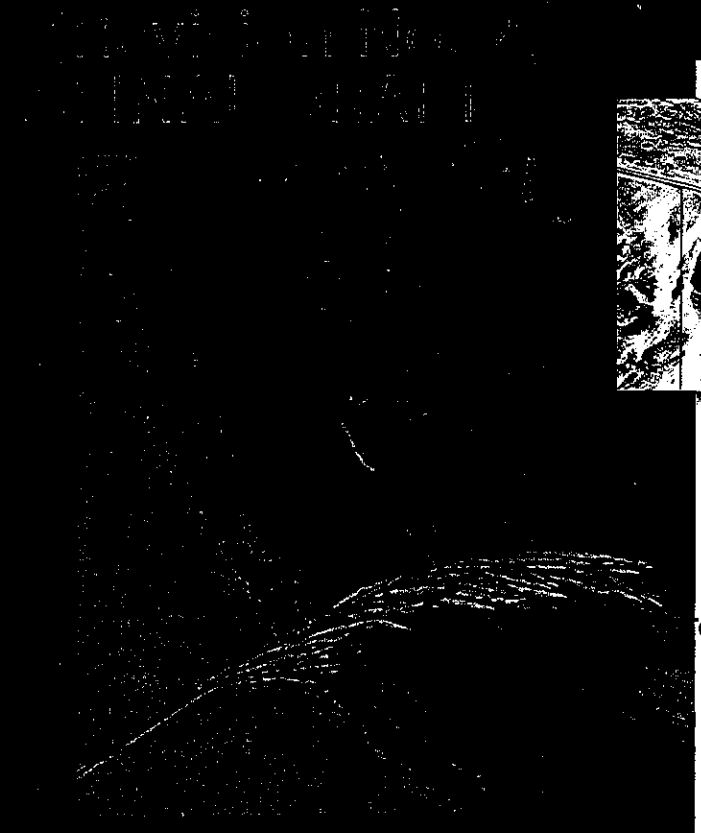

Santa Fe County

Preliminary Engineering Report

Wastewater Facilities for
Communities of Sombrillo & Arroyo Seco
Santa Fe County, New Mexico

February 2009

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- NMED CPB
  - Chris Vick, P.E.

Preliminary Engineering Report for Wastewater Facilities

- Standard format as per USDA Rural Utilities Services (RUS) Bulletin 1780-3
- Scope of Services by Santa Fe County
- SMA responded to County RFP on February 14, 2008
- SMA conducted site inspections and study in Summer of 2008

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Preliminary Engineering Report Outline

- Project Planning Area
- Existing Facilities
- Need for Project
- Alternatives Considered
- Selection of an Alternative
- Proposed Project
- Conclusions and Recommendations

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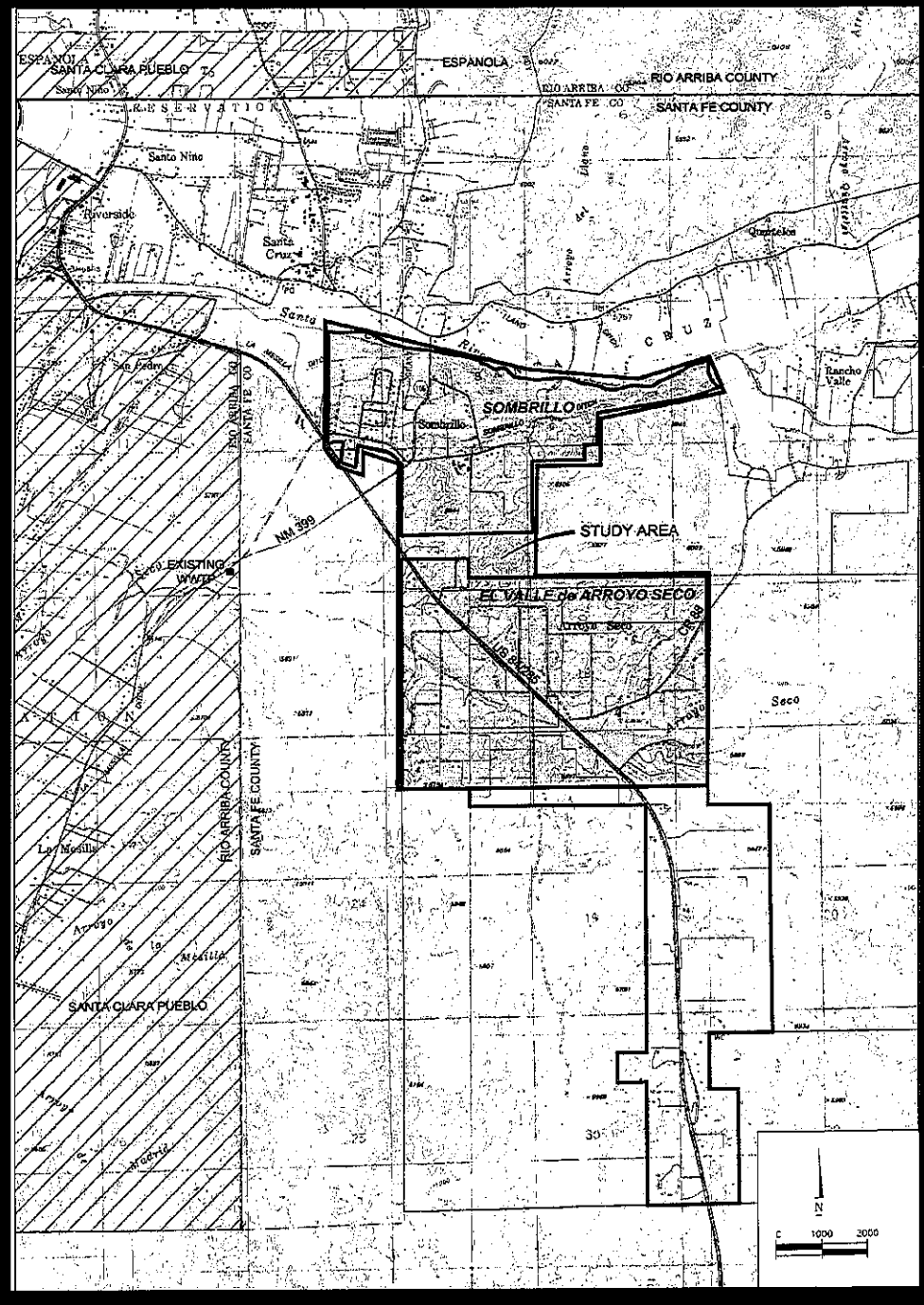
Project Planning Area



Project Planning Area

- Environmental Resources Present
  - Significant areas of high quality farmland
  - Wetlands in vicinity of Santa Cruz River
  - Rangeland surrounding area managed by BLM
  - Floodplains in area of Santa Cruz River and Arroyo Seco

Project Planning Area

- Environmental Resources Present (cont)
  - No historical registered sites located in project area
  - Endangered species present in Santa Fe County, but should not be affected by proposed project
  - Population growth estimated from 2,960 in 2008 to 5,024 in 2028.

Existing Facilities

- No community wastewater facilities, septic tanks are utilized
- Estimated wastewater flows
  (residential and commercial)
  - 2008 – 101,909 gpd
  - 2028 – 172,953 gpd

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Need for Project

- Depth to groundwater in study area ranges from 6 ft. to 100 ft. below grade
- High potential for nitrate from septic tank leachfields to impact groundwater
  (*drinking water standard for nitrate is 10 ppm*)
- Projected growth in next 20 years could result more than 800 additional septic tanks in the area
- Current NMED regulations require a minimum of 0.75 acre plus for a septic tank

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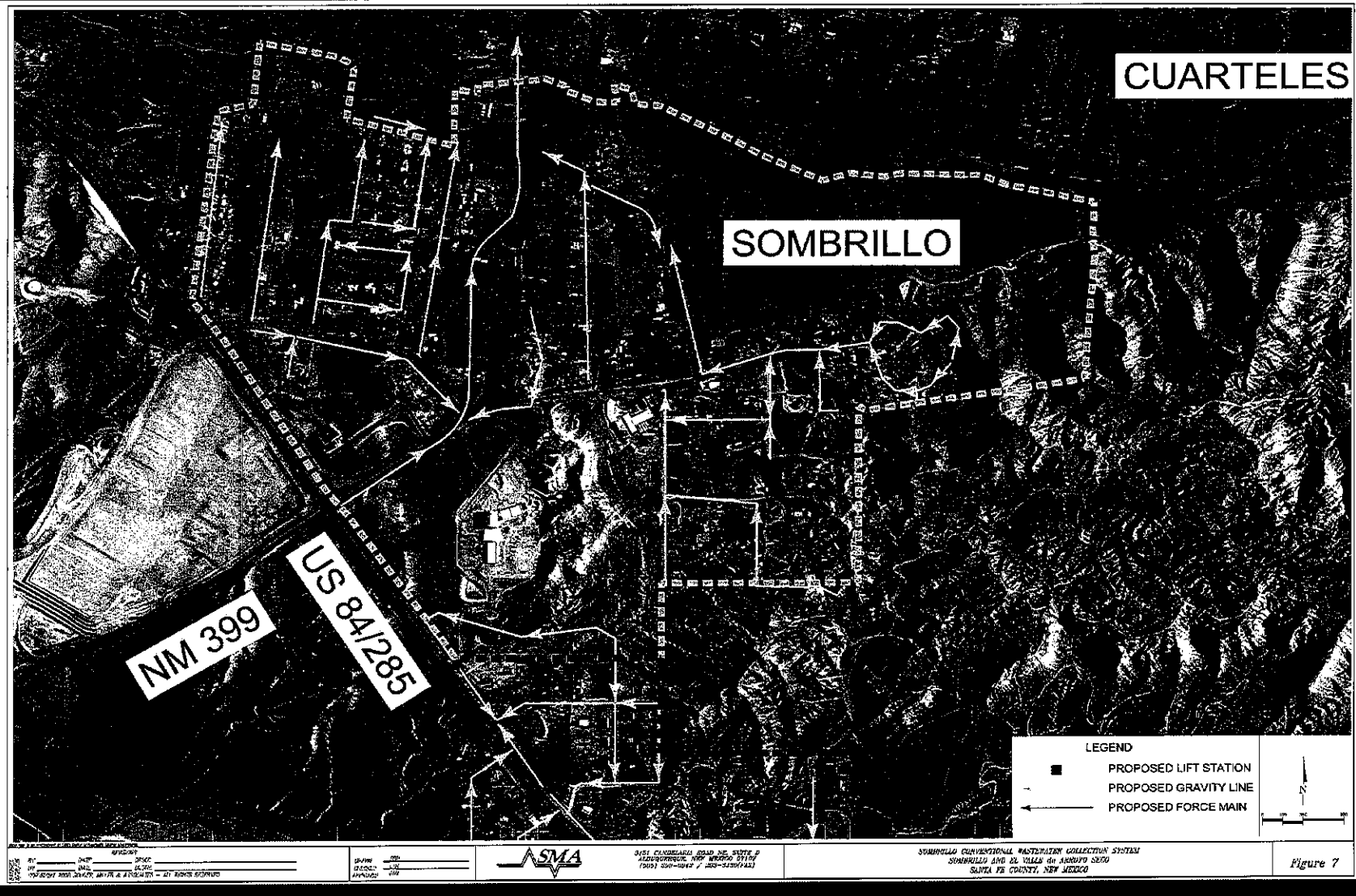
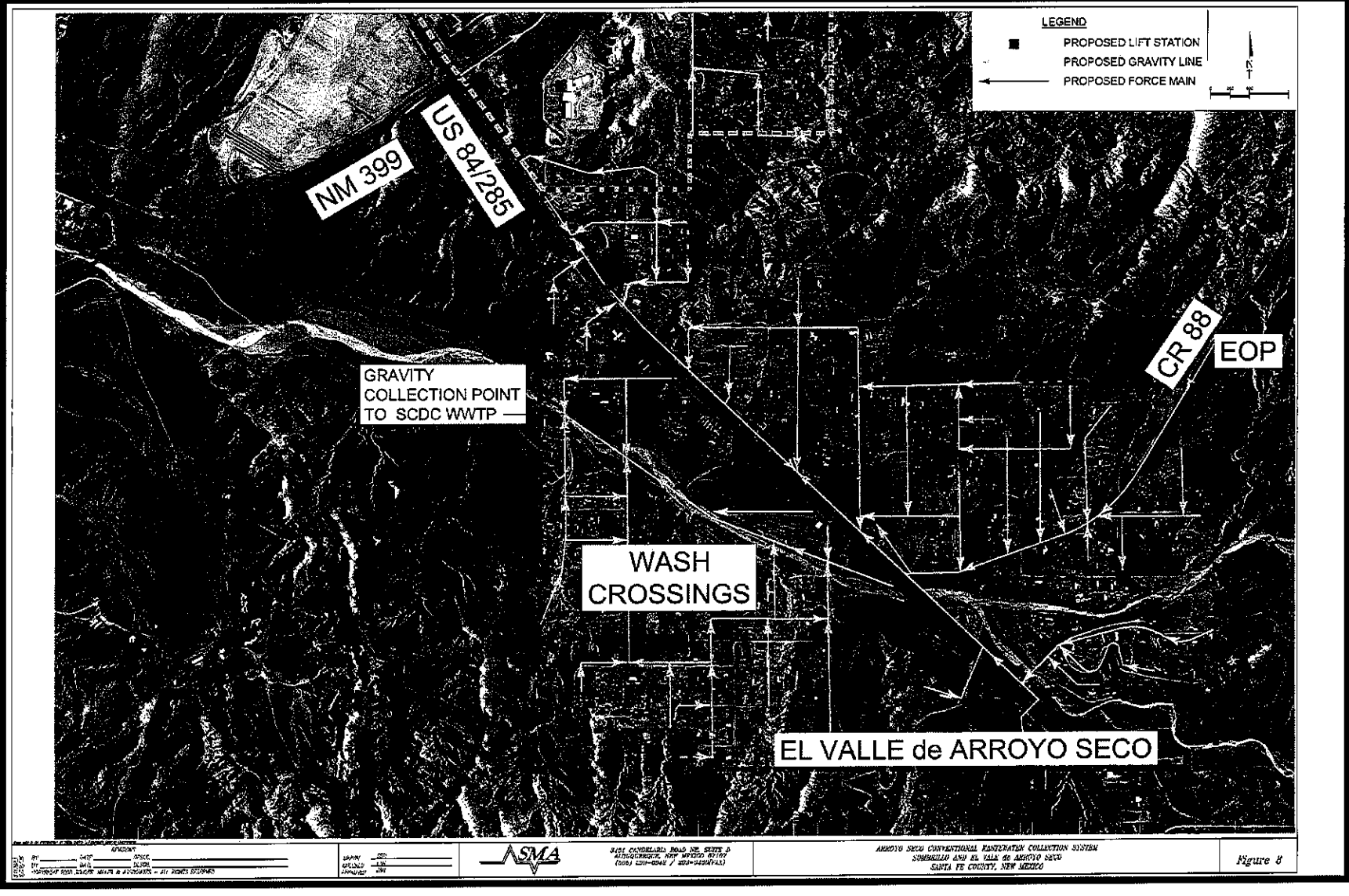
Wastewater Alternatives Considered

- Collection Systems
  - No action
  - Conventional gravity/force main system
  - Septic tank effluent pressure (STEP) and septic tank effluent gravity (STEG) system
  - Vacuum system

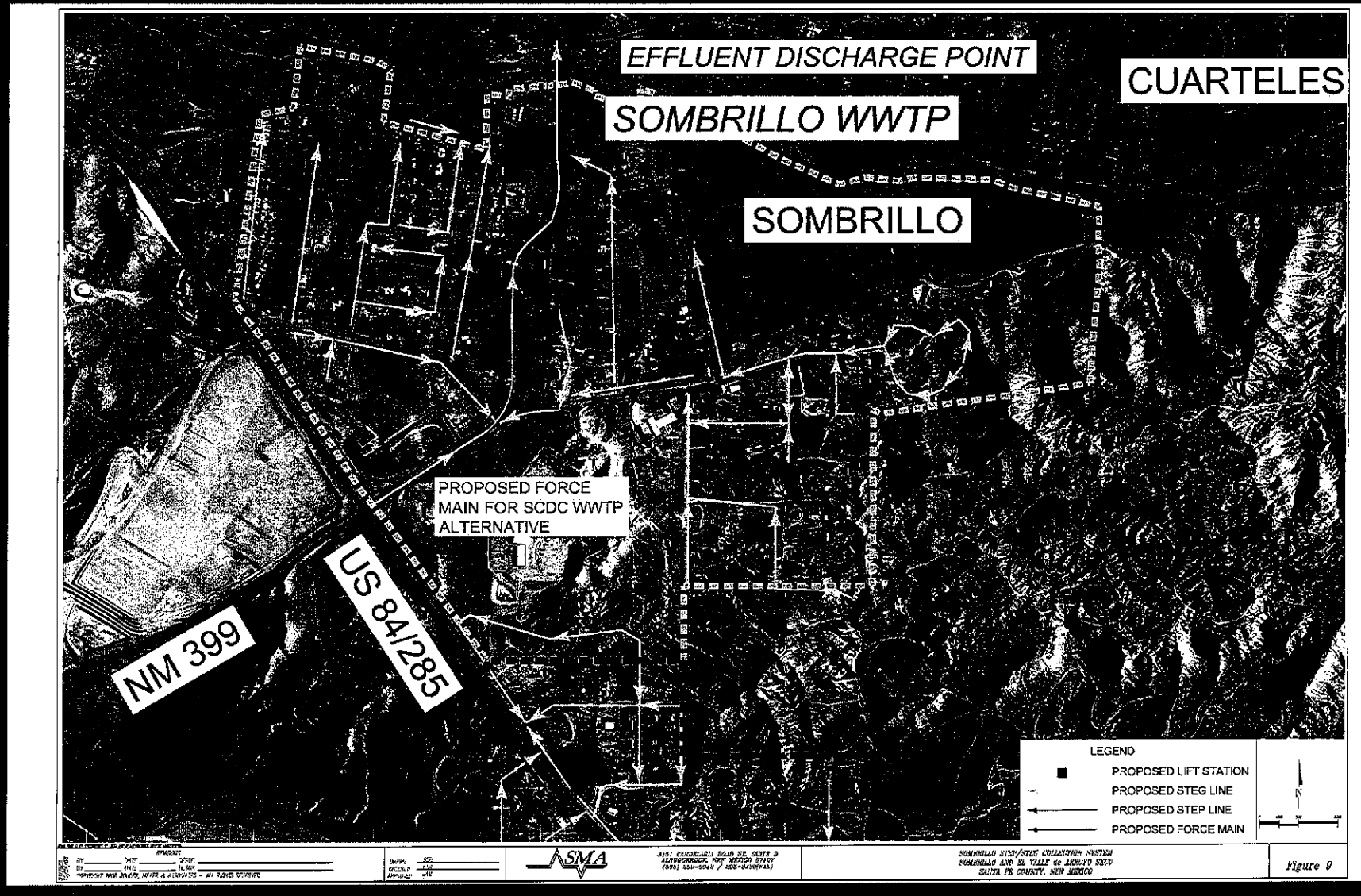
Conventional Gravity/Force Main Collection System



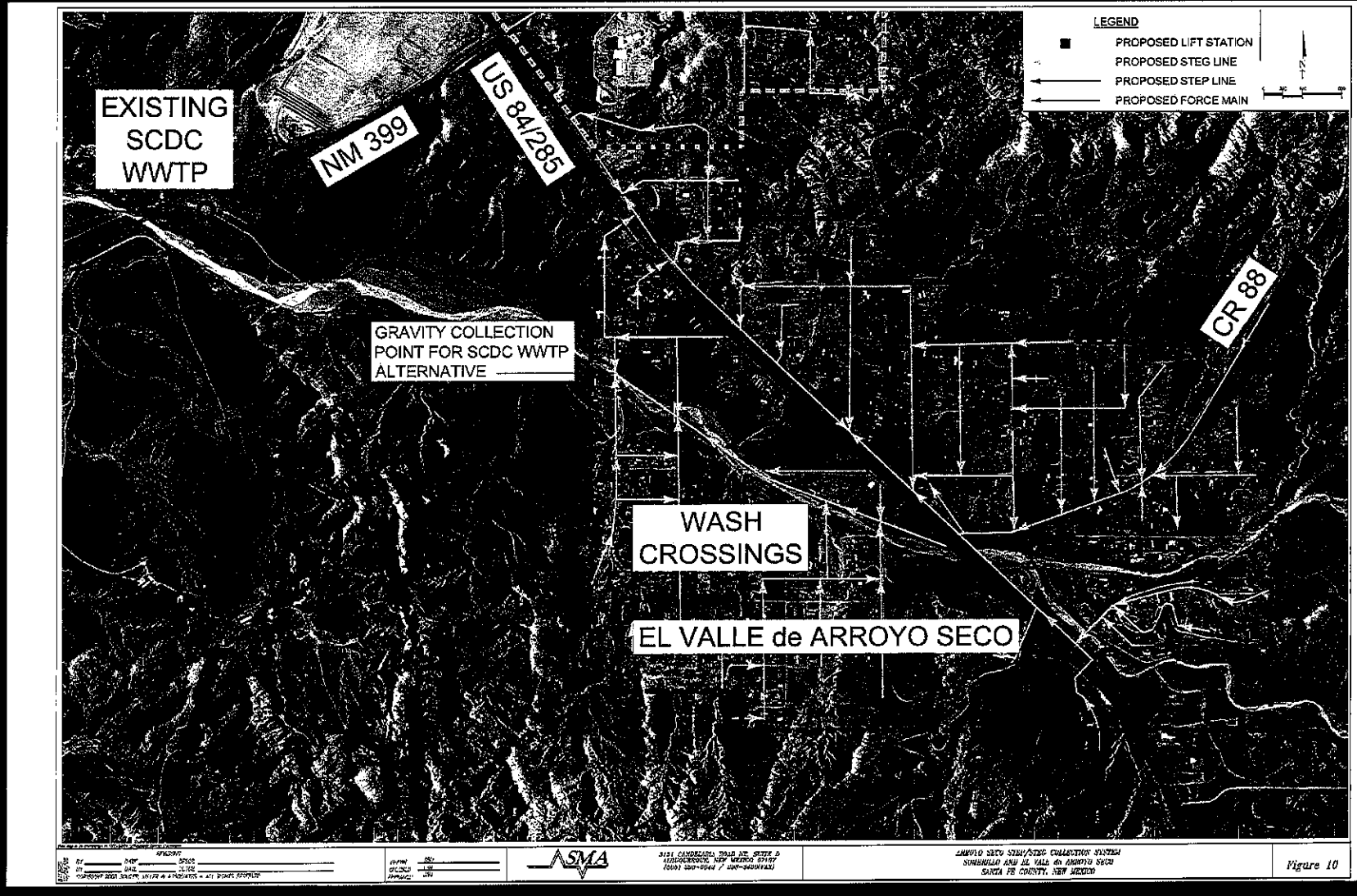
Conventional Gravity/Force Main Collection System



STEP/STEG Collection System



STEP/STEG Collection System



Vacuum Collection System

- Best utilized in low lying areas with existing conditions, such as high groundwater, bedrock, sensitive ecosystems, that limit other technologies
- High capital & operating cost system
- Not good technology for project area and not considered for further study

Wastewater Treatment Alternatives

- No Action – Septic Tanks
- Advanced Treatment Units (ATU)
- Connection to existing wastewater treatment plants
- Centralized wastewater treatment facility
- Individual community wastewater treatment facility

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Advanced Treatment Units

- Upgrade or replacement of septic tanks and individual properties
- 20 vendors approved by NMED
- Requires periodic maintenance
- Electrical cost
- Provides effluent quality similar to municipal WWTP – nitrate < 20 ppm

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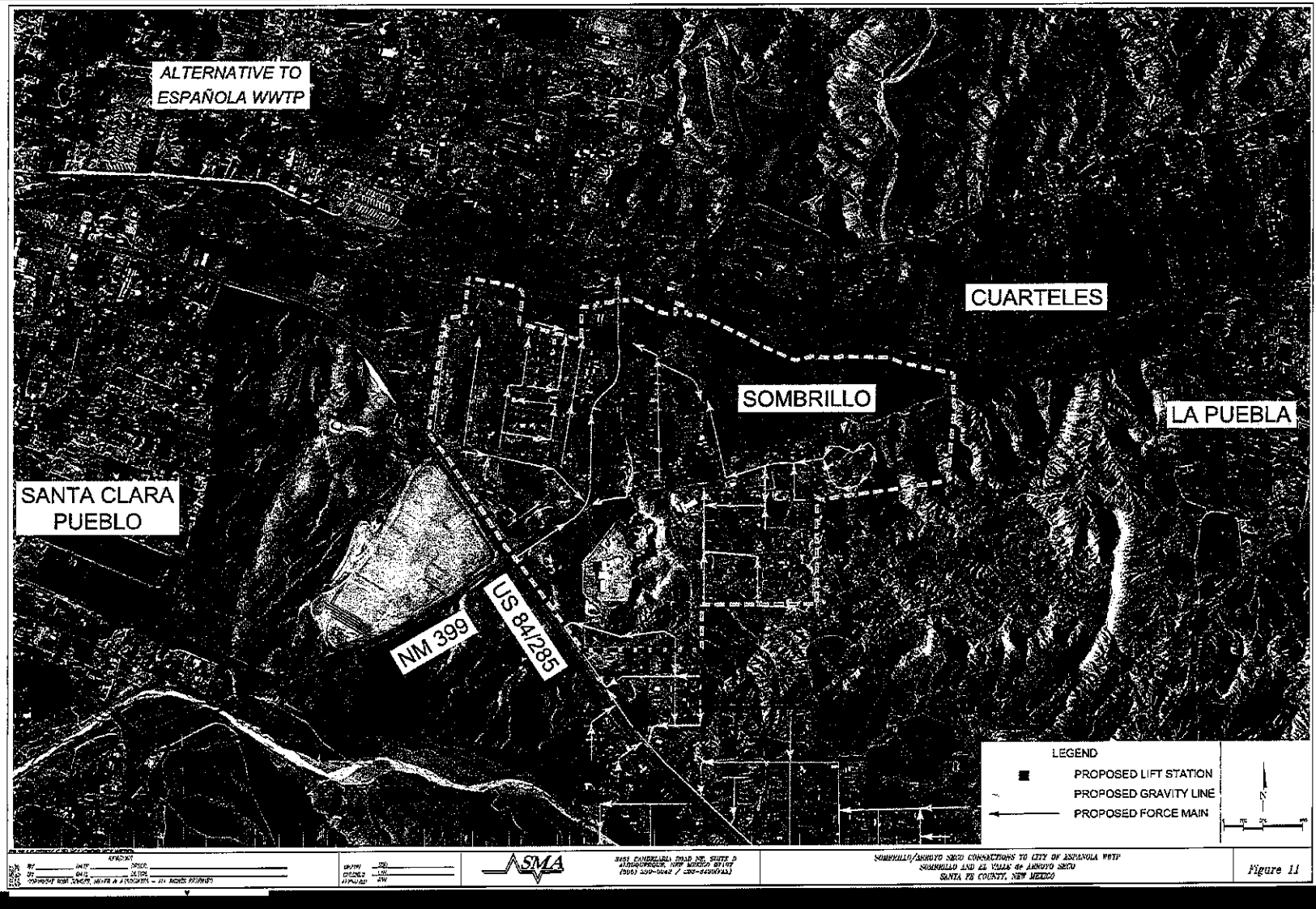
Connection to Existing WWTP's

- Connection to City of Española Collection System
  - Adding community flow can be accommodated
  - Easement with Pueblo of Santa Clara required for closest connection
  - Possible routing across Santa Cruz River and down State Highway

Connection to Existing WWTP's



Connection to Existing WWTP's

- Connection to Santa Clara Development Corporation's WWTP
  - Not in operation, can accommodate flows for a number of years (80,000 gal/capacity)
  - Expandable to accommodate future flows
  - Routing across US Highway 84

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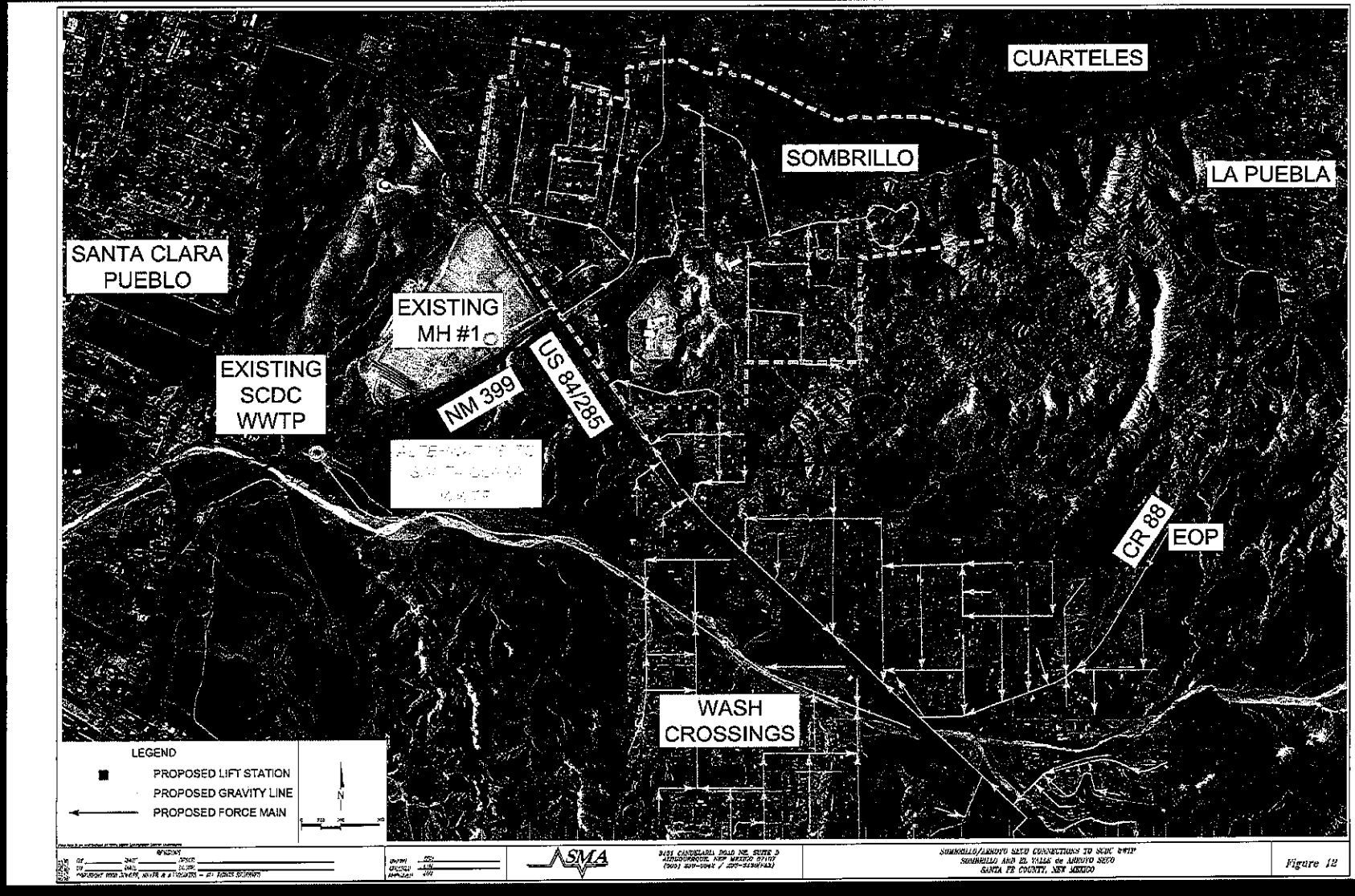
Connection to Existing WWTP's



Centralized or Individual WWTP's

- Sequencing Batch Reactor – (SBR)
- Integrated Fixed Film Inactivated Sludge (IFAS)
- Membrane Bioreactor (MBR)
- All capable of producing Class IA or Class IB reclaimed wastewater for reuse

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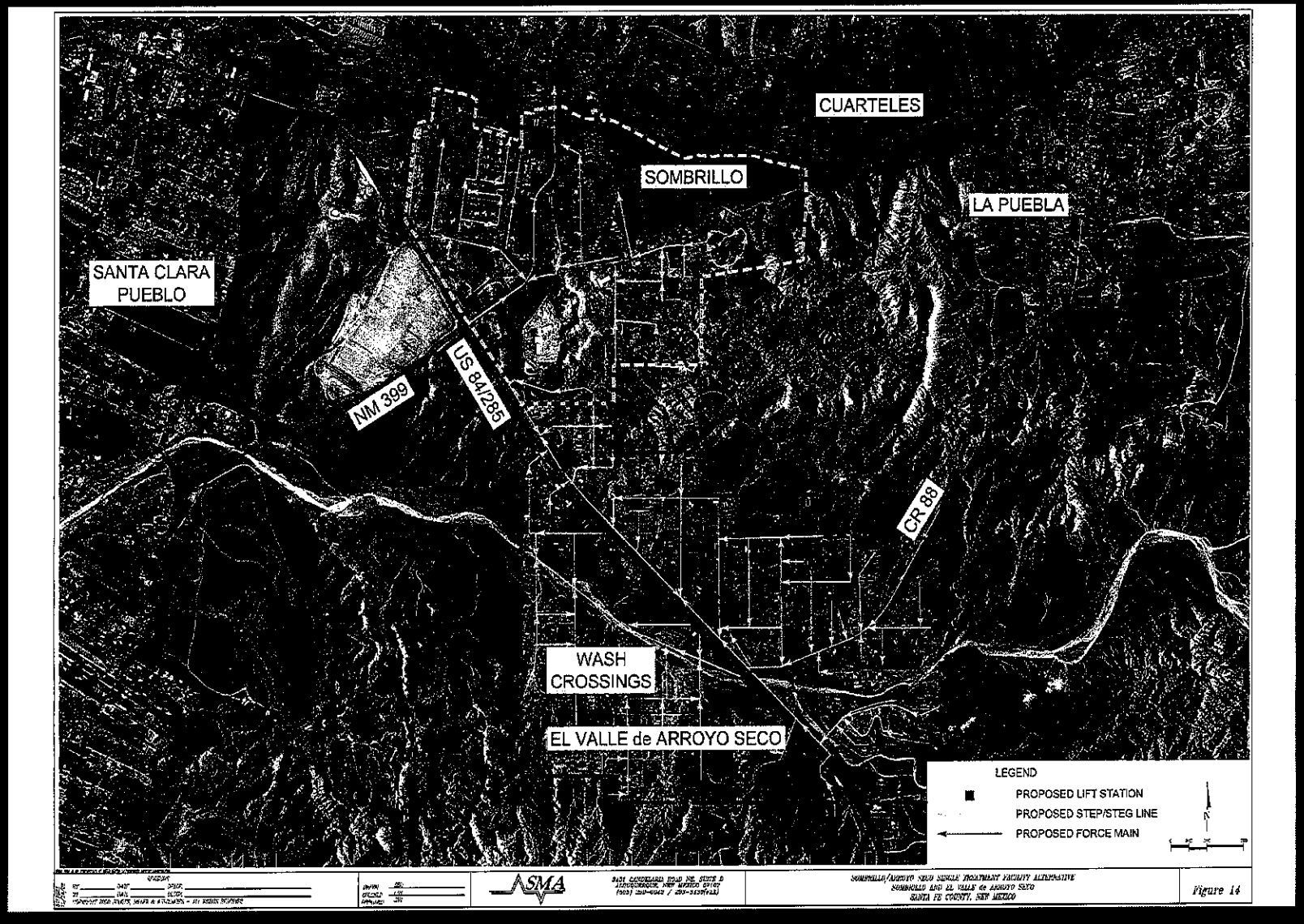
Centralized or Individual WWTP's



Wastewater Treatment Type Selection

Parameter	Score			
	SBR	Aerotor	MBR	ATU
Construction Cost	1	3	1	4
Operational Cost	1	3	2	4
Biosolids Generation	3	3	4	2
Operational Complexity	1	2	3	4
Effluent Quality	4	3	4	3
Odors	4	4	4	4
Land Required	1	3	2	4
Total	15	21	20	25

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WWTP Effluent Disposal Alternatives

- Surface disposal to Santa Cruz River or Arroyo Seco
- Surface disposal by irrigation
- Subsurface disposal by aquifer injection
- Subsurface disposal by infiltration

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WWTP Biosolids Processing and Disposal

- Biosolids (sludge) produced by WWTP's must be permitted, processed and disposed by NMED permit in accordance with EPA regulations
- Biosolids may be landfilled (closest permitted landfill is Rio Rancho) or reused
- Biosolids may also be transported and processed at large scale WWTP such as Española

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Selection of an Alternative

- Collection System

Alternatives	Construction Cost	Non-Construction Cost	Total Cost
Conventional Gravity/Force Main Sewer	$9,376,828	$2,520,098	$11,896,926
STEP/STEG System	$7,460,978	$1,895,824	$ 9,356,802

Criteria	Conventional Gravity/Force Main	Low pressure STEP/STEG
Ease of design	5	3
Capital cost	3	5
Construction depth	3	5
High groundwater impact	3	5
Infiltration potential	3	5
Traffic control	3	3
Community disruption	3	3
Easement/Access	3	3
Expandability	5	3
O&M	4	3
Capital cost	3	4
Total Score	**38**	**42**

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Treatment System Alternative Selection

Criteria	Connection to SCDC WWTP	Connection to Española WWTP	Single Centralized Treatment System	Individual Community Treatment Systems
Additional Collection System Cost	3	2	4	5
Ease of Design	5	5	3	3
Capital Cost	5	4	2	1
O&M Cost	5	5	2	2
Ease of Operation	5	5	2	1
Footprint	5	5	2	1
Effluent Quality (Reuse)	1	1	5	5
Biosolids Production	5	5	2	2
Operator Classification	5	5	2	2
Odor	5	5	3	3
Noise	5	5	3	3
Single Responsible Party	5	5	5	4
Required Level of Management	5	5	2	1
User rates	5	4	2	1
Total Score	**64**	**61**	**38**	**34**

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Treatment System Alternative Selection

Alternatives	Construction Cost	Non-Construction Cost	Total Cost
Advanced Treatment Units (High cost)	$11,440,000	$ 2,288,000	$ 13,728,000
Connect to the City of Española WWTP	$ 756,299	$ 191,533	$ 947,832
Connect to the SCDC WWTP	$ 589,834	$ 149,376	$ 739,210
Sequencing Batch Reactor	$ 4,349,316	$ 1,133,120	$ 5,482,436
IFAS (STM - Aerotor™)	$ 737,591	$ 218,451	$ 956,042
Membrane Biological Reactor	$ 4,283,091	$ 861,618	$ 5,144,709
Invidual Wastewater Treatment Facilties	$ 1,253,588	$ 323,802	$ 1,577,390
Packaged SBR Expansion of SCDC WWTP	$ 1,587,860	$ 158,786	$ 1,746,645

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Effluent Disposal Alternative Selection

Criteria	Surface River/Arroyo	Subsurface Aquifer Injection	Surface Irrigation	Subsurface Irrigation
Land Requirements	5	2	1	1
Formal Agreements	3	3	1	1
Reuse of Effluent	1	3	5	5
Year-Round Acceptance	5	4	1	1
Capital Cost	5	1	2	2
Operational Cost	2	2	5	3
Total Score	**21**	**20**	**18**	**16**

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Effluent Disposal Alternative Selection

Alternatives	Construction Cost	Non-Construction Cost	Total Cost
Surface Effluent Disposal (Individual WWTPs)	$175,365	$44,411	$219,776
Surface Effluent Disposal (Centralized WWTP)	$93,904	$23,781	$117,685
Subsurface Effluent Aquifer Injection	$1,342,225	$339,918	$1,682,143
Community Surface Effluent Irrigation	$342,039	$86,621	$428,661
Subsurface Effluent Disposal	$490,039	$124,102	$614,141
Reuse Piping System to Sports Fields	$47,497	$12,029	$59,526
Reuse Piping System to Commercial Site	$160,181	$40,566	$200,746
Reuse Piping System to Elementary School	$267,432	$67,727	$335,159
Reuse Piping System to Golf Course Pond	$231,217	$58,556	$289,773
36 Ac. Reuse Surface Irrigation System	$477,689	$95,538	$573,226

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Proposed Project (Recommended Alternatives)

- A proposed phase breakdown for this project is:
  - Phase 1: Sombrillo STEP/STEG wastewater collection system design - $777,819
  - Phase 2: Sombrillo wastewater collection system construction - $3,058,850
  - Phase 3: Sombrillo wastewater interconnection to SCDC WWTP - $589,834
  - Phase 4: SCDC WWTP regional reuse piping system to Black Mesa Golf Course pond design and construction - $289,772
  - Phase 5: Arroyo Seco wastewater collection system design - $1,337,929
  - Phase 6: Arroyo Seco wastewater collection system construction - $4,680,703
  - Phase 7: SCDC WWTP packaged SBR expansion design and construction - $1,746,645

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Questions?

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