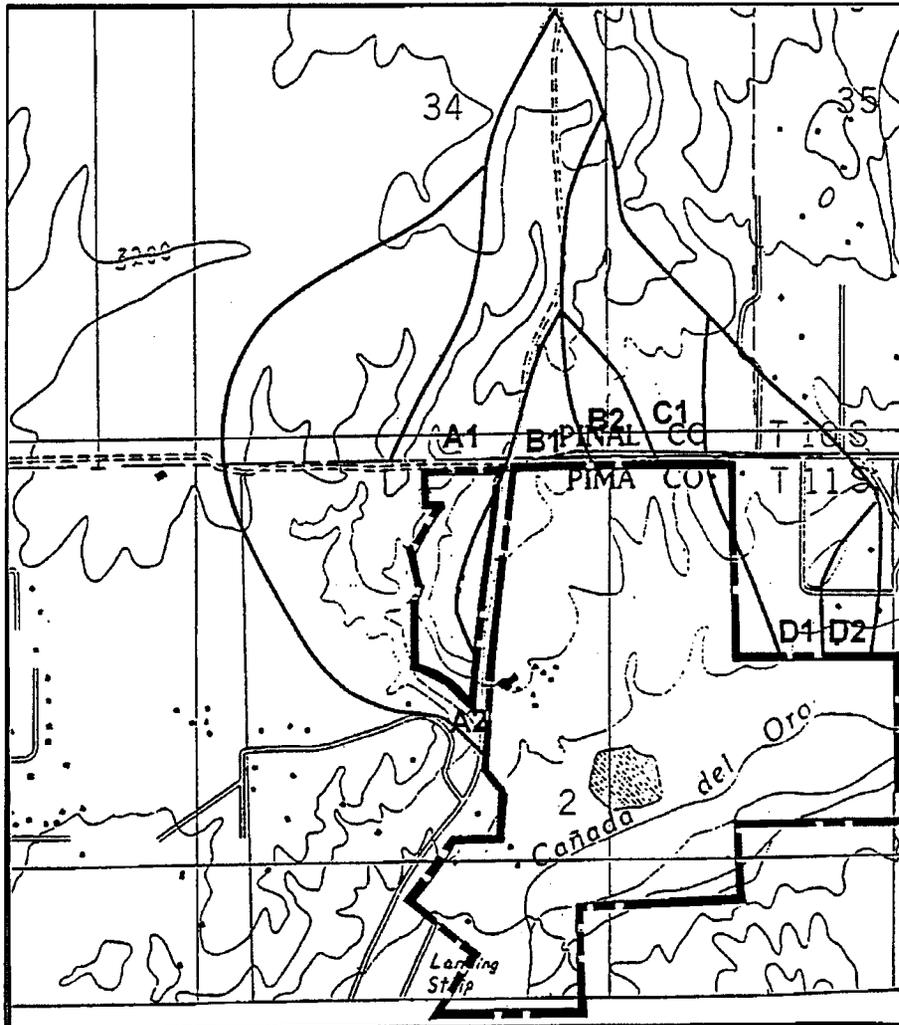
- a. The onsite 100-year floodprone areas associated with the water courses conveying regulatory discharges have been delineated on Exhibit II-C.4. Erosion Hazard Setbacks are required to be 50 feet from all 100-year floodprone areas, subject to reduction through further engineering study.
- b. Areas of sheet flooding are located at the confluence of the tributaries and the Cañada del Oro. The average depth of water is 2-3 feet.
- c. N/A
- d. The peak discharges are indicated on Exhibit II-C.4.

Several equestrian structures (sheds, barns, corrals, etc.) exist in the southern portion of the plan. These structures are in both the floodway fringe and the erosion hazard setback of the Canada del Oro. A review of County records indicates that there are no permits or floodplain use permits for these buildings.

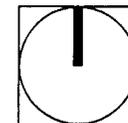
5. Existing Drainage Conditions along Downstream Property Boundary:

As previously mentioned, all runoff associated with this site drains to the Cañada del Oro Wash, which is located along the southern property line. The Cañada del Oro conveys the runoff southwesterly along the eastern side of Lago del Oro Parkway and then flows beneath a bridge at Golder Ranch Road.

EXHIBIT II-C.1:
Offsite Hydrology



<u>Watershed</u>	<u>Conc. Pt.</u>	<u>Acreage</u>	<u>Q₁₀₀</u>
A	A1	55	240
A	A2	200	740
B	B1	7	36
B	B2	9	48
C	C1	33	160
D	D1	40	180
D	D2	9	52



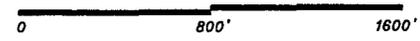
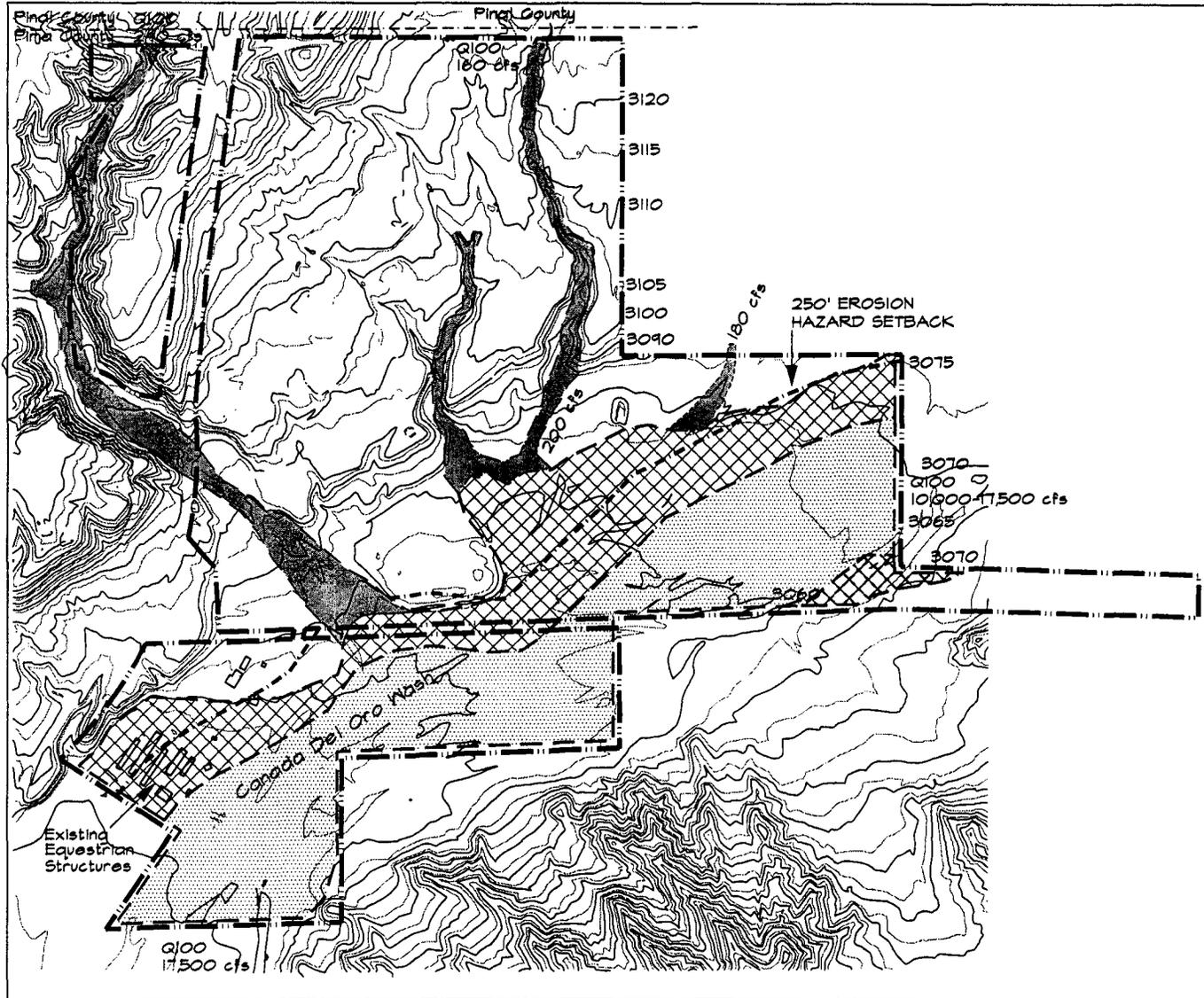
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EXHIBIT II-C.4:
Onsite Hydrology

LEGEND

-  FEMA Floodway
-  FEMA Floodway Fringe
-  100 year Flood Prone Area



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D. Vegetation

1. Vegetation Onsite

a. The site lies within the lower edge of the Semidesert Grassland or Scrub Grassland biotic community. The wash areas, however, are more characteristic of the Sonoran desert scrub biome, Arizona upland subdivision, Palo Verde-cacti-mixed scrub series.

Semidesert grassland has a naturally high species diversity of dry-tropic shrubby species. This edge of the semidesert grassland is host to a number of successful rangeland invaders. Vegetation found on the site includes Mesquite (*Prosopis spp.*), One-seed Juniper (*Juniperus monosperma*), Agave (*agave spp.*), Prickly Pear (*Opuntia phaenacantha*), Ocotillo (*Fouquieria splendens*), Barrel Cactus (*Ferocactus wislizenii*), Cane Cholla (*Opuntia imbricata*, *O. spinosior*), Creosote bush (*Larrea tridentata*), Blue Palo Verde (*cercidium microphyllum*) and various desert grasses.

The Canada del Oro wash is designated as a Class I wildlife habitat. It supports a hydro-meso riparian habitat. The other washes on the site support a xeroriparian habitat. The westernmost xeroriparian wash is classified as subclass C (total vegetative volume less than or equal to $0.675 \text{ m}^3/\text{m}^2$ and greater than $0.500 \text{ m}^3/\text{m}^2$). The easternmost is classified as subclass B (total vegetative volume less than or equal to $0.850 \text{ m}^3/\text{m}^2$ and greater than $0.675 \text{ m}^3/\text{m}^2$).

b. Two naturally occurring saguaros are on the site (others have been transplanted into the landscape for the existing facilities). Their location has been mapped in Exhibit II-D.1: Vegetative Communities/Wildlife. No other threatened or endangered species has been found on the site. The most dense vegetation is found in the above mentioned riparian habitats and the area surrounding the proposed wetlands wastewater treatment facility.

c. Because of the high visibility of the site from adjacent properties to the east and the south, vegetation is important for effective screening of the site.

2. Vegetative Densities

Vegetation densities on site were measured from aerial photographs and verified during field investigations. Vegetative canopy coverage for shrubs and trees was calculated using aerial photographs (perennial grasses and groundcovers were not considered.)

Vegetation densities were categorized as follows:

High Density:	70% - 100%
Medium Density	30% - 69%
Low Density	0% - 29%

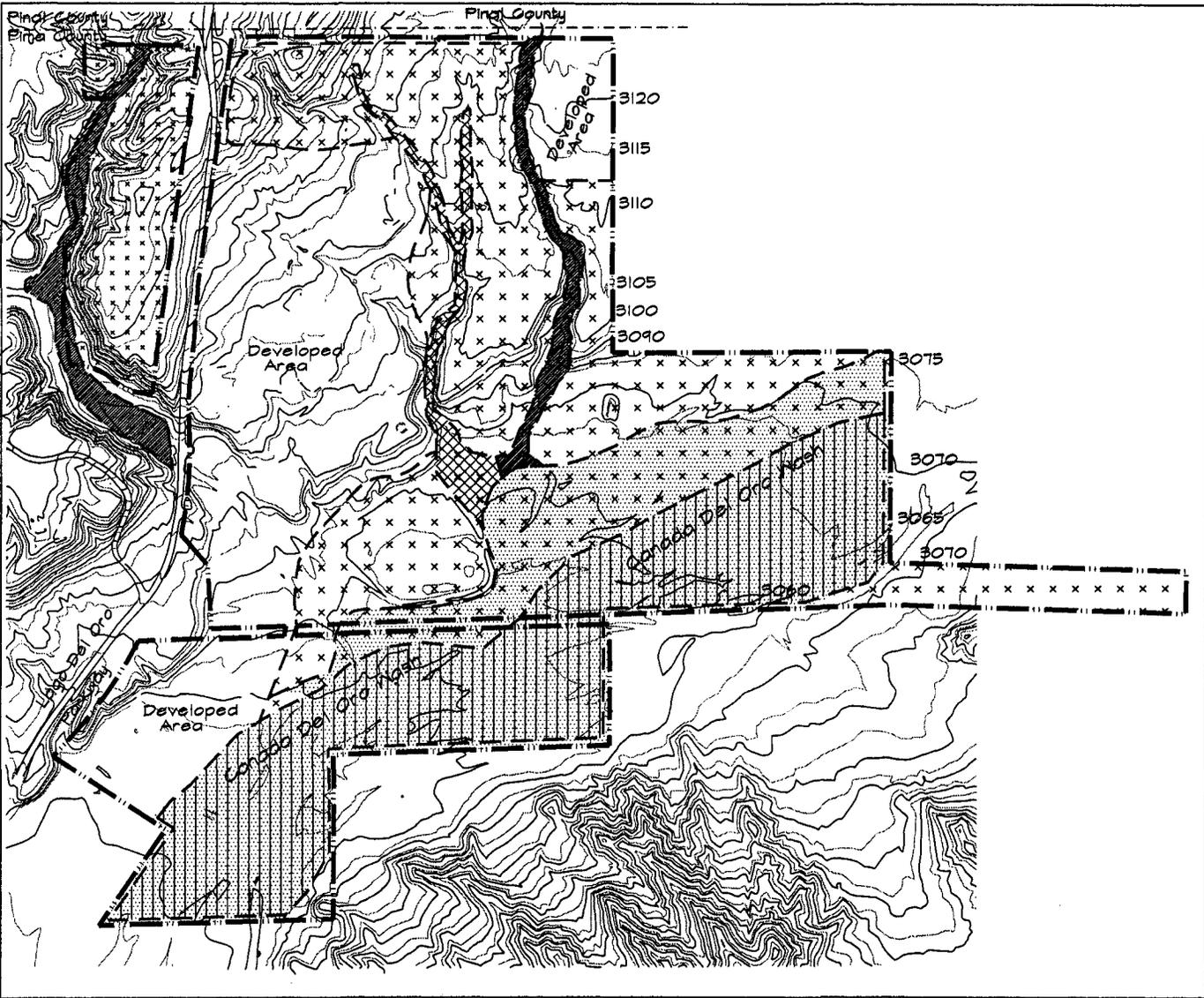
Most of the site has low to medium vegetation densities. A band of high density vegetation runs to the north of the Cañada del Oro wash. (See Exhibit II-D.2: Vegetation)

Using this scale, approximately 3% of the site is classified as High Density, 20% is Medium Density, 51% is Low Density, and 26% is already developed.

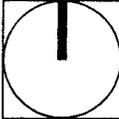
EXHIBIT II-D.1:
Vegetative Communities
Wildlife

LEGEND

-  Hydro-meso Riparian
-  Xeroriparian-Class B
-  Xeroriparian-Class C
-  Class-I Wildlife Habitat
-  Class-II Wildlife Habitat



0 800' 1600'



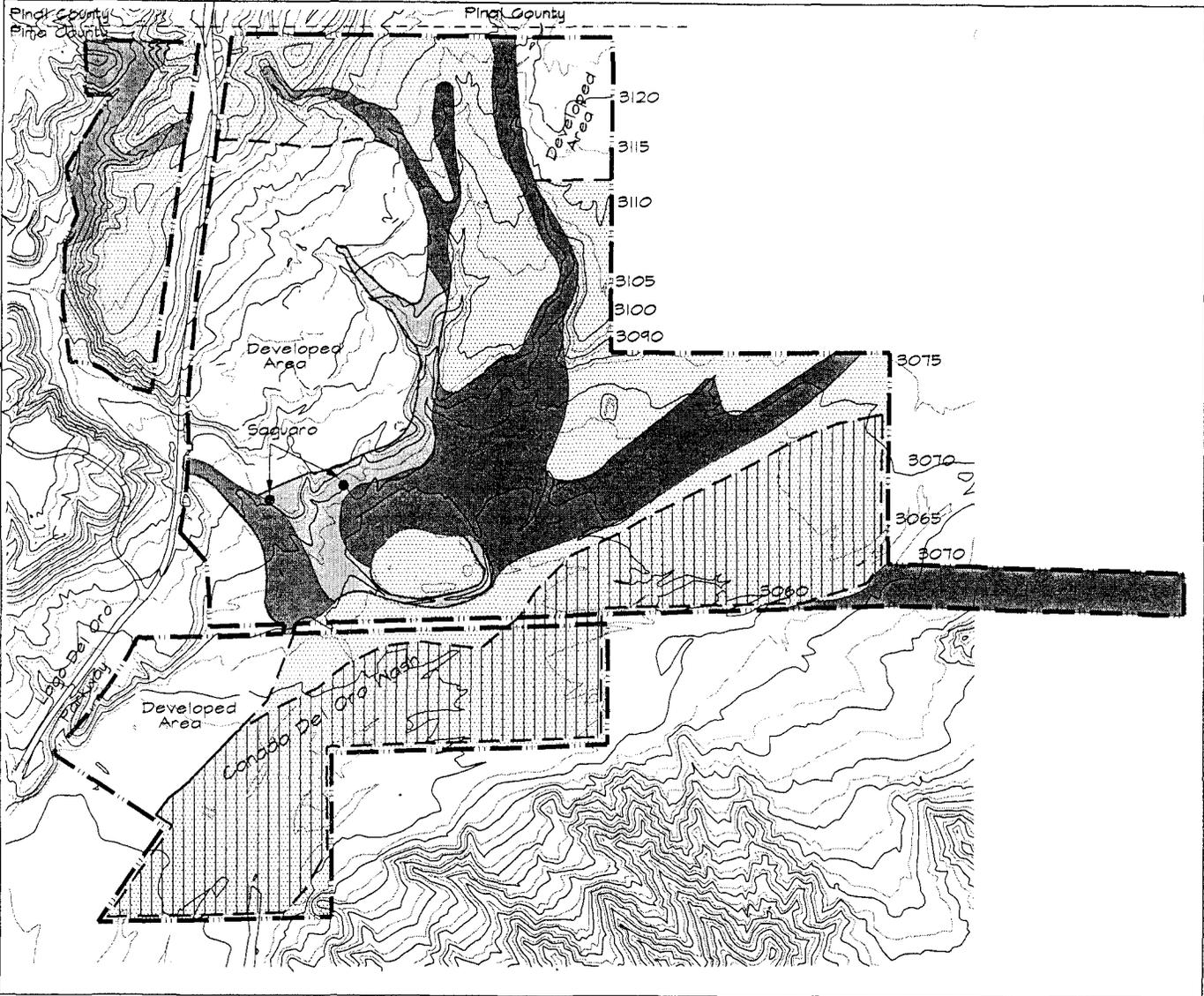
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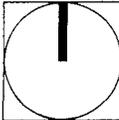
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EXHIBIT II-D.2:
Vegetation

LEGEND

-  Low 0-30%
-  Medium 30-70%
-  High 70-100%
-  Class-I Wildlife Habitat



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E. Wildlife

1. Summary of the Arizona Game and Fish Findings (See letter, Appendix C)

a) Threatened or Endangered Species:

The Sonoran desert tortoise (*Gopherus agassizii*), a federal Category 2 candidate species and a candidate for inclusion on the State's list of Threatened Native Wildlife and the Gila monster, (*Heloderma suspectum*), a "prohibited wildlife" species, have occurred in habitats similar to those present in the vicinity of the proposed project. Observations of the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), which has been proposed for inclusion as an Endangered species in Arizona, have occurred in habitats similar to those present on portions of the project site.

b) Species Density and Diversity:

The distribution of urban-breeding and nesting Harris' hawks is especially dense in the areas from the Coronado National Forest boundary south to the Rillito River and west to I-10. This urban population is a unique phenomenon in that behavior and demographic patterns appear to be very different from non-urban populations. These urban hawks are also thought to represent a significant portion of the statewide population.

c) Aquatic or Riparian Ecosystems:

The Cañada del Oro wash is designated as Class I wildlife habitat according to the Pima County 1986 Map of Critical and Sensitive Wildlife Habitats. Results from the Game and Fish Department's 1995 Winter Raptor Survey along with other field observations suggest that the major river courses and surrounding areas in the Tucson Basin, including the Cañada del Oro, are important habitat resources for raptors, providing them with ample foraging opportunities, suitable nest locations, and strategic roost sites.

The upland areas of the site are classified as Class II habitat. However, much of the upland area to the east of Lago del Oro has been disturbed by the existing facilities. Much of the upland area on the site has only low density vegetation.

See Exhibit II-D.1 - Vegetative Communities/Wildlife for map of riparian habitat and Class I/II habitats.

F. Soils

1. Soils Testing

Site-specific geotechnical investigations were completed for the construction of the existing structures on the site. For areas that have not already been tested, soils testing will occur during the final design and engineering stages of the project, prior to new construction.

The project area has been mapped by the Soil Conservation Service. The site's surface is composed of six different major soil series as identified and mapped (see Exhibit II.F.1, Soils Map). The area is covered by the Oracle series, the Comoro series, the Keysto series, the Mohave series, the Sasabe series, and the Caralampi series. Soils Interpretations records for each of these soil types can be found in Appendix D.

Oracle series consists of shallow, well draining, moderately slowly permeable soils formed in material weathered from granite on hillslopes and pediments. Typically these soils have brown gravelly and very gravelly loam surfaces 5 inches thick and reddish brown gravelly clay loam subsoils 12 inches thick over strongly weathered granite to 60 inches and more. Elevations are 2600 to 3600 feet. Map is 16-20. Frost free season is 200 to 255 days. Slopes range from 3 to 60 percent.

The Conrad series consists of deep, well-drained, moderately rapidly permeable soils formed in mixed recent alluvium on alluvial fans, floodplains, and terraces. Typically, they have a sandy loam surface layer 14 inches thick over a sandy loam and gravelly sandy loam substratum to 60 inches. Elevations are 2000 to 5000 feet. Precipitation is 6 to 12 inches. The frost-free season is 180 to 240 days. Slopes are 0 to 8 percent.

The Keysto series consists of very deep soils formed from mixed fan and stream alluvium, on alluvial fans and stream terraces. The surface is dark brown very gravelly sandy loam 3 inches thick. The subsoil is dark brown extremely cobbly sandy loam 21 inches thick, and the lower subsoil is brown extremely cobbly loamy sand to 60 inches.

The Mohave series consists of deep, well drained, moderately slowly permeable soils formed in old mixed alluvium on terraces, typically these soils have a light yellowish brown sandy loam surface layer 11

inches thick over a brown clay loam subsoil 44 inches thick. The substratum is reddish brown gravelly loamy coarse sand to 60 inches. Elevations are 1800 to 5000 feet. Precipitation is 7 to 12 inches. The frost-free season is 160 to 300 days. Slopes are 0 to 8 percent.

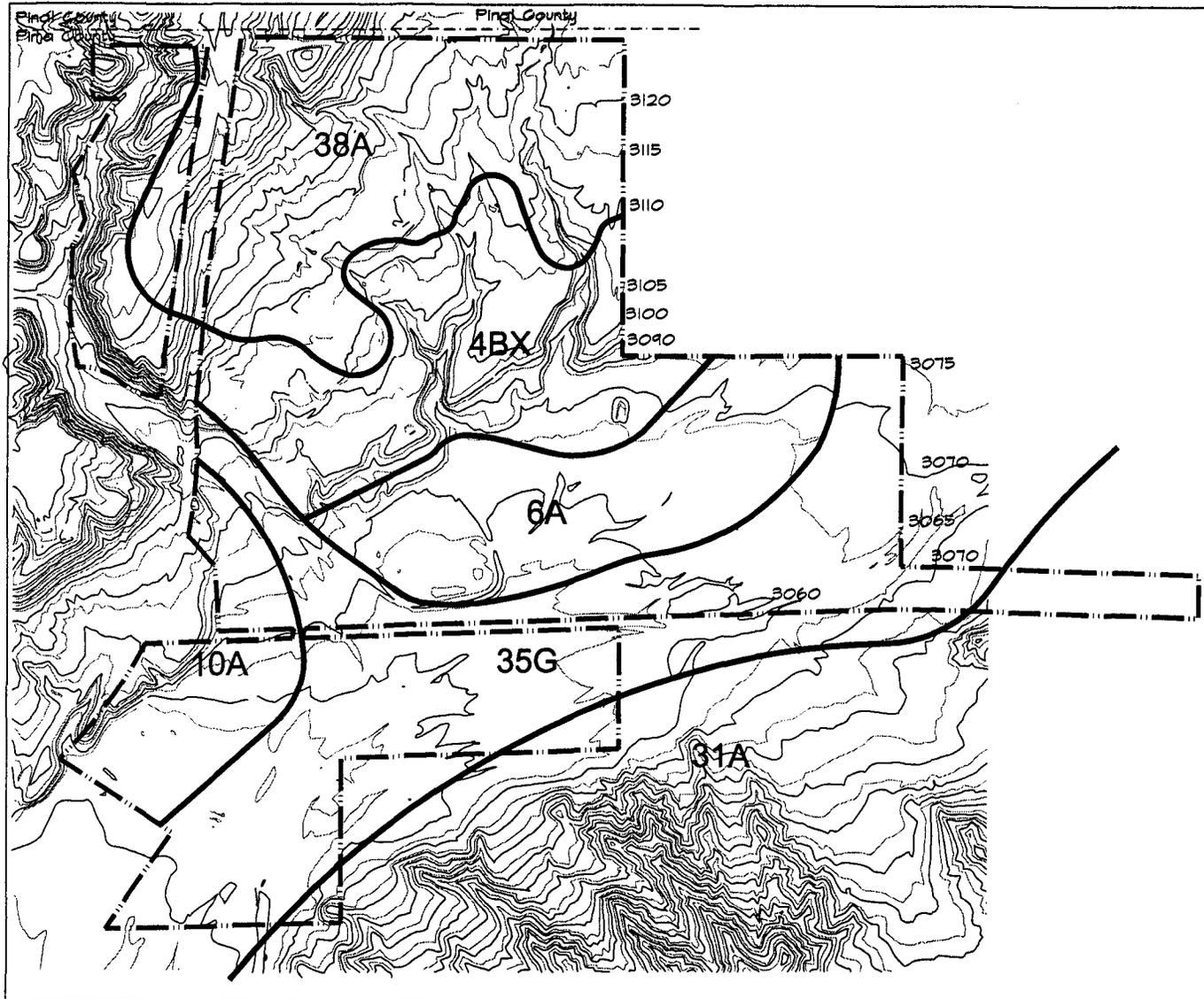
The Sasabe series consists of deep, well drained, slowly permeable soils formed in mixed alluvium on fan terraces. These soils have sandy loam surfaces 5 inches thick, an upper subsoil of clay loam, clay and gravelly clay loam 24 inches thick and a lower subsoil of gravelly and very gravelly sandy clay loam to 60 inches and more. Elevation is 3000 to 4000 feet. Average annual precipitation is 12 to 14 inches. Frost-free season is 200 to 230 days. Slopes range from 1 to 8 percent.

The Caralampi series consists of deep, well drained, moderately slowly permeable soils formed in mixed alluvium on old alluvial fans. Typically these soils have a dark brown gravelly sandy loam surface layer 2 inches thick over a dark brown and yellowish-red very gravelly sandy clay loam subsoil 21 inches thick. The substratum is reddish-brown very gravelly sandy loam to 60 inches. Elevations are from 3000 to 5000 feet. Precipitation is 12 to 14 inches., The frost-free season is 200 to 260 days. Slopes are 10 to 60 percent.

2. Soils Suitability

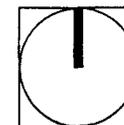
Previous soils tests have shown that those areas are suitable for septic. Currently a septic system is operational and serving the existing facilities.

EXHIBIT II-F: SOILS



LEGEND

- 4BX** SASABE-CARALAMPI COMPLEX
- 6A** CARALAMPI-VERY GRAVELLY SANDY LOAM
- 38A** MOHAVE SOILS SAND URBAN LAND
- 35G** KEYSTO EXTREMELY GRAVELLY FINE SANDY LOAM
- 10A** COMORO SANDY LOAM
- 31A** ORACLE-ROMERO-ROCK OUTCROP COMPLEX



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G. Viewsheds

1. Viewsheds Onto and Across the Site:

a) Views and Vistas from Adjacent Properties

Significant views are the Santa Catalina Mountains to the east, south and southeast of the site. Specifically, a view of Mount Lemmon lies to the east, and views of Pusch Ridge are to the south. Distant vistas of the Tucson Mountains are to the west.

b) Views and Vistas from Areas Beyond Adjacent Properties

The Santa Catalina Mountains, due to their proximity, dominate the views in this general vicinity. The Catalinas are visible along most of Lago del Oro Parkway, a designated scenic route.

2. On-Site Areas of Visibility from Off-Site:

The site lies in a valley between a ridge to the west and foothills to the east; a ridge lies to the south of the property. Areas to the north are at a slightly higher elevation than the subject property. The property is very visible from all sides. The site is most visible to the residential properties to the south and east. Property to the north is vacant.

The view of existing buildings is now mitigated by the natural vegetation surrounding them, and by their low-rise, flat-roofed architectural style. The light beige color of the buildings also blend well with the natural landscape.

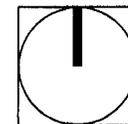
Exhibit II-G.2, Onsite Visibility depicts areas of low, medium and high visibility on the site based on the following criteria:

High	Medium	Low
<ul style="list-style-type: none">• Steep slopes, ridgetops, promontories, rock outcrops• Minimal perimeter vegetative variety to buffer visibility into site.	<ul style="list-style-type: none">• Low/moderate slopes; few rock outcrops• Medium degree of perimeter vegetative variety/density limiting visibility into site.	<ul style="list-style-type: none">• Little/no slope.• High degree of vegetative density/variety, perimeter vegetation dense, limiting visibility into site.

EXHIBIT II-G.1:
Offsite Visibility

LEGEND

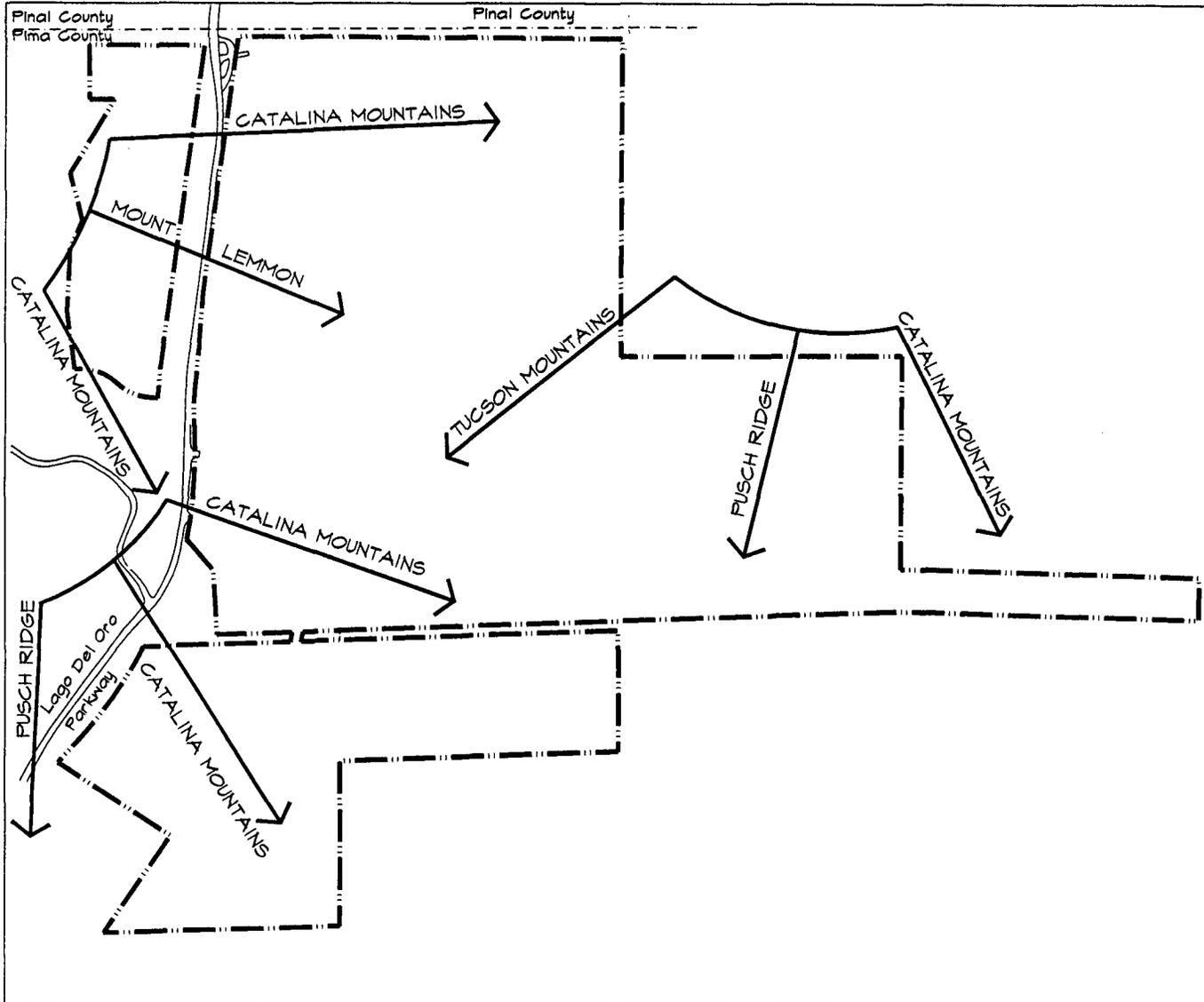
 Views from
Off-Site Vistas



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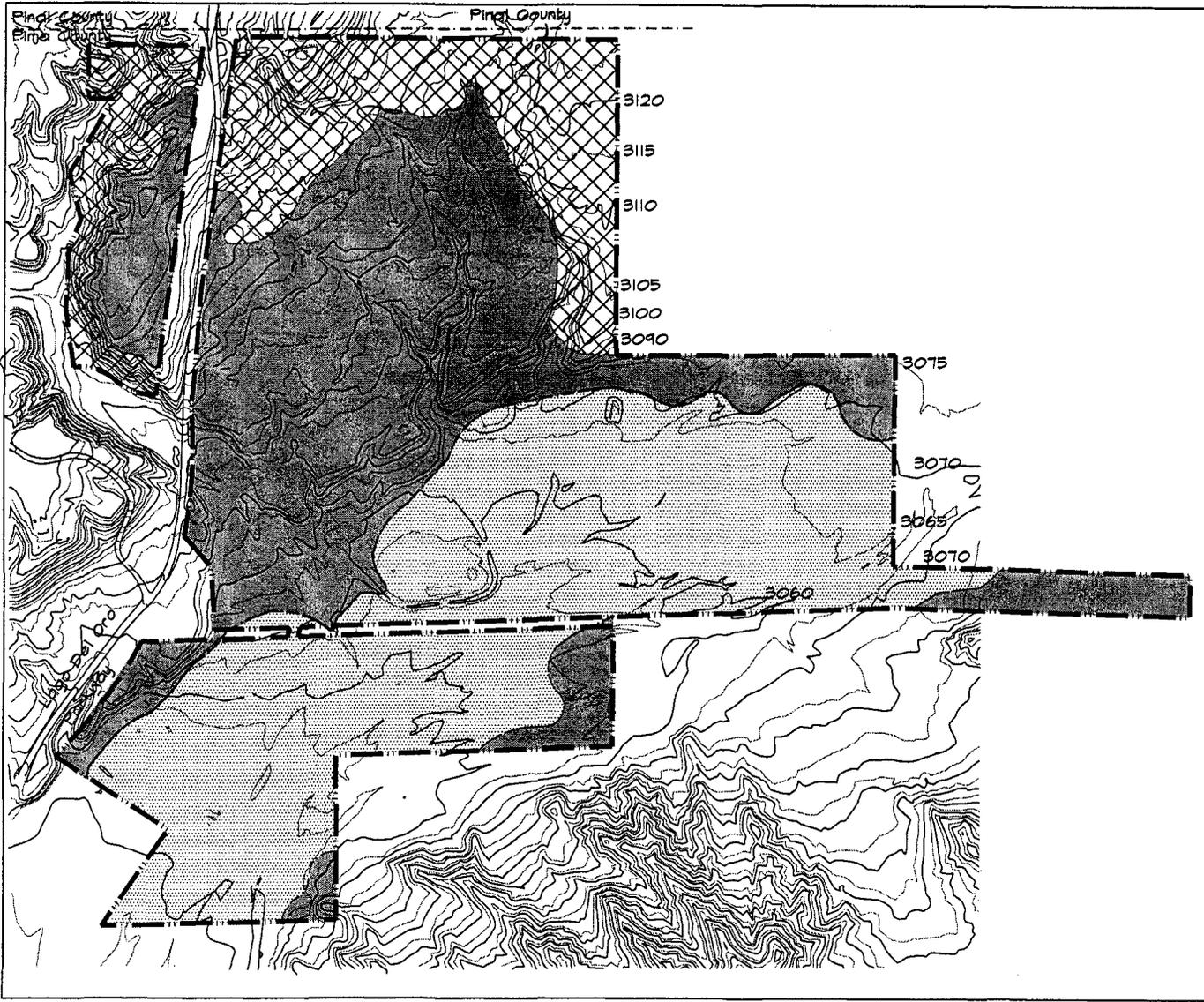
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0 800' 1600'

EXHIBIT II-G.2:
Onsite Visibility



LEGEND

-  Low Visibility
-  Medium Visibility
-  High Visibility



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H. Traffic

1. Existing and Proposed Offsite Streets:

Lago del Oro Parkway provides the primary access to the site, with Edwin Road providing secondary access. Lago del Oro Parkway is a two lane paved roadway that runs north and south and bisects the western portion of the site. The right-of-way for Lago del Oro Parkway varies from 165' to 180' adjacent to the project. Edwin Road is currently a two lane dirt road that is adjacent to the north boundary of the specific plan (see Exhibit II-H.I.J.K: Traffic, Sewer, Schools and Recreation). Lago del Oro Parkway is delineated as a Scenic Route on the Pima County Major Streets and Routes Map.

Lago del Oro Parkway continues north into Pinal County, but is unpaved after 1/8 mile and gated at Saddlebrook. Lago del Oro Parkway is not designated on the Pinal County Major Streets and Routes Plan, and is not included in the 5-year improvement plan.

The Tucson/Florence Highway can be accessed by traveling south two miles on Lago del Oro Parkway to Golder Ranch Road. The highway is one and one-half miles west of this intersection.

See Traffic Table on the following page for general information about these roads.

2. Existing Onsite Circulation

There are currently three paved driveways on the site. The first runs east from Lago del Oro Parkway and leads to the parking area for the eating disorders facility, then loops around to the north portion of the Miraval facility. The second drive serves as the main entrance to Miraval, leading to the arrival center and guest parking. The third paved driveway is off of Edwin Road, accessing the horse facility.

All other drives accessing the site are unimproved private driveways or service roads.

A paved golf cart path and several walking trails provide access to the eastern portion of the property.

TRAFFIC TABLE

Pertinent Traffic Data Pertaining to the Plan Area Perimeter Roadways

	Edwin Road	Lago del Oro Parkway	Golder Ranch Road	Tucson/ Florence Hwy.
Existing R.O.W.	0' 45' W of LDO	150'	150'	200'
Ultimate R.O.W.	60'	150'	90'	Undetermined
Existing Travel Lanes	2 (Dirt)	2 (A/C Pvmnt.)	2 (A/C Pvmnt.)	4 Divided S of Golder 5 N of Golder
Posted Speed	None	45 MPH	45 MPH	55 MPH
Capacity (Vehicles Per Day)	Undetermined	12,000	12,000	36,000
Present ADT	300-500 (Est.)	2,207 ('94) (N. of Golder Ranch Road)	5,019	16,700 ('95) (N. of Rancho Vistoso Blvd.)
Scenic Route	No	Yes	Yes	Yes
Existing Bikeways	No	No	No	Yes
Scheduled Improvements	*	*	*	**

* No improvements are shown in the Pima Association of Governments' Transportation Improvement Program.

** No improvements per ADOT for 1996-2000.

Intersection	Intersection Type	Intersection Improvements
Oracle/Golder Ranch	T	Traffic Signal, Left Turn/Right Turn Lanes
Golder Ranch/Lago del Oro	4-Way	Stop Signs - Lago del Oro; Left Turn Land Golder Ranch Road

I. Sewers

1. Wastewater Letter:

A capacity response letter from Pima County Department of Wastewater Management states that there is currently capacity for this project in the downstream system; however, the site is approximately 2.5 miles from the available sewer. Due to this distance and the associated costs of connection, the existing development operates on a private septic system.

(See Appendix E: Wastewater Letter)

2. Location of Existing Public Sewers:

The nearest public sewer main is an 8" diameter sewer located at Hawser Road and Twin Lakes Drive, approximately 2.5 miles southwest of the site.

(See Exhibit II-H.I.J.K: Traffic, Sewer, Schools and Recreation)

J. Schools

1. Existing/Proposed Schools:

The project area is served by the Amphitheater School District. No schools are present within a one mile radius of the site.

2. Schools to Serve the Site:

Outside the one mile radius, the site is served by the following schools:

Coronado K-8
3401 E. Wilds Rd.
Catalina, AZ 85737

Canyon del Oro High School
25 W. Calle Concordia
Oro Valley, AZ 85737

Approximate enrollments for the 1996-97 school year are:

Coronado	1,308
Canyon del Oro	2,550

K. Recreation And Trails

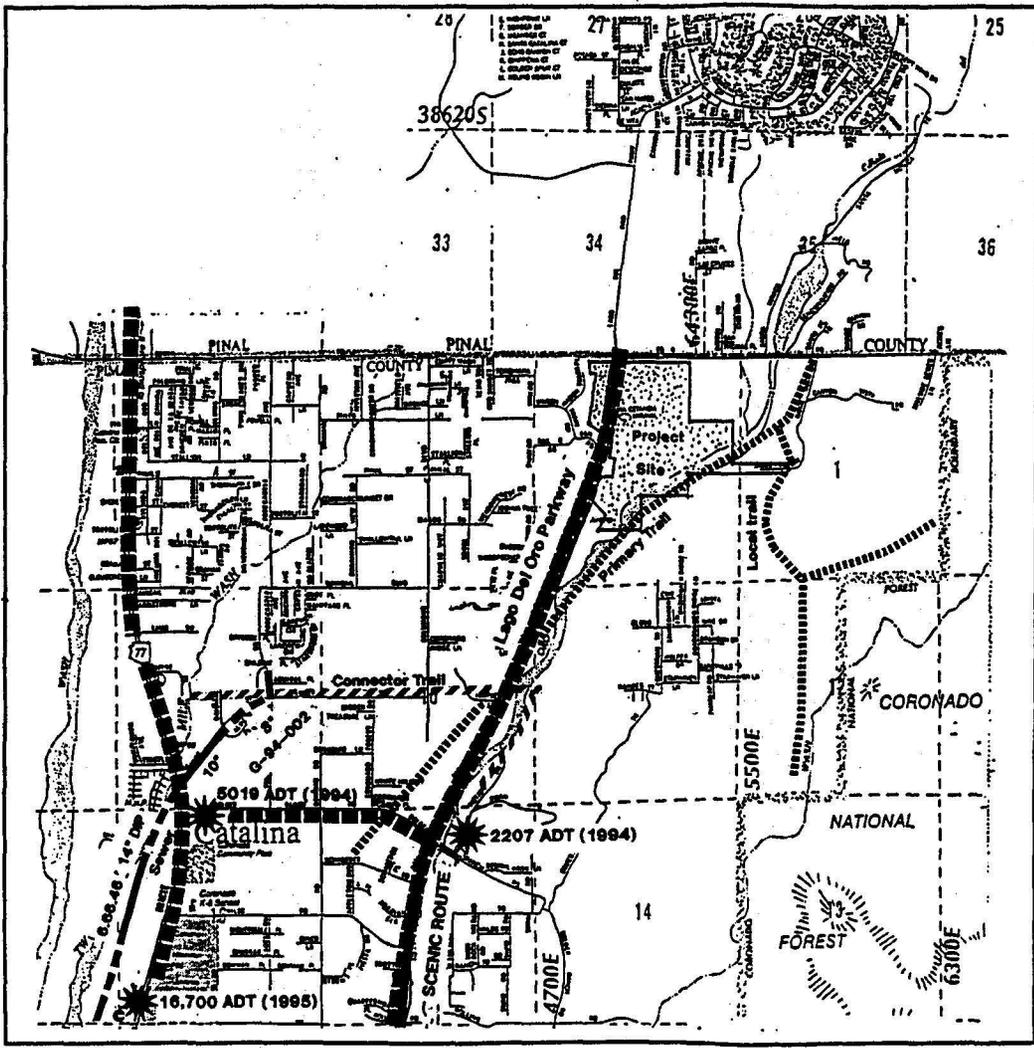
1. Parks, Recreation Areas, and Adopted Public Trails:

One Primary Trail runs through the southeastern portion of the site, following the Cañada del Oro wash. It is designated as Trail #2 on the Eastern Pima County Trail System Master Plan. The wash is identified in the Master Plan as a principal recreational trail corridor intended to serve pedestrians, equestrians and bicyclists, and is slated for ultimate development as a county river park.

Another local trail, known as the 50 Year Trail, runs to the east of the site, connecting the Canada del Oro trail to the Coronado National Forest.

The boundary of the Coronado National Forest falls within one mile of the site. (See Exhibit II-H.I.J.K: Traffic, Sewer, Schools and Recreation)

**EXHIBIT II-H,I,J,K:
Traffic, Sewers,
Schools & Recreation Map**



LEGEND

Within One Mile Radius of The Site

-  Scenic Route
-  Sewer
-  First Priority Trail Network
-  Second Priority Trail Network
-  Schools
-  Recreation Facilities



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L. Cultural/Archaeological/Historic Resources

1. Arizona State Museum Findings:

The developed portion of the site has been surveyed. No sites were found as a result of the survey. Sites have been reported a half mile to the north, which indicates a medium degree of potential for the recovery of cultural remains. See Appendix F, Letter from Arizona State Museum.

2. Archaeological or Historical Sites

No archaeological or historical sites have been identified on the site.

3. Field Survey

Field surveys were completed prior to the development now on the site. These surveys were limited to those areas that were disturbed for construction of the current facilities. Field surveys for previously unsurveyed portions of the property will be completed prior to the development plan/tentative plat submittal. A cultural resources mitigation plan for any identified archaeological sites on the subject property will be submitted at the time of, or prior to the submittal of any tentative plat or development plan. The mitigation plan will be prepared and reviewed as described in the Pima County Site Analysis Requirements.

M. Air Quality

No current activity on the site contributes to the degradation of air quality. Odor problems associated with the septic system and grease traps currently in use have been successfully controlled through biological odor control measures.

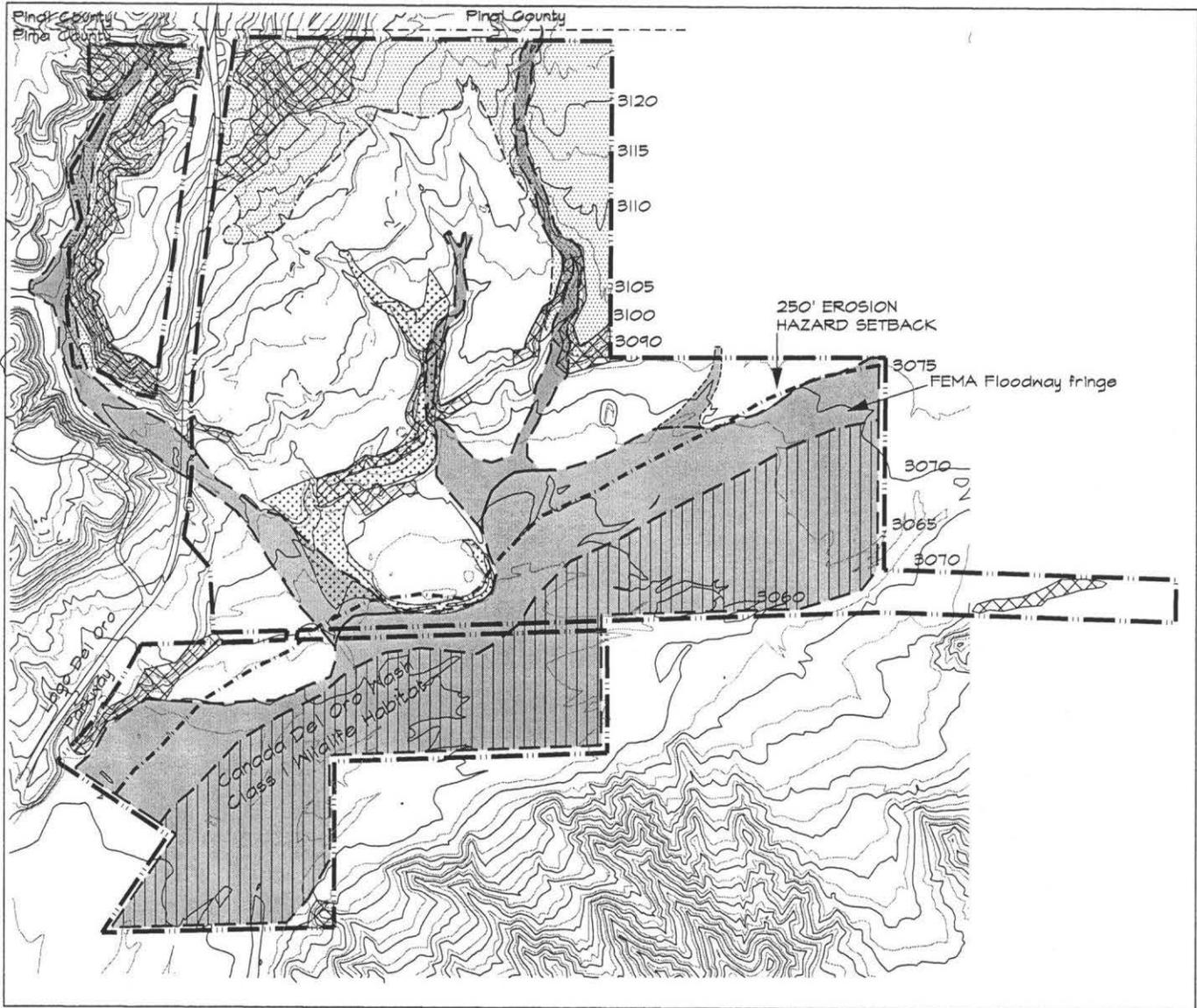
N. Composite Map

The following composite map shows the following characteristics:

Slopes 15% or above
100-year Floodplains

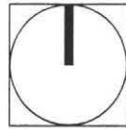
FEMA Floodway and Fringe
Areas of High Vegetation
Class I Habitat

EXHIBIT II-N.1:
Composite Map



LEGEND

-  Slopes 15% & Greater
-  High Visibility from Off-Site
-  High Vegetation Density
-  100 Yr. Flood prone areas
-  Class-I Wildlife Habitat



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III. DEVELOPMENT PLAN

A. Purpose and Intent

The Miraval Specific Plan is designed around the existing Sierra Tucson Facility. This plan integrates these facilities with approximately 231 acres of recreational, residential, open space and professional office and care facilities. The proposed development plan includes open space, resort related facilities, and a variety of active and passive recreational facilities. A system of pedestrian and equestrian trails is also provided throughout the project. Approximately 175,000 square feet of buildings currently exist on the site. All buildings currently on the site are to remain and will be used by the Miraval Resort. Currently 106 resort rooms and 34 patient rooms are on the site.

Up to 250 new resort guest rooms will be added to the existing rooms. In addition to the proposed resort, a residential component is included in the plan. A maximum of 226 units on the project site is allowed. In the area to the west of Lago del Oro Parkway, a maximum of 200 units at a density of 25 units per acre is planned. In the area east of Lago del Oro, a maximum of 26 units at a density of 1.2 units per acre is planned. Exhibit III-C shows the proposed Land Use Plan..

This section contains a description of Plan goals, combined with various specific plan components. These components provide the rationale for Development Regulations found in Section IV.

The project development plan is the result of thorough site analysis and research. As a result, the Plan resolves development related issues in the form of proposed physical plans, improvements, guidelines for future development, technical information and regulations. Through phasing and a range of potential land uses, this plan will also allow greater flexibility for the project as it evolves.

B. Goals

In recognizing the major development issues, the landowners' objectives and Pima County's requirements, a set of development plan goals have been established:

- Clarify and implement the goals and policies of Pima County;
- Ensure coordinated, responsible planning through the use of cohesive procedures, regulations, standards and guidelines;
- Provide a development phasing plan which is a general and logical estimate of how development will occur;
- Provide a conceptual vision for future growth and development for the specific plan area;
- Provide land use options based on current and anticipated demands.
- Provide infrastructure and public facilities to adequately serve full build-out of the development.
- Utilize the Canada del Oro as community amenities for recreation, open space, habitat preservation and habitat linkage;
- Provide a land use plan that not only respects the adjacent land uses, but will contribute to the overall quality of the community;
- Provide, within the Specific Plan, a community image that enhances the general Catalina area;
- Establish Design Guidelines to ensure a quality appearance and identity for Miraval;
- Establish a conceptual landscaping treatment to unify the development and reinforce the circulation and open space components of the project.
- Develop an ecologically sensitive land use plan consistent with Miraval's theme of "life in balance".

C. Land Use Plan

The Miraval Specific Plan encompasses approximately 231 acres and is divided into seven land use development areas (See Exhibit III-C.1: Proposed Land Use). The acreages of the development areas are gross acreages and include land to be allocated to the residential circulation system. The design of the project presents the areas as a planned resort/residential/recreational community. All land uses integrate circulation, infrastructure, open space, drainageways, environmental resources, visual setting, development standards and guidelines.

Land uses in the Specific Plan focus on and support the existing resort facilities. Areas north and east are envisioned as a mix of expanded resort

activities, recreational facilities and limited residential areas. The southern portion of the site adjacent to Cañada del Oro wash will be designated for recreational use. Emphasis will be placed on maintaining natural open space and habitat.

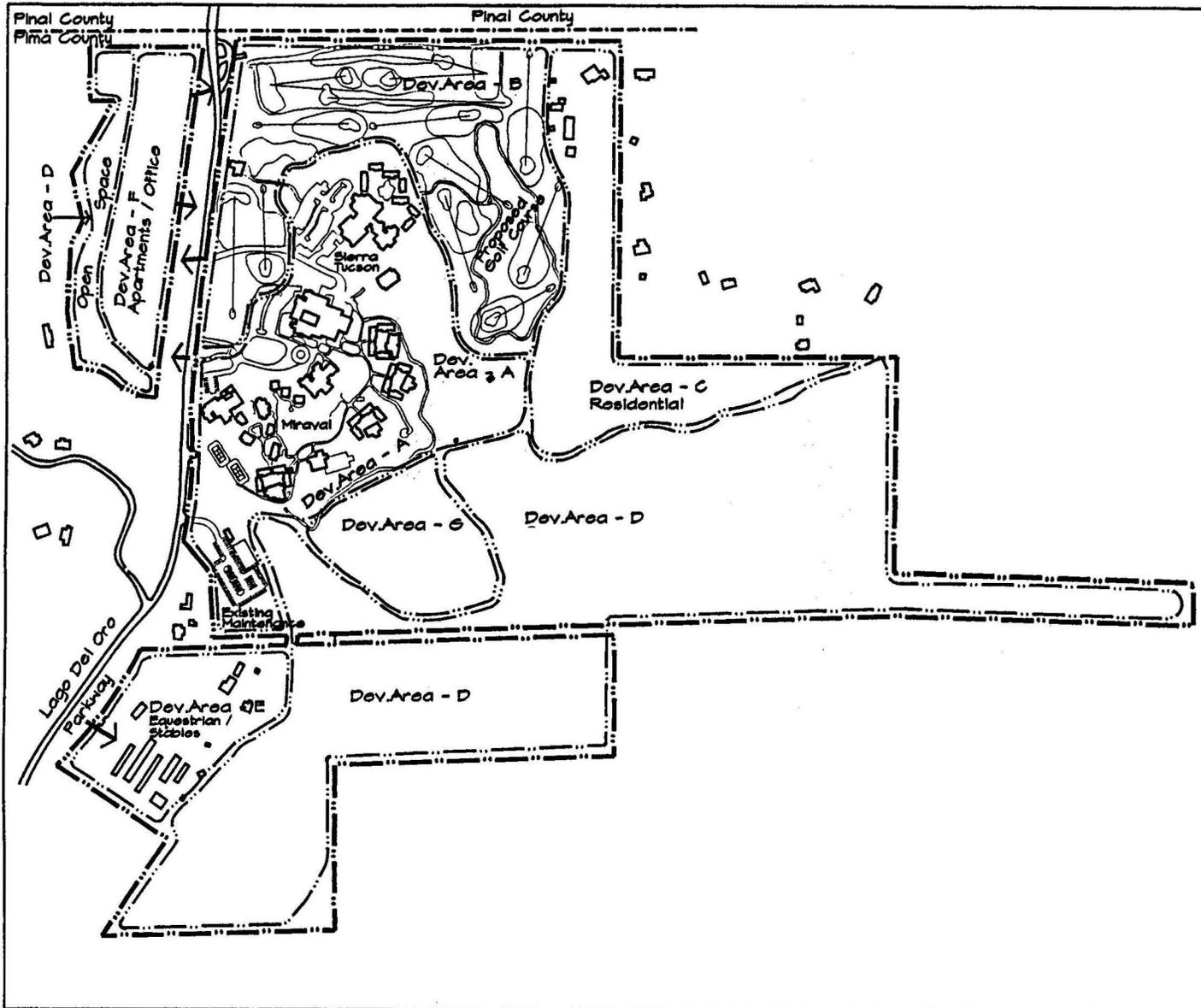
The proposed Miraval Specific Plan is in compliance with the Pima County Comprehensive Land Use Plan. (See Exhibit II-A.3: Pima County Comprehensive Plan Map). The area west of Lago del Oro Parkway is consistent with the Medium Intensity Urban designation of the plan and is contemplated as a mixed use area of support activities for the rest of the Specific Plan area.

The plan seeks to preserve the rural character of the area by buffering its more intensive land uses with a large amount of open space along the western and southern edges of the property. Additionally, a golf course is proposed to run along the northern and northeastern edge of the property. The resort is concentrated along Lago del Oro Parkway and the center of the property. On the western portion of the property, the wash along the western edge of the property will be retained, buffering those properties to the west. In recognition of the buffer overlay zone, all areas which are within one mile of Coronado National Forest shall be designated and reserved as open space.

A golf course will be developed to provide a portion of the community's recreational focus. In addition, open space found along the drainageways and along the south-eastern boundary, adjacent to the Cañada del Oro, will provide an additional area for the community's recreation, and effluent reuse. The golf course will be designed to be in compliance with Section 18.59.030 of the Pima County Zoning Code and the associated policies in the Pima County Comprehensive Plan.

A proposed constructed wetlands wastewater treatment facility will provide effluent to water the golf course. Effluent may be supplemented when necessary by water harvesting, groundwater and other water sources.

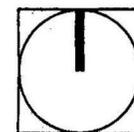
EXHIBIT III-C.2:
Land Use Plan



LEGEND



0 500' 1000'



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Table III-1 Land Use Summary

Development Area	Land Use Designation
A	Resort
B	Golf Course
C	Low Density Residential
D	Open Space
E	Major Resort
F	Mixed Use
G	Major Resort

Table III-2: Miraval Specific Plan Land Use Summary

Land Use Designation	Minimum Lot Size	Maximum Density	Gross Developable Acres	Maximum Dwelling Units	Maximum Resort Units
Low Density Residential (Development Area C)	35,000 sf	1.2 RAC	21.6	26	0
High Density Residential Development Area F	3,000 sf	25 RAC	10.8	200	0
Resort (Development Areas A, E, G)	-	-	66.5	0	356
Open Space (Development Area D)	-	-	96.1	0	0
Golf Course (Development Area B)	-	-	36.0	0	0
Unit Cap			231.0	226	356

D. Circulation Element

1. General Description

Exhibit III-D.1, Circulation Element, delineates the primary street network and access points for the Plan Area. All public or private drainage structures and roadways shall conform to Pima County Road and Street Standards. Design criteria including right-of-way widths, typical cross-sections, design speeds, paving, utility locations, design roadway slopes, access control, bike paths, pedestrian ways or sidewalks shall be subject to review and approval by DOT/FCD. The existing main entry drive will be utilized to access the resort and resort/golf areas from Lago del Oro Parkway.

The western portion of the plan will be accessed from Lago del Oro Parkway. This access will be near the center of the parcel, at a location that meets Pima County standards. Improvements to Lago del Oro Parkway will be contained within the existing right-of-way. Any public roadway encroachments that may exist will be resolved.

The loop drive will have primary access from Lago del Oro Parkway, located at the existing entry to the resort maintenance area. This access point will serve as the main entry to the project and carry the largest relative number of trips generated by the fully developed site. This access may be gated to provide security to the residents.

A second linkage for the main loop will be to Edwin Road. Edwin Road will be improved, and will utilize the existing roadway alignment lying on the north boundary of the Plan Area. This roadway, presently a dirt road, extends approximately 1 mile east of Lago del Oro Parkway and currently provides access to adjacent residential properties located east of the Specific Plan area. Edwin Road adjacent to the Plan Area will be improved to 24' of asphaltic concrete pavement (per Cross-Section B-B, Exhibit III-D.2) so as to provide a secondary access route, from Lago del Oro Parkway to the Specific Plan. A 45' right-of-way will be dedicated to Pima County for the improvements.

All of the Project's on-site streets will be privately held and will be local in both their scale and character. This use of local-scale streets is justified in light of, 1) the relatively low volumes of traffic the streets will accommodate, and 2) the foothills topography and setting

of the site, both of which require a more rural and sensitive approach to roadway design.

The proposed street cross-sections (to be described more fully in the next section) vary depending upon their functional requirements and specific settings.

2. Proposed Street Cross-Sections

The project will utilize two (2) different street cross-sections (these sections are keyed on the Circulation Element - Exhibit III-D.1 - and illustrated on Exhibit III-D.2, Street Sections). Street cross-sections meet or exceed Pima County Department Transportation standards.

Street Section A-A': The main loop drive of the Plan Area. This street will be the widest utilized in the Project and be comprised of two 18' travel lanes. This street section is consistent with the Pima County cross-section S-3 except for its wide lane widths.

Street Section B-B': This street will border the northern boundary of the Plan Area and provide secondary access (i.e. not all weather) to the north eastern most development block. The Edwin Road extension will be constructed by the developer, but maintained on a public basis due to its location within proposed public rights-of-way. Ingress/egress rights to adjacent property owners will not be affected. Controlled (i.e. gated) access points will be established, on the Project's private streets, where they intersect with Edwin Road. This street section is consistent with Pima County cross-section R-1.

Final design of the access system will be subject to review and approval by Pima County Department of Transportation and Flood Control.

3. Change in ADT

The project will generate approximately 4,700 additional ADT over the existing condition. The estimated ADT for each use is indicated on Exhibit II.D.1. Approximately 4,200 ADT can be assigned to the plans main entry drive. All of this volume will empty into Lago del Oro Parkway. The remaining 500 ADT can be assigned to Edwin Road.

Even if it is assumed, as a worst-case, that Lago del Oro parking carries all of the additional ADT to be generated by the development, the existing roadway (with a capacity of 12,000 vehicles per day) will still be carrying a total of only 6,907 ADT, and thus be operating at 40.9% of its capacity.

The proposed egress-only access at the Plan Area's northern boundary (See Circulation Element) will result in approximately 300 additional daily trips onto Edwin Road.

Golder Ranch Road (south of the site) exhibits a similar capacity to absorb the projected additional ADT. Golder Ranch Road's ADT would rise by 4700 to an estimated 9719 ADT, still comfortably below capacity for this type of roadway.

4. Minimization of Impact Upon Local Streets

The project will utilize an almost entirely self-contained street network employing only three ingress/egress routes to existing Lago del Oro Parkway (a major public route). The proposed ingress/egress routes shall be constructed and maintained solely by the developer. The limited access onto Edwin Road will be gated so that only limited traffic movement will be assured.

Improvements to Lago del Oro Parkway, such as pavement widening and striping, will be made as determined by Pima County.

5. Transit Routes

No mass transit bus routes nor attendant facilities are proposed.

6. Pedestrian Paths and Golf Cart Facilities

Pedestrian paths or refuge areas shall be provided (see Exhibit III-D.2, Street Sections) adjacent to most of the project's streets. No such pedestrian facilities are planned, due to negligible anticipated pedestrian traffic along Edwin Road, along the Plan's northern boundary.

The existing cart path will be augmented to access the development areas. The final alignment of this path through the site shall be determined at the final golf course phase design.

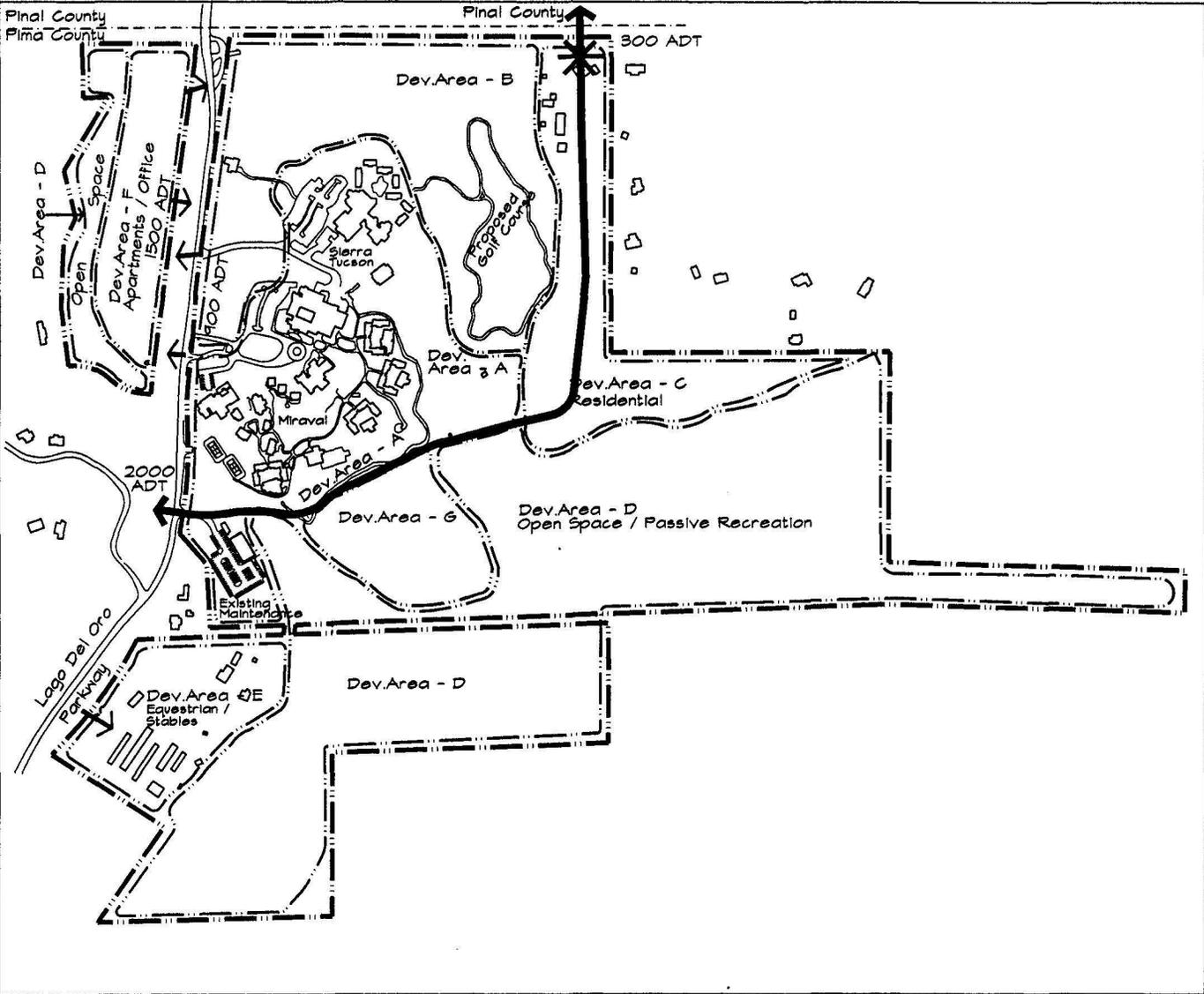
7. Emergency Access

Emergency access will be provided to all development areas.

EXHIBIT III-D.1:
Circulation Element

LEGEND

-  Proposed Major Circulation Loop
-  Secondary Access
-  Egress Only

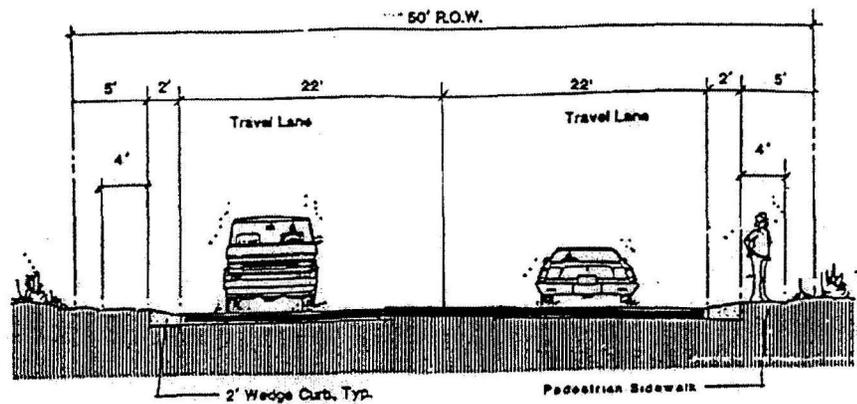


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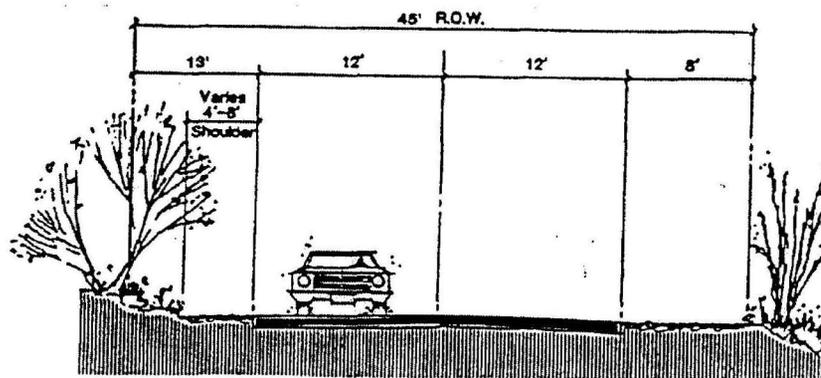
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EXHIBIT III-D.2:
Street Sections



LOCAL COLLECTOR

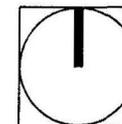
A-A



LOCAL STREET

B-B

Note: Street sections are conceptual.
Final sections to be determined at time of
improvement plan submittal to ensure
compliance with County Standards.



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E. Public Facilities

1. Water

Potable water is currently provided and will continue to be provided by the Lago del Oro Water Company. Lago del Oro Water Company does not have an assured 100-year water supply. As part of the development of the Saddlebrook community to the north of Miraval, the Arizona Department of Water Resources have on file hydrologic reports on the Lago del Oro Water Company for both Pinal and Pima County. The reports show adequate water supply available for the water company's current and committed demands plus the projected demand of Saddlebrook. This report is on file with the Arizona Department of Water Resources and may be referenced by future developers to be served by Lago del Oro Water Company within the boundaries of the area of review. (See Appendix J: Arizona Department of Water Resources Letter)

The proposed constructed wetland wastewater treatment system (see following paragraph) is anticipated to produce reclaimed water. This reclaimed water, when available, will be used to irrigate the proposed golf course.

2. Sewer

During the first two phases of this plan, this project will not connect directly to the public sewer system due to the distance to existing sewers from the property. A previous investigation to connect to the Pima County sewer system identified the need for a sewer lift station, 9,500 feet of force main, and 3,000 feet of gravity sewer. In Appendix E, the County estimates that the cost to construct this system would be in excess of \$400,000.00.

The main complex is currently served by five (5) major septic tank and leach field systems. Other support facilities such as the ranch house, service support and laundry are served by smaller individual septic systems and are not discussed here.

System No. 1 serves the Ocotillo, Saguaro, and Mesquite guest units. The buildings have received some modifications but are substantially the same. The septic system is composed of a 6" gravity sewer line which carries effluent from the buildings to a series of 3 - 5,000

gallon capacity septic tanks. Effluent then enters a lift station and is pumped to a 2,000 gallon dosing chamber and into the leach field.

System No. 3 serves the Cholla Guest units, the Yucca Guest units and Casitas No. 2 through 6. Casita No. 1 is to be demolished. The septic system is composed of a 6" gravity sewer line which carries effluent from the buildings to a series of 2 - 5,700 gallon septic tanks and 2 - 4,100 gallon septic tanks. Effluent then enters a common lift station with System No. 4 and is pumped into the leach field.

System No. 4 serves the Personal Services Building (previously known as the Medical Building before significant renovation and a change in usage), and the Fitness Building (previously known as the Recreation Center before expansion and renovation). The septic system is composed of a 6" gravity sewer line which carries effluent from the buildings to a series of 2 - 5,700 gallon septic tanks and 2 - 4,100 gallon septic tanks. Effluent then enters a common lift station with System No. 3 and is pumped into the leach field.

System No. 5 services the Sierra Tucson complex, a group of nine buildings to be known in the future as Miraval Guest Rooms. The septic system is composed of 4" and 6" gravity sewer lines which carry the effluent from the buildings to a series of 3 - 4,800 gallon septic tanks and then into 5 distribution boxes at the leach field.

Phase I:

Per agreement with Pima County, 250 additional guest units will be permitted. It is estimated that the existing septic systems can absorb 144 additional guest units without modifications. Further, 106 more guest units are possible with appropriate modifications to three of the septic systems and the addition of a smaller septic system on the northwest side of the project. The modifications and addition are generally outlined as follows:

System No. 2 proposed modifications include the addition of 3 - 4,800 gallon septic tanks, a lift station and the expansion of leach field no. 2 to the north. The proposed addition of a new 5,700 gallon septic tank and leach field to the west of the Sierra Tucson complex will provide for an expansion of guest units in Specific Plan Development Area A.

Phase II:

During this phase of Development, the golf course construction is proposed, along with the Wetland Wastewater Treatment System. This requires the relocation of septic tanks and discontinuation of use of the leach field. The leach field systems will be replaced with a flow-through constructed wetland. The proposed treatment facility has many advantages over connection to the public sewer system, including cost effectiveness and an aesthetically pleasing appearance of the whole area due to the availability of irrigation water.

Phase III:

During this phase of development a new apartment and office complex is proposed in Specific Plan Development Area F. A new public sewer and sewer lift station will be connected with existing public sewer systems to serve this phase of development. In addition, Specific Plan Development Area C residential area could be incorporated into the wetlands plan at this point.

**PRELIMINARY ANALYSIS OF AVAILABLE EXCESS
CAPACITY OF SEPTIC SYSTEMS #1-5**

**-Based on Existing Septic Tanks
-Per UPC, Table I-2
-Based on available DEQ File Information**

SYSTEM NO.	EXIST. PFU'S	REQ'D SEPTIC TANK CAPACITY (GAL)	EXIST. SEPTIC TANK CAPACITY (GAL)	EXCESS SEPTIC TANK CAPACITY (GAL)	PFU'S EQUIV. TO EXCESS CAPACITY	# OF UNITS @ PFU UNIT PERMITTED DUE TO EXCESS CAPACITY
1	560	15,000	16,500	1,500	33	3
2	198	6,000	20,500	14,500	540	54
3	376	10,400	19,600	9,200	328	33
4	291	8,275	19,600	11,325	413	41
5	369	10,225	14,400	4,175	127	13
TOTAL						144

3. Other Utilities

Electric and telephone services are now available on the site. Final design shall take place at the time of actual construction, subdividing, and site development. Actual service facility design will be coordinated with the individual utility companies.

5. Schools

The project will be served by the Amphitheater School District. The proposed resort will have no effect upon enrollment in schools serving the area. Using the Amphitheater School District's formulas, the residential component, at the maximum build-out of 226 units and a mix of 26 single family residential units and 200 apartments, would produce approximately 34 elementary, 14 middle and 15 high school students. See Appendix G for Amphitheater's formula for projecting students.

6. Parks

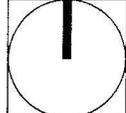
Much of Development Area D at the southern end of the property will be preserved as open space for passive recreation opportunities for Miraval guests. Several trails and an obstacle course run throughout the property for use by the guests. Swimming pools and exercise facilities also provide recreation opportunities for guests.

Additionally, the golf course will provide recreation opportunities for both Miraval guests and the general public. No public parks are proposed in conjunction with this project due to the exclusive and therapeutic nature of the proposed resort and the guests' need for privacy.

EXHIBIT III-E:
Onsite Wastewater Treatment



TO LEACHFIELDS



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F. Water Resources Element

1. Plan Response to Hydrologic Characteristics

The proposed development will have very minor effects to existing runoff levels. Only two watersheds will experience an increase in runoff as a result of this project (see Exhibit III-F.1).

Watershed A, the western watershed will expect an increase of approximately 30 cfs in a 100-year storm as a result of developing a 6 acre area located west of Lago del Oro. The land use for this area is transitional. The existing runoff is approximately 950 cfs with a post-development volume of 980 cfs.

Watershed B will increase its runoff by only 10 cfs as a result of approximately 3.5 acres of development including a longevity housing area and a resort. The increase in development will raise the 100-year peak flows from 320 cfs to 330 cfs.

The remainder of the watersheds will retain existing levels of runoff with some watersheds actually decreasing. The decrease would be expected as a result of developing the 9-hole golf course. The increase of vegetation including sod will tend to reduce levels of runoff by slowing travel time to specific concentration points.

Consideration to the existing hydrologic characteristic has been provided in establishing the Plan. The Cañada del Oro will be generally maintained in its natural condition and only those uses deemed acceptable by Pima County will be placed in the floodway and floodway fringe areas. The floodplain will be utilized as recreational area and will provide ecologically sensitive activities including hiking trails, conservation exhibits, an eco trail and a survival course.

The wash in the western portion of the site, the majority of which is in open space, will not be modified except for necessary utility and roadway crossings.

Portions of the remaining two washes in the main portion of the site will be altered by development. The washes will be integrated into the golf course design as shown on Exhibit III-F.2.

2. Floodplain Encroachment

Roads, utilities and golf course crossings represent the primary features of the development which will encroach into the mapped floodplains (not including the Cañada del Oro). Crossings through the washes shall be avoided whenever reasonably possible to reduce their aggregate impact upon these areas.

The existing structures in the equestrian areas are to remain. Any future development in this area will comply with the Pima County Floodplain Ordinance.

The re-alignment of the two eastern-most channels, as described above, will allow for more flexibility in the design of the golf course and residential area.

As mentioned above, the re-aligned channel will be primarily earthen in composition, revegetated, and contoured to resemble the characteristic channel cross-section of the Specific Plan Site.

3. Impacts to Offsite Land Uses

Because of the minimum increase in runoff resulting from development it is not expected that there will be any impact to off-site land uses either upstream or downstream of this site.

4. Hydrologic Engineering Features

The significant design feature of the proposed drainage scheme is the preservation of the vast majority of the site's existing major washes in their natural, undisturbed state.

The prominent engineering design feature being proposed is the retention facility in the south central portion of the Specific Plan area. The need for this facility has already been discussed above.

Several other locations have also been designated on the Water Resources Element as potential detention sites. The specific need for size and configuration of these basins will be determined at the time of platting and engineering of each individual development area.

Aside from detention facilities, a cross-section of a typical all-weather road crossing has been shown on Exhibit III-F.2, Hydrology Sections.

This cross-section shows numerous design elements for these crossings, including culverts, rip-rap, and shallow transitional slopes to meet the existing grade.

5. Conformation to Flood Control Policies

This site will be designed to conform to all area plans and other applicable flood control policies established by Pima County. Retention will be required if the overall density exceeds 3 units per acre. As mentioned, there is an existing retention basin that provides more volume than is required for this overall site plan. Detention will be designed and constructed on the parcel west of Lago del Oro Parkway. This portion of the site is in a balanced basin.

All internal drainage improvements and any external drainage improvements required to mitigate drainage impacts caused by development of the specific plan as determined by required drainage studies shall be constructed at no cost to Pima County.

A conservation easement in favor of the Pima County Flood Control District (FCD) shall be recorded for the regulatory floodplain of the Canada del Oro Wash (CDO) within 90 days of the adoption of this ordinance. The conservation easement shall require that the floodplain of the CDO shall remain in its present, existing natural state, with the exception that riparian vegetation or wetland enhancement may be allowed. Riparian vegetation enhancement of development shall require a floodplain use permit from the FCD.

EXHIBIT III-F.1:
Water Resource Element

LEGEND

-  Retention Area
-  Detention Area
-  Erosion Hazard Setback
-  Realigned Drainage
-  FEMA Floodway Fringe



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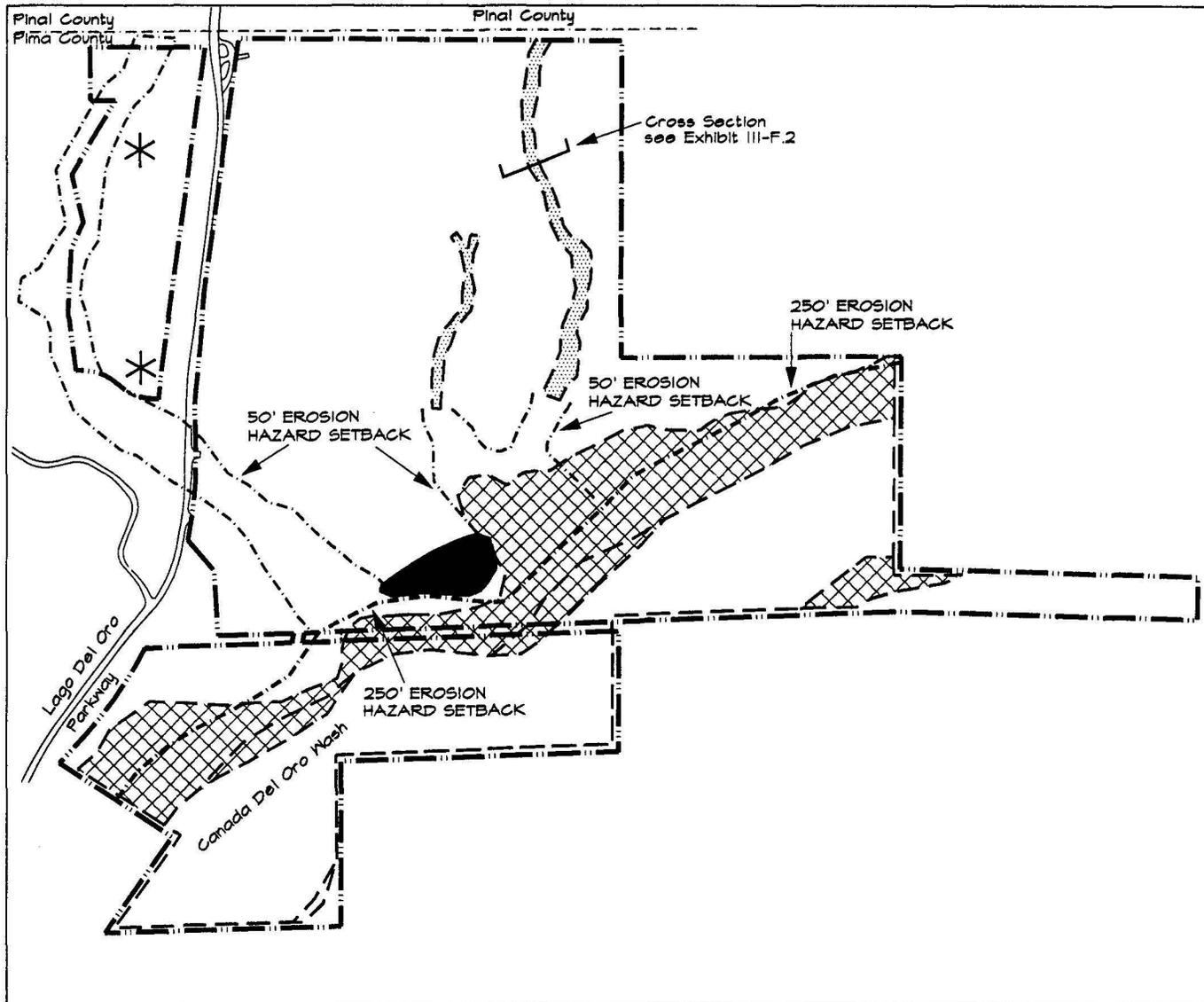
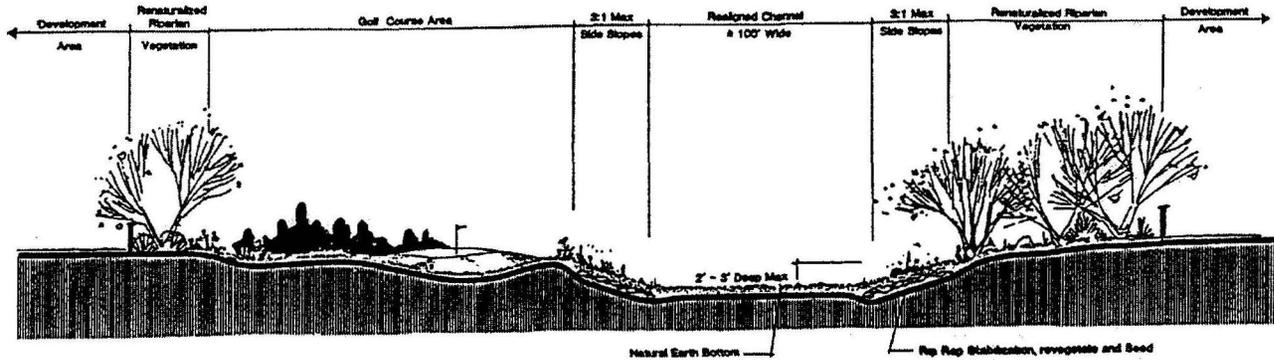
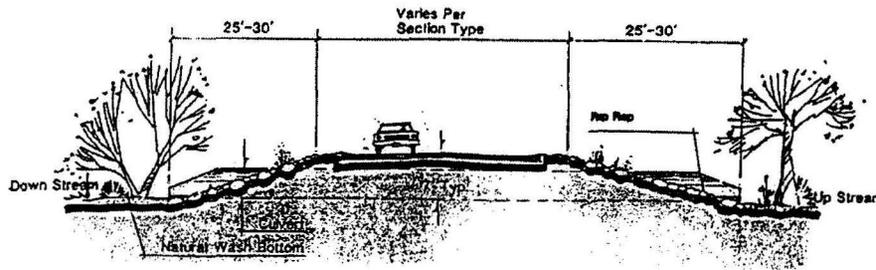


EXHIBIT III-F.2:
Hydrology Sections



PROPOSED
TYPICAL CHANNEL REALIGNMENT
TREATMENT



TYPICAL ALL WEATHER CROSSING



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G. Grading Concept Element

1. General Characteristics

The Conceptual Grading Element, Exhibit III-G.2, depicts the proposed grading characteristics for the site. A variety of grading treatments will be necessary depending on the uses in each development area.

The exhibit delineates four distinct categories of grading treatment. The first is areas of previous grading, approximately 52 acres. These areas have been cleared and graded for each existing use. Very little additional grading is expected in these areas.

The second type includes all of the area proposed for future development. The majority of this area will be mass graded. This area constitutes approximately 33 acres.

The 36-acre area designated as Golf Course is the third type of grading treatment. Construction of the course will require minor terrain modification with revegetation treatment.

Open space is the last category and is indicated “not graded”. It is expected that only minor grading will be required in this area for the passive recreation uses listed, utilities, access, erosion protection and other essential improvements that are normally excluded from the traditional definition of grading.

The total area graded in the project is approximately 120 acres, leaving 95 acres (44%) of the site ungraded.

The overall disposition of the post-graded site includes:

- Development Areas
- Building Sites
- Local Collector Road
- Re-aligned Drainage Channel
- Detention/Retention Basin Facilities
- Portions of Transition Areas (i.e., areas between Development Areas, Golf Course and Washes)
- Golf Course (minimized as necessary for turfed or bermed areas)
- Wetlands Wastewater Treatment Facility

Ungraded (i.e. Natural Areas)

- Undisturbed Class I Habitat
- Undisturbed Floodplains

2. Cut and Fill

The Conceptual Grading Element delineates those areas of the site which will be altered by more than 5' of cut or fill in the post-graded condition. This situation occurs primarily at or adjacent to the onsite drainages. The need to exceed the 5' cut/fill value is a result of the increasing steepness of the natural topography in these locations combined with the need for transition to existing perimeter grades at the boundary of each planning area.

3. Engineering and Design Features

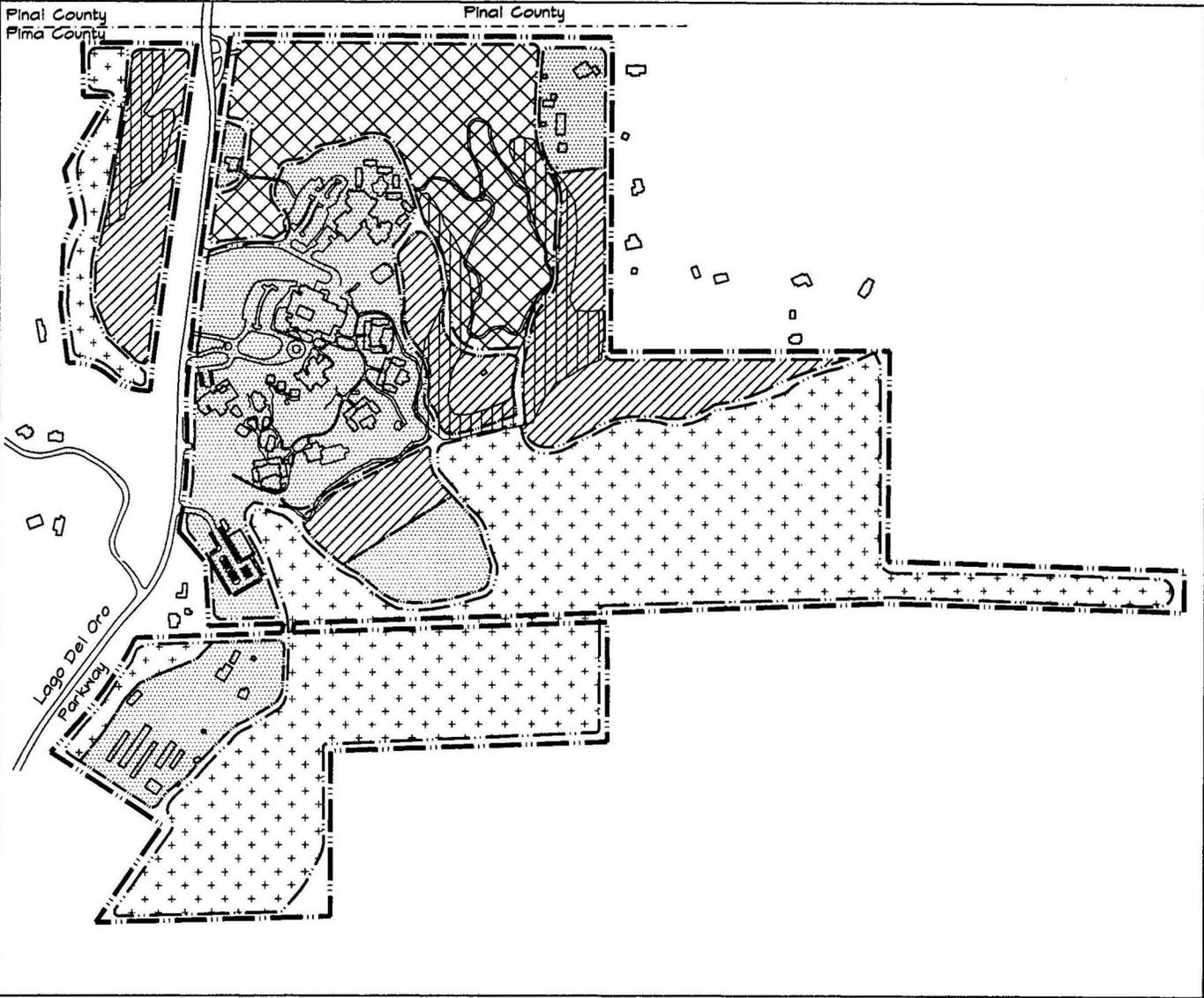
Given the change from natural to fully-graded settings on this project, the most critical grading issue center around sensitively transitioning from one setting to the other.

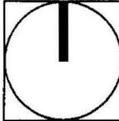
The use of revegetated earthen slopes and curvilinear contouring will be employed as primary design elements when transitioning from a fully graded condition to a natural and/or golf course setting. Optimally, a 3:1 slope (1' of rise for every 3' horizontal) would be the maximum steepness used in these applications, thereby allowing substantial revegetation.

Conceptual Grading Element

LEGEND

-  Existing Graded Areas
-  Minor Terrain Modification with Revegetation
-  Proposed Areas to be Graded
-  Areas of Cut or Fill In Excess of 5'
-  Areas Not Graded





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H. Environmental Resources Element

1. Wildlife Habitat Resources

A letter from the Arizona Game and Fish Department is included in Appendix C evaluating this proposal in respect to mitigation measures for wildlife.

The most significant environmental resource in terms of wildlife habitat values is the Cañada del Oro Wash and the other drainageways on the site. Protection of these areas has been given a high priority in developing the Land Use Plan. The following discussion describes how the habitat values of the riparian resources areas have protected, preserved, or enhanced during the site planning process.

- a. Canada del Oro Wash: All areas within the 100-year flood plain (Class I habitat) will be preserved as natural open space.
- b. Other drainageways: Drainageways will be preserved as open space or revegetated where disturbance is necessary. Additional habitat width is provided by siting the golf course/open space adjacent and parallel to these preserved washes. See Riparian Habitat Disturbance Mitigation Standards, Section IV-J.
- c. Areas of high-density vegetation/Upland Class II Habitat: A portion of these areas will be preserved in place, in association with natural open space areas. Where impacted by development, salvageable vegetation will be transplanted. The saguaros on the site will not be disturbed.

2. Open Space Resources

The Miraval Specific Plan is designed as a resort and recreation based community. Open space is an important opportunity from an environmental perspective as well an amenity in terms of a quality resort experience. This plan has identified and preserved areas of open space and has attempted to utilize a "multiple use" of open space.

Revegetated drainageways and the recreational/open space land use in conjunction with the washes will provide additional area for animal forage and cover. Some of the golf course fairways areas may be

located adjacent to such wash channels. This treatment helps preserve existing floodplain areas by providing increased setback areas from structural developments.

Much of Development Area D along the Cañada del Oro wash will be preserved as open space. Pedestrian and equestrian trails are planned to run through these areas, making it a recreational guest amenity. The preservation of this area is an important component of the Miraval experience, providing both a passive recreation area in which guests can enjoy the natural beauty of the desert; and a buffer between the resort and adjacent properties to the south.

All proposed open space areas will be owned and maintained by the property owners and/or management. A dialog with Pima County Parks and Recreation and the Flood Control District has begun to discuss dedication and trails issues associated with this project.

3. Buffer Overlay Zone

Per the Pima County Ordinance 18.67, Buffer Overlay Zone, the following items are called out as requiring special treatment. The portion of the Specific Plan that falls within the Buffer Overlay zone generally falls within the floodplain of the Canada del Oro, therefore, no permanent structures are proposed in the B.O.Z.O.

4. Archaeological Resources

See Archaeological Regulations, Section IV-I.

5. Natural Vegetation

See Vegetation Preservation/Salvage Standards, Section IV-F.

I. Landscape Element

The landscape concept is depicted in Exhibit III-I: Landscape Element. The landscape plan provides a landscape framework which serves to enhance the overall image and character of the site. The recommended plants for each area are to be selected from the list of existing plants identified onsite, the Pima County Recommended Plant List and the Buffer Overlay Zone Approved Plant List.

Miraval is planned as a resort community with a landscape concept that maintains the Sonoran Desert ambiance. The plants utilized will include plants currently existing onsite, trees salvaged from onsite and/or plants indigenous to the site.

The Landscape Element identifies two types of entry features: The Primary or Resort entry, and the secondary or Residential. Entry features, like doorways, delineate passage into or out of the community. The Miraval entry points shall include signage and accent landscaping to communicate the theme and identity of the resort. The residential entry statements will be smaller in scale than the primary entry statement and communicate the name and entrance into a residential area.

The design for both levels of entry will include a Sonoran Desert theme. The Primary entry Landscape will provide a safe and aesthetic progression into the resort. The scale will vary from a larger scale at the primary entry, to a smaller scale at the residential entry.

A wall, no higher than six feet, will be located along Lago del Oro and Edwin Road. This landscaped bufferyard takes into consideration existing residential developments surrounding the Miraval Specific Plan. Consistent within the overall project, landscaping and revegetation will include drought tolerant and indigenous plant materials.

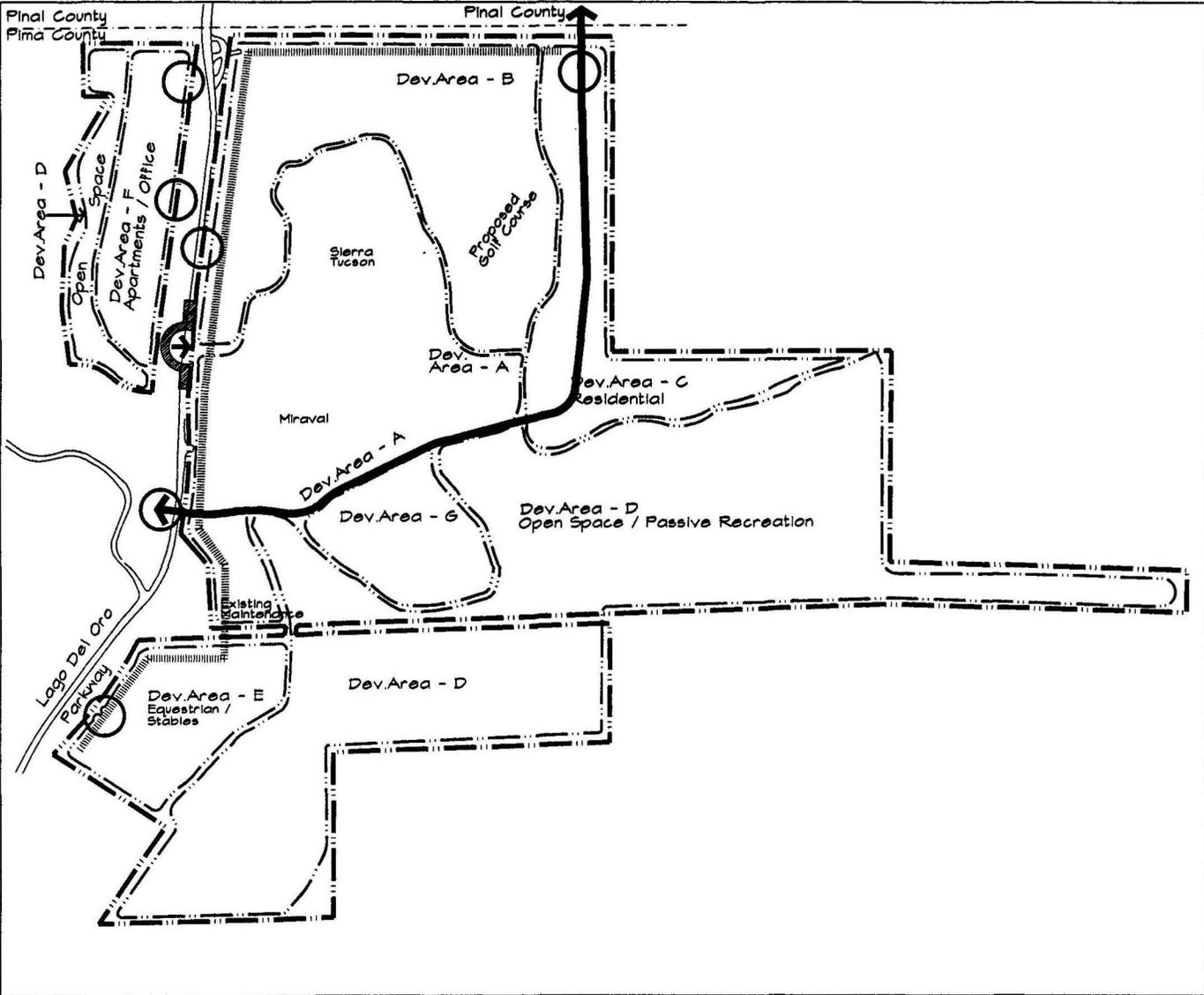
Retention/detention areas will be landscaped per Pima County Standards with plant materials able to withstand inundation.

Three different plant palettes are utilized within the plan area. The existing Miraval plant palette includes all existing plant species identified onsite. This plant palette may only be used in the existing developed areas. All newly developed areas must use the Pima County Recommended Low Water Use/Drought Tolerant Plant List. Those areas that fall within the Buffer Overlay Zone must use the B.O.Z.O. Approved Plant List, Resolution No. 1988-151. The existing Miraval palette can be found in Appendix I; other

palettes can be found in the Pima County Landscape Design Manual, as referenced by the Pima County Zoning Code, Chapter 18.73, Landscaping, Buffering and Screening Standards.

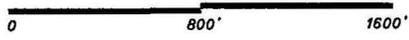
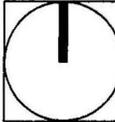
A plant preservation plan based on the methodology included in Section VI-F will be completed prior to approval of a final plat.

EXHIBIT III-H.1:
Landscape Element



LEGEND

-  Primary Entry Landscape
-  Secondary / Residential Entry Landscape
-  Residential Streetscape
-  Bufferyard with Wall

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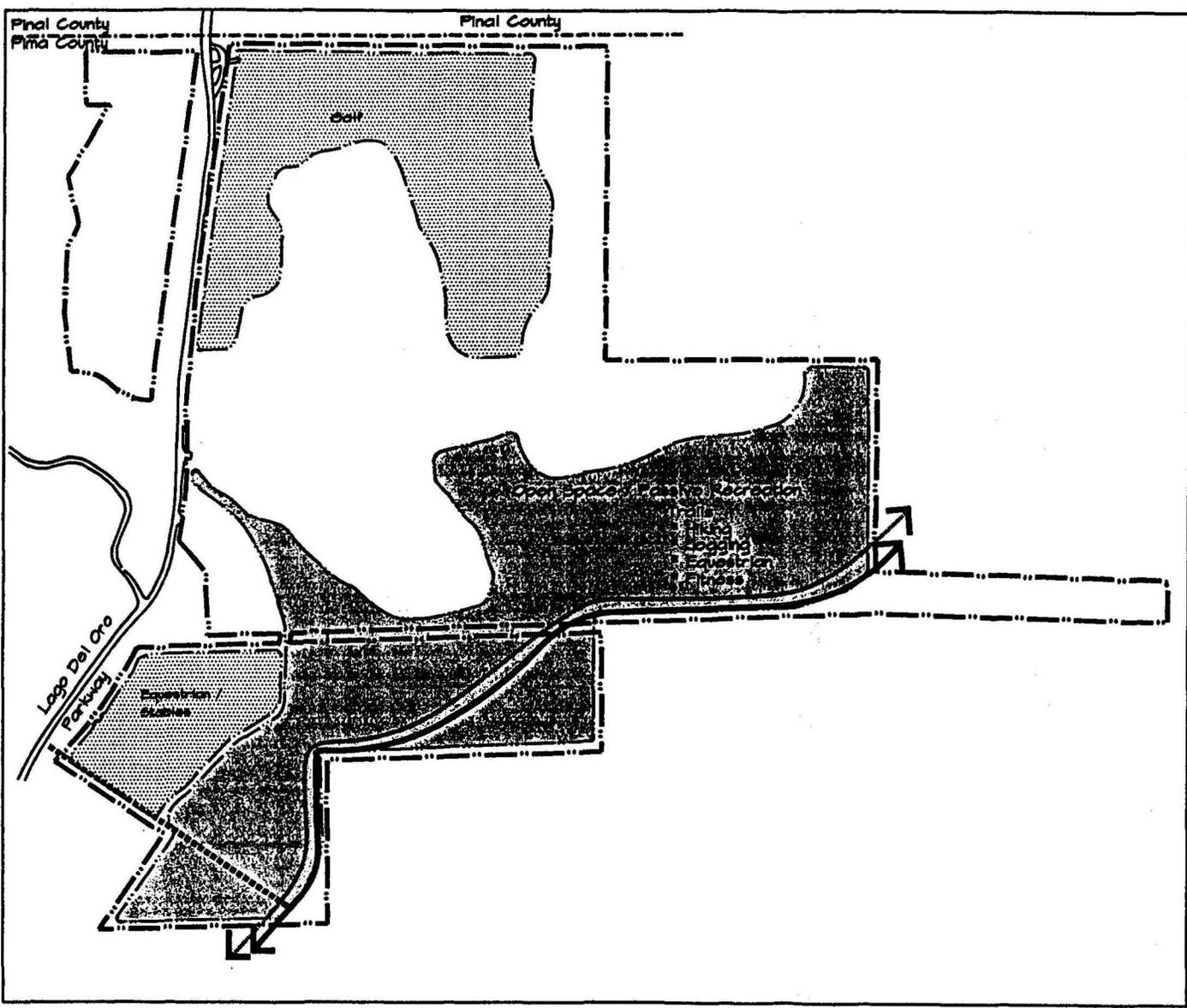
J. Recreation Concept

The Miraval Specific Plan is a recreation based resort community. The major recreational elements for Miraval will be financed by the Developer or builder. Elements include: open space adjacent to the Cañada del Oro; a golf course; and the pedestrian/bike path system associated with the entry drive and the local collector. (See Exhibit III-J: Conceptual Recreation Element). Trails will be non-lighted, meandering paths, made of compacted earth or decomposed granite. Existing exercise and challenge courses and equestrian trails will be expanded and enhanced.

Pima County has plans for a proposed river park trail. This trail follows the Cañada del Oro wash and cuts through the south part of the specific plan area. The property owner shall provide a 50-foot corridor on the south bank of the CDO for future linear park development as an easement at first, with the property owner providing an agreement to dedicate a 50-foot corridor to Pima County within five years of the date of the Board of Supervisors' approval of the specific plan or at the time a master plat is submitted and approved, whichever occurs first. A public trail access easement for the bed of the Canada del Oro Wash (CDO) shall be granted within 90 days of the approval of the specific plan. Pima County shall grant the property owner unrestricted access and recreation use across this dedicated strip. The costs of surveying the easements shall be borne by the property owner. Pima County shall work with the property owner to develop and implement an appropriate signage program for the trails that cross the subject area noticing the restriction to non-motorized traffic, with costs to be borne by Pima County. A public trail easement 15 feet in width from Lago del Oro Parkway to the CDO, as previously described and agreed upon to be granted within the same time period. All easements shall be granted within 90 days of the approval of this specific plan.

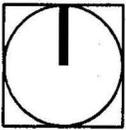
All recreational elements in the Specific Plan area are designed for the private use of Miraval residents and guests, with the exception of the golf course, which may be open to the public.

EXHIBIT III-J Conceptual Recreation Element



LEGEND

-  Functional Open Space
-  Natural Open Space
-  Proposed 50' Easement for Linear Park
-  Proposed 15' Trail Access Easement
-  Proposed 15' Trail Easement

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K. Air Quality

Air quality may be positively impacted as a result of paving onsite roadways and driveways resulting in the reduction of particulate pollution. No industrial or other pollution or odor producing land uses are proposed. Dust during construction will be strictly controlled by regularly watering the construction site and other appropriate methods to minimize the impact on resort guests and nearby residents.

Potential odor problems associated with the existing septic disposal on the site will be mitigated with the conversion to a constructed wetland treatment system.

L. Viewsheds

Development of the site will have little impact on the views and vistas of the Santa Catalina Mountains. The site lies in a valley, and is significantly lower in elevation than surrounding residential property to both the east and the west. A large ridge runs just south of the subject property upon which the residential property to the south is situated. Thus, the development of the site will have little impact on the views and vistas of this property.

Much of the Miraval site sits at a lower elevation than surrounding property. Therefore, much of the site is visible from adjacent property. However, views of the developed portion site from adjacent properties to the southeast and south are distant. These properties will also be buffered by the Canada del Oro wash and existing vegetation, which will be preserved. Views of the site from the properties to the northeast will be dominated by the golf course. Most of the site cannot be seen from Lago del Oro Parkway, since the developed areas have been placed away from the roadway.

IV. DEVELOPMENT REGULATIONS

A. Purpose and Intent

These regulations will serve as the primary mechanism for implementation of the land uses for the Miraval Specific Plan area after adoption by Pima County. The regulations contained herein provide an appropriate amount of flexibility to anticipate future needs and to achieve compatibility between land uses. This Specific Plan will abide by applicable Pima County Regulations that are not included or specifically addressed within this document.

B. Definitions

The terms and definitions used in this Plan shall mean those defined in Chapter 18.03 of the Pima County Zoning Code, with the following addition:

Longevity Housing: A non-medical, assisted living facility offering food preparation, housekeeping and recreation services in a residential setting.

Resort Villa: An individual, extended stay, pedestrian oriented, commercial resort unit having no attached parking or motor vehicle access and designed in such a way that it can be integrated into the facilities and operations of the resort. The units may be attached or detached, may include full kitchens and may be individually owned, leased, or rented.^{Reso2006-332}

C. General Provisions

If an issue, condition or situation arises or occurs that is not addressed by this plan, applicable portions of the current Pima County Zoning Code are as follows:

Development Area	Closest Pima County Equivalent
Development Area A	MR Major Resort
Development Area B	GC Golf Course
Development Area C	CR-1 Residential
Development Area D	Open Space
Development Area E	RH Rural Homestead
Development Area F	TR Transitional

Development Area G

MR Major Resort

Whenever a use has not specifically been listed as a permitted use in a particular zone classification within the Specific Plan, adherence must be established with Section 18.90.080-C of the Specific Plan ordinance.

D. Land Use Plan Designations

Land Use designations have been assigned to each Development Area identified in the Miraval Specific Plan. Their permitted uses and development standards are described in the following sections.

E. Development Area Categories

1. Resort (Development Areas A, E, G)

a) Permitted Uses:

1. Resort;
2. Diagnostic and Residential Treatment Facility;
3. Golf Course and Maintenance Facilities;
4. Longevity Housing;
5. Accessory Structures;
6. Private Stable;
7. Resort Villa Reso2006-332.

b) Nonresidential Development Standards:

- (1) Minimum Site Area: None. Reso2006-332
- (2) Minimum Site Requirements:
 - a) Front: Twenty feet;
 - b) Side: Seven feet each;
 - c) Rear: Twenty-five feet.
 - d) Individual Resort Villa parcels: None. Reso2006-332
- (3) Building Height Limitations:
 - a) Maximum Height: Twenty-four feet
- (4) Parking: in accordance with Pima County Zoning Code ;

- (5) Maximum Building Coverage: 60%
Maximum Building Coverage within individual Resort Villa parcels: 100 percent Reso2006-332.
- (6) Maximum Floor Area Ratio: 2.0;
- (7) Minimum landscape Coverage: 15% of site.

b) *Detached Accessory Building Development Standards:*

- (1) Permitted coverage: forty percent of the minimum rear yard area plus fifty percent of any additional space in the rear of the principal building.
- (2) Maximum height: Twenty-four feet;
- (3) Minimum Distance Requirement:
 - (a) To main buildings: Seven feet;
 - (b) To front lot line: Sixty feet;
 - (c) To side lot lines: Four feet.
 - (d) To rear lot line: Four feet.

2. Mixed Use (Development Area F)

a) *Permitted Uses:*

- 1. Residential Dwelling Units up to 25 Units per Acre;
- 2. Educational Facilities;
- 3. Congregate Care Facilities and Longevity Housing;
- 4. Accessory Structures;
- 5. Recreational Facilities;
- 6. Golf Course and Maintenance Facilities;
- 7. Resort Hotel;
- 8. Motel or Hotel;
- 9. Professional or Semi-professional Offices;
- 10. Child Care Center;
- 11. Research and Development Facilities; and
- 12. Hospital or Sanitarium.

b) *Residential Development Standards*

- (1) Minimum lot or site area:
 - (a) Single Family detached dwelling unit (lot): Three thousand square feet.
 - (b) Multiple dwelling unit (site); Ten thousand square feet.

c) *Minimum lot or side yard requirements:*

- (1) Single-family detached dwelling unit (lot):
 - (a) Front: Twenty feet or ten feet for side entry garages;
 - (b) Side: None. Zero lot-line siting of dwelling units on individual lots is permissible, subject to Pima County Building Codes (Title 15);
 - (c) Rear: Ten Feet.
- (2) Multiple dwelling unit (site):
 - (a) Front: Twenty feet;
 - (b) Side: Seven feet each;
 - (c) Rear: Twenty-five feet.
- (3) Building height limitations:
 - (a) Maximum height: Twenty-four feet; and
 - (b) In areas restricted by the hillside development zone (Chapter 18.61, HD Hillside Development Zone), no building shall exceed two stories; and
- (4) Parking: in accordance with Pima County Zoning Code.

3. Low Density Residential (Development Area C)

a) *Permitted Uses:*

- 1. Residential Dwelling Units up to 1.2 Units per Acre;
- 2. Educational Facilities;
- 3. Congregate Care Facilities and Longevity Housing;
- 4. Accessory Structures;

5. Recreational Facilities;
6. Golf Course and Maintenance Facilities;
7. Resort Hotel.

b) Residential Development Standards

- (1) Minimum lot or site area:
 - (a) Single Family detached dwelling unit (lot):
Thirty-five thousand square feet.

c) Minimum lot or site yard requirements:

- (1) Single-family detached dwelling unit (lot):
 - (a) Front: Twenty feet or ten feet for side entry garages;
 - (b) Side: None. Zero lot-line siting of dwelling units on individual lots is permissible, subject to Pima County Building Codes (Title 15);
 - (c) Rear: Ten Feet.
- (2) Building height limitations:
 - (a) Maximum height: Twenty-four feet; and
- (3) Parking: in accordance with Pima County Zoning Code

4. Open Space (Development Area D)

Permitted Uses:

1. Private Stables;
2. Exercise Trails and Courses.

5. Golf Course (Development Area B)

In accordance with Pima County Zoning Code Chapter 18.59 and Chapter 18.71, Development Plan Standards.

F. Vegetation Preservation/Salvage Standards:

Disturbance of existing vegetation protected under the Arizona Native Plant Law will be mitigated through the following measures:

1. 100% of all salvageable saguaros (as determined by a qualified landscape architect, biologist or horticulturist) be preserved in place.
2. A landscape mitigation plan will be provided at the time of tentative mapping which contains an inventory of all trees protected by the Arizona Native Plant Law, and measure a minimum of four caliper inches at a point three feet above the ground.

The mitigation plan will provide for either the transplanting, preserving or planting of at least as many trees as were originally inventoried on the site and deemed salvageable. Newly planted nursery trees will be fifteen gallon size or larger. This provision will pertain to all construction activity within the plan area. The mitigation plan shall include language that provides for protected, endangered species in the event they are found onsite during the construction process.

3. If endangered or threatened animal species are found during the construction process, they shall be protected and their location monitored until appropriate measures have been taken to relocate the animals per the conditions of the mitigation plan.

G. Public Facilities Regulation

1. **Utility Lines (Per Pima County Ordinance 18.67, B.O.Z.O.)**

All new or relocated lines within the Miraval Specific Plan area shall be placed underground, unless the relocated line is a one-hundred fifteen kilovolt (or greater) transmission line. All utility lines relocated due to improvement projects shall be placed underground unless such relocated line is a forty-six kilovolt (or greater) transmission line.

2. Underground Utility Lines

Location of underground utility lines within the Miraval Specific Plan area shall be planned, joint trenched where possible, and located beneath the paved portions of roadways or within twenty-five feet of the edge of the paved portions whenever possible so as to minimize vegetative disruption.

H. Hydrology/Drainage Regulations

1. Encroachment into Regulatory Floodplains

No encroachment will occur into the regulatory floodplain of the Canada del Oro. Encroachment into other regulatory floodplains (i.e. those with a 100-year flow of more than 100 cfs) will be allowed for the following:

- Roadway dip crossings;
- All-weather street crossings;
- Channelization/bank protection as subject to the review and approval of the Pima County Flood Control District;
- Accommodate detention basins and their associated outlets;
- Utility crossings in accordance with the previously-stated Public Facilities policies;
- Golf course, driving range, and other recreational uses.

2. Maintenance

Any flooding or erosion damage to the site's golf course will be addressed through standard golf course maintenance. No attempt will be made to address any such potential problem through subsequent requests for encroachment and bank protection.

I. Archaeological Regulations

A portion of the Miraval property that was previously developed has been surveyed for archaeological or cultural resources, with no sites located as a result. Site surveys will be done for previously undisturbed and unsurveyed areas prior to any ground disturbance. In consultation with Pima County, appropriate measures in accordance with the Pima County Comprehensive Plan policies for the treatment

of archaeological and historical sites will be taken to either avoid or mitigate impacts to sites that are determined to be scientifically significant. Archaeological sites will be recorded and if needed, mitigated to Pima County and Arizona State Museum guidelines.

J. Riparian Habitat Disturbance Mitigation

Consistent with Article X of Pima County's Floodplain and Erosion Hazard Maintenance Ordinance No. 1994-FC2, any disturbance of riparian habitat shall require a mitigation plan. The mitigation plan shall be consistent with any riparian habitat mitigation standards adopted by the Floodplain Management Board, and shall be prepared in accordance with the best available scientific or management practices.

K. Architectural Regulations

(Per Pima County Ordinance 18.67, B.O.Z.O.)

- Allowable Colors: Muted, blending with local colors and textures.
- Reflective Finishes are prohibited.
- Mechanical equipment must be screened and painted to reduce visibility.
- External lighting must be in conformance with Ordinance 18.67, B.O.Z.O.

V. DESIGN GUIDELINES

A. Introduction And Purpose

The following guidelines have been prepared for the Miraval Specific Plan. They have been organized for publication as a separate non-regulatory document. The Design Guidelines serve as an overall guidance for the refined design and development of each phase of the project.

1. Purpose

The Design Guidelines provide the framework for quality design, expressing the desired character of future development. They address common community features such as site planning, architecture, circulation, landscape, open space and recreation, and signage.

The purpose of the guidelines are to establish development criteria and assure a cohesive community character and appearance with environmental compatibility.

The objectives are:

- To serve as design criteria for use by planners, architects, landscape architects, engineers and builders.
- To provide guidance to the Master Developer and Builder in the review of future development projects in the Specific Plan area.
- To provide a viable framework which will achieve the plan's quality objective.

It is not the intent of the guidelines to limit the creativity of designers. Individual project identity is encouraged while providing community continuity.

2. Setting

The Miraval associated properties is a master planned resort community. The mixed land use development is planned for residential, office, recreational, and resort use. Much of the property will be maintained as natural open space, including the Cañada del Oro wash.

3. Guideline Framework

The Design Guidelines address two levels of planning and design:

Community scale
Secondary village scale

Community Level I

Streetscapes and project edges are the most visible elements within a master planned community. The Miraval Community is initially established by the entry monumentations, along Lago del Oro Parkway. Integrating landscape treatments, village theme walls and signage aides in achieving an overall community identity.

Secondary Level

Individual projects, the separate developments which comprise the community as a whole, include residential, office, resort and recreational uses. Each project should have an individual identity communicated through its architectural style, product type, and landscape treatment.

B. Community Character

Community character is created through site location along with development sensitivity within the natural parameters. Land use definitions, along with major circulation routes, begin to convey the essential character and complex interrelations between the environment and the development.

1. Land Use

Located adjacent to the Cañada del Oro wash, the Specific Plan area and surrounding area is partially developed. There is a strong

Sonoran Desert character in this area created by the indigenous vegetation, geology and arroyos. It is the intent of the master planning of this community to maintain the regional flavor through a desert resort style development blending into the existing landscape.

The Miraval Specific Plan area will be developed as a master planned resort community with mixed-uses. It will include a resort, single family and multiple family residences, offices and open space areas containing active and passive recreational opportunities.

The following design guidelines have been developed to ensure style, landscaping, fencing and road design appropriate for the desert ambiance. This, when combined with the large areas of open space and natural vegetation will produce a community in character with the surrounding properties.

2. Circulation

A clear hierarchy of streets and consistent design quality of public rights-of-ways will be developed and maintained to attain a circulation cohesiveness. The circulation concept will provide a strong community structure and identity.

The Circulation Element will be strengthened by the Design Guidelines. This entails focusing on the primary entry road, secondary entry road, and neighborhood streets, see Exhibit III-D.1 Circulation Concept Plan.

Lago del Oro Parkway is the primary entry road to the Miraval Specific Plan area. It provides access to the Plan area from the south off of Golder Ranch Road and eventually from Oracle Highway to the west. Lago del Oro Parkway is designated as a scenic route. It will have a 150' R.O.W.

3. Recreation/Open Space

A key component to the character of this community is the substantial amount of open space. Much of Development Area C will remain in open space providing a natural backdrop for the community.

C. Site Planning Guidelines

1. Objectives

The overall image for the Miraval Specific Plan development is to create buildable pads while retaining the underlying integrity of the landform. The main goal of the site planning guidelines are to take advantage and maximize views on and offsite, provide a sense of community, and honor the present development character of the area. The Miraval Design Review Board has the responsibility for implementing these Guidelines.

The following objectives form the basis for these guidelines:

- To encourage site planning sensitive to the topography, natural drainage, existing vegetation, and views.
- To respond to governmental standards and respect the privacy of offsite property owners.
- To create a cohesive community while allowing individual development identity.
- To provide a variety of housing types responding to existing natural features and having the flexibility to respond to changes in market demand.
- Provide community delineation and a sense of community security through the use of walls and monumentations..

The following guidelines in this section addresses the aesthetics of site planning and grading concerns.

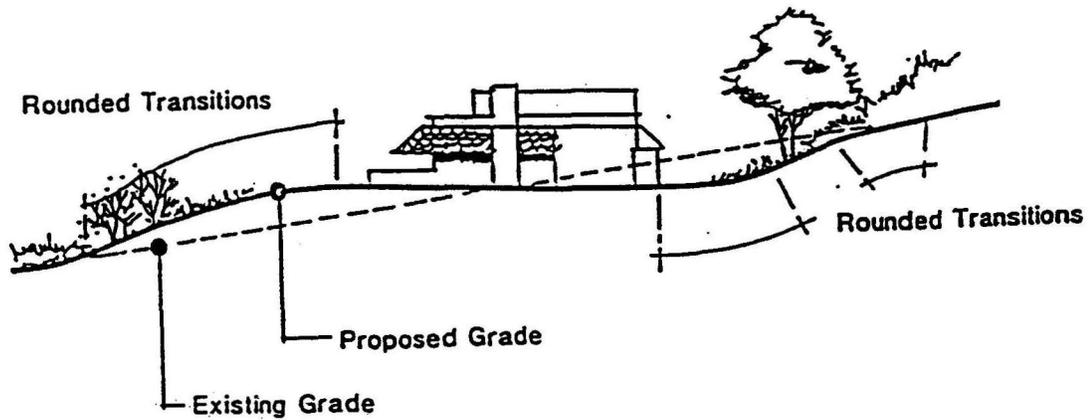
2. Site Planning

Site planning addresses the proper placement of buildings, roads and services within the site. This requires an understanding of existing drainage patterns and terrain, building form, and orientation.

- Stabilized drainageways, if lined, should use naturalistic materials.

- Building mass should be simple in form.
- Building placement on adjoining parcels along a street should be varied to create a more interesting streetscape.
- Clusters of buildings should be of similar scale and mass with one "key" building or element which stands out from each cluster.

BLEND WITH NATURAL LANDSCAPE — ESTATE LOTS

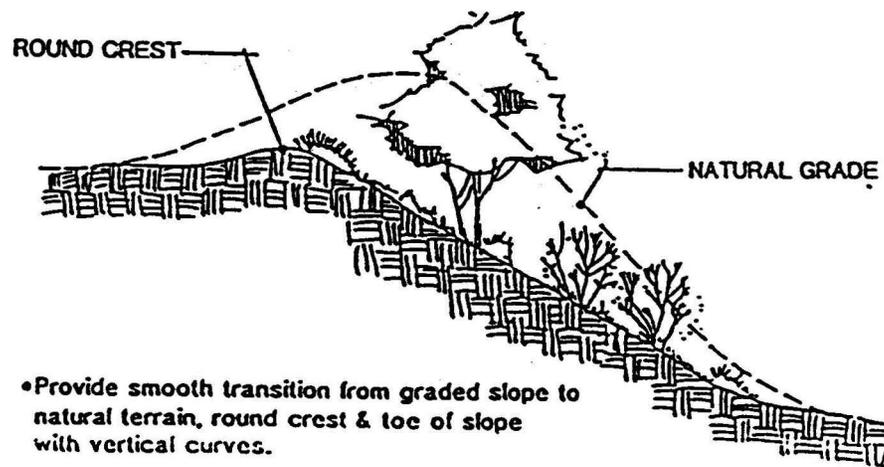


3. Grading

The key concepts in grading are to integrate buildable parcels with the existing topography and to maximize views from building pads while maintaining a low visual impact from surrounding properties.

The grading of the site terrain should conform to the natural topography as much as possible, resulting in a smooth transition from the natural grade to the developed pad.

ROUND CREST & TOE OF SLOPE – ESTATE LOTS



- Provide smooth transition from graded slope to natural terrain, round crest & toe of slope with vertical curves.
- Plant material of varying form & density to conceal and soften slope plane.

- Grade new banks with rounded forms to blend into the natural terrain.
- Graded slopes should provide flowing edges which reflect natural rounded terrain.
- Site grading design should complement and reinforce the architectural and landscape design character, helping to screen parking, loading and service areas, reduce the perception of height and mass on larger buildings, and provide elevation transitions contributing to the efficiency of onsite and offsite movement systems.
- Grading for development pads should follow the contours of the existing underlying landform when possible. Mass grading, in estate lot areas which can alter the integrity of the landform, should be avoided if possible. Mass grading is permissible in areas greater than 2 residences per acre.

D. Landscape Guidelines

1. Objectives

An overall landscape theme will unify and reinforce the open space and circulation components of the Miraval Specific Plan Community. The Landscape Guideline objectives are:

- Establish a landscape hierarchy for treatments of primary, specialty and secondary entries, and primary and secondary streets.
- Establish landscape design guideline for project design.
- Establish a plant palette for use in public rights-of-way, streets, and setbacks.

The Miraval landscape theme encourages the Sonoran Desert character, including riparian vegetation along the drainageways. This character is reinforced through the coordinated design and choice of landscape and paving materials, see Exhibit III-H: Landscape Concept Plan. To achieve the desired uniformity, landscape guidelines are provided for:

Entries and Intersection
Streetscapes
Open Space/Recreation

2. Entries and Intersection

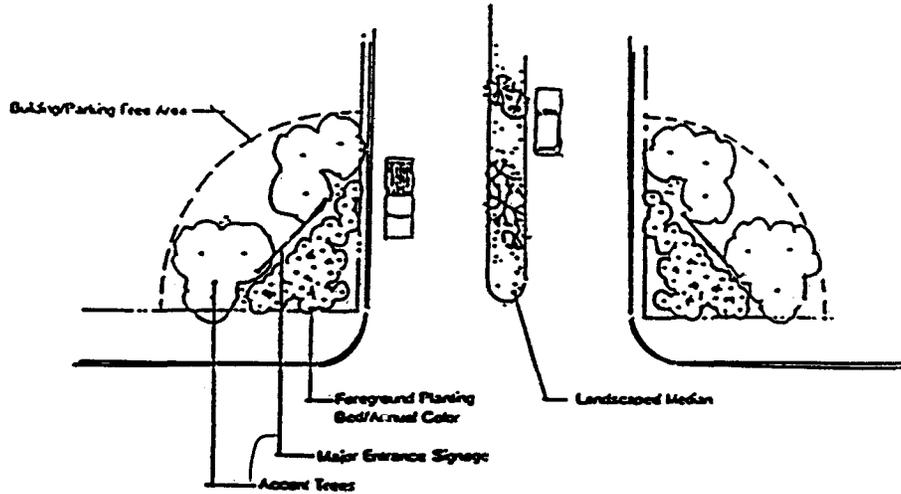
a. Community Entry (Primary Entry Statement)

The community entry should create a distinct sense of entry, identity, and landscape character for Miraval. There is one primary entry within the Specific Plan area, off Lago del Oro Parkway.

An entry zone should be defined and receive special landscape treatment to emphasize and contrast it with the surrounding environment. These specialty components create the sense of entry by framing the roadway at these points with the architectural elements and/or mass of trees to form symbolic gateways.

Clear views for traffic safety and project signage must be maintained.

TYPICAL MAJOR ENTRY STATEMENT



The primary entries to the project shall accommodate entry signs, accent trees, hedges, and/or groundcovers.

b. Secondary Entries

The secondary entries shall have similar treatments as the primary entries but smaller in scale. These entries are into individual development projects, residential or commercial, within the Specific Plan area.

3. **Streetscapes**

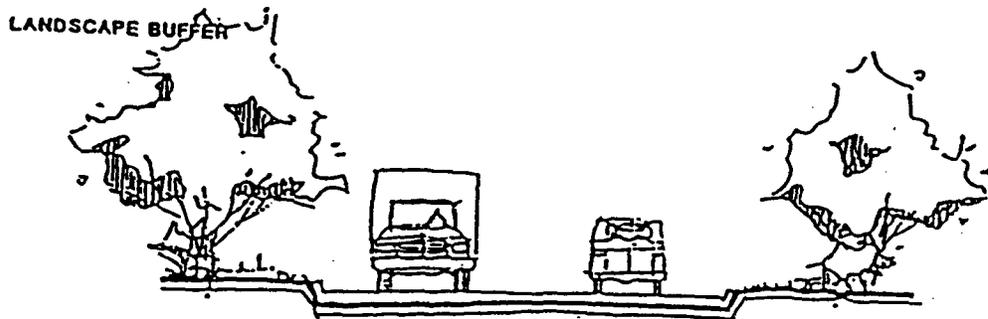
a. Primary Streets

Streetscapes and project edges are the most visible developed elements of Miraval. Lago del Oro Parkway will serve as the transportation spine within the community and requires landscape design continuity.

The landscape character should be of an enhanced desert corridor.

b. Secondary Streets

Secondary streets shall be similar in character as the primary roads, smaller in scale and without medians.



c. Neighborhood Streets

Neighborhood streets shall receive consistent treatment within each individual development. Efforts should be made by individual builders to integrate with the community streetscapes.

4. Open Space/Recreation

Open Space corridors shall maintain and/or be enhanced with native plant materials found within those areas. Where unchanneled open space areas abut more intensive land uses, a richer landscape treatment should be designed with an increase in plant materials.

E. Architectural Guidelines

Architectural Guidelines are provided to ensure the integration of buildings with the natural setting and to maintain a cohesive community character.

1. Objectives

The character of Miraval is based on influences of the climate and historical settlements. Architectural design is most prominent in the built environment. The following architectural guidelines are to establish parameters, while encouraging variety, for development of residential and commercial neighborhoods. The objectives are:

Establish architecture design criteria to achieve the desired external building form, materials and appearance.

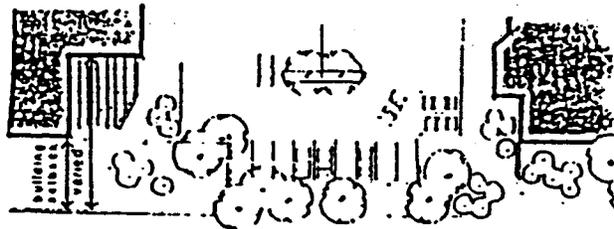
Reflect function of uses through architectural form.

Encourage and utilize a high quality and variations of the Southwestern style.

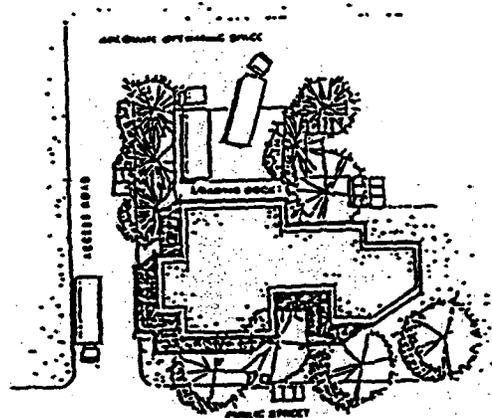
2. Office

Contemporary office building architecture provides exciting opportunities to create quality office development with historical ambiance.

- All visible elevations of a building shall receive adequate enrichment.



- Buildings with varied front setbacks are strongly encouraged.
- Building forms should be of simple geometry with traditional rectangular forms.



VARY BUILDING EDGES

Appropriate building materials include:

- Brick
- Masonry
- Stucco
- Adobe
- Concrete Block

Other materials should be used in small quantities only for accent.

Predominant colors should be earthtones, such as browns, red-browns, and tans. Exceptions must have prior approval of the Miraval Design Review Board.

Recesses that create interplay of light and shadow, covered walkways, colonnades, arcades, and openings that create interest are encouraged.

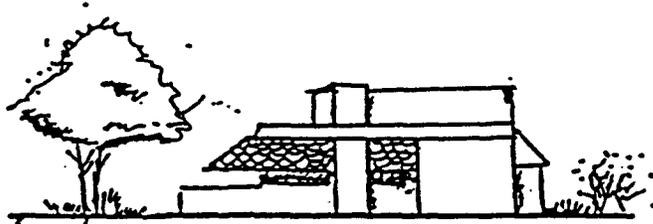
Electrical transformers located outdoors on the site shall be screened from view with landscaping when possible.

All changes to the exterior of any of the buildings or yards must have prior approval of the Miraval Design Review Board.

3. Residential

The theme for the residential uses within the Miraval Specific Plan area is Southwestern. Architectural designs which complement this style are encouraged. This theme adapts to and integrates with the existing environment.

- Residential homes should be of simple geometry with traditional rectangular forms.
- Residential buildings should have shadow reliefs such as offsets, popouts, overhangs, and recesses.



- Fully recessed openings are encouraged, although plaster projections and projecting windows may be used to add articulation to wall surfaces.
- Appropriate materials include:

Stucco
Brick
Masonry

- Predominant colors should be derived from the desert environment.
- Accent colors should be desert accent colors of wildflowers in bloom, sunrises, sunsets.
- Feelings of open space within the development can be achieved through design devices such as curving streets, orienting road axes to open areas and vistas.

4. Individual Development Theme Wall

Walls built around individual developments provide individual project identity but should also be consistent with community character.

- The walls should be solid or semi-open in design and typically be three to four feet in height.
- The wall should be constructed of material similar to the building materials, including stone, and be consistent throughout each individual development where possible.
- Semi-open walls should be constructed of such materials as stone pilasters with brick caps or similar materials that portray the image of the area.

F. Sign Guidelines

1. Objectives

Signage is an important element within a community, providing a sense of identity and visual linkages. It can reflect an image of quality through the style of graphic communication for residents and visitors. The hierarchy of facilities and informational importance directing residents and visitors can be achieved through a consistent standard of signage style and scale.

Individual development projects within the Specific Plan area are each portions of the whole community and contributes significantly to the visual image of the Miraval community. The Signage Guidelines will provide the basis for an integrated visual character and continuity throughout the Specific Plan build-out.

The objectives are:

- Provide entry signs to the Community.
- Establish parameters for individual project entry signs.
- Establish a hierarchy of sign sizes, colors, and materials relative to the importance of the information.

2. Materials/Color Scheme

An effort should be made to achieve consistency between building style and sign design. In all cases, signage should reinforce the Southwestern image. The message a sign conveys is affected by the materials and colors used in combination with one another.

Color schemes for signage should relate to other signs, graphics and color schemes in the vicinity to achieve an overall sense of identity. Appropriate colors are the same as those stated in the Architectural Guidelines.

3. Entry Signage

Entry signs include community entry signs, individual development entry signs and commercial/office identification signs.

Appropriate material reinforcing the Southwestern image may include stone, brick, masonry, and stucco.

a. Community Entry Signs

Community entry signs shall be provided by the Master Developer. These signs should be large in scale, monument type sign, creating a major statement.

b. Individual Project Entry Signs

Individual project signs shall be similar to the community entry signs but smaller in scale. They should reflect the specific design of the architecture and theme wall for that project.

c. Office Identification Signs

Office Identification signs shall be similar in character to the community entry signs but smaller in scale. They should reflect the specific design of the architecture.

2. Directional Signage

a. Directional Signs

Directional signs should direct a visitor to his/her destination in a safe, convenient and efficient manner. Signage should identify both the destination (facility, visitor parking, etc.) and direction of travel. Direction may be indicated by arrows or other symbols, or by sign placement.

b. Traffic and Regulatory Signs

Traffic and regulatory signs must meet county/state standards for face size, face design, reflective qualities, height and other uniformities which make them instantly recognizable as traffic signs.

3. Signage Lighting

The quality of signage lighting should relate to the character that is intended for the area. Sign illumination should not cause a glare or illuminate adjacent sites to the extent possible. Signage may be illuminated by uniform external ground lighting sources. Light fixtures should be well integrated with the design and color scheme of the sign using appropriate design, color and lighting hardware.

G. Site Lighting

The lighting concept for the Miraval Specific Plan area should be subdued and discrete in keeping with the desired character of the development. Lighting should provide adequate visibility for security and safety. Reduction of onsite and offsite glare should be a prime consideration by strategically placing lights to minimize glare off-site. Simple fixtures should be chosen to blend into the streetscape.

The hierarchy of illumination for streets, entries, and individual projects should be clear. The intent is to respond to the varied land use and street edge conditions and avoid monotonous lighting levels and patterns.

- Street lighting fixtures should incorporate cut-off shields to focus, as much light as is possible, down on roads and walkways.
- All exterior building lighting should use energy conserving lamps.
- Lighting fixtures should be strategically placed in order to minimize glare to adjacent properties.

H. Design Review Board

A Design Review Board (DRB) shall be formed by the Master Developer and shall consist of three regular members and one alternate member. The committee may consist of representatives from the land owners, home builders, homeowners association, and land planner/landscape architect consultants.

The DRB shall review all proposals for construction and ensure that such proposals meet the intent not only of the Guidelines, but also the development philosophy of the Miraval community. The DRB also has the authority to interpret the Guidelines in the event the Guidelines may not be explicit in a

particular situation. The Committee may also amend the Guidelines by 2/3 majority vote of the DRB members.

The DRB may adopt, amend, and repeal by a 2/3 majority vote, these Design Guidelines, which may serve to supplement, clarify, interpret or implement the Guidelines.

VI. SPECIFIC PLAN IMPLEMENTATION

A. Purpose

The regulations and guidance contained within the Specific Plan prescribe the implementation of development. Procedures for the administration of Specific Plan provisions are contained in this section, including the phasing plan for the development of the proposed development areas. These development areas define the type, location, intensity, and timing of development. Programs for the projected sequence of development are also included. In order to track the progress of Specific Plan development, associated improvements and budgetary needs, a monitoring program is provided. This chapter also provides information regarding general administration, subdivision procedures, amendment procedures, and the linkage between these elements.

B. Definitions

Two entities are assigned responsibility for implementation of the improvements for Miraval: the developer and the builder. The developer is the entity responsible for insuring that the basic infrastructure facilities are planned and constructed to serve the development areas within the Miraval Specific Plan. The builder is the purchaser of a development area, or portions of a development area, who will either build or provide for buildings within those areas.

C. General Implementation Responsibilities

Implementation of the Miraval Specific Plan shall be the responsibility of the developer. The developer shall be responsible for the engineering and implementation of the infrastructure systems at the time of development. These systems include access roads, residential collectors and associated streetscapes, the wastewater disposal facility, water mains, electric lines, gas lines and cable television facilities.

An approved master plat shall be required prior to the approval of any subdivision plat or development plan or the issuance of a permit based on this specific plan. Prior to submittal of the master plat, this specific plan is subject to approval by the Planning Official, with the written concurrence of

the directors of the Transportation and Flood Control District, Parks and Recreation, and Wastewater Management departments, of a master platting and improvements phasing schedule for the entire specific plan. This schedule shall reference the master studies necessary for preparation of the master plat and shall identify the necessary improvements and dedications (including roads, sewer, drainage, trails and open space).

D. Phasing Plan

A significant amount of infrastructure and structural development has already occurred within the Miraval Specific Plan Area. Subsequent phases will build upon those existing facilities. In order to allow an adequate level of additional infrastructure to be built to accommodate new development, it is envisioned that the Miraval Specific Plan be developed in three phases. Market factors have been considered in order to stagger the introduction of additional resort phases, recreational uses, and residential units.

The first phase will be the conversion of the Sierra Tucson facilities to the Miraval resort, and further expansion of the resort facilities (Development Area A). Phase two will be the development of the golf course and the constructed wetlands facility (Development Areas B and G). Phase three will be the development of the office and the apartment uses west of Lago del Oro Parkway (Development Area F), and the residential area east of the resort in Development Area C.

The primary intention of the phasing plan is to relate land uses to infrastructure requirements of the proposed and existing development. The phasing plan implies a building sequence, but there is nothing in this plan to preclude a different order of development, or a different combination of sub-phases, as long as the related infrastructure is adequately in place. This flexibility is insured by the Specific Plan since the actual sequence of development may be affected by external factors which are not controlled by the developer or builder.

The Phasing Plan and monitoring program must be flexible enough to make adjustments in corresponding infrastructure and service requirements. These adjustments to the phasing plan and monitoring program will be made at the staff level. If the build-out rate accelerates, for example, key infrastructure improvements may have to occur earlier than shown on the Phasing Plan. Likewise, if projected build-out occurs at a slower rate, certain improvements to infrastructure may not be required until a later phase than what is shown on the Phasing Plan.

The first phase builds upon the existing development on the site. It is during this phase that a significant level of additional infrastructure for the project will be completed. The first phase will be developed in subphases as market conditions dictate.

The development of the golf course and constructed wetlands facilities are tied together in Phase two, since the two are interrelated. The golf course will be dependent upon the effluent from the wetlands facility; and the wetlands facility needs the golf course to utilize the treated water it will output.

Phase three, the development of more intensive office and residential uses on the site, will be dependent upon the provision of sanitary sewer to the site.

E. Circulation Phasing Plan

Based on the recommended Land Use Phasing Plan, the circulation system will be implemented in phases as development occurs. The required street improvements as shown on the Circulation Concept Plan will be provided by the developer in phases and built to Pima County standards.

F. Public Facilities Phasing

Sewer System Implementation: The facilities currently onsite utilize existing septic tanks. Expansion of the project will require additional sewage disposal capacity. Due to the distance from the nearest existing sewer, on-site sewage disposal will continue to be utilized. See Section III.E.2: Sewer, for an expanded discussion of this topic.

Water Distribution System: The buildings now on the site are connected to the existing water distribution system. This existing infrastructure will be expanded to serve future development as the project is built out.

G. Monitoring Program

The Specific Plan Monitoring Program is designed to provide assurances to Pima County and the developer that the Specific Plan is operating properly as the development is built out. The function of the program is to establish a system which allows periodic adjustments within the project development area. This system provides mechanisms for accomplishing and documenting

these adjustments. The monitoring program effectively establishes an accounting system to insure that all changes, upon approval, are properly recorded. (See Exhibit VI-G.1: Miraval Specific Plan Monitoring Report).

In order to accommodate possible changes and to insure conformance with the adopted Pima County Development Code, the following provisions shall guide and govern incremental allocation and provision of residential dwelling units within the project area.

1. The overall assigned dwelling unit yield of 226 residential dwelling units (not including resort guest rooms) shall not be exceeded;
2. Development Plans or plats shall be submitted to Pima County for review and approval prior to development. Such plans shall be consistent with this Specific Plan;
3. The Pima County Planning Official shall cause to be established and maintained an official project file for the Miraval Specific Plan, which contains an original and certified copy of every revision to the Specific Plan, including a record of dwelling unit potential remaining in each development area.

EXHIBIT VI-G.1: Monitoring Report Form

TABLE

DATE:
ACTION:

MIRAVAL SPECIFIC PLAN MONITORING REPORT

1	2	3	4	5	6
Development Area	Acres	Develop. Category	D/U Utilized	D/U Remaining	D/U Cap

TOTAL

H. Site Plan Review Procedures

The Specific Plan shall be implemented through the review process of development plans and/or plats (Pima County Subdivision Ordinance).

A plan document will be required for all development within the Specific Plan area requiring a building permit in accordance with the Pima County Subdivision Code, 18.69.

All proposed projects within the Specific Plan area shall be required to have an approved plat prior to issuance of building permits, conditional use permits, or any other Pima County permit for the property. Plant salvage, clearing and grading can occur after tentative plat is approved if assurances in a form acceptable to the County are posted prior to the issuance of permits. No permits will be issued until plant preservation/mitigation/salvage plans are approved by Pima County. The plan review procedure is necessary for the following reasons:

1. To ensure consistency with the Specific Plan, Pima County land use policies and all implementing ordinances and development policies;
2. To promote the highest contemporary standards of site design;
3. To adapt to specific or special development conditions that occur from time to time while continuing to implement the Specific Plan and conform development to Pima County land use policies and implementing ordinances;
4. To facilitate complete documentation of authorized land use entitlement and pertinent conditions;
5. To adapt to substantial changes that may occur with respect to the circumstances under which the project is undertaken.

I. Substantial Change

The Miraval Specific Plan shall be administered and enforced by the Pima County Planning and Development Services Department in accordance with the provisions of the Pima County Zoning Code.

Certain changes to explicit provisions in the Specific Plan may be made administratively by the Planning Official or Chief Zoning Inspector, subject

to direct appeal to the Board of Supervisors. These categories include but are not limited to:

1. The addition of new information to the Specific Plan maps or text that does not change the effect of any regulations or guidelines;
2. Changes to the community infrastructure planning and alignment such as roads, drainage, water and sewer systems which do not significantly increase or decrease development capacity in the Specific Plan area.
3. The determination that a use may be allowed which is not specifically listed as permitted, but which may be determined similar in nature to those uses explicitly listed as permitted, shall be made by the Chief Zoning Inspector.

All required or requested amendments to the Specific Plan will be in accordance with Section 18.90.080 of the Pima County Zoning Code.

BIBLIOGRAPHY

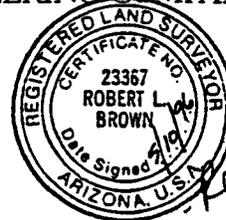
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Appendix A: Legal Description



3443 N. Campbell Ave.
Suite ...
Tucson, AZ 85715-2308
(520) 795-1000
FAX: (520) 322-0950

RICK ENG' EERING COMPANY



LEGAL DESCRIPTION

THAT PORTION OF THE NORTH HALF OF SECTIONS 1 & 2, TOWNSHIP 11 SOUTH, RANGE 14 EAST, GILA & SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA, DESCRIBED AS FOLLOWS:

COMMENCING AT A 2" LEAD CAPPED PIPE "LS 4399" AT THE CENTER OF SAID SECTION 2;

THENCE NORTH 00°03'48" WEST 45.02 FEET UPON THE MIDSECTION LINE AS MONUMENTED BY SAID LEAD CAPPED PIPE AND BY A 5/8" IRON PIN (NO TAG) AT THE NORTH QUARTER CORNER OF SAID SECTION 2, TO A LINE 45.00 FEET NORTHERLY OF AND PARALLEL WITH THE SOUTH LINE OF THE NORTHWEST QUARTER OF SAID SECTION 2;

THENCE SOUTH 88°19'10" WEST 171.99 FEET UPON SAID PARALLEL LINE; THENCE SOUTH 09°25'06" WEST 45.86 FEET TO A 5/8 " IRON PIN WITH TAG "PE 5178" ON SAID SOUTH LINE OF THE NORTHWEST QUARTER;

THENCE SOUTH 88°19'10" WEST 50.95 FEET UPON SAID SOUTH LINE;

THENCE NORTH 10°18'34" EAST 46.00 FEET TO SAID PARALLEL LINE;

THENCE SOUTH 88°19'10" WEST 349.52 FEET UPON SAID PARALLEL LINE;

THENCE NORTH 03°22'28" WEST 303.92 FEET TO A 5/8" IRON PIN WITH TAG "PE 4570";

THENCE NORTH 40°49'27" WEST 191.12 FEET TO A POINT ON THE EAST RIGHT-OF-WAY LINE OF LAGO DEL ORO PARKWAY (PREVIOUSLY KNOWN AS CAÑADA DEL ORO PARKWAY) SHOWN ON THE DEDICATION MAP THEREOF, RECORDED IN BOOK 11 AT PAGE 28, RECORDS OF PIMA COUNTY, ARIZONA, SAID RIGHT-OF-WAY LINE BEING THE ARC OF A CURVE CONCAVE WESTERLY, THE RADIUS POINT OF SAID CURVE BEARS NORTH 78°39'49" WEST FROM SAID POINT;

THENCE NORTHERLY UPON SAID RIGHT-OF-WAY LINE, UPON SAID ARC, TO THE LEFT, HAVING A RADIUS OF 2010.00 FEET AND A CENTRAL ANGLE OF 13°36'46", FOR AN ARC DISTANCE OF 477.55 FEET TO A POINT OF REVERSE CURVATURE OF A TANGENT CURVE CONCAVE EASTERLY;

THENCE NORTHERLY UPON SAID RIGHT-OF-WAY LINE, UPON THE ARC OF SAID CURVE, TO THE RIGHT, HAVING A RADIUS OF 1810.00 FEET AND A CENTRAL ANGLE OF 05°02'54", FOR AN ARC DISTANCE OF 159.48 FEET TO A RADIAL LINE, ALSO BEING RADIAL TO THE NEXT DESCRIBED CURVE;

THENCE NORTH 87°13'41" WEST 5.00 FEET UPON SAID RADIAL LINE TO A POINT ON THE ARC OF A CURVE CONCAVE EASTERLY AND 5.00 FEET WESTERLY OF AND CONCENTRIC WITH SAID EAST RIGHT-OF-WAY LINE;

Appendix A: Legal Description (cont.)

THENCE NORTHERLY UPON SAID CONCENTRIC ARC, TO THE RIGHT, HAVING A RADIUS OF 1815.00 FEET AND A CENTRAL ANGLE OF 04°50'26", FOR AN ARC DISTANCE OF 153.34 FEET TO A POINT OF TANGENCY;

THENCE NORTH 07°36'45" EAST 122.41 FEET UPON A LINE 5.00 FEET WESTERLY OF AND PARALLEL WITH SAID EAST RIGHT-OF-WAY LINE;

THENCE NORTH 82°23'15" WEST 5.00 FEET TO A LINE 10.00 FEET WESTERLY OF AND PARALLEL WITH SAID EAST RIGHT-OF-WAY LINE;

THENCE NORTH 07°36'45" EAST 300.00 FEET UPON SAID PARALLEL LINE;

THENCE NORTH 82°23'15" WEST 15.00 FEET TO A LINE 25.00 FEET WESTERLY OF AND PARALLEL WITH SAID EAST RIGHT-OF-WAY LINE, ALSO BEING THE WEST LINE OF THAT ROAD WAY ABANDONMENT RECORDED IN DOCKET 6534, PAGE 885.

THENCE NORTH 07°36'45" EAST 1159.46 FEET UPON SAID PARALLEL LINE TO THE NORTH LINE OF SAID SECTION 2;

THENCE SOUTH 89°21'42" EAST 474.35 FEET UPON SAID NORTH LINE, ALSO BEING THE NORTH LINE OF GOVERNMENT LOT 3 OF SAID SECTION 2 TO A 5/8" IRON PIN AT THE NORTHWEST CORNER OF GOVERNMENT LOT 2 OF SAID SECTION 2;

THENCE SOUTH 89°21'41" EAST 1318.10 FEET UPON THE NORTH LINE OF SAID GOVERNMENT LOT 2 AS MONUMENTED BY SAID 5/8" IRON PIN AND BY A 1/2" IRON PIN AT THE NORTHEAST CORNER OF SAID SECTION 2 TO THE NORTHEAST CORNER OF SAID GOVERNMENT LOT 2;

THENCE SOUTH 00°09'04" WEST 1495.28 FEET UPON THE EAST LINE OF SAID GOVERNMENT LOT 2 TO THE SOUTHEAST CORNER OF SAID LOT 2;

THENCE SOUTH 89°56'52" EAST 1311.91 FEET UPON THE SOUTH LINE OF GOVERNMENT LOT 1 OF SAID SECTION 2 TO A 1/2" IRON PIN WITH TAG RLS 12122 AT THE SOUTHEAST CORNER OF SAID GOVERNMENT LOT 1;

THENCE SOUTH 00°22'07" WEST 995.62 FEET UPON THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 2 TO A POINT FROM WHICH A GLO MONUMENT AT THE QUARTER CORNER COMMON TO SAID SECTION 2 AND SAID SECTION 1 BEARS SOUTH 00°22'07" WEST 245.06 FEET;

THENCE SOUTH 88°24'37" EAST 1400.32 FEET UPON A LINE 245.00 FEET NORTHERLY OF AND PARALLEL WITH THE SOUTH LINE OF THE NORTHWEST QUARTER OF SAID SECTION 1, TO A LINE 1400.00 FEET EASTERLY OF AND PARALLEL WITH THE WEST LINE OF SAID NORTHWEST QUARTER OF SECTION 1;

THENCE SOUTH 00°22'07" WEST 200.05 FEET UPON SAID PARALLEL LINE TO A LINE 45.00 FEET NORTHERLY OF AND PARALLEL WITH SAID SOUTH LINE OF THE NORTHWEST QUARTER OF SECTION 1;

THENCE NORTH 88°24'37" WEST 1400.32 FEET UPON SAID PARALLEL LINE TO SAID WEST LINE OF THE NORTHWEST QUARTER OF SECTION 1;

THENCE SOUTH 88°18'47" WEST 2616.35 FEET UPON A LINE 45.00 FEET NORTHERLY OF AND PARALLEL WITH THE SOUTH LINE OF SAID NORTHEAST QUARTER OF SECTION 2 TO THE POINT OF BEGINNING;

TOGETHER WITH THE FOLLOWING DESCRIBED PARCEL.

Appendix A: Legal Description (cont.)

THAT PORTION OF THE SOUTH HALF OF SAID SECTION 2, DESCRIBED AS FOLLOWS:

BEGINNING AT SAID 2 INCH LEAD CAPPED PIPE "RLS 4399" AT THE CENTER OF SAID SECTION 2;

THENCE NORTH 88°18'46" EAST 1300.53 FEET UPON THE NORTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 2 AS MONUMENTED BY SAID LEAD CAPPED PIPE AND BY SAID GLO MONUMENT AT THE QUARTER CORNER COMMON TO SECTION 2 AND SECTION 1;

THENCE SOUTH 00°03'11" EAST 567.18 FEET (RECORD) SOUTH 00°03'30" EAST 567.32 FEET (MEASURED) TO A HALF INCH IRON PIN "RLS 4080";

THENCE SOUTH 88°18'46" WEST 1300.53 FEET (RECORD) SOUTH 88°19'08" WEST 1300.58 FEET (MEASURED) TO THE WEST LINE OF SAID SOUTHEAST QUARTER OF SECTION 2;

THENCE SOUTH 00°03'11" EAST 773.93 FEET UPON SAID WEST LINE;

THENCE SOUTH 88°47'21" WEST 1100.35 FEET;

THENCE NORTH 34°31'52" EAST 549.23 FEET;

THENCE NORTH 57°08'09" WEST 604.19 (RECORD) 603.74 FEET (MEASURED) TO A LEAD CAPPED PIPE "RLS 4399" ON SAID EAST RIGHT OF WAY LINE OF LAGO DEL ORO PARKWAY;

THENCE NORTH 47°22'58" WEST 25.00 FEET RADIAL TO THE NEXT DESCRIBED CURVE, TO THE WEST LINE OF THE EASTERLY PORTION OF SAID ROADWAY ABANDONMENT RECORDED IN DOCKET 6534 AT PAGE 885, BEING THE ARC OF A NON-TANGENT CURVE CONCAVE TO THE SOUTHEAST;

THENCE NORTHEASTERLY UPON SAID WESTERLY LINE, UPON SAID ARC, TO THE RIGHT, HAVING A RADIUS OF 1835.00 FEET AND A CENTRAL ANGLE OF 01°09'40" FOR AN ARC DISTANCE OF 37.19 FEET TO A POINT ON A NON-TANGENT LINE, SAID POINT BEING 25.00 FEET NORTHWESTERLY ON A RADIAL BEARING OF NORTH 63°05'44" WEST FROM A HALF INCH IRON PIN (NO TAG) ON SAID EAST RIGHT OF WAY LINE OF LAGO DEL ORO PARKWAY;

THENCE NORTH 42°59'25" EAST 53.17 FEET UPON SAID WESTERLY LINE TO A POINT ON A NON-TANGENT CURVE CONCAVE TO THE NORTHWEST, FROM WHICH THE RADIUS POINT BEARS NORTH 46°14'50" WEST;

THENCE NORTHEASTERLY UPON SAID WESTERLY LINE, UPON THE ARC OF SAID CURVE, TO THE LEFT, HAVING A RADIUS OF 1985.00 FEET AND A CENTRAL ANGLE OF 16°50'54" FOR AN ARC DISTANCE OF 583.71 FEET TO THE NON-TANGENT NORTH LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 2;

THENCE NORTH 88°19'10" EAST 915.40 FEET UPON SAID NORTH LINE TO THE POINT OF BEGINNING;

TOGETHER WITH THE FOLLOWING DESCRIBED PARCEL:

THAT PORTION OF GOVERNMENT LOT 3 OF SAID SECTION 2 DESCRIBED AS FOLLOWS:

Appendix A: Legal Description (cont.)

BEGINNING AT THE NORTHEAST CORNER OF LOT 18 OF MOUNTAIN VISTA ESTATES, A SUBDIVISION RECORDED IN BOOK 25 OF MAPS AND PLATS AT PAGE 49, RECORDS OF PIMA COUNTY, ARIZONA;

THENCE NORTH 89°21'42" WEST 115.00 FEET UPON THE NORTH LINE OF SAID LOT 18;

THENCE NORTH 00°56'49" WEST 255.09 FEET TO THE SOUTH RIGHT OF WAY LINE OF EDWIN ROAD BEING A LINE 45.00 FEET SOUTHERLY OF AND PARALLEL WITH THE NORTH LINE OF SAID GOVERNMENT LOT 3;

THENCE SOUTH 89°21'42" EAST 538.44 FEET UPON SAID SOUTH RIGHT OF WAY LINE UPON SAID PARALLEL LINE TO THE EAST LINE OF THE WESTERLY PORTION OF SAID ROADWAY ABANDONMENT OF LAGO DEL ORO PARKWAY RECORDED IN DOCKET 6534 AT PAGE 885;

THENCE SOUTH 07°36'45" WEST 1518.19 FEET UPON SAID EAST LINE TO A POINT ON THE ARC OF A TANGENT CURVE CONCAVE TO THE EAST;

THENCE SOUTHERLY UPON SAID EAST LINE, UPON SAID ARC, TO THE LEFT, HAVING A RADIUS OF 1985.00 FEET AND A CENTRAL ANGLE OF 04°17'42", FOR AN ARC DISTANCE OF 148.80 FEET TO THE NORTH RIGHT OF WAY LINE OF RAIL N ROAD ACCORDING TO THE ABANDONMENT PROCEEDING RECORDED IN DOCKET 7428 AT PAGE 769;

THENCE NORTH 87°32'54" WEST 25.23 FEET UPON SAID NORTH RIGHT OF WAY LINE TO A POINT ON THE ARC OF A TANGENT CURVE CONCAVE TO THE NORTHEAST;

THENCE NORTHWESTERLY UPON SAID NORTH RIGHT OF WAY LINE, UPON SAID ARC, TO THE RIGHT, HAVING A RADIUS OF 260.99 FEET AND A CENTRAL ANGLE OF 40°52'42", FOR AN ARC DISTANCE OF 186.21 FEET TO A POINT OF REVERSE CURVATURE OF A TANGENT CURVE CONCAVE TO THE SOUTH;

THENCE WESTERLY UPON SAID NORTH RIGHT OF WAY LINE, UPON THE ARC OF SAID CURVE, TO THE LEFT; HAVING A RADIUS OF 240.00 FEET AND A CENTRAL ANGLE OF 50°36'05" FOR AN ARC DISTANCE OF 211.96 FEET TO THE SOUTHEAST CORNER OF LOT 25 OF SAID MOUNTAIN VISTA ESTATES;

THENCE NORTH 07°16'23" WEST 275.69 FEET UPON THE EAST LINE OF SAID LOT 25 TO THE SOUTHEAST CORNER OF LOT 21 OF SAID SUBDIVISION;

THENCE NORTH 02°41'52" EAST 297.95 FEET UPON THE EAST LINE OF SAID LOT 21 AND UPON THE EAST LINE OF LOT 20 OF SAID SUBDIVISION TO THE SOUTHEAST CORNER OF LOT 19 OF SAID SUBDIVISION;

THENCE NORTH 23°30'06" EAST 140.00 FEET UPON THE EAST LINE OF SAID LOT 19;

THENCE NORTH 13°42'31" WEST 230.00 FEET UPON SAID EAST LINE OF LOT 19 TO THE SOUTHEAST CORNER OF SAID LOT 18;

THENCE NORTH 30°38'18" EAST 400.00 FEET UPON THE EAST LINE OF SAID LOT 18 TO THE POINT OF BEGINNING;

ALL PARCELS TOGETHER CONTAINING 10,071,223 SQUARE FEET OR 231.2035 ACRES MORE OR LESS.

Appendix B: Assessor's Parcel Numbers

222-01-0300
222-02-0100
222-02-0110
222-02-0240
222-02-0250
222-02-0260
222-02-0270
222-02-0280
222-02-0290
222-02-0300
222-02-031A
222-02-032A
222-02-0370
222-02-0380
222-02-0390
222-02-0400
222-02-062C
222-02-062E
222-02-0840
222-02-0850

Appendix C: Arizona Game and Fish Letter



GAME & FISH DEPARTMENT

2221 West Greenway Road, Phoenix, Arizona 85023-4399 (602) 942-3000
Tucson Office, 555 N. Greasewood Rd., Tucson, AZ 85745

Governor
Fife Symington
Commissioners:
Chairman, Arthur Porter, Phoenix
Nemie Johnson, Snowflake
Michael M. Goughly, Flagstaff
Herb Guenther, Tucson
Fred Belman, Tucson
Director
Duane L. Shroufe
Deputy Director
Thomas W. Spalding

February 23, 1996

Ms. Linda Little Morales
The Planning Center
450 W. Paseo Redondo, Ste. 202
Tucson, Arizona 85701

Re: Site Analysis Information for Approximately 240 Acres Near
Lago del Oro Parkway and Mainsail Road; T11S, R14E, Sections
1 and 2.

Dear Ms. Morales:

The Arizona Game & Fish Department (Department) has reviewed the above-referenced project for potential impacts to special status species, habitats of special concern, and wildlife resources in the project area. Due to time and personnel constraints, we were unable to do an on-the-ground review of resource conditions. Aerial photographs and other reference materials facilitated our review.

Special Status Species

Records in the Department's Heritage Data Management System¹ (HDMS) were reviewed and indicate that the following species are known to occur in the vicinity of the proposed project.

The Sonoran desert tortoise (Gopherus agassizii) is a federal Category 2 Candidate species and a Candidate for inclusion on the State's list of Threatened Native Wildlife in Arizona. It is generally found in rocky foothills, semi-desert scrublands, bajadas, and creosote flats. Guidelines for handling desert tortoise encountered on development-related projects are enclosed.

The Gila monster (Heloderma suspectum) is likely to occur in the area. Like other "prohibited wildlife" species, Gila monsters can not be collected (alive or dead), imported, sold, leased, or offered for sale except under very specific circumstances. In the

¹ Information contained in the Department's HDMS is dynamic and updated on a periodic basis. Any information, therefore, is likely to become outdated shortly after its release. Such information is intended to serve as a guide regarding what species may be found in a particular area. It does not represent the results of comprehensive species-specific surveys.

Appendix C: Arizona Game and Fish Letter (cont.)

Ms. Morales
February 23, 1996
2

Sonoran Desert, habitat includes saguaro - palo verde communities and riparian areas. We strongly recommend that any Gila monsters and other venomous reptiles encountered during ground-disturbing activities be encouraged/allowed to leave the area on their own volition.

In Arizona, Harris's hawks (Parabuteo unicinctus) are traditionally thought of as desert inhabitants; typically found in areas dominated by palo verde-cacti-mixed scrub vegetation types. However, Dawson and Mannan (1994)² recently found that a substantial number of Harris' hawks now occupy the urban environs of the Tucson basin. Dawson and Mannan discerned that the distribution of urban-breeding and nesting Harris' hawks is especially dense in the area from the Coronado National Forest boundary south to the Rillito River and west to I-10. This urban population is a unique phenomenon in that behavior and demographic patterns appear to be very different from non-urban populations. These urban hawks are also thought to represent a significant portion of the statewide population.

Observations of the cactus ferruginous pygmy-owl (Glaucidium brasilianum cactorum) have occurred in habitats similar to those present on the proposed project site. This bird is listed as Endangered in Arizona's Threatened Native Wildlife and, as of 12 December 1994 (Federal Register Vol. 59, No. 237; Pages 63975-63986), is proposed for federal listing as an Endangered species in Arizona with critical habitat under the auspices of the Endangered Species Act of 1973, as amended.

Given the apparent tentative existence of the pygmy-owl in Arizona and the amount of habitat loss (e.g., land clearing, development) presently occurring in one of the few areas currently known to support pygmy-owls, the Department is highly concerned about the continued existence of this bird. For the past few years, the Department has been conducting intensive surveys for pygmy-owls. The Department is extremely interested in exploring the feasibility of completing a survey on the proposed project site prior to the commencement of ground-disturbing activities. The optimum survey period for this bird is January through March. We would appreciate establishing a dialogue with the landowner(s) and/or developer or their designated representative to address the matter of on-site surveys. Please contact Scott Richardson, Urban Wildlife Specialist, at 520/628-5376 Ext. 153 to discuss the possibility of the Department surveying the proposed project site.

² Dawson, J.W. and R.W. Mannan. 1994. The Ecology of Harris' Hawks in Urban Environments. Final Report, Urban Heritage Grant #G20058-A.

Appendix C: Arizona Game and Fish Letter (cont.)

Ms. Morales
February 23, 1996
3

Sensitive Wildlife Habitats

According to Pima County's 1986 Map of Critical and Sensitive Wildlife Habitats, the Canada del Oro Wash is designated as Class I wildlife habitat. Upland areas support a palo verde-cacti-mixed scrub vegetation community which is recognized as Class II wildlife habitat.

Results from the Department's 1995 Winter Raptor Survey along with other field observations suggest that the major river courses and surrounding areas in the Tucson Basin (Rillito, Santa Cruz, Pantano, Tanguete Verde, Agua Caliente, Canada del Oro) are important habitat resources for raptors (falcons, hawks, etc). These wash corridors likely provide raptors with ample foraging opportunities, suitable nest locations, and strategic roost sites. Given the pronounced presence of raptors in and adjacent to wash corridors, the Department encourages proponents of development projects proposed for lands in the vicinity of wash corridors to be particularly sensitive to the increased potential to encounter raptor nest sites.

Conclusions and Conservation Recommendations

With implementation of the following measures, the Department does not anticipate that statewide or regional wildlife resources will suffer significant adverse impacts as the result of rezoning the property in question.

Adhere to the attached tortoise-handling guidelines.

Contact the Department's Tucson Regional Office immediately for direction regarding the disposition of an active bat roost site(s) if one is found on the property.

During pre-construction and construction activities, contact the Department's Tucson Regional Office immediately for direction regarding the disposition of an active raptor nest(s) if one is found on the property.

Concentrate development zones near Lago del Oro Parkway and/or previously developed structures.

Maximize the amount of interconnected open space within the development.

Utilize native plant species for all on-site vegetation and revegetation.

Appendix C: Arizona Game and Fish Letter (cont.)

Ms. Morales
February 23, 1996
4

Retain in place or salvage mature woody vegetation including saguaros (mature adults as well as immatures).

Maintain the natural vegetative and hydrologic integrity of Class I riparian areas on the property (i.e., Canada del Oro Wash).

Please give me a call at 520/628-5982 Ext. 137 if you have questions or require additional information.

Sincerely,



Sherry A. Ruther
Habitat Specialist

SAR:sr

cc: Ron Christofferson, Project Evaluation Coordinator, Habitat
Branch, PHX
Cadie Pruss, District Wildlife Manager
Scott Richardson, Urban Wildlife Specialist

Attachment

Appendix C: Arizona Game and Fish Letter (cont.)

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES
ENCOUNTERED ON DEVELOPMENT PROJECTS
Arizona Game and Fish Department
Revised November 29, 1993

Desert tortoises of the Sonoran population are those occurring south and east of the Colorado River. Tortoises encountered on short-term projects (less than one week), and not in a burrow should be moved out of harm's way to adjacent appropriate habitat. A tortoise should be moved no further than necessary, not to exceed 0.1 mile from its original location. If it is necessary to move a tortoise more than 0.1 mile to safeguard that tortoise, the Arizona Game and Fish Department (Department) should be contacted to place the tortoise into a Department-regulated desert tortoise adoption program. Moving a tortoise should be done quickly, handling the tortoise as little as possible, while keeping the tortoise in an upright position at all times. If more than one tortoise is to be handled, separate disposable gloves should be worn for each one to avoid potential transfer of disease between tortoises.

If a burrow of a specific tortoise is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow, as determined by a qualified biologist. Failure to locate a suitable burrow nearby could mean death for a tortoise, especially during May, June or July, before the onset of the summer rains, or during the winter brumation (hibernation) in December, January and February. If a suitable burrow cannot be found nearby, the tortoise should be placed in an adoption program.

Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and farm developments), or those requiring removal during long-term (longer than one week) construction projects, will also be placed in desert tortoise adoption programs. Managers of projects likely to affect desert tortoises should apply for a Department handling permit to facilitate temporary possession of tortoises. Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- These guidelines do not apply to the Mohave population of desert tortoises which are found to the north and west of the Colorado River. Mohave desert tortoises are specifically protected under the Endangered Species Act, as administered by the U.S. Fish and Wildlife Service.
- These guidelines are subject to revision at the discretion of the Department. We recommend that the Department be contacted during the planning stages of any project that may affect the desert tortoise.
- Take, possession or harassment of a desert tortoise is prohibited by state law. Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.

RAC:NLO:rc

Appendix D: Soils

A20265

SOIL INTERPRETATIONS RECORD

ORACLE SERIES

MIRALIS: 41
REV. MR. BLR, 1-84
USTOLIC MAPLARIIDS, FINE-LOAMY, MIXED, THERMIC

ORACLE SERIES CONSISTS OF SHALLOW, WELL DRAINED, MODERATELY SLOWLY PERMEABLE SOILS FORMED IN MATERIAL WEATHERED FROM GRANITE ON HILLSLOPES AND PEDIMENTS. TYPICALLY THESE SOILS HAVE BROWN GRAVELLY AND VERY GRAVELLY LOAM SURFACES 8 INCHES THICK AND REDDISH BROWN GRAVELLY CLAY LOAM SUBSOILS 13 INCHES THICK OVER STRONGLY WEATHERED GRANITE (GAS) TO 60 INCHES AND MORE. ELEVATIONS ARE 3600 TO 5400 FEET. MAP IS 16 TO 20 INCHES. FROST-FREE SEASON IS 200 TO 255 DAYS. SLOPES RANGE FROM 2 TO 50 PERCENT.

ESTIMATED SOIL PROPERTIES

DEPTH (IN.)	USDA TEXTURE	UNIFIED	AASHTO	FRACT % IN (PCT)	PERCENT OF MATERIAL LESS THAN 20" PASSING SIEVE NO.				LIQUID LIMIT	PLAS- TICITY INDEX
					4	10	40	200		
0-8	SR-L, SR-LL	SM, SM-SC	A-2, A-4	0-8	10-20	40-75	40-55	25-45	20-30	10-10
0-8	SR-VL, SR-VL	SM, SM-SC	A-2, A-1	0-8	20-60	40-80	30-60	10-35	20-30	10-10
0-16	SR-CL, SR-SCL, SR-L	SM, SC	A-2, A-4, A-6	0-8	70-80	80-75	40-55	20-50	30-40	5-15
16-60	WD									

DEPTH (IN.)	CLAY (PCT)	MOIST BULK DENSITY (G/CM ³)	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHDS/CM)	SHRINK- SWELL POTENTIAL	EROSION FACTORS		ORGANIC MATTER (PCT)	CORROSIIVITY	
								K	T		STEEL	CONCRETE
0-8	10-20	-	0.0-2.0	0.10-0.14	6.1-6.4	-	LOW	.10	1	1	MODERATE	LOW
0-8	10-20	-	0.0-2.0	0.06-0.10	6.1-6.4	-	LOW	.05	1	1	MODERATE	LOW
0-16	20-35	-	0.0-2.0	0.12-0.16	6.1-6.4	-	MODERATE	.10	1	1	MODERATE	LOW
16-60												

FLOODING			HIGH WATER TABLE			CEMENTED PAV		SEPADECK		SUBSISTENCE		HYD SWP	POVERTY L FROST ACTION
FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS (IN)	DEPTH (IN)	HARDNESS (IN)	INIT. TOTAL (IN)	TOTAL (IN)		
			1.0			-		10-20	SOFT			0	

SANITARY FACILITIES

CONSTRUCTION MATERIAL

SEPTIC TANK ABSORPTION FIELDS	3-15%: SEVERE-DEPTH TO ROCK 10%: SEVERE-DEPTH TO ROCK, SLOPE	ROADFILL	3-25%: POOR-AREA RECLAIM 25%: POOR-AREA RECLAIM, SLOPE
SEWAGE LAGOON AREAS	3-1%: SEVERE-DEPTH TO ROCK 7%: SEVERE-DEPTH TO ROCK, SLOPE	SAND	IMPROBABLE-EXCESS FINES
SANITARY LANDFILL (TRENCH)	3-15%: SEVERE-DEPTH TO ROCK 15%: SEVERE-DEPTH TO ROCK, SLOPE	GRAVEL	IMPROBABLE-EXCESS FINES
SANITARY LANDFILL (AREA)	3-15%: SEVERE-DEPTH TO ROCK 10%: SEVERE-DEPTH TO ROCK, SLOPE	TOPSOIL	3-15%: POOR-AREA RECLAIM, SMALL STONES 16%: POOR-AREA RECLAIM, SMALL STONES, SLOPE
DAILY COVER FOR LANDFILL	3-15%: POOR-AREA RECLAIM, SMALL STONES 15%: POOR-AREA RECLAIM, SMALL STONES, SLOPE		
			WATER MANAGEMENT
		POND RESERVOIR AREA	3-5%: SEVERE-DEPTH TO ROCK 0%: SEVERE-DEPTH TO ROCK, SLOPE
SHALLOW EXCAVATIONS	3-15%: SEVERE-DEPTH TO ROCK 10%: SEVERE-DEPTH TO ROCK, SLOPE	EMBANKMENTS DIKES AND LEVEES	SEVERE-THIN LAYER
DWELLINGS WITHOUT BASEMENTS	3-5%: MODERATE-SHINK-SWELL, DEPTH TO ROCK 0-15%: MODERATE-SHINK-SWELL, SLOPE, --DEPTH TO ROCK 10%: SEVERE-SLOPE	EXCAVATED PONDS ACQUIFER PEG	SEVERE-NO WATER
DWELLINGS WITH BASEMENTS	3-15%: SEVERE-DEPTH TO ROCK 15%: SEVERE-DEPTH TO ROCK, SLOPE	DRAINAGE	DEEP TO WATER
SMALL COMMERCIAL BUILDINGS	3-5%: MODERATE-SHINK-SWELL, DEPTH TO ROCK 4-8%: MODERATE-SHINK-SWELL, SLOPE, --DEPTH TO ROCK 0%: SEVERE-SLOPE	IRRIGATION	DEPTH TO ROCK, SLOPE
LOCAL ROADS AND STREETS	3-5%: MODERATE-DEPTH TO ROCK, SHINK-SWELL 0-15%: MODERATE-DEPTH TO ROCK, SLOPE, SHRINK-SWELL 10%: SEVERE-SLOPE	TERRACES AND DIVERSIONS	3-5%: DEPTH TO ROCK 0%: SLOPE, DEPTH TO ROCK
LAWNS, LANDSCAPING AND GOLF FAIRWAYS	3-15% SA: SEVERE-THIN LAYER 15% SR: SEVERE-SLOPE, THIN LAYER 3-15% SAV: SEVERE-SMALL STONES, THIN LAYER 15% SEV: SEVERE-SMALL STONES, SLOPE, THIN LAYER	GRASED WATERWAYS	3-5%: DEPTH TO ROCK 0%: SLOPE, DEPTH TO ROCK

REGIONAL INTERPRETATIONS

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Appendix D: Soils

A20067

SOIL INTERPRETATIONS RECORD

MRA(S): 41
REV. J.E.J.B.R., 9-83
TYPIC TERRAPLEVENTS, COARSE-LOAMY, MIXED (CALCAREOUS), THERMIC

COMB0 SERIES

THE COMB0 SERIES CONSISTS OF DEEP, WELL-DRAINED, MODERATELY RAPIDLY PERMEABLE SOILS FORMED IN MIXED RECENT ALLUVIUM ON ALLUVIAL FANS, FLOOD PLAINS, AND TERRACES. TYPICALLY, THEY HAVE A SANDY LOAM SURFACE LAYER 14 INCHES THICK OVER A SANDY LOAM AND GRAVELLY SANDY LOAM SUBSTRATUM TO 60 INCHES. ELEVATIONS ARE 2000 TO 6000 FEET. PRECIPITATION IS 6 TO 12 INCHES. THE FROST-FREE SEASON IS 160 TO 240 DAYS. SLOPES ARE 0 TO 4 PERCENT.

ESTIMATED SOIL PROPERTIES												
DEPTH (IN.)	USDA TEXTURE	UNIFIED	AASHTO	FRACT. > 2 IN. (PCT)	PERCENT OF MATERIAL LESS THAN 2" PASSING SIEVE NO.					LIQUID LIMIT (%)	PLASTICITY INDEX	
					4	10	40	100	200			
0-14	L	ML, CL-ML	A-4	0	100	100	95-95	40-40	20-20	NP-10		
0-14	SL, FSL	SM	A-2, A-4	0	95-100	95-100	50-70	30-40	10-20	NP-6		
0-14	SR-SL	SM, SM	A-1, A-2	0-5	85-85	80-75	30-65	20-20	10-20	NP-6		
14-60	SR-SL-SR-LS	SM, SM	A-2, A-6	0-5	85-100	80-75	30-70	20-40	10-20	NP-6		

DEPTH (IN.)	CLAY (PCT)	MOISTURE DENSITY (S/CM)	PERMEA-SILTY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHDS/CM)	SHRINK-SWELL POTENTIAL	SANDIENESS		WIND EROD. GROUP	ORGANIC MATTER (PCT)	COMPACTION	
								U	T			STEE	CONCRETE
0-14	15-20	1.25-1.25	0.0-2.0	0.10-0.10	7.0-8.4	(2)	LOW	22	5	AL	1-2	HIGH	LOW
0-14	8-18	1.50-1.55	2.0-6.0	0.10-0.10	7.0-8.4	(2)	LOW	20	5	2	1-2	HIGH	LOW
0-14	8-18	1.50-1.55	2.0-6.0	0.07-0.09	7.0-8.4	(2)	LOW	15	5	2	1-2	HIGH	LOW
14-60	8-18	1.60-1.65	2.0-6.0	0.07-0.09	7.0-8.4	(2)	LOW	15	5	2	1-2	HIGH	LOW

FLOODING			HIGH WATER TABLE			CEMENTED PAV		BEDROCK		BUILDINGS		HYDROPHOBICITY	POTENTIAL
FREQUENCY	DURATION	MONTHS	DEPTH	WIND	MONTHS	DEPTH	HARDNESS (IN)	DEPTH	HARDNESS (IN)	SOIL	TOTAL		
SOIL-BASE			14.0				100		100				

SANITARY FACILITIES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	NONE: SLIGHT RARE: MODERATE-FLOODING	ROADFILL	LEES
SEWER LAGOON AREAS	0-1% NONE; SEVERE-SEEPAGE 7-5 NONE; SEVERE-SEEPAGE, SLOPE 0-7% RARE; SEVERE-SEEPAGE, FLOODING 7-1% RARE; SEVERE-SEEPAGE, FLOODING, SLOPE	SAND	IMPASSABLE-EXCESS FINES
SANITARY LANDFILL (TRENCH)	NONE: MODERATE-TOO SANDY RARE: MODERATE-FLOODING, TOO SANDY	GRAVEL	IMPASSABLE-EXCESS FINES
SANITARY LANDFILL (AREA)	NONE: SLIGHT RARE: MODERATE-FLOODING	TOPSOIL	POOR-SMALL STONES, AREA RECLAIM
DAILY COVER-FOR-LANDFILL	POOR-SMALL STONES		
			WATER MANAGEMENT
		POND RESERVOIR AREA	SEVERE-SEEPAGE
SHALLOW EXCAVATIONS	SEVERE-CUTS BANKS CAVE	EMBANKMENTS DIKES AND LEVEES	MODERATE-SEEPAGE, PIPING
DWELLINGS WITHOUT BASEMENTS	NONE: SLIGHT RARE: SEVERE-FLOODING	EXCAVATED POND AQUIFER PUD	SEVERE-NO WATER
DWELLINGS WITH BASEMENTS	NONE: SLIGHT RARE: SEVERE-FLOODING	DRAINAGE	DEEP TO WATER
SMALL COMMERCIAL BUILDINGS	0-4% NONE; SLIGHT 4-6% NONE; MODERATE-SLOPE RARE: SEVERE-FLOODING	IRRIGATION	L: FAVORABLE SL, FSL, SR-SL: DROUGHTY, SOIL BLOWING
LOCAL ROADS AND STREETS	NONE: SLIGHT RARE: MODERATE-FLOODING	TERRACES AND SEVERINGS	L: TOO SANDY SL, FSL, SR-SL: TOO SANDY, SOIL BLOWING
LAWNS, LANDSCAPING AND GOLF FAIRWAYS	L: SL, FSL: SLIGHT SR: MODERATE-SMALL STONES	GRADES WATERWAYS	L: FAVORABLE SL, FSL, SR-SL: DROUGHTY

REGIONAL INTERPRETATIONS	

Appendix D: Soils

AZ0949

SOIL INTERPRETATIONS RECORD

MLRA(S): 41
 REV. DJB, 7-93 6-93
 USTIC TORRIFLUVENTS, LOAMY-SKELETAL, MIXED, NONACID, THERMIC

THE KEYSTO SERIES CONSISTS OF VERY DEEP SOILS FORMED FROM MIXED FAN AND STREAM ALLUVIUM, ON ALLUVIAL FANS AND STREAM TERRACES. THE SURFACE IS DARK BROWN VERY GRAVELLY SANDY LOAM 3 INCHES THICK. THE SUBSOIL IS DARK BROWN EXTREMELY COBBLY SANDY LOAM 21 INCHES THICK, AND THE LOWER SUBSOIL IS BROWN EXTREMELY COBBLY LOAMY SAND TO 60 INCHES.

LANDSCAPE AND CLIMATE PROPERTIES												
ANNUAL AIR TEMPERATURE	FROST FREE DAYS	ANNUAL PRECIPITATION	ELEVATION (FT)	DRAINAGE CLASS	SLOPE (PCT)							
59-67	215-250	12-16	3000-5000	M	0-5							
ESTIMATED SOIL PROPERTIES												
DEPTH (IN.)	USDA TEXTURE	UNIFIED	AASHTO	FRACT. >10 IN	FRACT. 3-10 IN	PERCENT OF MATERIAL LESS THAN 3" PASSING SIEVE NO.				CLAY (PCT)		
0-3	GRV-SL	GM-GC, GM, GP-GM	A-1, A-2	0	0-5	135-85	30-50	15-30	10-20	15-15		
3-24	CBX-SL	GM-GC	A-1	0	55-75	155-75	50-70	30-50	15-30	15-15		
24-60	CBX-LS	GM-GC	A-1	0	55-75	160-75	55-70	25-55	10-20	15-10		
DEPTH (IN.)	LIQUID LIMIT INDEX	PLASTICITY INDEX	MOIST DENSITY (G/CM3)	BULK DENSITY (G/CM3)	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SAR	CEC (ME/100G)	CAC03 (PCT)	GYPSUM (PCT)
0-3	20-25	NP-5	1.25-1.50	2.0-6.0	0.04-0.08	6.6-7.8	—	0	5-15	0-0	0-0	
3-24	20-25	NP-5	1.25-1.55	2.0-6.0	0.04-0.08	6.6-7.8	—	0	5-15	0-0	0-0	
24-60	20-25	NP-5	1.15-1.45	6.0-20	0.02-0.05	7.4-7.8	—	0	5-10	0-5	0-0	
DEPTH (IN.)	ORGANIC MATTER (PCT)	SHRINKAGE POTENTIAL	SMELL	EROSION FACTORS (K, K ₁ , I)	WIND EROD. GROUP	WIND EROD. INDEX	CORROSIVITY (STEEL, CONCRETE)					
0-3	1-3	LOW	0.05, 2.5	5	8	MODERATE	LOW					
3-24	1-3	LOW	0.10, 2.8									
24-60	5-1	LOW	0.02, 1.7									
FLOODING												
DEPTH (IN.)	KIND	DURATION (MONTHS)	HIGH WATER TABLE	CEMENTED PAN	BEDROCK	SUBSIDENCE (IN/100)	HYDROLYZABLE POTENTIAL					
			>6.0			0	1 B					

Appendix D: Soils

A20007

SOIL INTERPRETATIONS RECORD

MONAVE SERIES

MRD(S): 40, 42
REV. DR. 2-65
TYPIC NAPLACIOUS, FINE-LOAMY, MIXED, THERMIC

THE MONAVE SERIES CONSISTS OF DEEP, WELL DRAINED, MODERATELY SLOWLY PERMEABLE SOILS FORMED IN OLD MIXED ALLUVIUM ON TERRACES. TYPICALLY THESE SOILS HAVE A LIGHT YELLOWISH BROWN SANDY LOAM SURFACE LAYER 1 1/2 INCHES THICK OVER A BROWN CLAY LOAM SUBSOIL 44 INCHES THICK. THE SUBSTRATUM IS REDDISH BROWN GRAVELLY LOAMY SANDY TO 40 INCHES. ELEVATIONS ARE 1000 TO 5000 FEET. PRECIPITATION IS 7 TO 12 INCHES. THE FROST-FREE SEASON IS 100 TO 300 DAYS. SLOPES ARE 0 TO 5 PERCENT.

ESTIMATED SOIL PROPERTIES												
DEPTH (IN.)	USDA TEXTURE	UNIFIED	AASHTO	FRAC% (PCT)	PERCENT OF MATERIAL LESS THAN 75 MICRONS SIEVE NO. 200				LIQUID LIMIT (%)	PLASTICITY INDEX	CORROSIVITY	CATIONICITY
					4	10	40	100				
0-11	SL, SA-SL	SM, SM-SC	A-2, A-4	0	75-100	70-100	55-75	20-41	20-30	0-10	SP-10	
0-11	L	CL, CL-ML	A-4, A-6	0	100	95-100	75-85	55-75	25-35	0-15		
0-11	SCL	CL	A-6, A-7	0	100	95-100	85-95	70-80	35-45	15-25		
11-55	CL, L	CL, CL-ML	A-6, A-7, A-4	0	100	95-100	85-95	70-80	35-45	0-25		
55-60	SA-LESS	SM, SP-SM	A-1	0	75-85	60-65	20-25	5-15	-	NP		
60-70	VSCL	CL, ML	A-2	0	100	95-100	80-95	50-75	20-25	5-15		
DEPTH (IN.)	CLAY (PCT)	MOIST DENSITY (G/CM3)	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTOR	WIND EROSION GROUP	ORGANIC MATTER (PCT)	CORROSIVITY	
											STEEL	CONCRETE
0-11	10-20	1.45-1.55	2.0-6.0	0.05-0.12	5.5-6.4	-	LOW	20	3	0.5-1	HIGH	LOW
0-11	20-27	1.40-1.50	0.2-0.5	0.15-0.20	5.5-6.4	-	MODERATE	24	5	0.1	HIGH	LOW
0-11	27-30	1.40-1.50	0.2-0.5	0.15-0.21	5.5-6.4	-	MODERATE	24	5	0.1	HIGH	LOW
11-55	20-35	1.55-1.65	0.2-0.5	0.15-0.21	7.0-8.4	2	MODERATE	24	5	0.1	HIGH	LOW
55-60	3-7	1.45-1.55	0.0-2.0	0.05-0.07	7.0-8.4	2	LOW	0.02				
60-70	12-20	1.45-1.55	0.5-2.0	0.15-0.18	7.0-8.4	2	LOW	0.27				

SANITARY FACILITIES				CONSTRUCTION MATERIAL			
SEPTIC TANK ABSORPTION FIELDS	SEVERE-FRAC SLOWLY			ROADFILL			GOOD
SEWAGE LAGOON AREAS	0-1% SEVERE-SLEEPAE SLOPE 7-1% SEVERE-SLEEPAE SLOPE			SAND			IMPROBABLE-EXCESS FINES
SANITARY LANDFILL (TRENCH)	SLIGHT			GRAVEL			IMPROBABLE-EXCESS FINES
SANITARY LANDFILL (AREA)	SLIGHT			TOPSOIL			L,SCL: FAIR-TOO CLAYEY SL,SM: FAIR-TOO CLAYEY, SMALL STONES

BUILDING SITE DEVELOPMENT			
SHALLOW EXCAVATIONS	SEVERE-CUTS/BAKS CAVE		
DWELLINGS WITHOUT BASEMENTS	MODERATE-SHINK-SWELL	EMBANKMENTS DICES AND LEVEES	SEVERE-NO WATER
DWELLINGS WITH BASEMENTS	MODERATE-SHINK-SWELL	EXCAVATED POND/AQUIFER PEG	DEEP TO WATER
SMALL COMMERCIAL BUILDINGS	0-4% MODERATE-SHINK-SWELL 4-8% MODERATE-SHINK-SWELL SLOPE	IRRIGATION	0-3% L,SCL: FAVORABLE 3-5% L,SCL: SLOPE 0-2% SL,SA-SL: SOIL BLOWING 3-5% SL,SA-SL: SLOPE, SOIL BLOWING
LOCAL ROADS AND STREETS	SEVERE-LOW STRENGTH	TERRACES AND DIVERSIONS	L,SCL: FAVORABLE SL,SA-SL: SOIL BLOWING
LAWNS, LANDSCAPING AND GOLF FAIRWAYS	L,SCL: SLIGHT SL,SM: MODERATE-SMALL STONES	GRASSED WATERWAYS	TOE AIDS

REGIONAL INTERPRETATIONS

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Appendix D: Soils

A20611

SOIL INTERPRETATIONS RECORD

SABASE SERIES

MURKIN; 41
REV. CCC-BLR, 10-84
USTALYTIC MAPLARISS, FINE, MIXED, THERMIC

THE SABASE SERIES CONSISTS OF DEEP, WELL DRAINED, SLOWLY PERMEABLE SOILS FORMED IN MIXED ALLUVIUM ON FAN TERRACES. THESE SOILS HAVE SANDY LOAM SURFACES 5 INCHES THICK, AN UPPER SUBSOIL OF CLAY LOAM, CLAY AND GRAVELLY CLAY LOAM 34 INCHES THICK AND A LOWER SUBSOIL OF GRAVELLY AND VERY GRAVELLY SANDY CLAY LOAM TO 60 INCHES AND MORE. ELEVATION IS 3000 TO 4000 FEET. AVERAGE ANNUAL PRECIPITATION IS 12 TO 16 INCHES. FROST-FREE SEASON IS 200 TO 230 DAYS. SLOPES RANGE FROM 1 TO 8 PERCENT.

DEPTH (IN.)	USDA TEXTURE	UNIFIED	AASHTO	PERCENT OF MATERIAL LESS THAN 2" PASSING SIEVE NO.				LIQUID LIMIT	PLAS- TICITY INDEX	
				4	10	40	200			
0-6	SL, FSL	SM	A-4	0	55-100	90-100	55-75	35-55	15-25	NP-5
6-22	L, SCL	CL, SC	A-6	0	55-100	90-100	75-90	40-60	25-35	10-15
22-31	CL, S	CL, CM	A-7	0	55-100	90-100	30-50	10-25	40-55	15-20
31-41	SR-CL	SC, CC, CL	A-7	0-5	70-85	80-95	55-70	40-60	40-45	15-20
41-60	SR-SCL	SC	A-2, A-6	0-5	70-85	80-95	50-70	30-40	30-40	10-15
61-80	SR-SCL	SC	A-2	0-15	45-60	75-90	30-45	15-20	30-40	10-15

DEPTH (IN.)	CLAY (PCV)	SILT (PCV)	PERCENT SILTY (1/2")	AVAILABLE WATER CAPACITY (1/2")	SOIL REACTION (pH)	SALINITY (MMHDS/CM)	SHRINK-SWELL POTENTIAL	EROSION FACTOR	WIND EROSION	ORGANIC MATTER (%)	CORROSIIVITY	
											STEEL	CONCRETE
0-6	10-20	-	3.0-4.0	0.15-0.16	4.1-5.1	-	LOW	.24	3	3	CI	HIGH
6-22	30-37	-	0.0-2.0	0.10-0.10	5.1-7.0	-	MODERATE	.22	3	3	CI	LOW
22-31	35-40	-	0.05-0.2	0.10-0.10	6.0-6.4	-	HIGH	.22	3	3	CI	LOW
31-41	35-40	-	0.05-0.2	0.10-0.17	7.0-8.4	CI	MODERATE	.24	3	3	CI	LOW
41-60	35-35	-	0.2-0.6	0.11-0.14	7.5-8.4	CI	MODERATE	.20	3	3	CI	LOW
61-80	35-35	-	0.2-0.6	0.07-0.10	7.0-8.4	CI	MODERATE	.20	3	3	CI	LOW

FREQUENCY	DURATION	MONTHS	HIGH WATER TABLE		CEMENTED SOIL	EXPANSE	SUSCEPT	TOTAL GRP	HYD POTENT
			DEPTH (FT)	RIND MONTHS					
None			11.0						

SANITARY FACILITIES		CONSTRUCTION MATERIAL	
SEPTIC TANK ABSORPTION FIELDS	SEVERE-POOR SLOWLY	ROADFILL	FAIR-SHrink-SWELL
SEWER LAGOON AREAS	1-2% SLIGHT 2-5% MODERATE-SLOPE 7-8% SEVERE-SLOPE	SAND	IMPASSABLE-EXCEL FINE
SANITARY LANDFILL (TRENCH)	SLIGHT	GRAVEL	IMPASSABLE-EXCEL FINE
SANITARY LANDFILL (AREA)	SLIGHT	TOPSOIL	POOR-SMALL STONES, AREA RECLAIM
DAILY COVER FOR LANDFILL	POOR-SMALL STONES		
BUILDING SITE DEVELOPMENT		WATER MANAGEMENT	
SHALLOW EXCAVATIONS	MODERATE-TOO CLAYEY	EMBANKMENTS DIKES AND LEVERS	SLIGHT
DWELLINGS WITHOUT BASEMENTS	SEVERE-SHrink-SWELL	EXCAVATED PONDS AQUIFER PFD	SEVERE-NO WATER
DWELLINGS WITH BASEMENTS	MODERATE-SHrink-SWELL	DRAINAGE	DEEP TO WATER
SMALL COMMERCIAL BUILDINGS	SEVERE-SHrink-SWELL	IRRIGATION	1-2% L.SCL: PERCE SLOWLY 3-5% L.SCL: PERCE SLOWLY, SLOPE 1-2% SL, FSL: SOIL BLOWING, PERCE SLOWLY 3-5% SL, FSL: SOIL BLOWING, PERCE SLOWLY, SLOPE
LOCAL ROADS AND STREETS	SEVERE-LOW STRENGTH, SHrink-SWELL	TERRACES AND DIVERSIONS	L.SCL: PAVABLE SL, FSL: SOIL BLOWING
LAWNS, LANDSCAPING AND GOLF FAIRWAYS	SLIGHT	GRASSED WATERWAYS	100 AID, PERCE SLOWLY
REGIONAL INTERPRETATIONS			

Appendix D: Soils

A20061

SOIL INTERPRETATIONS RECORD

CARALAMP1 SERIES

MRA(S): 01
REV. MAR. 01. 0-03
OSTOLIC NAPLAKISS, LOAMY-SKELETAL, MIXED, THERMIC

THE CARALAMP1 SERIES CONSISTS OF DEEP, WELL GRAINED, MODERATELY SLOWLY PERMEABLE SOILS FORMED IN MIXED ALUVIUM ON OLD ALLUVIAL FANS. TYPICALLY THESE SOILS HAVE A DARK BROWN GRAVELLY SANDY LOAM SURFACE LAYER 2 INCHES THICK OVER A DARK BROWN AND YELLOWISH-BROWN VERY GRAVELLY SANDY CLAY LOAM SUBSOIL 21 INCHES THICK. THE SUBSTRATUM IS REDDISH-BROWN VERY GRAVELLY SANDY LOAM TO 40 INCHES. ELEVATIONS ARE FROM 2000 TO 2000 FEET. PRECIPITATION IS 12 TO 16 INCHES. THE FROST-FREE SEASON IS 200 TO 240 DAYS. SLOPES ARE 10 TO 40 PERCENT.

ESTIMATED SOIL PROPERTIES

DEPTH (IN.)	USDA TEXTURE	UNIFIED	AASHTO	PERCENT OF MATERIAL LESS THAN 2" PASSING SIEVE, US					LIQUID LIMIT (%)	PLASTICITY INDEX
				2	10	40	60	100		
0-2	SA-SL	SM	A-1, A-2	0-5	45-50	40-45	35-40	10-20	15-20	SP-5
0-2	SAV-SL	SM, SM	A-1	0-5	50-60	35-40	30-35	10-20	15-20	SP-5
2-23	SAV-CL, SAV-CL	SM-SC, SM	A-1, A-2	0-5	50-60	35-40	30-45	10-20	25-35	SP-5
23-60	SAV-SL	SM, SM	A-2, A-1	0-5	50-60	35-40	30-35	10-20	20-25	SP-5

DEPTH (IN.)	CLAY (%)	MOISTURE SENSIBILITY (1/CM)	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHQS/CM)	SHRINK-SWELL POTENTIAL (%)	FASSON WIND FACTORS (E, Y)	CREEP (IN/100)	CORROSION	
										ACID	ALKALINE
0-2	10-15	-	0.5-2.0	0.05-0.11	5.0-6.5	-	LOW	10	5	1-2	MIGRATE/MIGRATE
0-2	10-15	-	0.5-2.0	0.05-0.08	5.0-6.5	-	LOW	10	5	1-2	MIGRATE/MIGRATE
2-23	20-30	-	0.2-0.5	0.07-0.10	5.1-7.2	-	LOW	10	5	1-2	MIGRATE/MIGRATE
23-60	15-20	-	0.5-2.0	0.05-0.05	5.1-7.2	-	LOW	10	5	1-2	MIGRATE/MIGRATE

FLOODING	DRAINAGE	WATER TABLE		GROUNDED WATER	SLOPE	TOTAL CAP	HYD	POTENTIAL
		DEPTH (FT)	KIND					
		21.5						

SEPTIC TANK ABSORPTION PLOTS		CONSTRUCTION MATERIAL	
10-15% MODERATE-SLOPE	10-15% SEVERE-SLOPE	ROADFILL	10-15% GOOD 15-20% FAIR-SLOPE 25% POOR-SLOPE
SEVERE-SLOPE		SAND	IMPROBABLE-EXCESS FINE
10-15% MODERATE-SLOPE	10-15% SEVERE-SLOPE	GRAVEL	IMPROBABLE-EXCESS FINE
10-15% MODERATE-SLOPE	10-15% SEVERE-SLOPE	TOPSOIL	10-15% POOR-SMALL STONES, AREA RECLAIM 15-20% POOR-SMALL STONES, AREA RECLAIM, SLOPE
10-15% POOR-SMALL STONES	10-15% POOR-SMALL STONES, SLOPE		
WATER MANAGEMENT		POND RESERVOIR AREA	
SEVERE-SLOPE		SEVERE-SLOPE	
BUILDING SITE DEVELOPMENT			
SHALLOW EXCAVATIONS	10-15% MODERATE-SLOPE 15-20% SEVERE-SLOPE	FOUNDATION DICES AND LEVELS	SLIGHT
WELLINGS WITHOUT BASEMENTS	10-15% MODERATE-SLOPE 15-20% SEVERE-SLOPE	EXCAVATED PONDS ACQUIFER PRO	SEVERE-NO WATER
WELLINGS WITH BASEMENTS	10-15% MODERATE-SLOPE 15-20% SEVERE-SLOPE	DRAINAGE	DEEP TO WATER
SMALL COMMERCIAL BUILDINGS	SEVERE-SLOPE	IRRIGATION	SUBSIDENTY, SLOPE
LOCAL ROADS AND STREETS	10-15% MODERATE-SLOPE 15-20% SEVERE-SLOPE	TERRACES AND DIVERSIONS	SLOPE
LAWNS, LANDSCAPING AND SOFT FAIRWAYS	10-15% SA; MODERATE-SMALL STONES, SUBSIDENTY, SLOPE 15-20% SEVERE-SLOPE 10-15% SAV; SEVERE-SMALL STONES 15-20% SAV; SEVERE-SMALL STONES, SLOPE	GRASSED WAYSIDES	SLOPE, SUBSIDENTY

Appendix E: Wastewater Capacity Response Letter



PIMA COUNTY
WASTEWATER MANAGEMENT DEPARTMENT
201 NORTH STONE AVENUE
TUCSON, ARIZONA 85701-1207

February 20, 1996

GEORGE A. BRINSKO

PH. 740-6500

Director

Linda Little Morales
The Planning Center
450 W. Paseo Redondo, Suite 202
Tucson, Arizona 85701

Re: CAPACITY RESPONSE NO. 96-13

Dear Ms. Morales:

We have reviewed your request of February 6, 1996 regarding the availability of sewer service for the following proposed use and property:

The Miraval Resort (formerly Sierra Tucson) at 16350 N. Lago Del Oro Parkway.

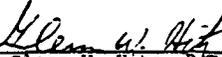
The Miraval Resort is approximately 2 1/2 miles from the available sewer. Under existing conditions (actual developments and commitments for service through approved Sewer Service Agreements), there is capacity for this proposed development in the downstream sewerage system and in the existing 8-inch diameter sewer located at Hawser Road and Twin Lakes Drive, with the provision that flow from a pump station at Hawser Road alignment and Lago Del Oro Parkway be limited to a 4-inch diameter force main. If greater capacity is required, the force main would have to be extended to at least the Daisy Place intersection with Hawser Road.

Several options have been reviewed in the past as to how this facility could be served. Our recommended method would be construction of a public 8-inch diameter sewer along the Lago Del Oro Parkway to the Hawser Road alignment, then a public pump station and a force main to Twin Lakes Drive. The flow from on-site could either be by a pressure line from the existing private pump station, or possibly by gravity (an easement across the parcel to the south would probably be necessary). The on-site facility would continue to be a private system. A very rough estimate of engineering and construction costs for this option would be \$400,000.00. There would also be a connection fee which depends upon the number of fixture units. A copy of the connection fee ordinance is attached in order to give you some idea as to the fees.

This response is not to be construed as a commitment for conveyance capacity allocation, but rather an analysis of the existing sewerage system as of this date.

Should you desire additional information regarding this subject, please contact this office (740-6547).

Very truly yours,


Glenn W. Hitz, P.E.
Civil Engineer

Attachment

Copy: Jerry Stratton
Steve Magelli
Capacity Response File/111402

Appendix F: Arizona State Museum Letter



Arizona State Museum

THE UNIVERSITY OF
ARIZONA.
TUCSON ARIZONA

Tucson, Arizona 85721
(602) 621-6281
FAX (602) 621-2976

February 13, 1996

Ms. Linda Little Morales
Project Planner
THE PLANNING CENTER
450 West Paseo Redondo, Suite 202
Tucson, AZ 85701

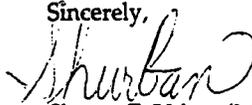
Dear Ms. Morales:

Thank you for your letter of February 6th requesting an archaeological file check for property located at T11S R14E Sec 2 (center north half) for project Sierra Tucson/Miraval Resort.

The Archaeological Site Survey Files at the Arizona State Museum have been consulted with the following results. There has been only one small survey in the area (1991-60) on which sites were not located. They have been reported just a half mile to the north, indicating a medium degree of potential for the recovery of cultural remains. A survey would be recommended for those areas not previously disturbed, and in the case of any future land modification activities. In the event that cultural remains are found, then a data recovery program (which may include: monitoring, testing, and/or excavation) will be required of those areas impacted by the development. Clearance on this property would not be recommended until after archaeological investigations have been completed by a qualified (based on standards established by the State Historic Preservation Office) archaeologist.

If you have any questions concerning this statement, please feel free to contact me at 621-4011. Billing for this file check is here in enclosed.

Sincerely,


Sharon F. Urban (Miss)
Public Archaeologist

Encl. (1)
sfu

**Appendix G: Amphitheater School District
Student Enrollment Projection Figures**

1980 DEMOGRAPHIC MULTIPLIERS

SINGLE FAMILY	2 BR	3BR	4BR	5BR	BLENDED
ELEMENTARY - K - 5	0.143	0.394	0.710	1.045	0.455
MIDDLE SCHOOL - 6 - 8	0.048	0.151	0.326	0.525	0.192
HIGH SCHOOL - 9 - 12	0.045	0.145	0.494	0.636	0.202
APARTMENTS	1 BR	2BR	3BR	BLENDED	
ELEMENTARY - K - 5	0.015	0.122	0.336	0.103	
MIDDLE SCHOOL - 6 - 8	0.005	0.046	0.163	0.043	
HIGH SCHOOL - 9 - 12	0.014	0.047	0.166	0.046	
TOWNHOMES	1 BR	2BR	3BR	BLENDED	
ELEMENTARY - K - 5	0.037	0.064	0.184	0.135	
MIDDLE SCHOOL - 6 - 8	0.015	0.031	0.091	0.072	
HIGH SCHOOL - 9 - 12	0.048	0.041	0.134	0.096	

Adjusted to Amphitheater grade configurations from figures presented in:
"The Practitioner's Guide to Fiscal Impact Analysis," page 66.
Source: U. S. Department of Commerce, Bureau of Census

Appendix H: NextHealth Wastewater Treatment Alternatives



RECEIVED AUG 08 1996

August 7, 1996

Gail Cushner
PIMA ASSOCIATION OF GOVERNMENTS
177 N. Church
Tucson, Arizona 85701

RE: NEXTHEALTH CONSTRUCTED WETLAND

Dear Ms. Cushner:

NextHealth operates Miraval, a health spa located at 166000 N. Lago del Oro Parkway. Miraval occupies approximately 130-acres of the 160-acre site that was known as Sierra Tucson. The motto of the resort is "Life in Balance", and this motto will be continued through the wastewater treatment system. The complex is currently served by septic tanks and leach fields. SWCA analyzed the existing system and future plans for the resort and recommended moving the septic tanks and replacing the leach fields with a flow-through constructed wetland. The treated water would be reused on a proposed golf course. I have enclosed a report on the constructed wetland system for your review. A previous investigation to connect to Pima County sewer system identified the need for a sewer lift station, 9,500 feet of force main, and 7,200 feet of gravity sewer. A disadvantage of off-site treatment is that NextHealth would lose the ability to irrigate the golf course with reclaimed water.

The property is currently being rezoned to incorporate the constructed wetland treatment system, and other improvements, including the golf course. We are requesting a determination on consistency with Pima County's 208 plan. Our assessment of the 208 plan resulted in the opinion that converting from leach fields to a flow through constructed wetland is consistent with the existing 208 plan as long as septic tanks remain the bases for primary treatment. Your expedient reply is much appreciated.

Sincerely,

Peter A. Livingston P.E.
SWCA, Inc.

Enclosure: NextHealth Wastewater treatment analysis

cc: Ken Whitaker/NextHealth
Mike Grassinger/Planning Center

DSR:\WP51\23-51-407\PAG206.LET



ALBUQUERQUE • AUSTIN • DENVER • DURANGO • FLAGSTAFF • PHOENIX • RENO • SALT LAKE CITY • TUCSON

February 10, 1997

MEMORANDUM

TO: Glenn Hitz/Pima County Wastewater Management Department
FROM: Peter Livingston
CC: Project File 28-51407
RE: NEXT HEALTH WASTEWATER TREATMENT

INTRODUCTION

The purpose of this revised report is to calculate the size of a constructed wetland necessary to treat waste from 400 hotel units at the Mirival Resort.

EXISTING WASTEWATER SEPTIC SYSTEM

Mirival's existing sewage disposal system consists of five primary septic tank systems. Figure 1 shows the location of the septic tanks for each of the five systems.

System 1 consists of three 5,500 gallon septic tanks in series. System 2 consists of three 5,500 gallon septic tanks, and two 5,700 gallon settling tanks in series. System 3 consists of two 5,700 gallon and two 4,100 gallon septic tanks. System 4 consists of two 5,700 gallon and two 4,100 gallon septic tanks. System 5 consists of three 4,800 gallon septic tanks in series.

PROPOSED WETLAND

The proposed Miraval Wetland system would consist of four basic components: (1) **pretreatment for solids removal** in septic tanks; (2) **initial clarification, denitrification, and aeration** of the effluent in a gravel bed planted with cattails and bulrush; (3) open water wetland, for **further clarification and denitrification**; (4) **disinfection** prior to reuse. The various treatment areas do not need to be located in the same area, and can be integrated into a golf course or nature trail.

If the water is reused on a golf course, then we recommend a minimal surface area for storage of irrigation water, which would be one or more interconnected lakes. The irrigation system would be fed from pumps located at the lakes.

Figure 1 shows the proposed location of the wetlands, the existing sewer lines and the proposed sewer connections. Some of the existing septic tanks and pump stations would be abandoned, eliminating odor problems near the buildings. Wastewater will flow from the sewer line into a series of new septic tanks, and then into the wetland for treatment.

In the remainder of this section, we discuss the wastewater quantities involved; the surface area requirements for the wetland, storage, and reuse; permitting requirements; and cost.

Wastewater Quantities

The quantity of wastewater delivered to the treatment system was calculated using criteria from Arizona Department of Water Resources Engineering Bulletin #12, water use data, and historical occupancy data. Engineering Bulletin #12 requires 100 gallons per day (gpd) wastewater treatment capacity for each overnight guest, and 25 gpd for each full-time employee.

The propose wetland will treat waste from the 400 guest room resort. Based on information provided by Ken Whitaker of Next Health, the occupancy rate averages about 1.5 guests per room. This results in 600 guests. The required treatment capacity based on the above assumptions is shown below for each scenario.

Wastewater Quantity

600 guests @ 100 gpd =	60,000 gpd
400 full-time employees @ 25 gpd =	<u>10,000 gpd</u>
Total =	<u>70,000 gpd</u>

Wastewater Treatment

Design. Figure 2 shows the treatment process in a schematic format.

Groups of effluent sources will be combined. The first step of the treatment train is a series of septic tanks. The septic tanks will reduce the Biological Oxygen Demand (BOD) by 40%, Total Suspended Solids (TSS) by 50%, and Total Nitrogen (TN) by 20%. The total septic tank capacity will be between 1.6 and 3.2 times the daily flow of 70,000 gpd.

Effluent from all of the septic tanks will be combined, and discharged into a flow splitter which will divide the flow between two parallel sets of wetland cells. This would allow one side of the treatment system to be drained for maintenance or repairs while the other side of the treatment system is still in operation.

Once the flow is split, it will not be recombined until the treated effluent is ready for disinfection and discharge.

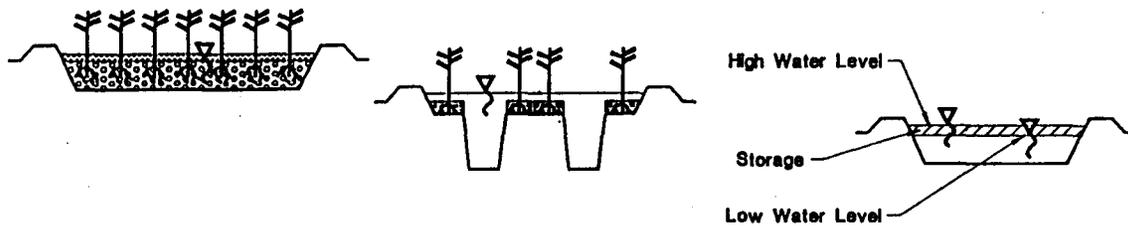
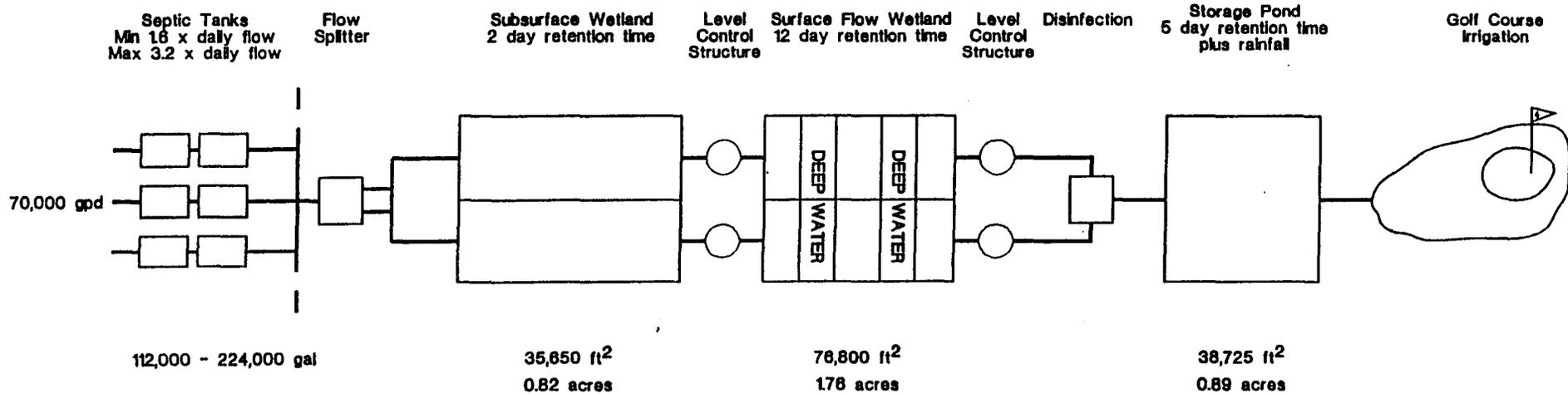
The first wetland cell is a subsurface flow wetland with 1.5 feet of ½-inch to ¾-inch gravel covered by a 3-inch layer of mulch. In a subsurface wetland, all flow occurs within the gravel layer. The mulch layer provides odor control and a source of carbon for denitrification. The purpose of this cell will be to remove approximately 80% of suspended solids (TSS), 95% of BOD and 35% of remaining nitrogen. The water level will be maintained just below the top of the gravel, providing a 2-day retention capacity. The water level in the first cell is controlled by a water-level control structure on the downstream end.

From the first wetland cell, the water flows into an open water wetland with a 12-day retention capacity. In an open water wetland, water flows over the wetland soil, either in shallow areas (1 foot) planted with emergent wetland plants, or through deep areas (4 feet) without plants. The primary purpose of this open water wetland will be to further reduce the nitrogen concentration to less than 10 mg/L; the secondary purpose will be to further reduce BOD and TSS. The water depth will be maintained at 1-foot at the entrance, followed by a 4-foot deep zone of open water, followed by a shallow zone, another deep zone, and finally a shallow polishing zone. The open water wetland is followed by a water-level control structure.

The purpose of alternating the shallow and deep zones is to enhance nitrogen removal. The deep water areas of the open water wetland will provide an anaerobic environment for denitrification to occur, while the plant roots in the other wetland components provide an aerobic environment for nitrification. The mulch and plant parts provide a carbon source for denitrification.

After flowing through the parallel system of wetland cells, the effluent is recombined and passed through a disinfection unit and then discharged into a storage area for reuse. Golf course lakes could be used for the storage area.

Each wetland cell will be lined to prevent untreated wastewater from reaching the groundwater. The wetland components will be outside of the 100-year flood event, and the berms will be sufficient to hold a 10-year, 24-hour rainfall.



NEXT HEALTH
WASTEWATER FACILITY

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	FILE NAME: RA-ACAD\BIN\20\NI-FLOW.DWG	CHECKED BY:	REV. DATE:

FIGURE 2
TREATMENT PROCESS DIAGRAM

Table 4. Treatment System Cost Estimate.

	Unit Price	per	Scenario 1		Scenario 2		Scenario 3	
			Quantity	Cost	Quantity	Cost	Quantity	Cost
Pipe 8"	\$20	ft	800	\$16,000	1100	\$22,000	1100	\$22,000
Connections	\$1,000	ea	4	\$4,000	6	\$6,000	6	\$6,000
Earthwork	\$2.50	cy	3,510	\$8,775	4,700	\$11,750	5,660	\$14,150
Gravel	\$18	cy	880	\$15,840	1,180	\$21,240	1,420	\$25,560
Liner	\$0.40	ft ²	47,640	\$19,056	63,720	\$25,488	76,800	\$30,720
Plants	\$5,000	ac	0.79	\$3,950	1.06	\$5,300	1.27	\$6,350
Structures	\$1,200	ea	5	\$6,000	5	\$6,000	5	\$6,000
Disinfection	\$8,000	ea	1	\$8,000	1.2	\$9,600	1.4	\$11,200
Tanks	\$1.50	gal	60,000	\$90,000	80,000	\$120,000	100,000	\$150,000
Mulch	\$20	cy	220	\$4,400	300	\$6,000	350	\$7,000
Subtotal				\$176,021		\$233,378		\$278,980
Contingency 15%				\$26,403		\$35,007		\$41,847
Subtotal				\$202,424		\$268,385		\$320,827
Engineering 12%				\$24,291		\$32,206		\$38,499
Permitting				\$6,000		\$6,000		\$6,000
APP/Reuse Permit				\$20,000		\$20,000		\$20,000
Total				\$252,715		\$326,591		\$385,326

Area Requirements

Table 1 shows the areas required for the treatment wetlands. The area required for storage of treated effluent is covered in the Reuse section.

		Area
Cell 1	Square feet	35,650
	Acres	0.82
Cell 2	Square feet	76,800
	Acres	1.76
Subtotal	Square feet	112,450
	Acres	2.58
Berms and structures add 25%	Square feet	28,113
	Acres	0.65
Total	Square feet	140,563
	Acres	3.23

Reuse of Treated Effluent

In order to use the treated effluent to irrigate golf course turf, there must be sufficient area under irrigation to evapotranspire the treated effluent in the winter, and sufficient storage capacity to store the treated effluent between irrigations.

We recommend storage capacity for five days worth of treated effluent plus a 10-year, 24-hour rainfall event. Storage would be in a number of golf course ponds. Under normal operations, the pond level would fluctuate at most two to three inches. A total of 1.5 feet of freeboard would be available for storage when the irrigation system wasn't in use due to heavy rainfall or maintenance. The berms for the ponds would be part of the golf course. With 1.5 feet of freeboard, the required pond surface area is 38,725 ft² (0.90 acres). The surface area could be made smaller or larger by using larger or smaller freeboard depths. The pond should also have sufficient freeboard for wave action above the maximum storage requirements.

The area required for evapotranspiration was calculated using the potential evapotranspiration minus the average rainfall for each month. The lowest net evapotranspiration occurs in December.

Figure 3 shows that, with 35 acres of golf course turf area, all of the treated effluent can be used for turf irrigation, except for December. The additional effluent produced during December would require less than 1-inch of irrigation over the month beyond the evapotranspiration requirement.

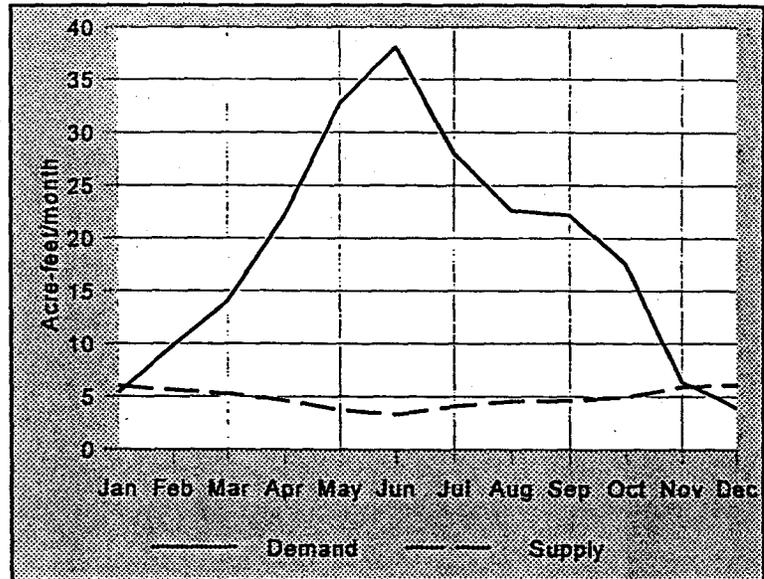


Figure 3. Wastewater supply and golf course demand.

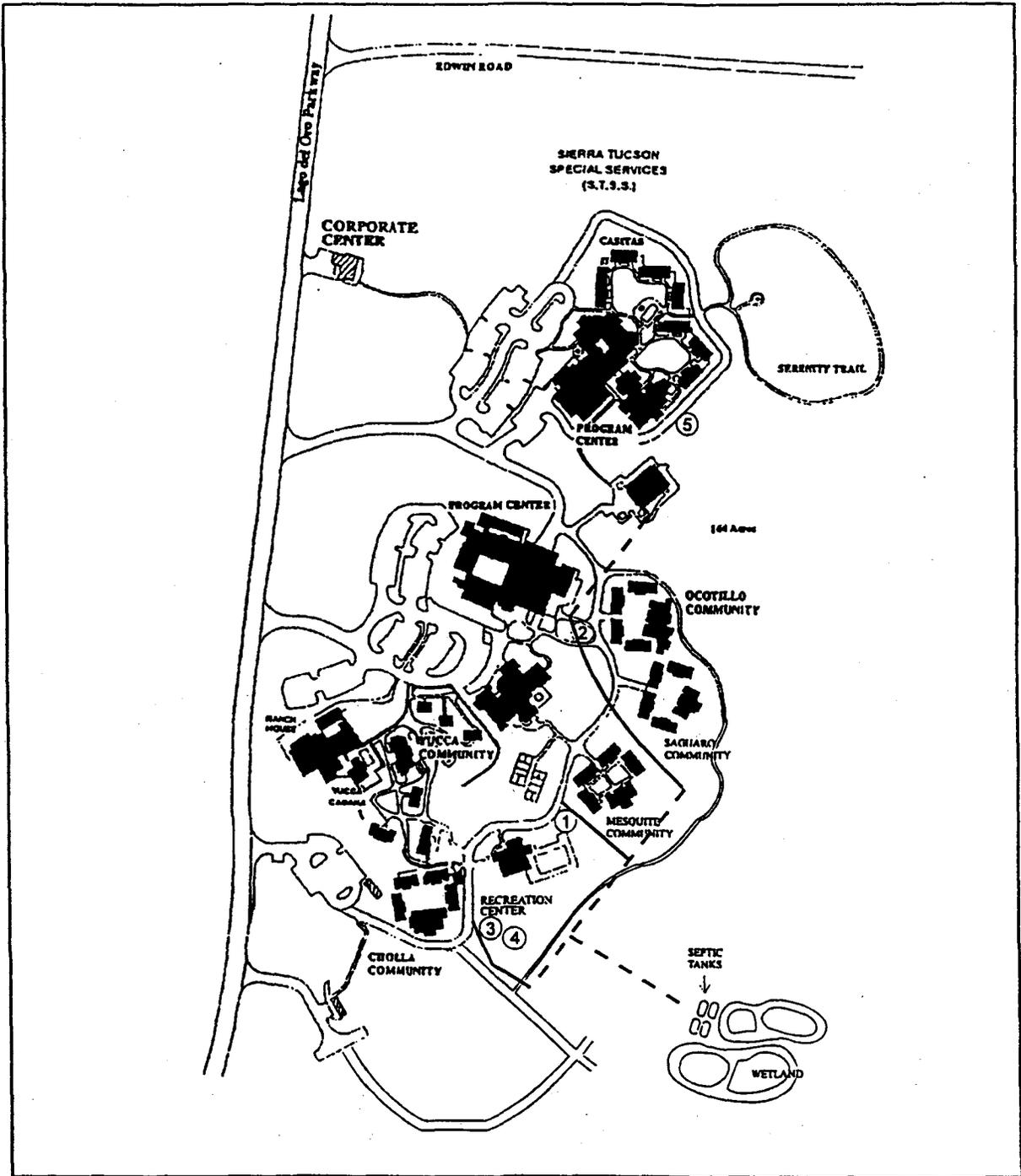
PERMITTING

Approval to Construct

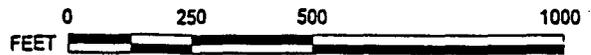
An Approval-to-Construct permit is required by the Arizona Department of Environmental Quality before construction of the treatment system begins. The application for the permit requires design drawings, design specifications, site layout, an analysis of the treatment capabilities the system, and an operation and maintenance manual.

Aquifer Protection/Reuse Permits

The Arizona Department of Environmental Quality (ADEQ) requires an Aquifer Protection Permit (APP) and a reuse permit.



- Existing Sewer
- - Proposed Sewer
- ① Existing Septic Tanks



NEXT HEALTH WETLAND

FIGURE 1. SITE PLAN



343 S. Scott Avenue
Tucson, Arizona 85701
Phone (520) 325-0104
FAX (520) 325-2033

JOB NUMBER	DATE
FILE NAME	REV. DATE

NEXTHEALTH WASTEWATER TREATMENT ALTERNATIVES

Submitted to

**Ken Whitaker
NEXTHEALTH
16600 North Lago del Oro Parkway
Tucson, Arizona 85739
(520) 792-5800**



Submitted by

**SWCA, INC.
Environmental Consultants
343 South Scott Avenue
Tucson, Arizona 85701
(520) 325-9194**

March 15, 1996

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INTRODUCTION

PURPOSE

The purpose of this report is to identify short-term solutions to odor problems with Mirival's present sewage disposal system, and to present an alternative to replace the present sewage disposal system and to allow for future growth. The report is in three sections: existing conditions, short term solutions to odor problems, and long term solutions.

Long term solutions include the design of a constructed wetland for each of three scenarios. The scenarios are (1) Miraval, (2) Miraval with north campus, and (3) maximum capacity of both Miraval and the north campus.

EXISTING WASTEWATER SEPTIC SYSTEM

Mirival's existing sewage disposal system consists of five primary septic tank systems. Figure 1 shows the location of the septic tanks, and Table 1 shows the capacity for each of the five systems.

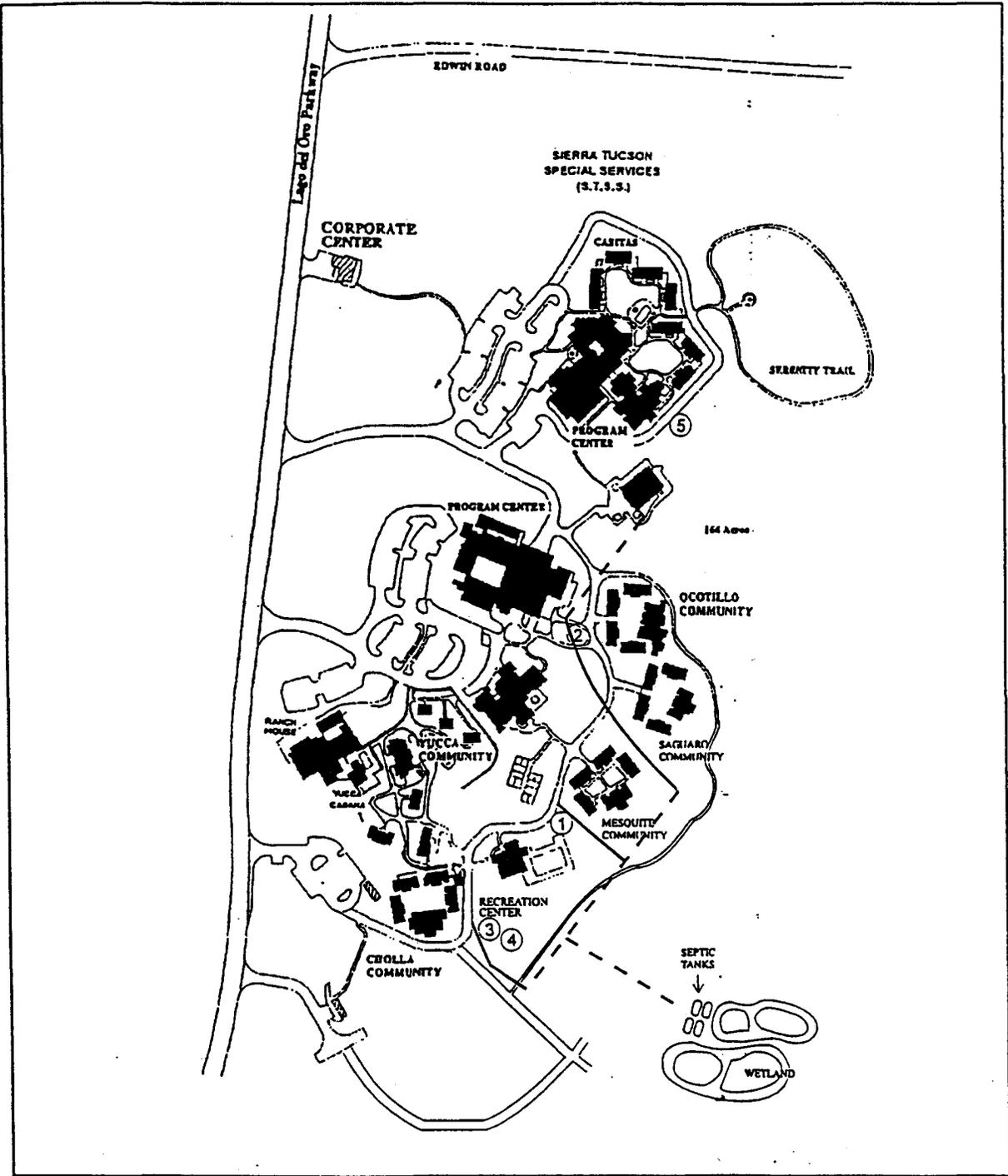
Table 1. Existing Septic Tank Capacity.

	Capacity (gpd)	Description
System 1	10,000	Three 5,500 gallon septic tanks in series.
System 2	12,500	Three 5,500 gallon septic tanks, and two 5,700 gallon settling tanks in series.
System 3	6,500	Two 5,700 gallon and two 4,100 gallon septic tanks in series.
System 4	9,000	Two 5,700 gallon and two 4,100 gallon septic tanks in series.
System 5	8,625	Three 4,800 gallon septic tanks.

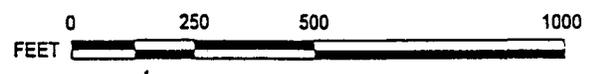
SHORT-TERM SOLUTION

SWCA and EEC conducted a site visit to the Mirival facilities on January 24, 1996. The purposes of the visit were to obtain background information on odor sources from the wastewater system, evaluate ongoing odor control measures, and to recommend interim or immediately implementable alternative odor control measures. To summarize our findings:

- Odor control measures presently employed include the use of biological or enzyme preparations which have the effect of metabolizing grease deposits which can be a prime odor source. These products are generally quite satisfactory. Products that emulsify grease can cause problems from coalescence downstream from the point of application. We saw no emulsifiers in use.



- Existing Sewer
- - Proposed Sewer
- ① Existing Septic Tanks



NEXT HEALTH WETLAND
FIGURE 1. SITE PLAN



343 S. Scott Avenue
 Tucson, Arizona 85701
 Phone (520) 325-8194
 FAX (520) 325-2033

JOB NUMBER	DATE
FILE NAME	REV. DATE

Other methods of odor control in use include sealing access risers and hatches to the septic tanks and pump stations. The potential problem associated with this approach is forcing the gases being generated in the tanks and pump stations back up the building drain lines to the building vents. On-site personnel reported no history of odors from building roof vents. Subsequent to the site visit we contacted Mike Nicholson of Sunmechanical Contracting who stated that he has been on the roofs of several of the buildings when large volumes of foul smelling gases were being discharged from the roof vents.

The construction plans furnished showed that the inlet to each tank is through an elbow turned down below the liquid surface. This approach should preclude the migration of gases from the tanks to the roof vents. Normally septic tanks use an inlet tee which will allow migration of gases to the building drain and vent piping. Mr. Nicholson did not remember if the inlets to the tanks were tees or elbows.

The construction plans also showed that the access risers on the tanks were 24 inches in diameter. Normally these risers are 18 inches in diameter. Mr. Nicholson remembered the risers as being almost impossible to enter and assumed that they must be smaller than 24 inches.

New construction, relocation of sidewalks, and extensive landscaping have rendered access to many of the tanks for inspection, pumping, or maintenance to be problematic.

INTERIM SOLUTIONS

We have evaluated available information in an attempt to determine a viable method of odor control. Several options were examined, including using submergible aerators or an above-ground air compressor with diffusion piping in the lift stations after each series of septic tanks. Successful implementation of either of these approaches is complicated by lack of definitive information regarding the construction details of the tanks. The submergible aerators are 20 inches in diameter and therefore if the access tubes are only 18 inches in diameter the aerators will not fit.

In the case of a system of above-ground compressors and submerged diffusers, it is doubtful that sufficient liquid depth above the diffusers can be obtained to ensure effective oxygen dispersion. For the submergible aerators it would be necessary to conduct a thorough inspection of each of the lift stations to determine the best installation method. The inspection would involve uncovering and examining each of the lift stations to determine the size and configuration of hatches and the location of the existing pumps within the tanks.

If Mr. Nicholson is correct in his observation of significant gas escaping the building vents and if this gas is due to tees having been installed in the tank inlets, then installation of any type aeration in the pump stations could exacerbate the problem by forcing even more gas up the building drain lines to the roof

vents. The solution to this problem, if it exists, would be to replace the inlet tees with elbows or plug the tops of the inlet tees in each septic tank and pump station.

Preliminary designs have been prepared for installation of the above-ground compressors/submerged diffuser and the submergible aerator systems. Both designs include provisions for exhausting the air from the pump stations through an odor absorption system. Given sufficient information on tankage construction and configuration the design work we have completed could be implemented. A submerged aerator and above ground odor absorption system could be installed for about \$3,500 per unit.

In summary, there is not sufficient information on the existing facilities to recommend with confidence implementation of either of the design alternatives. To collect the information needed would involve considerable time, effort, and expense and would likely cause significant disturbance to the landscaping and irrigation systems.

RECOMMENDATIONS

Because of the level of effort anticipated to determine the design requirements for a system of pump station aerators and because of the probable extent of site disturbance associated with inspection of the tankage, we do not recommend proceeding with this approach.

Recommendations are as follows:

- In the short term, continue using biological odor control measures now in use and extend their application to the pump stations if warranted.
- Proceed with design and construction of the central treatment and wetlands system. The existence of the installed trunk sewer system will greatly facilitate this effort.

An important element of the construction of the central system will be coordinating the abandonment of the existing tankage in a manner that will ensure uninterrupted service to the facilities while minimizing site disturbance.

LONG-TERM SOLUTION

One wastewater treatment option is a constructed wetland. The use of a constructed wetland treatment system allows for many benefits not found in conventional treatment systems. These benefits include:

- Flow through treatment that results in reuse quality water that could be used on the proposed golf course.

- Natural treatment system that is aesthetically attractive.
- Can be integrated into golf course design, or implemented independently of the golf course.
- Low maintenance and does not require class 2 or above registered operator.
- Miraval could integrate into a natural history interpretive program that could include biology, and historical and prehistorical cultural history.
- Creation of riparian habitat will attract birds that bird watchers will flock to see, including Harris's hawk; American widgon; mallard, and ruddy ducks; American coot; Canada geese; cinnamon, blue winged, and green winged teal; vermilion fly catcher; great blue, and green-backed heron; summer tanager; red-winged, and yellow-headed blackbirds; and northern rough-winged swallow.
- Mosquitos and other annoying insects would be controlled by mosquito fish and bats, including yellow, red, Mexican freetail, big brown, and Townsend big-eared bats; and Yuma myotos.

The proposed Miraval Wetland system would consist of four basic components: (1) pretreatment for solids removal in septic tanks; (2) initial clarification, denitrification, and aeration of the effluent in a gravel bed planted with cattails and bulrush; (3) open water wetland, for further clarification and denitrification; (4) disinfection prior to reuse. The various treatment areas do not need to be located in the same area, and can be integrated into a golf course or nature trail.

SWCA calculated a preliminary size based on three scenarios: (1) Miraval, (2) Miraval with north campus, and (3) maximum capacity of both Miraval and the north campus. The surface areas for required treatment are found in the table below. If the water is reused on a golf course, then we recommend a minimal surface area for storage of irrigation water, which would be one or more interconnected lakes. The irrigation system would be fed from pumps located at the lakes.

Figure 1 shows the proposed location of the wetlands, the existing sewer lines and the proposed sewer connections. Wastewater would enter the sewer line before the existing septic tanks. The existing septic tanks and pump stations would be abandoned, eliminating odor problems near the buildings. Wastewater will flow from the sewer line into a series of new septic tanks, and then into the wetland for treatment.

In the remainder of this section, we discuss the wastewater quantities involved; the surface area requirements for the wetland, storage, and reuse; permitting requirements; and cost.

WASTEWATER QUANTITIES

The quantity of wastewater delivered to the treatment system was calculated using criteria from Arizona Department of Water Resources Engineering Bulletin #12, water use data, and historical occupancy data. Engineering Bulletin #12 requires 100 gallons per day (gpd) wastewater treatment capacity for each overnight guest, and 25 gpd for each full-time employee. Because employees may use dining and other facilities, 35 gpd treatment capacity will be provided for each employee.

At present, the laundry facility uses about 6000 gpd. This number is scaled up for Scenarios 2 and 3 based on the increased number of overnight guests.

Based on information provided by Ken Whitaker of NextHealth, the occupancy rate averages about 1.5 guests per room. The required treatment capacity based on the above assumptions is shown below for each scenario.

Scenario 1

175 guests @ 100 gpd =	17,500 gpd
200 full-time employees @ 35 gpd =	7,000 gpd
Laundry facility =	<u>6,000 gpd</u>
Total =	30,500 gpd
Design Flow =	<u>31,000 gpd</u>

Scenario 2

235 guests @ 100 gpd =	23,500 gpd
275 full-time employees @ 35 gpd =	9,625 gpd
Laundry facility =	<u>8,060 gpd</u>
Total =	41,185 gpd
Design Flow =	<u>41,500 gpd</u>

Scenario 3

265 guests @ 100 gpd =	26,500 gpd
400 full-time employees @ 35 gpd =	14,000 gpd
Laundry facility =	<u>9,090 gpd</u>
Total =	49,590 gpd
Design Flow =	<u>50,000 gpd</u>

WASTEWATER TREATMENT

Design

The design for each scenario uses the same components with different sizes based on the loading requirements. Figure 2 shows the treatment process in a schematic format.

Groups of effluent sources will be combined. The first step of the treatment train is a series of septic tanks. The septic tanks will reduce the Biological Oxygen Demand (BOD) by 40% and nitrogen by 20%. The Pima County Department of Environmental Quality (PDCEQ) requires 1.6 times the daily flow rate in septic tank capacity. We recommend a septic tank capacity of about 2 times the daily flow rate to allow for additional solids removal.

Effluent from all of the septic tanks will be combined, and discharged into a flow splitter which will divide the flow between two parallel sets of wetland cells. This would allow one side of the treatment system to be drained for maintenance or repairs, while the other side of the treatment system is still in operation. Once the flow is split, it will not be recombined until the treated effluent is ready for disinfection and discharge.

The first wetland cell is a subsurface flow wetland with 1 foot of ½-inch to ¾-inch gravel covered by a 3-inch layer of mulch. In a subsurface wetland, all flow occurs within the gravel layer. The mulch layer provides odor control and a source of carbon for denitrification. The purpose of this cell will be to remove approximately 85% of suspended solids(TSS), 95% of BOD and 50% of remaining nitrogen. The water level will be maintained just below the top of the gravel, providing a 2-day retention capacity. The water level in the first cell is controlled by a water-level control structure on the downstream end.

From the first wetland cell, the water flows into an open water wetland with a 9-day retention capacity. In an open water wetland, water flows over the wetland soil, either in shallow areas (6 inches) planted with emergent wetland plants, or through deep areas (6 feet) without plants. The primary purpose of this open water wetland will be to further reduce the nitrogen concentration to less than 10 mg/L; the secondary purpose will be to further reduce BOD and TSS. The water depth will be maintained at 6-inches at the entrance, followed by a 6-foot deep zone of open water, followed by a shallow zone, another deep zone, and finally a shallow polishing zone. Two-thirds of the wetland will be shallow (6 inches) and the rest will be deep open water (6 feet). The open water wetland is followed by a water-level control structure.

The purpose of alternating the shallow and deep zones is to enhance nitrogen removal. The deep water areas of the open water wetland will provide an anaerobic environment for denitrification to occur, while the plant roots in the other wetland components provide an aerobic environment for nitrification. The mulch and plant parts provide a carbon source for denitrification.

Septic Tanks
Min 1.6 x daily flow

Flow
Splitter

Subsurface Wetland
2 day retention time

Level
Control
Structure

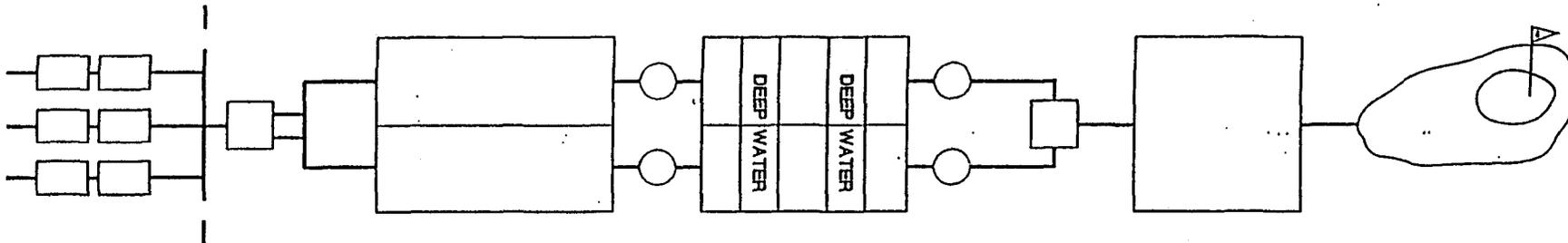
Surface Flow Wetland
9 day retention time

Level
Control
Structure

Disinfection

Storage Pond
5 day retention time
plus rainfall

Golf Course
Irrigation



SCENARIO 1 60,000 GAL

23,700 FT²

16,000 FT²

20,800 FT²

SCENARIO 2 80,000 GAL

31,700 FT²

21,400 FT²

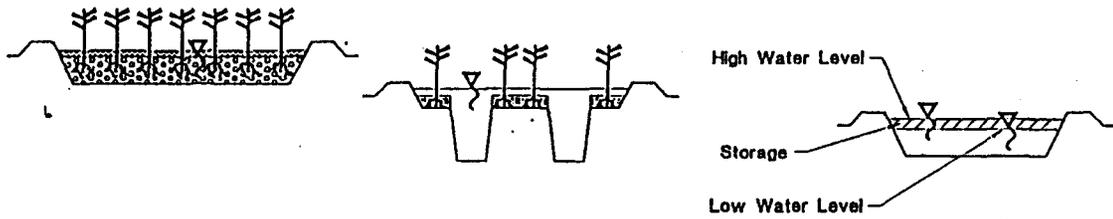
27,800 FT²

SCENARIO 3 100,000 GAL

38,200 FT²

25,800 FT²

33,500 FT²



NEXT HEALTH
WASTEWATER FACILITY

	JOB # 20-51107	DRAWN BY:	DATE: 1/18/96
	FILE NAME: RA-VACADVIN\20\101-FLOW.DWG	CHECKED BY:	REV. DATE

FIGURE 2
TREATMENT PROCESS DIAGRAM

After flowing through the parallel system of wetland cells, the effluent is recombined and passed through a disinfection unit and then discharged into a storage area for reuse. Golf course lakes could be used for the storage area.

Each wetland cell will be lined to prevent untreated wastewater from reaching the groundwater. The wetland components will be outside of the 100-year flood event, and the berms will be sufficient to hold a 10-year, 24-hour rainfall.

Area Requirements

Table 2 shows the areas required for the treatment wetlands for each scenario. The area required for storage of treated effluent is covered in the Reuse section.

		Scenario 1	Scenario 2	Scenario 3
Cell 1	Square feet	23,700	31,700	38,200
	Acres	0.54	0.73	0.88
Cell 2	Square feet	16,000	21,400	25,800
	Acres	0.37	0.49	0.59
Subtotal	Square feet	39,700	53,100	64,000
	Acres	0.91	1.22	1.47
Berms and structures add 25%	Square feet	9,925	13,275	16,000
	Acres	0.23	0.30	0.37
Total	Square feet	49,625	66,375	80,000
	Acres	1.14	1.52	1.84

REUSE OF TREATED EFFLUENT

In order to use the treated effluent to irrigate golf course turf, there must be sufficient area under irrigation to evapotranspire the treated effluent in the winter, and sufficient storage capacity to store the treated effluent between irrigations.

We recommend storage capacity for five days worth of treated effluent plus a 10-year, 24-hour rainfall event. Storage would be in a number of golf course ponds. Under normal operations, the pond level would fluctuate at most two to three inches. Another 1.7 feet of freeboard would be available for storage when the irrigation system wasn't in use due to heavy rainfall or maintenance. The berms for the ponds would be part of the golf course. Table 3 shows the area required for storage under each scenario.

Table 3. Storage Area Requirements.

		Scenario 1	Scenario 2	Scenario 3
Area	Square feet	20,720	27,740	33,420
	Acres	0.48	0.64	0.77

The area required for evapotranspiration was calculated using the potential evapotranspiration minus the average rainfall for each month. The lowest net evapotranspiration occurs in December.

Figure 3 show that, with 35 acres of golf course turf area, all of the treated effluent can be used for turf irrigation.

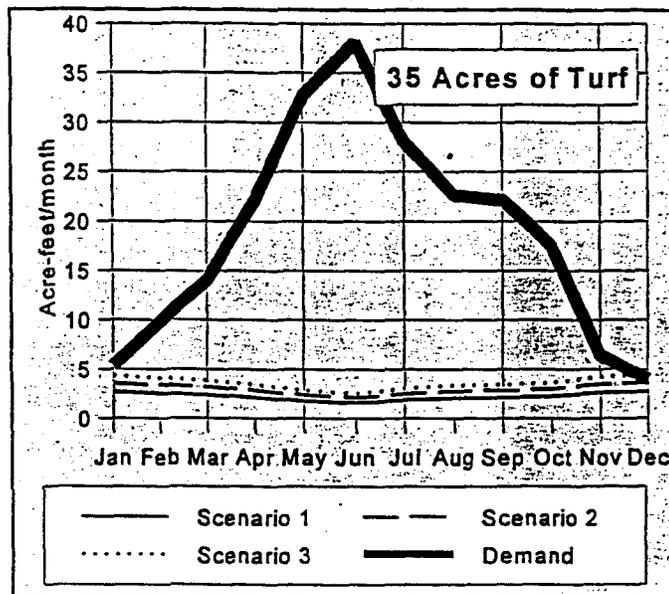


Figure 3. Wastewater supply and golf course demand.

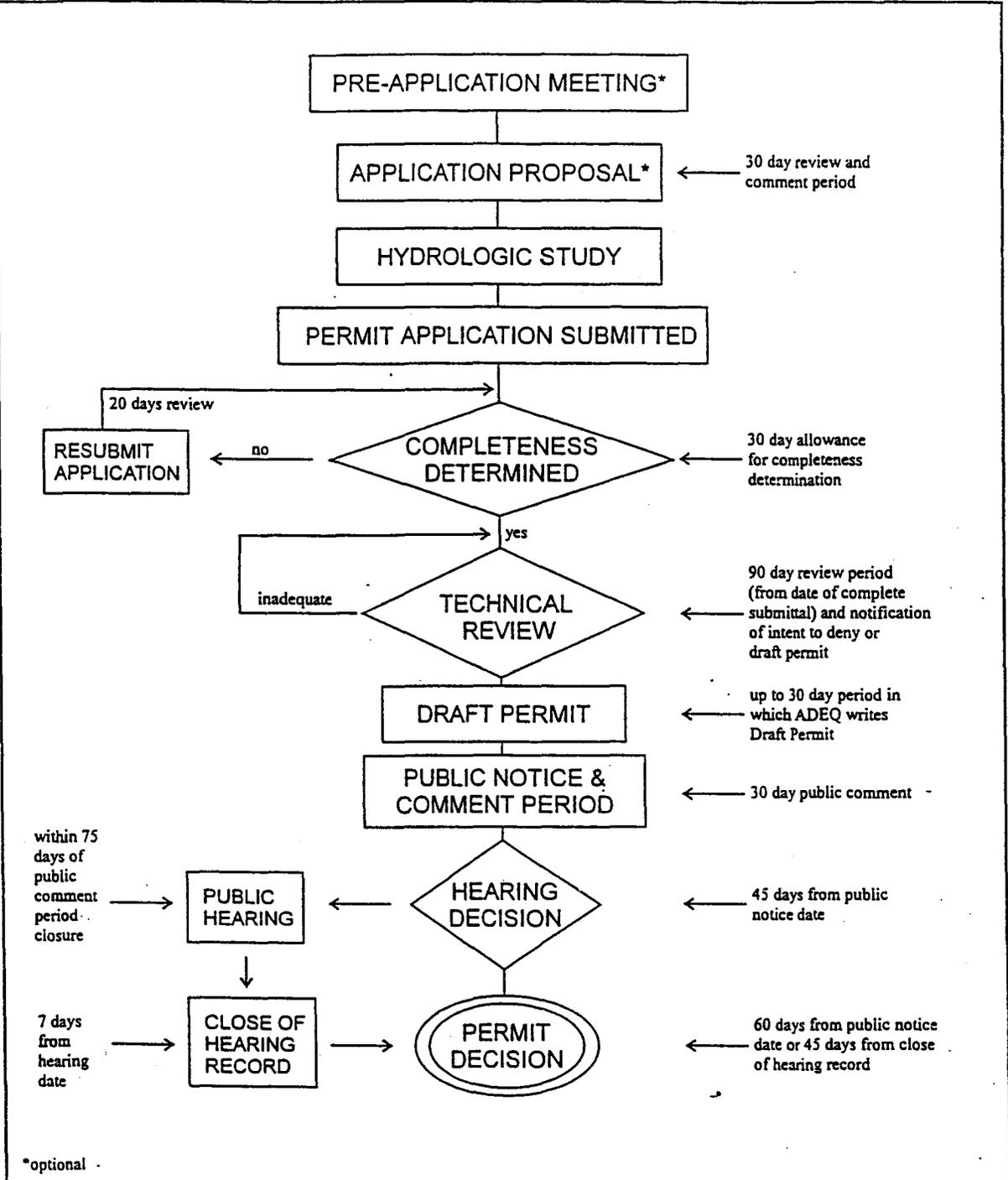
PERMITTING

Approval to Construct

An Approval-to-Construct permit is required by the Pima County Department of Environmental Quality before construction of the treatment system begins. The application for the permit requires design drawings, design specifications, site layout, an analysis of the treatment capabilities the system, and an operation and maintenance manual.

Aquifer Protection/Reuse Permits

The Arizona Department of Environmental Quality (ADEQ) requires an Aquifer Protection Permit (APP) and a reuse permit. Figure 4 shows the application process for the APP/Reuse permit.



Source: ADEQ, Aquifer Protection Permits Application Guidance Manual

NEXT HEALTH WETLAND
 FIGURE 4. APP/REUSE PERMIT PROCESS



343 S. Scott Avenue
 Tucson, Arizona 85701
 Phone (520) 325-9194
 FAX (520) 325-2033

JOB NUMBER	28-51407	DATE	3/13/96
FILE NAME	fig4_app.cdr	REV. DATE	

COST

The cost estimates in Table 4 include the wetland treatment cells, inlet and outlet structures, and disinfection. Permitting costs are divided between the Approval to Construct and the APP/Reuse permit.

It is assumed that the cost of the storage lakes and the irrigation system is included in the cost of the golf course construction.

Appendix I: Plant Palette

Botanical Name	Common Name
Acacia Redolens	No common name
Agapanthus Africanus	Lily-of-the-Nile
Agave Americana "Margnata"	Variegated Century Plant
Agave Vilmoriniana	Octopus Agave
Ambrosai Del Todia	Bur Sage
Arbutus Unedo "Multi"	Strawberry Tree
Baccharis "Centennial"	Coyote Brush
Bougainvillea Spectabilis	White Madonna
Butia Capitata	Pindo Palm
Caesalpinia Mexicana	Mexican Bird of Paradise
Cercidium Floridum Multi	Blue Palo Verde
Chilopsis Linearis	Desert Willow
Chitalpa Tashkentensis	Chitalpa
Cycas Revoluta	Sago Palm
Dalea Capitata "Sierra Gold"	Dalea Sierra Gold
Dasyilirion Wheeleri	Desert Spoon
Dietes Bicolor	Fortnight Lily
Dodonaea Viscosa	Hop Seed Bush
Elaeagnus Pungens	Silverberry
Euphorbia Rigida	No common name
Fatsia Japonica	Japenese Aralia
Feijoa Sellowiana "Multi"	Pineapple Guava
Hesperaloe Parviflora	Red Yucca
Iris Siberica	Water Iris
Juniperus Horizontalis "B.H."	"Bar Harbor" Juniper
Leucophyllum Frutescens	Texas Ranger
Ligustrum Lucidum "Multi"	Glossy Privet
Ligustrum Japonicum "Texanum"	Waxleaf Privet
Liriope Gigantea	Big Blue Lily Turf
Lonicera Sempervirens	Trumpet Honeysuckle
Macfadyena Ungus - Cati	Cat's Claw Vine
Muhlenberghia Regens	Deer Grass
Nandina Domestica	Heavenly Bamboo
Nepeta Cataria	Catnip
Nerium Oleander "Petite Pink"	Dward Oleander
Oenothera Berlanderieri	Mexican Primrose
Phoenix Dactylifera "Zaheed"	Date Palm

Pinus Halepensis	Aleppo Pine
Populus Fremontii	Fremont Cottonwood
Prosopis Chilensis "Standard"	Chilean Mesquite (Std)
Prosopis Chilensis Multi	Chilean Mesquite
Prunus Caroliniana (Std)	Carolina Cherry
Raphiolepis Indica "Clara"	Indian Hawthorne
Rosa Banksiae	Lady Bank's Rose
Rosmarinus Officinalis "Prostratus"	Dwarf Rosemary
Salvia Argentea 'Quick Silver'	Silver Sage
Salvia Greggii	Salvia
Trachelospermum Jasminoides	Star Jasmine
Trachycarpus Fortunei	Windmill Palm
Verbena Gooddingii	No common name
Verbena Tenera	Verbena
Verbena Pulchella "Gracilior"	Moss Verbena
Viburnum Tinus Dwarf	Laurustinus
Vitex Agnus-Castus	Chaste Tree
Zauschneria	California Fuschia

Appendix J: Arizona Department of Water Resources Letter

DEPARTMENT OF WATER RESOURCES

99 E. Virginia Avenue, Phoenix, Arizona 85004



December 22, 1986

BRUCE BABBITT, Governor
KATHLEEN FERRIS, Director

Mr. Larry Onyskow
Project Manager
Cella Barr Associates
5062 North 19th Avenue
Phoenix, Arizona 85015

RE: Lago del Oro Water Company/Saddlebrooke Estates, Pinal County

Dear Mr. Onyskow:

We have completed our review of your recent Lago Del Oro water supply report. The submitted information demonstrates that a water supply is available for the proposed 4155 lots in the Saddlebrooke Estates Development located in Sections 13, 23-27, T10S, R14E within the Pinal County franchise of the Lago del Oro Water Company.

This report will remain on file with the Department and may be referenced by future developers to be served by Lago del Oro Water Company within the boundaries of the area of review. The report satisfies the requirements of A.R.S. 45-577(B). Developers of new subdivisions to be served by the water company need submit the information specified in A.R.S. 45-577(A) to apply for a certificate of assured water supply, until the 4155 lot limit (or demand equivalent thereto) is reached. Such applications can be processed in a timely fashion, depending on the Department's work load.

The management goal for the Tucson Active Management Area (AMA) is safe yield by the year 2025. In order to meet this goal, it may be necessary to modify the current criteria for determining an assured water supply as part of the management plan for the Tucson AMA. If the Department finds that an assured water supply is not available to the water company, either because the criteria for determining an assured water supply are modified or because the assumptions used in determining an assured water supply under the current criteria prove incorrect, the Department will modify the above-mentioned limitation accordingly.

If you have any questions regarding our review of the report, please do not hesitate to contact us.

Sincerely,

A handwritten signature in cursive script that reads "Steven Szyprowski".

Steven Szyprowski
Water Supply Section

mb

Think Conservation!

Office of Director 255-1554

Administration 255-1550, Water Resources and Flood Control Planning 255-1566, Dam Safety 255-1541,
Flood Warning Office 255-1548, Water Rights Administration 255-1581, Hydrology 255-1586.