

MINUTE ITEM

This Calendar Item No. C12
was approved as Minute Item
No. 12 by the State Lands
Commission by a vote of 3
to 0 at its 8/26/82
meeting.

CALENDAR ITEM

C12

8/26/82
W 23076
Lane
Plummer
PRC 6201

AUTHORIZATION FOR ISSUANCE OF A
GENERAL PERMIT - PUBLIC AGENCY USE

APPLICANT: Las Gallinas Valley Sanitary District
300 Smith Ranch Road
San Rafael, California 94903

AREA, TYPE LAND AND LOCATION:
A 383.79-acre parcel of diked tidelands
at San Pablo Bay near Miller Creek, Marin
County.

LAND USE: Construction and maintenance of a waste-
water disposal project combined with agriculture,
wildlife enhancement, and open space preservation
uses.

TERMS OF PROPOSED PERMIT:
Initial period: 49 years.

CONSIDERATION: The public use and benefit, with the State
reserving the right at any time to set
a monetary rental if the Commission finds
such action to be in the State's best interest.

BASIS FOR CONSIDERATION:
Pursuant to 2 Cal. Adm. Code 2003.

A 9
S 2

CALENDAR PAGE - 1989-
MINUTE PAGE 75A

PREREQUISITE TERMS, FEES AND EXPENSES:

Applicant is in the process of acquiring record title to the subject land.

STATUTORY AND OTHER REFERENCES:

- A. P.R.C.: Div. 6, Parts 1 & 2; Div. 13.
- B. Cal. Adm. Code: Title 2, Div. 3; Title 14, Div. 6.

OTHER PERTINENT INFORMATION:

1. Record title to the property underlying the wastewater treatment disposal project site is now owned by St. Vincent's Catholic Church and is being acquired by Las Gallinas Valley Sanitary District. To complete the sale, grant funds which are under strict time constraints must be obtained.

Because State funding agencies and the EPA need assurance that the project site is clear of any encumbrance (public trust) that would adversely affect the value or usefulness of the land for the proposed purpose the district requests the State Lands Commission's approval to secure a lease for whatever the State's title or interests are.

2. Based on a staff investigation, the premises to be leased appear to have contained tidelands in their natural state and staff asserts the existence of some right, title or interest of the State, held by the State in its sovereign capacity. The exact nature and extent of the public interest, if any, has not been determined by agreement or court decree. For this reason, staff believes that the processing expense fee should be waived.
3. This permit would be issued by the State and accepted by the Permittee without prejudice to any claims of right, title or interest by either party. Should any State right, title

CALENDAR ITEM NO. C 1 2 (CONTD)

or interest be confirmed by decree or agreement, this Permit would survive that determination.

4. The State's interest in the site cannot be determined because the exact nature and extent of the State's ownership, if any, has not been determined.
5. A final EIR/EIS was prepared and certified by Novato Sanitary District and the Environmental Protection Agency, pursuant to CEQA and the State EIR Guidelines. The Novato Sanitary District found that the project will not have a significant effect on the environment.
6. The project is situated on lands identified as possessing significant environmental values pursuant to P.R.C. 6370.1, and is classified in use category "C" which authorizes Multiple Use. The project as proposed will not have a significant effect on identified environmental values.

AB 884: N/A.

APPROVALS OBTAINED:

The United States Army Corps of Engineers, Regional Water Quality Control Board, National Marine Fisheries Service and the Department of Fish and Game.

EXHIBITS:

- A. Land Description.
- B. Location Map.
- C. EIR/EIS.

IT IS RECOMMENDED THAT THE COMMISSION:

1. DETERMINE THAT AN EIR HAS BEEN PREPARED AND CERTIFIED FOR THIS PROJECT BY THE NOVATO SANITARY DISTRICT (LEAD AGENCY) AND THE U. S. ENVIRONMENTAL PROTECTION AGENCY; CERTIFY THAT THE INFORMATION CONTAINED IN THE EIR HAS BEEN REVIEWED AND CONSIDERED BY THE COMMISSION; DETERMINE THAT THE PROJECT WILL NOT HAVE A SIGNIFICANT EFFECT ON THE ENVIRONMENT.

CALENDAR ITEM NO. 12 (CONTD)

2. AUTHORIZE A 49-YEAR GENERAL PERMIT - PUBLIC AGENCY USE, TO LAS GALLINAS VALLEY SANITARY DISTRICT, SUBJECT TO DISTRICT ACQUISITION OF THE LAND DESCRIBED ON EXHIBIT "A"; IN CONSIDERATION OF THE PUBLIC USE AND BENEFIT, WITH THE STATE RESERVING THE RIGHT AT ANY TIME TO SET A MONETARY RENTAL IF THE COMMISSION FINDS SUCH ACTION TO BE IN THE STATE'S BEST INTEREST; FOR CONSTRUCTION AND MAINTENANCE OF A WASTEWATER DISPOSAL PROJECT COMBINED WITH AGRICULTURE, WILDLIFE ENHANCEMENT AND OPEN SPACE PRESERVATION USES.

EXHIBIT "A"

LAND DESCRIPTION

All State owned lands under the jurisdiction of the State Lands Commission within the following described property:

BEGINNING at the Northeast corner of that certain parcel of land described in the deed from Saint Vincent's Roman Catholic Orphan Asylum of San Francisco For Boys to the Las Gallinas Valley Sanitary District recorded December 20, 1965 in Book 2009 at Page 464, Marin County Records, said point being also on the line designated "Limit of Jurisdiction of the Tide Land Commissions" as shown on that certain map entitled "Map No. 3, Salt Marsh and Tide Lands" surveyed by G. F. Allardt in 1870, running thence from said POINT OF BEGINNING along said Limit of Jurisdiction line the following courses and distances North 62° 22' 08" East 243.27 feet, North 63° 43' 08" East 869.88 feet, North 65° 27' 08" East 732.60 feet, North 67° 03' 08" East 723.36 feet, North 68° 36' 08" East 714.78 feet, North 69° 26' 03" East 74.64 feet, North 70° 12' 39" East 632.83 feet, North 71° 41' 26" East 671.22 feet; thence leaving said Limit of Jurisdiction line and running North 15° 27' 17" West 162.12 feet, North 47° 24' 01" East 118.19 feet, North 31° 19' 43" East 134.63 feet, North 22° 22' 48" East 110.31 feet, North 3° 04' 49" West 223.32 feet, North 9° 52' 36" West 227.37 feet, North 44° 05' 26" West 44.55 feet, North 76° 10' 17" West 401.64 feet, North 15° 31' 27" West 112.09 feet, North 56° 20' 01" East 273.06 feet to a point hereinafter referred to as Point "A", running thence North 17° 42' 39" East 294.29 feet, North 26° 54' 40" East 2,428.24 feet, North 1° 44' 58" East 2,593.49 feet, more or less, to the boundary line between the lands of St. Vicent's School For Boys and the United States Government Hamilton Air Force Base, said point hereinafter referred to as Point "B", running thence westerly along said boundary line North 88° 41' 18" West, 1,900.46 feet, thence leaving said boundary line and running South 2° 04' 31" East 3,067.31 feet, South 89° 50' 22" West 1,161.52 feet, South 0° 09' 38" East 1,924.24 feet, North 82° 46' 32" West 357.84 feet, South 2° 28' 18" West 920.86 feet, South 87° 21' 32" West 850.83 feet, South 34° 01' 26" West 703.78 feet, South 67° 03' 08" West 1,279.46 feet, more or less to the West boundary of Survey No. 130 of Swamp and Overflow Lands, Marin County, California, running thence southerly along said westerly boundary, South 1° 10' 38" West 907.26 feet, more or less, to the most northerly corner of said lands of the Las Gallinas Valley Sanitary District (2009 OR 464); running thence along the northeasterly boundary of said lands of the Las Gallinas Valley Sanitary District South 51° 14' 08" East 430.15 feet to the POINT OF BEGINNING.

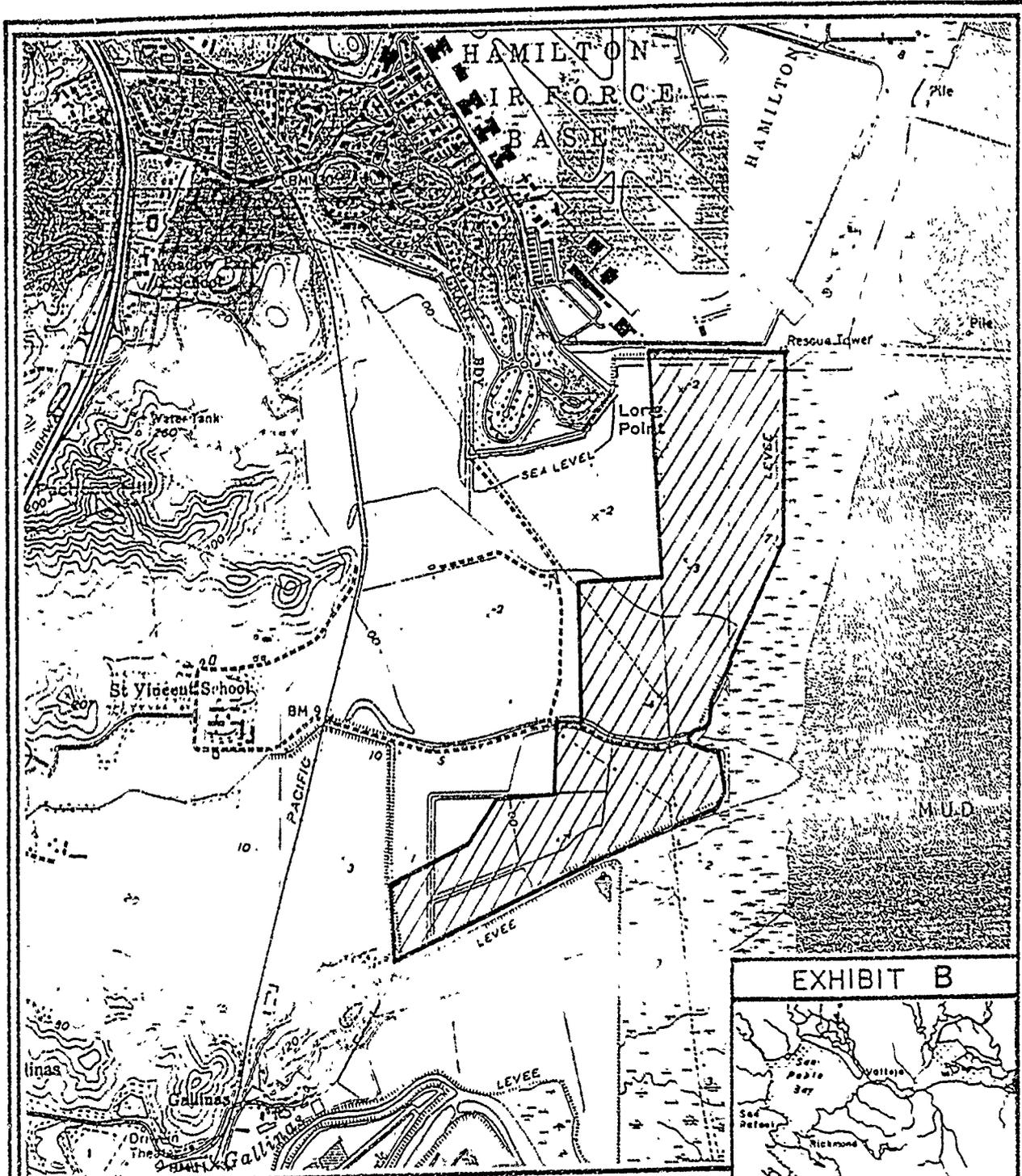
Containing 383.79 acres, more or less.

Note: All bearings are based on the California Coordinate System Zone 3 and all distances are ground level distances.

END OF DESCRIPTION

REVIEWED AUGUST 2, 1982 BY BOUNDARY AND TITLE UNIT, LEROY

| | |
|------------------|------|
| DEED, SUPERVISOR | 79 |
| CALENDAR PAGE | |
| MINUTE PAGE | 1993 |



STATE LANDS COMMISSION
 PLAT OF LEASE PARCEL

W.O. 23076

Date: 8-2-82 A:9 S2

Title Study Las Gallinas Valley Sanitary District

23 N56 F141 142

CALENDAR PAGE

MINUTE PAGE

80
 1984

The following is a summary of a final EIR/EIS (Volume 3: North Marin) for the Eastern Marin - Southern Sonoma Wastewater Management Plan. The document was completed by the Novato Sanitary District (Lead Agency) and the U.S. Environmental Protection Agency in June, 1979.

Las Gallinas Valley Sanitary District

There are two treatment alternatives available to the Las Gallinas Valley Sanitary District. The first alternative involves modifying the existing treatment plant at Las Gallinas. This treatment plant has sufficient dry-weather flow capacity to meet the needs until 1988. The capacity to treat wet-weather flow will need to be expanded, however. Another expansion in 1988 would be required to meet the 1998 needs.

Nitrification would be achieved by a fixed-film reactor that would be the major process addition in the 1978 project. Odor control would be included because of the plant's proximity to the new McInnis Park. The primary clarifier, primary biofilter, sludge thickener and degritter, and dewatering facilities would be covered and the exhaust air scrubbed to remove odors. Visual screening in the form of solid fencing or earth mounding would be done. Additional property would also be acquired to act as a buffer.

Maintaining a treatment plant at Las Gallinas would enable treated effluent to be provided to McInnis Park for landscape irrigation (a contract for this has already been signed), agricultural irrigation, and a possible marsh enhancement project.

The other alternative, NM-4, would involve abandoning the Las Gallinas treatment plant and expanding the subregional plant near San Pablo Bay by approximately 50 percent to allow inclusion of the Las Gallinas flows. Naturally this alternative is only available if the Novato Sanitary District also decides that this is the best alternative for the Novato area. The treatment plant would still use the activated sludge process preceded by a fixed-film reactor to achieve nitrification. As before, odor control or visual screening would not be necessary. Disposal would be to San Pablo Bay via one of the alternative types of outfalls.

Raw sewage from the Las Gallinas plant would be transported 16,000 feet to the subregional treatment plant site. The pipeline route would be across reclaimed pasture land between St. Vincent School and the bay.

Table I-2 presents a summary of the treatment alternatives available to the Las Gallinas Valley Sanitary District.

TABLE I-2
SUMMARY EVALUATION OF LAS GALLINAS TREATMENT ALTERNATIVES

| Evaluation Criteria | Treatment Alternative | |
|---|--|--|
| | NM-1,2,3 Upgrade Existing Las Gallinas Plant | NM-4 Consolidate Treatment with Novato-Ignacio at San Pablo Bay Site |
| Present Worth of Project Costs (\$1,000) | 5,994 | 11,099 |
| Wildlife Disruption | Minimal | Very small; displaced wildlife should easily relocate. |
| Land Use Compatibility, Odors, and Aesthetics | Fair; development of McInnis Park will require that plant additions be carefully located; architectural design and odor control can adequately mitigate effects. | Best; no development expected near the treatment plant site. |
| Disruption of Archaeological Resources | No sites recorded. Very unlikely that artifacts would be unearthed by construction. | No sites recorded. Very unlikely that artifacts would be unearthed by construction. |
| Energy Utilization (1,000 kw-hrs annually-1998) | 1,000 | 1,182 |
| Reuse Potential | Good: existing reuse to expand to 1 mgd with development of McInnis Park. | Fair: reuse at McInnis Park would require scaling plant at Las Gallinas or pipeline back from regional plant |

NORTH MARIN DISPOSAL ALTERNATIVES

Six bay discharge alternatives were presented in the Draft EIR/EIS for disposing of effluent from the Novato Sanitary District and the Las Gallinas Sanitary District. These alternatives are listed in Table I-3. The three basic types of discharges considered could either be implemented independently by Novato and Las Gallinas or combined into one discharge through construction of a joint outfall.

TABLE I-3

NORTH MARIN DISCHARGE ALTERNATIVES EVALUATED IN EIR/EIS

| Alternative | Outfall Facilities |
|-------------|--|
| D-1 | Independent intermittent shallow water disposal. |
| D-1c | Combined intermittent shallow water disposal. |
| D-2 | Independent continuous shallow water disposal. |
| D-2c | Combined continuous shallow water disposal. |
| D-3 | Independent continuous deep water disposal. |
| D-3c | Combined continuous deep water disposal. |

The requirements for bay disposal set by the Regional Water Quality Control Board are that effluent discharged through a bay outfall must (1) achieve a minimum 10:1 initial dilution within one foot of the water surface and (2) must not result in a receiving water concentration of undissociated ammonia greater than 0.025 mg/l as N for the annual median nor greater than 0.4 mg/l as N for the maximum. Removal of ammonia in the effluent (nitrification) will be necessary unless the initial dilution is greater than 30:1.

The apparent best alternative recommended in the Wastewater Facility Plan was D-1c, the combined intermittent shallow water disposal option. This plan drew opposition after the publication of the Draft EIR/EIS. Both the U. S. Environmental Protection Agency and the Regional Water Quality Control Board wrote letters to the Novato Sanitary District opposing this plan (References 5 and 6). Environmental impacts on fishery and shellfish resources of San Pablo Bay were cited as principal reasons for

their opposition. The only way in which the present discharge locations could be maintained would be if a reclamation/reuse project were implemented that used all the wastewater effluent during the summer months. Consequently, the only year-round disposal option would be Alternatives D-3 and D-3c which involve a deep water outfall. A description of this alternative follows. Reuse alternatives are described in a subsequent section.

Continuous Deep Water Bay Outfall

To achieve 35:1 minimum initial dilution would require discharging at a depth of 20 feet near the middle of San Pablo Bay. To achieve this depth, an independent or combined Novato outfall would be 23,000 feet long, and an independent Las Gallinas outfall would be 21,000 feet long. Effluent pumping would be required, and the treatment requirements would call for secondary treatment without nitrification.

RECLAMATION FOR IRRIGATED AGRICULTURE

The Draft Facilities Plan and EIR/EIS do not contain a specified reclamation alternative for disposal of effluent. Reclamation of treated effluent for agricultural irrigation in the Novato area was investigated as an alternative to bay disposal. This alternative is developed in Chapter 2 of the Facilities Plan. It was found that there is not sufficient land for year-round reclamation using all of the effluent. Consequently, it was concluded that new or improved bay outfalls would be necessary to meet discharge requirements.

Several comments were received on the draft reports suggesting further consideration of agricultural reclamation as part of the current facilities planning. In response to these comments, a separate additional study was undertaken to assess the technical and economic feasibility of reclamation and reuse for crop irrigation in the summer with bay disposal utilized the rest of the year. The results of this study, conducted by H. Esmaili & Associates, Inc., are published in a separate report (H. Esmaili & Associates, Inc., 1979). The alternatives considered in this study are summarized in the following paragraphs and the recommended reclamation plan is presented in Chapter III.

Availability of Land

Approximately 4,300 acres of diked, tidal lands bordering San Pablo Bay were included in the study area. These lands are divided into ten separately owned parcels. Eight of the ten available sites are located in close proximity to the Novato Main and Ignacio treatment plants, as shown on Figure I-5. Site 9 is shown on Figure III-6 and site 10 is located between site 9 and the Northwestern Pacific railroad tracks. The ownership, acreage, type and present use are shown in Table I-4.

TABLE I-4
NORTH MARIN
POTENTIALLY IRRIGABLE LANDS.

| Site Number | Ownership | Area (acres) | Type ¹ |
|-------------|--------------------------------------|--------------|-------------------|
| 1 | State Lands (Hanna Ranch) | 233 | A |
| 2 | Richardson-Dickson (north) | 228 | A |
| 3 | Richardson-Dickson (south) | 248 | A |
| 4 | Leveroni | 137 | B |
| 5 | Marin Meadows | 839 | A |
| 6 | McAlister-Marín Meadows | 601 | A |
| 7 | County Flood Control (Sartori Ranch) | 694 | A |
| 8 | County Flood Control (Nunes-DeBorba) | 316 | B |
| 9 | St. Vincent School | 900 | A |
| 10 | Silviera | 80 | B |
| | To all | 4,276 | |

- ¹A: Leveled, well-drained land. Used for winter oat hay crop for past several years.
B: Generally flat but not leveled land. Relatively poor drainage. Used for grazing non-milking cows.

All sites have similar physical characteristics. They are subject to periodic flooding; however, the construction of levees and drainage facilities has permitted the cultivation of oat hay and pasture in the area. All sites are dominated by the Reyes silty clay. This soil may be characterized as a fine-textured, acidic soil with poor internal drainage. A brackish and acidic water

table is present within a few feet of the surface throughout the year. Although the Reyes soil has some agricultural limitations, it is suitable for production of most feed, forage, and grain crops.

These sites were evaluated in terms of soil characteristics, shallow water-table conditions, acreage, purchase price, and regulatory constraints which may affect their use for effluent irrigation. On the basis of these criteria, it was concluded that sites 2, 3, and 7 were most suitable for receiving the effluent produced by the Novato Sanitary District. Sites 5 and 6 could be used if needed. For Las Gallinas, only 9 is suitable for crop irrigation purposes, although site 10 could be used for storage facilities.

Development and Screening of Alternatives

Three crops--corn, pasture, and barley--were evaluated for production on the proposed reuse farms. For each crop, three project alternatives were developed for each sanitary district on the basis of minimum, medium, and maximum irrigated acreages. The alternatives were designed to allow complete curtailment of wastewater discharge for a period of not less than 90 days for Novato and not less than 150 days for Las Gallinas, as specified in the preliminary discharge requirements issued by the Regional Water Quality Control Board. Primary criteria for crop selection were (1) high per-acre water use, (2) tolerance to detrimental wastewater constituents, (3) tolerability to thrive under conditions of under- or over-irrigation and possible flooding, (4) ability to thrive under the North Marin climatic conditions, and (5) ability to grow in the Reyes soil.

The combinations of three crop types and three sizes of the irrigated area yielded nine alternatives for each sanitary district. Principal features of the nine alternatives for the Novato Sanitary District are listed in Table I-5. Similarly, principal features of the nine alternatives for the Las Gallinas Sanitary District are listed in Table I-6. As indicated on these tables, the smaller crop acreages require a larger storage pond in order to provide sufficient evaporation as a supplemental means of disposing of the wastewater generated in the no-discharge period. Most of the barley crop alternatives require supplemental land for wastewater disposal. The no-discharge periods vary, depending upon the amount of wastewater reused, from 90 days to 225 days for Novato and 150 days to 225 days for Las Gallinas.

TABLE I-5
SUMMARY OF NOVATO SANITARY DISTRICT IRRIGATION ALTERNATIVES

| Alternative Number | Crop | Crop Acreage (acres) | Disposal Acreage (acres) | Storage Capacity (acre-ft) | Water Applied to Crop (acre-ft) | Other Water Consumed* (acre-ft) | No-Discharge Period |
|--------------------|---------|----------------------|--------------------------|----------------------------|---------------------------------|---------------------------------|---------------------|
| NP1 | pasture | 900 | -0- | 550 | 3,000 | 350 | Apr 1-Oct 15 |
| NP2 | pasture | 725 | -0- | 120 | 2,420 | 50 | Jun 1-Sep 10 |
| NP3 | pasture | 600 | -0- | 270 | 2,000 | 160 | Jun 1-Sep 10 |
| NC1 | corn | 1,100 | -0- | 1,200 | 2,550 | 830 | Apr 1-Nov 15 |
| NC2 | corn | 750 | -0- | 290 | 1,740 | 130 | Jun 1-Sep 15 |
| NC3 | corn | 20 | -0- | 330 | 1,440 | 150 | Jun 1-Sep 1 |
| NB1 | barley | 1,125 | -0- | 120 | 1,560 | 50 | Jun 1-Sep 1 |
| NB2 | barley | 850 | 200 | 100 | 1,180 | 540 | Jun 1-Sep 1 |
| NB3 | barley | 650 | 300 | 120 | 900 | 810 | Jun 1-Sep 1 |

Source: H. Eschli & Associates, Inc.

*Includes evaporative loss from storage reservoirs and wastewater disposal on uncultivated land.

TABLE 1-6

SUMMARY OF LAS GALLINAS VALLEY SANITARY DISTRICT IRRIGATION ALTERNATIVES

| Alternative Number | Crop | Crop Acreage (acres) | Disposal Acreage (acres) | Storage Capacity (acre-ft) | Water Applied to Crop (acre-ft) | Other Water Consumed* (acre-ft) | No-Discharge Period |
|--------------------|---------|----------------------|--------------------------|----------------------------|---------------------------------|---------------------------------|---------------------|
| LGP1 | pasture | 360 | -0- | 320 | 1,200 | 210 | Apr 1-Nov 1 |
| LGP2 | pasture | 250 | -0- | 180 | 835 | 110 | May 1-Oct 1 |
| LGP3 | pasture | 175 | -0- | 330 | 585 | 210 | May 1-Oct 1 |
| LGCL | corn | 440 | -0- | 540 | 1,020 | 410 | Apr 1-Nov 15 |
| LGC2 | corn | 375 | -0- | 290 | 610 | 160 | May 1-Oct 1 |
| LGC3 | corn | 300 | 200 | 120 | 490 | 480 | May 1-Oct 1 |
| LGB1 | barley | 440 | 100 | 220 | 610 | 260 | May 1-Oct 1 |
| LGB2 | barley | 350 | 200 | 150 | 490 | 420 | May 1-Oct 1 |
| LGB3 | barley | 275 | 200 | 150 | 380 | 520 | May 1-Oct 1 |

Source: H. Esmaili & Associates, Inc.

*Includes evaporative loss from storage reservoirs and wastewater disposal on uncultivated acreage.

Cost estimates for the 18 alternatives are shown in Table I-7. Land purchase costs were based upon existing evaluations. The various parcels are valued from \$900 to \$2,500 per acre. In the case of sites 3 and 7, joint ownership with Marin County Flood Control District was assumed to result in a 50 percent cost savings to Novato for the acreage provided by these parcels. Other capital costs include land leveling, improved drainage facilities, effluent storage ponds, effluent distribution system, and irrigation equipment costs. The principal operation and maintenance cost item is for electric power. On a present worth basis, Alternatives NP2 and LGP2 are the least expensive although NP3 and LGP3 are only slightly more expensive.

On the basis of economic, environmental, and technical considerations, the medium-sized pasture alternatives (NP2 and LGP2) were selected as the apparent best alternatives. These projects are described in Chapter III.

The monthly distribution of effluent production, storage, irrigation, and bay discharge is shown in Table III-1. Pasture irrigation will commence in April, using water left in the pond from the winter. For the months of April and May, effluent will be added from the Novato outfall as necessary to make up the irrigation demand, with the requirement that the pond level must be drawn down so that as of June 1 at least 100 acre-ft of storage is available in the ponds. The 100 acre-ft of storage on June 1 will allow balancing of the rate of wastewater production with pasture irrigation demand so as to curtail a bay discharge from June 1 to August 31. On September 1 the bay discharge will resume, but at a reduced level because the effluent production exceeds the irrigation demand. By the end of October, pasture irrigation would be finished and the ponds will contain approximately 60 acre-ft of water, leaving about 86 acre-ft capacity for holding the winter rainfall. The 60 acre-ft of water remaining in the ponds will allow the maintenance of the wildlife pond (36 acre-ft capacity) and allow maintenance of about 1.5 feet of water in the primary storage pond as necessary to maintain the mosquito fish. By the end of winter, the water stored in the ponds will be increased by the amount of rainfall collected and will be used for the beginning of the pasture irrigation in April.

Recommended Project for Las Gallinas Valley Sanitary District

The recommended project for Las Gallinas Valley Sanitary District entails irrigation of about 250 acres of land on the St. Vincent School for Boys' property. A total of 310 acres will be required for project implementation. The volume of reclaimed water applied to this land in the design year will be about 830 acre-ft or 60 percent of the wastewater generated between April 1 and September 30. As required by the Regional Board, the reclamation project will permit elimination of wastewater discharge to Miller Creek for 150 days, starting on May 1. Effluent to be used for irrigation in a 27-acre primary storage pond together with a 14-acre wildlife pond will have a total storage capacity of 216 acre-ft and an operational storage capacity of 181 acre-ft. As shown on Figure III-6, the pond will be located on the southwest corner of site 9, the St. Vincent School property. All effluent will pass through the pond prior to land application. The pond could be filled either by gravity flow or with the assistance of a small booster pump. The storage pond will be 6-8 feet deep in order to prevent growth of cattails and to provide adequate

TABLE III-1

WATER BALANCE FOR OPERATION OF
THE NOVATO RECLAMATION/DISPOSAL PROJECT
(acre-ft)

| Month | 1968 Eff. Prod. | Water in Storage ¹ | Effluent to Storage | Rainfall Evap. (Avg.) ² | Pasture Irrigation Demand | Bay Discharge | Remarks |
|-------|-----------------------|-------------------------------------|---------------------------|---------------------------------------|---------------------------------|------------------|--|
| Jan | 1,316 | 68 | 0 | 8 | 0 | 1,316 | |
| Feb | 895 | 76 | 0 | 6 | 0 | 895 | |
| Mar | 1,105 | 82 | 0 | -3 | 0 | 1,105 | |
| Apr | 759 | 79 | 191 | -10 | -181 | 568 | |
| May | 640 | 79 | 376 | -18 | -392 | 264 | |
| Jun | 544 | 45 | 544 | -22 | -421 | 0 | Lowest Storage |
| Jul | 516 | 146 | 516 | -24 | -515 | 0 | Maximum Storage |
| Aug | 516 | 123 | 516 | -21 | -515 | 0 | No Discharge Period Jun 1 to Aug 31 |
| Sep | 544 | 103 | 378 | -16 | -363 | 166 | |
| Oct | 707 | 102 | 0 | -11 | -29 | 707 | |
| Nov | 809 | 62 | 0 | -1 | 0 | 809 | |
| Dec | 991 | 61 | 0 | 7 | 0 | 991 | Storage Reduced for Winter ⁴ . |
| Total | 9,342 | -- | -- | -105 | -2,416 | 6,821 | |

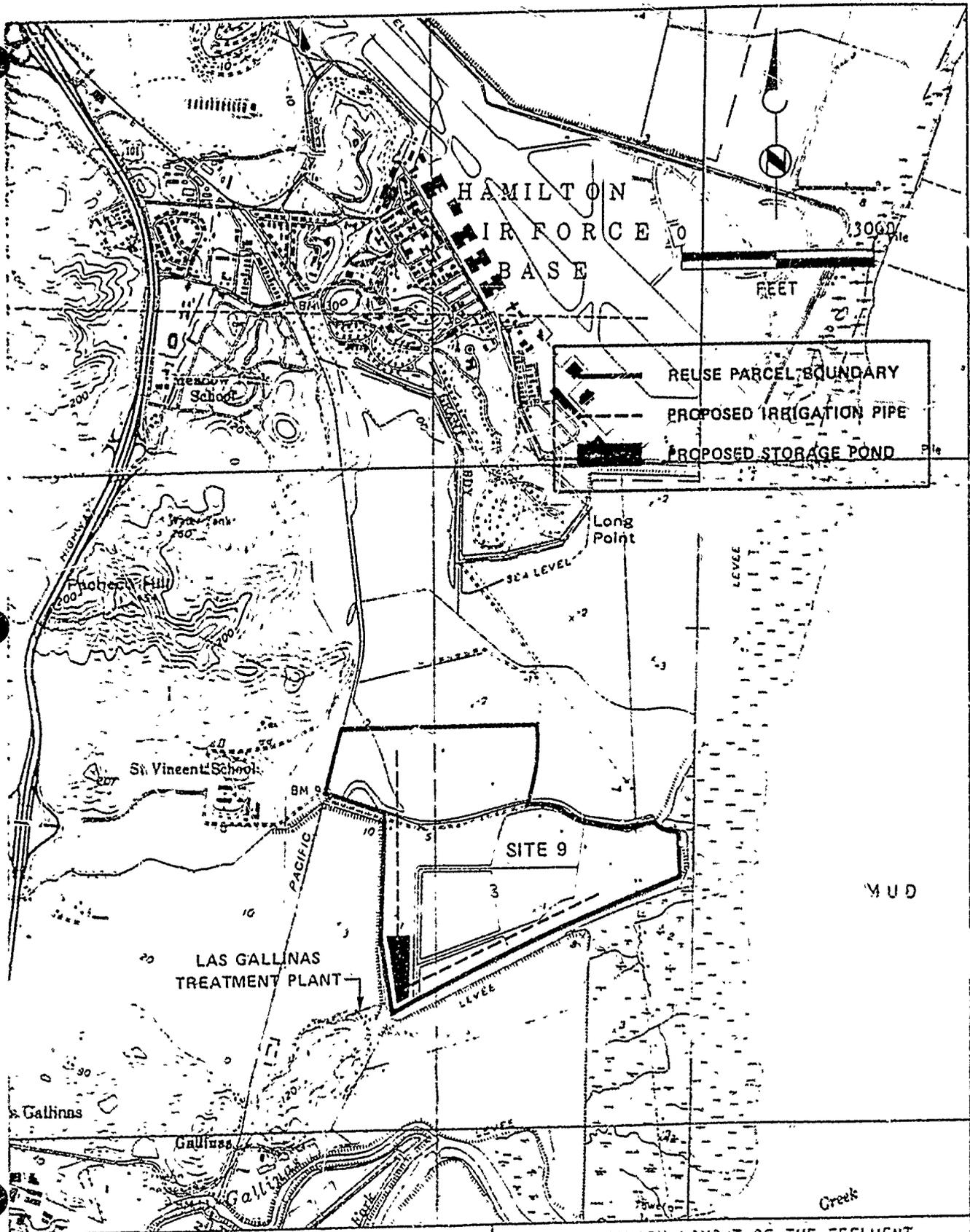
Source: Joint Venture Engineers, 1979

¹Total pond storage is 146 acre-ft and usable storage is 124 acre-ft (includes wildlife pond).

²Based on 27 acre total pond surface area (includes wildlife pond).

³Based on a 725-acre pasture.

⁴The winter storage level could be reduced to accept greater rainfall, if predicted. Maximum recorded rainfall at the Hamilton AFB is 46.6 inches which will require 63 acre-ft of available storage from November through April 1 for full containment if evaporation is assumed to be 20 inches.



PRELIMINARY LAYOUT OF THE EFFLUENT
DISTRIBUTION SYSTEM FOR
LAS GALLINAS VALLEY SANITARY DISTRICT

JBGA/WOM/RTC 3/75

FIGURE 31-0

CALENDAR PAGE

MINUTE PAGE

2007

mosquito control including mosquito fish. Groundwater migration from the storage pond will be controlled through the use of clay cutoff trenches. The pond will also serve as a wet-weather flow equalization pond and will have a compartment to trap the sludge and floating grease.

Effluent distribution will occur through a 14-inch force main. A 7.0 mgd capacity pump station (including 2.5 mgd standby capacity) will be required for this purpose. The supply pipeline will traverse north along the edge of the property to the end of the irrigated area, with a smaller spur line paralleling the southern boundary. Wheel-move sprinkler systems will be fed through appropriate turnouts in the main supply line.

The monthly distribution of effluent production, storage, irrigation, and bay discharge is shown in Table III-2. Of the total effluent produced by the Las Gallinas plant, it is expected that the Marin Municipal Water District will utilize about eight percent by 1988 as a reclaimed water supply for local landscape irrigation. Although the landscape supply is projected to increase over the years, this use is not firm, even from one year to the next. Accordingly, in order to assure that the Miller Creek discharge is curtailed for a full five months, some excess storage must be provided.

Pasture irrigation will begin in April and the water level in the pond will be reduced to a storage capacity of 95 acre-ft. This minimum storage capacity will allow maintenance of water in the wetlands (56 acre-ft) and maintenance of about 1.5 feet of water in the primary storage pond. If the MMWD landscape irrigation use does not materialize as predicted, the initial storage capacity will have to be increased to accommodate the extra effluent.

On May 1 the District's discharge to Miller Creek will cease and all effluent will be diverted to the ponds so that the effluent production can be balanced with the irrigation demand. The effluent ponds will reach their full storage volume by July and will remain essentially full through September. By October 1, the discharge of plant effluent to Miller Creek can resume.

During the month of October the water in the storage pond will be pumped back to the treatment plant for treatment and discharge to Miller Creek. By the end of October the water in storage will be reduced to about 95 acre-ft to allow pond capacity for equalization of wet-weather flows. When equalization is necessary,

TABLE VII-2

WATER BALANCE FOR OPERATION OF THE
LAS GALINAS RECLAMATION/DISPOSAL PROJECT
(ACRO-Ft.)

| Month | 1966 Lif. Prod. | 1966 app. Use ¹ | 1966 Eff. to Rec./Disp. | Water In Storage ² | Effluent to Storage | Rainfall (Avr.) ³ | Pasture Supply ⁴ Demand | Effluent Return To Plant ⁵ | Predicted Discharge To Miller/Creek | Remarks |
|-------|-----------------------|----------------------------------|-------------------------------|-------------------------------------|---------------------------|---------------------------------|--|---|---|--|
| Jan | 673 | | 673 | 104 | 0 | 12 | 0 | 0 | 673 | |
| Feb | 457 | | 457 | 116 | 0 | 0 | 0 | 0 | 457 | |
| Mar | 565 | | 565 | 124 | 0 | -4 | 0 | 0 | 607 | |
| Apr | 388 | -16 | 372 | 120 | 53 | -15 | -13 | 0 | 319 | Reduce pond storage to carry efflu- ent through irrigation season |
| May | 327 | -72 | 255 | 95 | 255 | -27 | -115 | 0 | 0 | |
| Jun | 276 | -72 | 206 | 188 | 206 | -34 | -145 | 0 | 0 | |
| Jul | 214 | -92 | 172 | 215 | 172 | -36 | -178 | 0 | 0 | |
| Aug | 264 | -80 | 184 | 173 | 184 | -32 | -178 | 0 | 0 | |
| Sep | 270 | -60 | 210 | 147 | 210 | -24 | -125 | 0 | 0 | No discharge Period May 1 to Sep 30 |
| Oct | 361 | -0 | 363 | 216 | 0 | -16 | -10 | 95 | 448 | |
| Nov | 414 | | 414 | 95 | 0 | -1 | 0 | 0 | 414 | |
| Dec | 506 | | 506 | 94 | 0 | 10 | 0 | 0 | 506 | |
| Total | 4,775 | -400 | 4,375 | | | -159 | -834 | 956 | 3,474 | |

Source: Joint Venture Engineers, 1979

- 1 Effluent diversion for landscape irrigation by the Marin Municipal Water District is an estimate only.
- 2 Total pond storage is 216 acre-ft and usable storage is 101 acre-ft (includes wildlife pond).
- 3 Based on 41 acre total pond surface area (includes wildlife pond).
- 4 Based on 250-acre pasture.
- 5 Excludes wet weather flow equalization in storage pond.
- 6 Excess rainwater in ponds can be returned to the plant for treatment and discharge.

excess wet-weather flows will be diverted to the storage ponds when plant flows are high and then returned to the plant for treatment. At the end of the winter, by about April, any excess water in storage will be returned to the plant as necessary to adjust the storage pond's level to about 95 acre-ft so that effluent can be accepted for the irrigation season.

Common Farm Management Considerations

Proper functioning of the reclamation project will require good working cooperation between the agency and the leaseholder. Within the constraints of the lease agreement, however, the particulars of the farming operation should be left to the maximum extent to the discretion of the tenant.

Establishment of perennial pasture will require an initial major cultivation and seeding effort. Full productivity will not, however, be reached for two to three years. Natural reseeding should then be adequate to maintain a relatively permanent cover. Depending upon the type of usage, a major reseeding may be required every 10 to 20 years and a secondary broadcasting of seed may be needed at four- to six-year intervals. A large number of suitable seed mixes are available and appropriate species should be selected from those that are tolerant of soil salinity and acidity, water logging, and which have good nutritional and palatability characteristics. One such mixture would consist of ryegrass, birdsfoot or narrow leaf trefoil, orchard grass, and red clover.

Although application of commercial fertilizers may not be necessary due to nutrients contained in the effluent, pilot studies have shown that supplemental fertilization can substantially increase crop productivity. Experimentation in the initial years of the project will indicate suitable fertilization practices. An initial liming of the soil is desirable to raise the pH and supply calcium to help aggregate the soil. This will also serve to counteract excess sodium in the wastewater. Liming should be repeated every 3-5 years or as dictated by observation and monitoring of soil and crop conditions.

The parcels will be irrigated by wheel-line sprinklers which allow for a highly controlled water application rate. Throughout most of the season a 12-hour irrigation day may be adequate; however, during the peak irrigation period of July and August, it may be necessary to operate the units 18 hours per day. Irrigation will probably be conducted at night to take advantage

of cheaper electric power rates. High output sprinkler nozzles will be required to meet peak irrigation demands. This may result in some temporary ponding when the application rate exceeds the intake rate of the soil. Appropriate provisions will be made so that the wheel-line units can cross the drainage ditches, where necessary. Irrigation will be done on a 10 to 14 day cycle. Fencing will be provided to keep the animals grazing on dry pasture. This will prevent hoof prints and attendant mosquito breeding conditions.

The sanitary districts will be responsible for paying all costs associated with the storage ponds, effluent pumping and distribution, and winter drainage. The lessee/farmer will pay all costs associated with farm operation.

A marketing survey was undertaken to determine the most reliable and cost-effective mode of operation. It was concluded that direct grazing of the pasture by beef cattle, calves, or dry cows would provide equivalent or superior economic return for the district while avoiding the uncertainty associated with a harvest and sale operation.

Project Expansion for the 1988-1998 Period

Over the 10-year period of 1988-1998 a net increase of 22 percent or 772 acre-ft in flow is anticipated for Novato. Over the same 10-year period net dry season flow for Las Gallinas is expected to decline by 216 acre-feet. This decrease will result from increased diversions of treated wastewater to the Marin Municipal Water District, which are expected to surpass the increase in gross wastewater production.

For Novato some expansion of the reclamation project will be required to utilize the increased volume of water while still meeting the 90-day discharge curtailment period. The additional flow volume could be handled by providing extra storage capacity, with or without an expansion of the irrigated crop acreage. To accommodate the increased flows by storage alone would require 230 acre-ft of added operational capacity. The water stored in the ponds would be discharged to San Pablo Bay at the end of the 90-day no-discharge period. Alternately, 140 acres of pasture could be added to the project in combination with expansion of storage capacity from 120 to 150 acre-ft. Approximately 120 to 130 acres of extra irrigable land will be available in the unused portion of Parcel 7. In addition, if necessary, more land could possibly be purchased from the unused U. S. Government property adjoining the southwest corner of Parcel 7.

Las Gallinas will not require any expansion of the reclamation project if the diversions projected for the Water District are realized. The net reduction in summer flow would not affect operation of the irrigation project but would allow the no-discharge period to be extended an additional 10 to 14 days. If, however, diversions remain at the level projected in 1988, the net increase in wastewater production of 230 acre-ft will require project expansion. This could be accomplished by increasing the irrigated acreage to a total of 290 acres and by enlarging the operational storage capacity to about 220 acre-ft.

BAY DISCHARGE

The recommended plan for both the Novato and Las Gallinas Valley Sanitary Districts involves continued use of existing discharge facilities during the non-irrigation season. For Las Gallinas their discharge to Miller Creek would be used from October 1 to April 30. For Novato, both the Novato main plant and the Ignacio plant would discharge through the existing shallow water outfall from September 1 to May 30.

This recommendation is predicated on the assumption that the presently ongoing Bay Studies will not divulge any significant impact from present operations that cannot be adequately mitigated by cessation of summer discharge and improved wastewater treatment during other times of the year. If analysis of Bay Studies data indicates that future impacts will still be significant, then improvements to the discharge facilities will be made. This analysis will be the subject of a future report.

BAHIA INTERCEPTOR

The apparent best alternative project for the Bahia Service Area of the Novato Sanitary District will involve the abandonment of the existing Bahia treatment plant and the construction of a raw sewage pumping station and interceptor force main to the Novato Sanitary District Main Plant.

A description of each of the elements of the Bahia Interceptor project is given below.