

PRELIMINARY OUTLINE SPECIFICATIONS

FOR

NAVAL LIVE OAKS

GULF ISLANDS NATIONAL SEASHORE

Division 2 SITE WORK

Site Preparation

022021 Site Preparation (Architecture)

This Section referred to by Section 15350 - Lift Stations for all such work as clearing and grubbing, tree pruning, soil stabilization, finish grading, etc. within 25 radius of stations.

02102 Clearing and Grubbing

Clearing and grubbing will be very severely restricted to actual building site or parking lanes. The intent is to preserve all vegetation feasible.

02105 Selective Thinning - Vista Clearing

This work would be done under the direct supervision of the C.O.

02115 Obliteration of Roads

This work consists generally of removing paving materials and scarifying the road alignment. Most removals will have been done by Park forces.

Earthwork

02200 Earthwork (minor nature)

02217 Machine Grading

02221 Excavation Trenching and Backfill

Section referred to by various Division 15 Mechanical sections for all such work.

Minimum cover of 36 inches for pipelines under roadways, 24 inches minimum cover elsewhere.

Trench excavation to elevation -3.0 feet will require walers and shores as well as point dewatering.

Lift station excavation to elevation -8.0 feet will require steel sheeting enclosed excavation and well point dewatering.

A total of seven (7) conduits for utility pipes and cables will be jacked under US 98 (four-lane divided highway) at four (4) different locations within the Reservation and at one (1) location under State 399 (four-lane divided highway at English Cove).

02223 Roadway Excavation and Embankment

Cuts and fills will be minimal. Generally the road will stay on existing grade insofar as possible.

02225 Minor Structure Excavation

02227 Waste Materials Disposal

Excavated materials which are unsuitable for backfill shall be loaded and hauled to an approved disposal site outside the external boundaries of the Reservation.

Site Drainage

02515 Manholes, Inlets and Catch Basins

02 Cast Iron Grates

02521 Pipe Culverts and Storm Drains

Roads and Parking

02203 Borrow

(From sources outside the park)

02205 Subgrade Preparation

02206 Stabilized Subgrade

02606 Aggregate Base Course

02608 Bituminous Base Course

02611 Bituminous Prime Coat

02612 Bituminous Seal Coat

02613 Bituminous Concrete Pavement

02617 Chips

02618 Pavement Marking

02 Grasscrete and Alternates

The parking design is predicated on pervious pavement for free flow downward of storm waters.

02 Paving and Surfacing - Grasscrete

02 Paving and Surfacing - (alt.) Hastings Checkerblock

02622 Concrete Curb and Gutter

02626 Precast Concrete Curb

Landscape Paving and Walks

02631 Concrete Walks (and terraces)

02635 Aggregate Walks

02638 Bituminous Walks

02 Wood Chip Trail Surfacing

Wood Decking see Division 6

02 Exposed Aggregate Concrete

Fences and Gates

02717 Vinyl-clad Chain Link Fence

02718 Wood Gates

Road and Parking Appurtenances

02721 Sign posts

02724 Guide and Barrier Posts

02728 Concrete Wheelstops

Landscaping

02812 Topsoil

02821 Seeding, Fertilizing and Mulching

02830 Planting

02 Grassing of Pervious Pavement

Division 3 CONCRETE

03150 Forms

03200 Concrete reinforcement- Provide as required

03250 Concrete accessories

03305 Portland Cement Concrete

03310 Structural Concrete - Concrete foundations; concrete floor slab on grade.

03411 Precast wall panels - Visitor Center/Administration Building walls are to be precast concrete.

Division 4 MASONRY

04100 Mortar

04150 Masonry Accessories

04220 Concrete Unit Masonry - 8" concrete block walls for maintenance buildings. Fallout shelter in Visitor Center/Administration building to have 8" concrete block walls fully grouted. All exterior walls to be sealed and insulated.

Division 5 METALS

05120 Structural Steel

05210 Steel Joists - all roof framing (except Visitor Center information area) to be open web steel joists.

05310 Metal Roof Deck - all roof decking (except Visitor Center information area) to be metal.

05410 Metal Stud System - all interior walls to be framed with metal studs.

05500 Metal Fabrications

05700 Ornamental Metal - prefinished metal panels above windows at Maintenance Area Field Office, also at shop building.

Division 6 WOOD AND PLASTICS

- 06180 Glued Laminated Construction - roof structure at Visitor Center to be glue laminated wood beams with wood decking.
- 06200 Finish Carpentry
- 06220 Millwork - wood millwork in information area, sales, auditorium, interpretive work room, bathroom vanities, lunch room, conference room.

Division 7 THERMAL AND MOISTURE PROTECTION

- 07160 Bituminous Damp Proofing - on foundation walls.
- 07190 Vapor Barriers
- 07210 Building Insulation = Exterior walls to be R=11, Roof/Ceiling R=19.
- 07313 Wood Shingles and Shakes-Visitor Center roof to have wood shingles.
- 07510 Built-up Bituminous Roofing-all buildings, except Visitor Center, to have built-up roofs, drain to exterior walls; minimum 1/4" slope per foot; smooth surfaced roof where leaves are a problem; 20 year bondable roof and flashing.
- 07620 Flashing and Trim
- 07631 Gutters and Downspouts - metal gutters, conductor heads and downspouts at exterior walls as required.
- 07810 Skylights - skylights as shown on drawings.
- 07910 Sealants:

Division 8 DOORS AND WINDOWS

- 08110 Hollow Metal Work - exterior doors at auditorium; Field Office main door at fire truck garage; Maintenance Building interior exterior doors.

- 08120 Aluminum Doors and Frames - anodized aluminum doors and frames at Visitor Center/Administration Building exterior doors, Field Office exterior doors.
- 08210 Wood Doors - interior doors at Visitor Center/Administration Building and Field Office to be wood with natural finish (red oak).
- 08360 Overhead Doors - insulated metal panel overhead doors as shown on drawings.
- 08520 Aluminum Windows - operable anodized aluminum windows as shown on drawings.
- 08710 Finish Hardware - "best" hardware.
- 08730 Weatherstripping and Seals - all operable windows and exterior doors to be weatherstripped.
- 08740 Thresholds
- 08800 Glazing - thermal pane glazing U=.61
- 08912 Aluminum Window Walls - anodized aluminum window walls at Visitor Center information area.

Division 9 FINISHES

- 09260 Gypsum Wallboard Systems - all interior wall surfaces to be 5/8" gypsum board: ceilings in toilets and information area.
- 09310 Ceramic Tile - ceramic tile in toilets
- 09400 Terrazzo - terrazzo floors in Visitor Center and other high use areas.
- 09500 Acoustical Treatment - acoustical treatment in auditorium.
- 09540 Ceiling Suspension Systems - auditorium, administration area, field office, and shop offices to have acoustical grid suspended ceilings. Office ceilings at 8'0", AFF., Sales and Exhibits areas ceilings at 10'0" AFF (Information area vaulted ceiling).
- 09650 Resilient Flooring
- 09680 Carpeting - carpet in offices and auditorium
- 09800 Special Coatings - sealed floor in shops.

09910 Exterior Painting - exterior metal painted. Exterior face of concrete block walls to be sealed.

09920 Interior Painting - interior surfaces to be painted.

09930 Transparent Finishes - interior wood.

Note: Maintenance buildings (except Field Office and offices in shop building) to have exposed roof structure and concrete block walls.

Division 10 SPECIALTIES

10160 Toilet Partitions and Urinal Screens

10350 Flagpole

10440 Signs

10800 Toilet Accessories

Division 11 EQUIPMENT

11550 Industrial Equipment - compressor, hydraulic lifts in shop.

11801 Refuse Container Unit

11802 Trash Receptacle

11805 Picnic Tables

11806 Wood Benches

11870 Loading Dock Equipment - at warehouse.

11970 Theater and Stage Equipment - at auditorium.

Division 12 FURNISHINGS

12100 Artwork

12501 Window Blinds

12600 Furniture

12710 Auditorium Seating

Division 15 MECHANICAL

The Visitor Center/Administration Building will be heated (approximately 55,000 BTUH) and cooled (approximately 25 tons) with an air to air heat pump. The cooling system will have an economizer cycle which will utilize outside air for airconditioning when outside air temperature permits.

Standard plumbing fixtures will be provided as shown on the drawings. Handicapped toilets will be provided. Electric water cooling will be provided. Domestic hot water will be provided via an electric water heater with solar assistance.

The Field Office will be heated and cooled via air to air heat pumps.

Domestic hot water will be heated via solar collectors.

The shop building will be heated only via oil fired boilers.

15041 Disinfection of water lines

15042 Testing of water and sewer lines

15058 Utility line markers

15225 Water piping and appertenances

Pipe

- Cast and ductile iron
- Galvanized steel
- PVC plastic

Valves

- Gate
- Air relief vacuum vent
- Ball

Fire hydrants

Drinking fountain

Valve Boxes

- Roadway screw
- Service
- Post indicator
- Manhole

Line markers

Barrier posts

15305 Sewer piping and appurtenances

Pipe

Cast and ductile iron force main

Cast iron soil

PVC plastic force main

PVC plastic gravity

Valves

Plug

Check

Sewer

Valve boxes

Roadway screw

Manhole

Lift stations

Manholes

Cleanouts

Line markers

Barrier posts

15334 Manholes, wet wells and manhole type valve boxes

15350 Lift Stations

15479 Drinking fountain

15502 Fire hydrants (dry barrel)

Division 16 ELECTRICAL

General notes:

All new electrical and telephone lines and facilities to be underground.

Secondary wiring for the Visitor Center/Administration Building, Field Office and Maintenance Buildings will be 120/208 v. 3Ø. Other buildings and structures will be 120/240 v 1Ø.

All panels to have spare capacity.

All wiring to be concealed and in conduit.

Emergency exit signage in all visitor use areas.

No exterior lighting except as required for security.

Visitor Center/Administration Building

Area lighting

Exhibit lighting by Harpers Ferry

Office lighting will be flourescent

Maintenance Area

General lighting will be flourescent.

Fire and instrusion detection will be provided.

Telephone service will be provided to offices.

Outlets will be provided at work areas and for equipment.

A 220 v welder receptacle will be provided.

Exterior lighting will be provided at the fire equipment area.

DESIGN ANALYSIS

NAVAL LIVE OAKS RESERVATION

COMPREHENSIVE DESIGN PLAN

APRIL 1978

Naval Live Oaks Reservation - Comprehensive Design Plan

The comprehensive design package includes the whole of Naval Live Oaks Reservation. Based on the assessment for the Development Concept Plan (No D.C.P. will be prepared) the major items of the package are as follows: The Visitor Center/Administration Building and related development; The Special Naval Live Oaks Reservation Exhibit; Residential Area; Maintenance Area; Environmental Study Area and Youth Group Camp. Each of these elements will be discussed separately.

Visitor Center/Administration Building

The favored alternative in the Assessment for the DCP locates the visitor facilities at Naval Live Oaks quite specifically. Other factors such as a hurricane flood surge of 9.5 feet and agreements with the state regarding development adjacent to the midden site further restrict the options for locating the Visitor Center/Administration Building.

The intent of the design is to provide a high degree of correlation between the building and site. Ideally the building (Visitor Center) would function, visually, as a pavillion set in the Live Oak, waterside milieu. The realities of climate, however, require glazing. Broad terraces and walks flow into and around the building and allow a high degree of freedom to circulate about the immediate site. Vegetation is to be undisturbed insofar as possible and disturbed areas will be restored. Strictly ornamental plantings are not anticipated.

Early studies made evident the excessive impact on the site of a building containing the expansive space detailed in the management requirements.

The alternatives studied ranged from separating the Visitor Center and Administration Building into two separate structures locating the Administrative Building where it would cause the least damage, to removing some functions to reduce the size of the building. The design proposed here is based on removing those administrative functions not directly related to overall park administration and moving them either to Fort Pickens or to an expanded "Maintenance Field Office" at Naval Live Oaks.

This reduction allowed a much better integration of the Visitor Center/ Administration Building with the site.

Early designs for the parking area at Naval Live Oaks Visitor Center development were based on capacities assumed in the Assessment for the DCP, i.e. 150 parking spaces related to the Visitor Center and 300 spaces assumed to be necessary for the boat transportation system.

These assumptions have been abandoned. Based on the estimated carrying capacity of the visitor center and related trails and exhibits and staff needs for the Administration Building, the need is more like 125 units. The draft transportation study projects a need for 165 units of parking for 1985.

Basic to the design concept for the parking at NLO is the use of "Grasscrete" or some similar product for the paving. The design intent is to construct a parking lot with a minimum of grading, without drainage structures and without curb and gutter.

The "Grasscrete" paving set on a pervious gravel base eliminates the need for drainage structures. The minimal grading combined with the modular

paving allows the maximum flexibility for conserving trees. The design proposes saving many trees, within the parking lot, to maintain an almost continuous canopy. The "Grasscrete" design has the least adverse impact on the site. A conventionally designed parking area with adequate drainage, curb and gutter and profile adequate for carrying off water would require excessive grading and almost clear cutting.

All facilities related to the boat transportation system are located at the eastern end of the site. This, despite the logic of locating a ticket kiosk and pier in close proximity with the visitor center. Location of transportation elements adjacent to the visitor center would cause the parking sites closest to the Visitor Center to be monopolized by the long term parking patrons of the boat system. The design assumes that it is better to encourage long term parking away from the Visitor Center than to have the ticket kiosk and pier close to the Visitor Center.

If the proposed boat transportation system becomes a dead issue, then a shortened pier would be constructed adjacent to the Visitor Center as a facility for visitors off the intracoastal waterway.

Residential Area

The residential area proposed in the Assessment for the DCP has been eliminated from consideration by direction from the Regional Director.

Special Naval Live Oaks Exhibit

This plan recommends that the site for the Special Naval Live Oaks exhibit be moved from the Breckenridge site at the west end of Naval Live Oaks

Reservation to the site of the present Girl Scout camp. The consensus of opinion is that the original site is so remote from the Visitor Center that few visitors would make the trek. The Girl Scout camp is adjacent to the Visitor Center and would only require a hike of 1/2 mile or so. The details of the exhibit are not a part of this plan.

Maintenance Area

The location of the maintenance area has been determined by the Assessment for the DCP.

The maintenance facility has two major components, the Maintenance Field Office and the shop and storage elements within the fenced compound.

Within the compound are the shops, vehicle storage sheds, warehousing and storage of construction materials and flammables.

Broad expanses of paving have been avoided in the design, paving is only that which is required for circulation. The center island is left intact to take the greatest advantage of the cooling qualities of vegetation.

The Maintenance Field Office serves two functions, the District Ranger and the Maintenance supervision for Gulf Islands, Florida. The field office is placed outside the maintenance area compound so that it can operate without reference to the enclosed area. Business visitors will be able to park and transact business without passing through work and storage areas. Similarly, employees park outside the compound, assemble in the field office, then disperse to their respective work areas. The only parking, other than storage, within the compound is for several official

park vehicles adjacent to the Field Office. The fire cache with 4-wheel drive fire truck is located in the Field Office Building to provide the fastest response, particularly after hours, in event of fire.

Youth Group Camp/Environmental Study Area

The Assessment for the DCP proposes a central parking area for both the Youth Group Camp and the Environmental Study Area. As studies were done at larger scale it became evident that a parking area central to both areas was also too far from either one. Separate parking areas allow better access for loading and separate the two groups of users lessening the likelihood of conflicts.

Comfort facilities and a bare bones cooking shelter will be provided for the group campers. The cooking shelter is provided to eliminate the use of scattered individual fires. This concept presupposes that individual meal preparation over wood fires would be discouraged or prohibited.

The fire circle for the Youth Group Camp will be designed to use for evening programs and will be adaptable for cook fires if such are needed for merit badge programs.

The program for an Environmental Study Area has not been formulated. It is assumed that in any case there will be a need for a comfort station-shelter structure and adequate parking for one or two school buses. This plan shows the required utilities, parking and structures to suit this assumption.

DESIGN PROBLEM AND CRITERIA

The architectural program for the Gulf Islands National Seashore, Naval Live Oaks complex includes the design of six buildings. The program input was provided by both the Region and the park. The Denver Service Center provided programming assistance when needed.

BUILDING	PROGRAMMED SQUARE FOOTAGE	PROGRAMMED SQUARE FOOTAGE PLUS 25% for Circulation, wall thickness Mechanical, etc.	ACTUAL SQUARE FOOTAGE
Visitor Center/ Administration Building	7,871	9,839	9,510
Visitor Center Administration	4,090	5,113	4,594
	3,781	4,726	4,916
Maintenance Area Field Office	2,135	2,669	2,924
Shop Building	4,660	5,825	5,333
19 Open Vehicle Parking Spaces	3,800		
Cement and Flammable Storage Bldg.	888	1,110	695
Enclosed Vehicle Storage (12 Vehicles)	3,456	4,320	3,421
Warehouse	3,600	4,500	3,671
6 Open Vehicle Parking Spaces	1,200		
TOTALS	22,610 Plus 5000 Open Vehicle Parking	28,263	25,553

Note: See following sheets for individual building area breakdown

PROGRAMMED SQUARE FOOTAGE

<u>VISITOR CENTER</u>	<u>Square Feet</u>
Toilets	660
Information, lounge	1,200
Exhibits	400
Sales	130
Miscellaneous	200
Auditorium	<u>1,500</u>
TOTAL	4,090

ADMINISTRATIONSQUARE FEET

Superintendent	225
Secretary	144
Reception entry area	200
Administrative Officer, Private Office	144
Personnel Specialist, Private Office	120
Cont. and Prop. Mgt. Spec.	250
Fiscal Clerk	
Personnel Clerk	200
Supply clerk	
Mail and file clerk, mail room	
Xerox, files	350
Storage (secured)	100
Chief of Interpretation	144
Clerk typist	120
Chief Ranger	144
Clerk, locker, storage, extra desk	220
Chief of Maintenance	180
Clerk typist	120
Conference Room	260
Lunch room	110
First aid	100
Storage	250
NLO interpretive staff & programs work area	300
Toilets (Men and Women)	100
Mechanical room	
*janitor room	

TOTAL	<u>3,781</u>
-------	--------------

*added at December 2, 1977 meeting as per Pridemore

<u>MAINTENANCE FIELD OFFICE</u>	<u>SQUARE FEET</u>
Toilet (to accommodate handicapped)	75
Assembly room	560
Assistant Chief of Maintenance	150
Maps and files	150
*Storage	75
NLO District Ranger	120
Clerk, Radio and Reception	120
Ranger ready room	225
Maintenance Foreman	150
Maintenance Supply Clerk	150
Fire Truck	360
TOTAL	<u>2,135</u>

*December 2, 1977 meeting 100 square feet added to warehouse for xerox, sales pub. storage

MAINTENANCE SHOP BUILDINGSQUARE FEET

Mechanical shop:	2,200
4 - 32'x12' bays, 2 with hydraulic lifts	1,536
general work area	488
toilets: men and women	176
	<u>2,200</u>
Carpenter shop	1,600
Multipurpose shop	600
* 2 offices (100/each)	200
* Battery room	60
Wash pad	Exterior
Open vehicle storage (19 spaces)	<u> </u>
TOTAL	4,660

*as per letter from Region dated January 9, 1978

ARCHITECTURAL DESIGN CRITERIA

1. Visitor Center and Administration functions are to be enclosed in one building.
2. The Visitor Center should not only be visually distinguishable from the Administration portion of the building, but should also be seen as the dominant form by the arriving park visitor. The overall building form should lead the visitor to the Visitor Center where he can obtain information and assistance in interpreting the park's resources.
3. The Visitor Center should relate to the park resources: Live Oak trees, water, archeological site, etc. The building should encourage visitor interaction with the resource. (via direct access to the resource from the Visitor Center, space flow between the two, transparent enclosure around Visitor Center).
4. The Visitor Center should be omnidirectional-it should have access from as many sides as possible.
5. Visitor Center toilets are to be accessible from both inside and outside the building.
6. All buildings are to be accessible to the handicapped.
7. Visitor Center is to have 110 fixed seat auditorium.
8. Building floor plans should be as open as possible to enhance natural ventilation and evaporative cooling.

9. Visitor Center/Administration building to have a fallout shelter.
10. The buildings are to be "Designed With Nature"-that is they should "fit" with the site. They should respond to the sites limitations (i.e. hurricane floor surge, windows and people spaces should be shaded and heat gain minimized during overheated periods-use of light colored materials and minimizing hot, heat-absorbing surfaces) and utilize any advantage offered by the site (i.e. natural energies: heating, cooling, daylighting, etc.)
11. Buildings are to be energy conscious.
12. Building design and detailing should not be complicated.
13. Building materials should be locally available, compatible with the environs, durable and easy to maintain.
14. The building floor plans should be efficient in terms of the staff required to operate them.
15. Buildings to conform to Southern Building Code.

ARCHITECTURAL DESIGN PHILOSOPHY

The philosophy which was utilized in the design of the Visitor Center/ Administration Building, Field Office, and Maintenance Buildings focused on five areas of concern:

1. The design situation should be SIMPLE. That is, it should do and say only what is required to satisfy the user's needs. No more-no less. The visual pattern of the building should read as a large, simple pattern, almost as though it was painted with a single stroke of a large paintbrush.
2. The design solution should be APPROPRIATE. That is, it should be an honest and responsive solution to the design problem. The solution should evidence a "fit" not only with the program, as defined, but also with its setting or environment. The former is referred to as "form following function" while the latter is referred to by Ian McHarg is "Designing With Nature".

"Designing With Nature" is concerned with the design solutions' response to the inherent limitations and advantages offered by the site. The design should recognize and respond to any limitations. For example, buildings should be located above the hurricane flood surge elevation (9.5 feet). Heat gain should be minimized during overheated periods (April, May, June, July, August, September and possibly October) and heat loss minimized in underheated periods (January, February, March, November and December). The solution should also recognize and utilize any advantage offered by the site. This would include vistas, maximizing heat gain in underheated periods, utilizing natural breezes for evaporative cooling, etc. The physical

solution should also be part of and blend in with the site's massing, color and value schemes.

3. The solution should be FUNCTIONAL. It should respond to both the activity or functional needs as well as the user (direct and indirect) needs. A design is for people.

4. The design should be ECONOMICAL to build, operate and maintain. The building materials should be locally available, durable and of good quality; the construction details should be simple and easy to construct.

5. The design solution should be UNIQUE: it should utilize the current available technology to the fullest.

Naval Live Oaks

Electric Utilities Summary

All power extensions into the park areas shall be underground except for the crossing of Hwy US 9E.

Three phase power will be extended to the Visitor Center and Maintenance Area by Gulf Power Co. Three phase secondary voltage will be 120/208 v.

Single phase voltage to comfort stations and other loads will be 120/240.

Padmount transformers will be located for minimum visibility.

Telephone-Service to Visitor Center, Ranger Station, and Maintenance Area will be underground.

NAVAL LIVE OAKS - MECHANICAL SYSTEMS

Visitor Center, Design Summary

1. HVAC. Install air to air heat pumps to provide approximately 25 tons of cooling and 50,000 BTUH of heating. Electric resistance back up heating for 100% of the design load will be provided. Cooling system to employ an economizer cycle to utilize outside air for airconditioning purposes when suitable Ductwork will be required for conditioned air distribution. Heat loss calculation utilized the following-summer design: dry bulb 93^o, wet bulb 79^o, month August, room design-dry bulb 78^o, wet bulb 63.5^o. Winter design: dry bulb 29^o, room design-dry bulb 70^o. Computer weather tape-New Orleans. External "U" values wall-0.09, glass-0.61, roof-0.05. This information was processed through the Trane Airconditioning Economics Computer Program-Trace Version 200. If present local practice uses more conservative criteria we would appreciate being appraised of the rationale for this practice.

2. Plumbing-Install standard plumbing fixtures. One station in the ladies restroom and one in the mens restroom will be for handicapped. Electric watercooler to be provided. Domestic hot water to be provided by an electric water heater. If required water heater shall be energy saving type. Install electric timer to prevent operation at night.

MECHANICAL SYSTEM - DESIGN SUMMARY

Maintenance Area

A. Maintenance Field Office

1. HVAC-The heat loss calculations for the Maintenance Field Office utilized a 35°F outside design temperature from ASHRAE for New Orleans. The heat loss will be recalculated, utilizing a 29°F outside design temperature, during preparation of construction drawings. The inside design temperature is 68°F. U-factors for walls are to be designed to yield 1040. Thermopane windows yield .65 and the ceiling is to be designed for .0526. We used one air change per hour for Infiltration and will provide weatherstripping, etc. to attain this figure or less. It is expected that energy legislation will make mandatory a more limited heat loss than has been customary. If present local practice uses more conservative criteria, we would appreciate being apprised of the rationale for this practice. Cooling system to employ an economizer cycle to utilize outside air for air conditioning purposes when it is suitable.

2. Plumbing-Install standard plumbing fixtures. W.C. to have elongated bowl with adjustable flush valve. Lavatory to be countertop, enameled cast iron. Janitor sink to be floor mounted precast stone with supply faucets having vacuum breaker and pail hook.

Electric water cooler to be provided. Domestic hot water to be provided by an electric water heater with solar assistance. Water heater shall have extra insulation package applied, and a timer to prevent operation at night.

B. Shop Building

1. Heating System-Oil fired boiler with unit heaters in shop areas and fan coil heaters in offices and restrooms. Oil tanks to be mounted in the mechanical room. Exhaust fan and air inlet louvers shall provide ventilation when required. Unit heaters to be sized for low temperature water so that possible future solar heated water may be utilized. Heating system will be aided by passive solar heat provided by south facing windows which shall be shaded in the summer and exposed to the sun in the winter.

2. Plumbing-Install standard plumbing fixtures. Water closets to have elongated bowl with adjustable flush valve.

Lavatories-Standard wall mounted fixture.

Urinal-Wall hung urinal with adjustable flush valve.

Floor Drains-Drain to exterior sediment-grease trap. No traps on individual drains. Carpenter shop drain to have lid. Mechanical shop and wash pad to have heavy duty cast iron grates. Hot water to be provided by solar panels with storage, assisted by oil fired heater or from the boiler.

3. Vehicle exhaust system-As required for the types of vehicles to be serviced. This may also serve other items such as a welding booth if one is to be provided.

4. Central vacuum system-provide convenient outlets in carpenter shop and at machine locations for possible attachment to machines.

c. Warehouse

Heating System-Install electric heat pump to provide minimum heating and air conditioning for dehumidification purposes to protect stored materials subject to freezing or deterioration due to high humidity. This system will be limited as much as possible to the storage area requiring such control. Cooling cycle will be controlled by humidity rather than temperature.

TRAFFIC ANALYSIS

US 98 at Naval Live Oaks Reservation

Two-way average daily traffic (1978) = 10,877

Two-way peak-daily traffic (1978) = 12,400

Two-way peak-hourly traffic (1978) = 1,250

Design year = 2000

Traffic projection factor = 2.5

Ratio of peak-hourly traffic to peak-daily
traffic = $1,250 \div 12,400$ = 10%

Assumed ratio of midday-hourly traffic to
peak-daily traffic = 4%

Assumed peak-hour directional distribution
of traffic = 60%

Assumed midday-hour directional distribution
of traffic = 50%

Assumed truck traffic = 10%

One-way peak-hourly design volume (2000) =
 $10,877 \times 2.5 \times 0.10 \times 0.60 \times 1.10$ = 1,795

One-way midday-hourly design volume (2000) =
 $10,877 \times 2.5 \times 0.04 \times 0.50 \times 1.10$ = 598

TRAFFIC ANALYSIS (cont)

Administration/Visitor Center Building

Annual visitation (2000) = 219,000

Ratio of peak-monthly visitation to
annual visitation = 13.9%

Ratio of peak-daily visitation to weekly
visitation = 20%

Ratio of peak-hourly visitation to daily
visitation = 3.2%

Ratio of midday-hourly visitation to
daily visitation = 22.5%

Number of visitors per vehicle = 3.5

Assumed directional distribution of traffic = 80%

Assumed RV traffic = 7%

One-way peak-hourly design volume (2000) =
 $219,000 \times 0.139 \times 7/30 \times 0.20 \times 0.032$
 $\times 1/3.5 \times 0.8 \times 1.07$ = 11

One-way midday-hourly design volume (2000) =
 $219,000 \times 0.139 \times 7/30 \times 0.20 \times 0.225$
 $\times 1/3.5 \times 0.80 \times 1.07$ = 78

TRAFFIC ANALYSIS (cont)

Ferry Pier

Number of passengers per boat = 150

Number of passengers per vehicle = 3.5

Assumed directional distribution of traffic = 80%

Assumed RV traffic = 7%

One-way peak and midday hourly design

volumes (2000) =

$$150 \times 1/3.5 \times 0.80 \times 1.07 = 37$$

Combined Administration/Visitor Center - Ferry Pier

One-way peak hourly design volume =

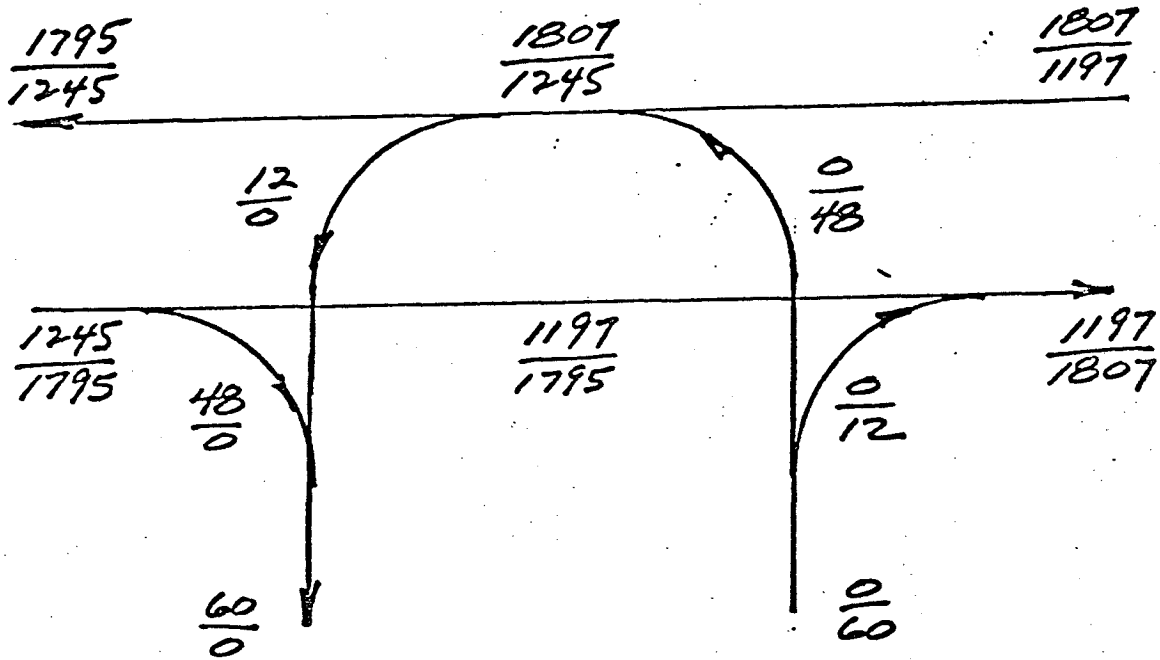
$$11 + 37 = 48$$

One-way midday hourly design volume =

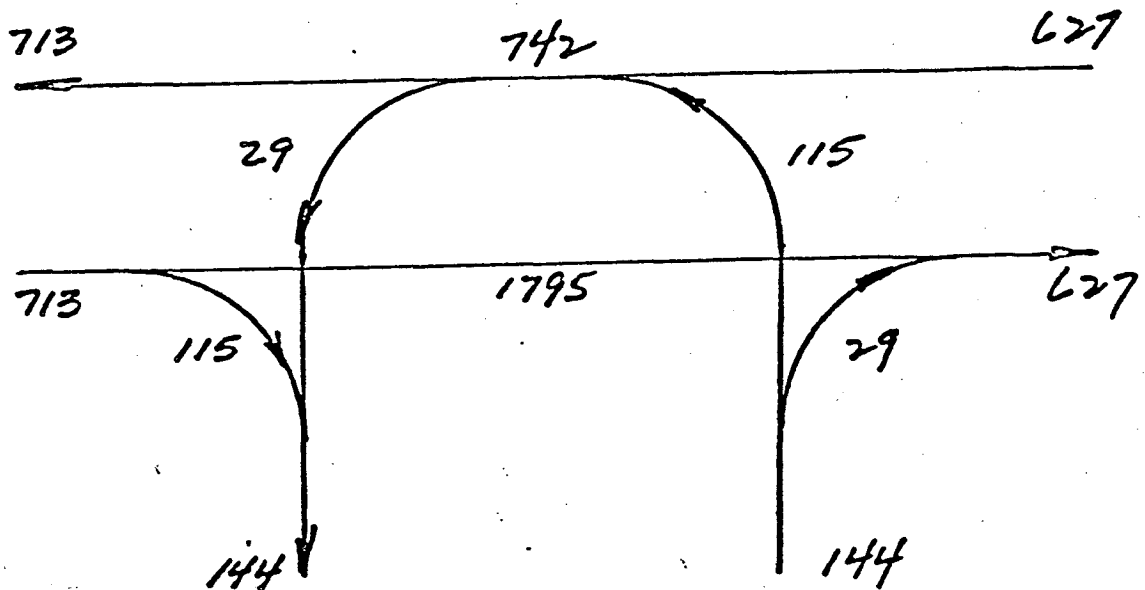
$$78 + 37 = 115$$

Traffic Analysis (cont.)

Peak hourly design volumes (2000):



Mid-day hourly design volume (2000):



GEOMETRIC DESIGN OF INTERSECTIONS (cont)

Design Elements

Lane width	12 ft
Useable sholder	
Median	8 ft
Outside	10 ft
Back slop	4:1
Median width	30 ft
Right of way width	160 ft
Angle of intersection turns	90o
Highway approach grades	
At Maintenance-YGC-ESA	2.8%
At Admin./Vis.Center-Ferry Pier	0.0%
Min. edge of pavement curve	
Simple curve radius	50 ft
3-center curve radii	150-50-150 ft
Turning lane width	18 ft
Offset	5 ft
Min. corner island	80 sf
	12 ft legs
Min. radius-speed combination	50 ft R/15 mph
Speed change lanes	
Directional type	20:1 taper
Parrellel lane type	
Deceleration to stop	550 ft including 290 ft taper
Left turn storage	25 ft per 30 vph
Median nose taper	14:1

GEOMETRIC DESIGN OF INTERSECTIONS

One-way design hourly volumes

US 98 (D=60%) 1807 vph

Administration/Visitor Center-

Ferry Pier leg (D=80%) 48 vph

Design Vehicles

Admin/VC-Ferry Pier SU

Maintenance-YGC-ESA WB-50

Design Speeds

US 98 65 mph

Administration/Vis. Center-Ferry Pier 15 mph

Maintenance-YGC-ESA 25 mph

Highway Capacity

Number of lanes 4

Two-way average daily traffic volume 30,000

Signalization assumed in design yes

Type of control stop

Peak hourly merging capacity 423 vph

Peak hourly diverging capacity 516 vph

Site Distance

Min. site distance for turning roadway 1170 ft

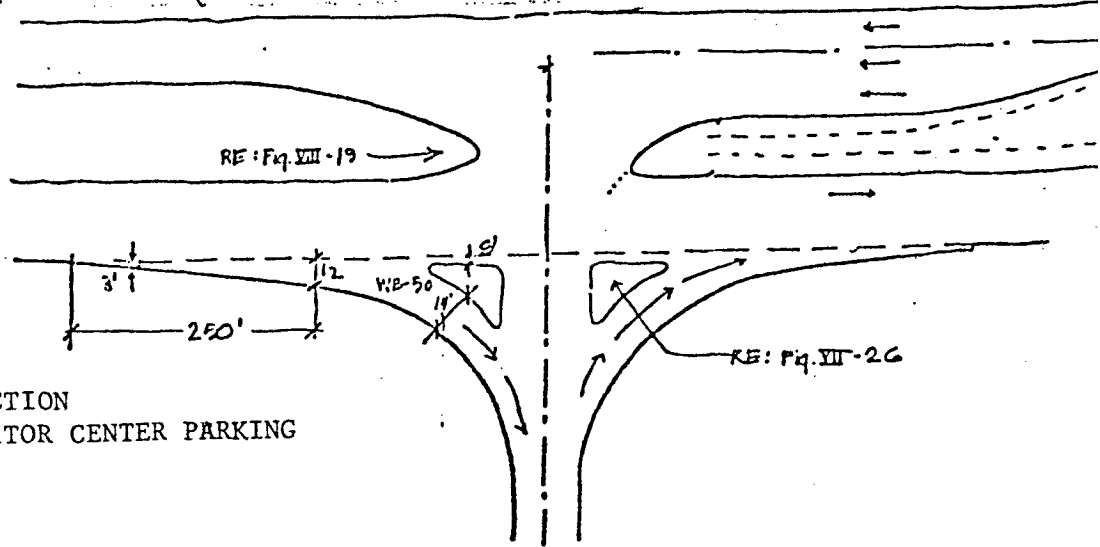
Superelevation

Rates for intersection curves 0.06-0.01 ft/ft

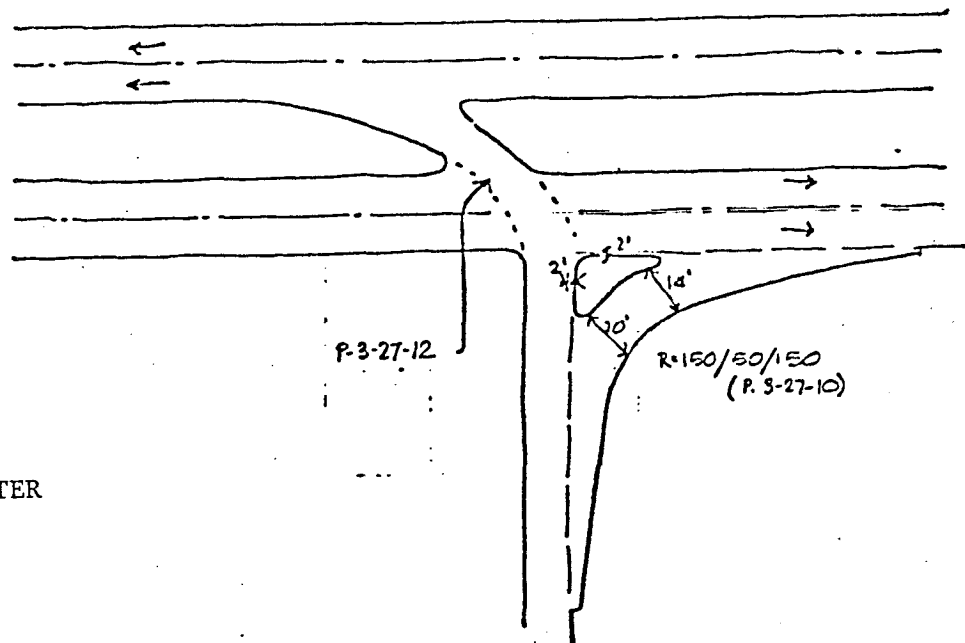
Max. cross-stop change for intersection 0.08 ft/ft-sta

Allowable difference in cross-slopes 0.04 ft/ft

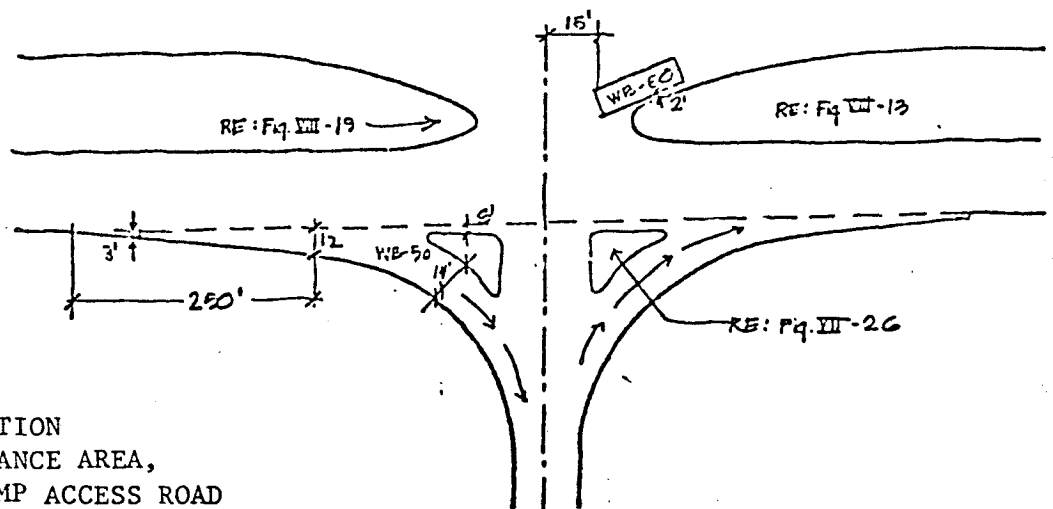
TWO WAY INTERSECTION
ENTRANCE TO VISITOR CENTER PARKING
FROM US 98



ONE WAY INTERSECTION
EXIT FROM VISITOR CENTER
PARKING TO US 98



TWO WAY INTERSECTION
US 98 TO MAINTENANCE AREA,
ESA AND YOUTH CAMP ACCESS ROAD



Naval Live Oaks - Water System

General

It is proposed to connect to the City of Gulf Breeze's distribution system within the US 98 right-of-way median at a location approximately 300 feet west of the Reservation boundary. The City's source of supply is the Midland well field east of the Reservation. A 12-inch main from Midland to the City traverses the Reservation. The City's consent and direction and an estimate of connection and meter installation charges have been requested. The City has recently completed construction of a one million gallon water tank and booster pump station at a location immediately west of the Reservation boundary. The four pump station has rated capacity and head of 2,700 gallons per minute at 80 pounds per square inch. One of its four pumps is gasoline engine operated. The pumps are both pressure and flow controlled, and they will come on line when a fire hydrant is opened anywhere on the distribution system. Service pressures at the proposed point of connection to the City system will vary from 58 to 80 psi. Pressure reducing valves will be installed in all buildings to maintain 40 psi. Seashore units will have individually metered service.

Water Demand

Peak Daily

Visitor Center/Administrative Building

Visitors 1,420 x 5 = 7,100 gpd

Employees 20 x 15 = 300

Irrigation 1 x 6,800 = 6,800

Picnic Area-Ferry Pier

Visitors 570 x 5 = 2,850

Picnicers 70 x 10 = 700

Maintenance Area

Employees 15 x 15 = 225

Car Wash 7 x 120 = 840

NLO Exhibit

Visitors 250 x 0.5 = 125

Environmental Study Area

Students 40 x 15 = 600

Youth Group Camp

Campers 50 x 35 = 1,750

TOTAL 21,290 gpd

Domestic Water Demand

Visitor Center/Administrative Building

Fixture value

WC 10 @ 35 = 350 fv

L 8 @ 4 = 32

SS 1 @ 7 = 7

DF 2 @ 2 = 4

393 fv

Demand

Fixture value 79 gpm @ 35 psi

Hoses 2 @ 6.5 13

92 gpm @ 35 psi

98 gpm @ 40 psi

Picnic Area Comfort Station

Fixture Value

WC 6 @ 35 = 210 fv

L 4 @ 4 = 16

SS 1 @ 7 = 7

DF 1 @ 2 = 2

235 fv

Demand

Fixture Value 65 gpm @ 35 psi

70 gpm @ 40 psi

Domestic Water Demand (cont.)

Maintenance Area

Fixture value

WC 2 @ 35 = 70 fv

L 2 @ 4 = 8

Sh 2 @ 4 = 8

DF 2 @ 2 = 4

90 fv

Demand

Fixture value 53 gpm @ 35 psi

Hoses 2 @ 6.5 13

66 gpm @ 35 psi

71 gpm @ 40 psi

Environmental Study Area

Fixture value

WC 6 @ 35 = 210 fv

L 4 @ 4 = 16

SS 1 @ 7 = 7

DF 1 @ 2 = 2

235 fv

Demand

Fixture value 65 gpm @ 35 psi

70 gpm @ 40 psi

Domestic Water Demand (cont.)

Youth Group Camp

Fixture Value

WC 6 @ 35 = 210 fv

L 4 @ 4 = 16

SS 2 @ 7 = 14

DF 1 @ 2 = 2

242 fv

Demand

Fixture value 66 gpm @ 35 psi

71 gpm @ 40 psi

Combined Domestic Demand

Fixture value

VC-Admin. Bldg. 393 fv

Pic. Area Comf. Stat. 235

Maintenance Area 52

ESA 235

YGC 242

1,158 fv

Demand

Fixture value 130 gpm @ 35 psi

Hoses 4 @ 6.5 26

156 gpm @ 35 psi

167 gpm @ 40 psi

Domestic Water Demand (cont.)

Domestic Demand Concurrent with Fire at Visitor Center/Administration Bldg.

Fixture value

VC-Admin Bldg	0 fv
Pic. Area Comf. Stat.	235
Maintenance Area	0
ESA	235
YGC	<u>242</u>
	710 fv

Demand

Fixture value	107 gpm @ 35 psi
Hoses 4 @ 6.5	<u>26</u>
	133 gpm @ 35 psi
	142 gpm @ 40 psi

Domestic Demand Concurrent with Fire at Maintenance Area

Fixture value

VC-Admin. Bldg.	372 fv
Pic. Area Comf. Sta	235
Maintenance Area	0
ESA	235
YGC	<u>242</u>
	1,084 fv

Domestic Water Demand (cont.)

Domestic Demand Concurrent with Fire at Maintenance Area (continued)

Demand

Fixture value	126 gpm @ 35 psi
Hoses 4 @ 6.5	<u>26</u>
	152 gpm @ 35 psi
	163 gpm @ 40 psi

Domestic Demand Concurrent with Fire at Ferry Pier

Fixture value

VC - Admin. Bldg	193 fv
Pic. Area Comfort Sta.	115
Maintenance Area	0
ESA	235
YGC	<u>242</u>
	785 fv

Demand

Fixture value	111 gpm @ 35 psi
Hoses 4 @ 6.5	<u>26</u>
	137 gpm @ 35 psi
	147 gpm @ 40 psi

Fire Demand

Visitor Center/Administration Building

Concurrent domestic demand	142 gpm
Sprinklers 5 @ 41	205
Hose Streams 2 @ 220	<u>440</u>
	787 gpm

Maintenance Area

Concurrent domestic demane	163 gpm
Sprinklers 5 @ 41	205
Hose Streams 2 @ 220	<u>440</u>
	808 gpm

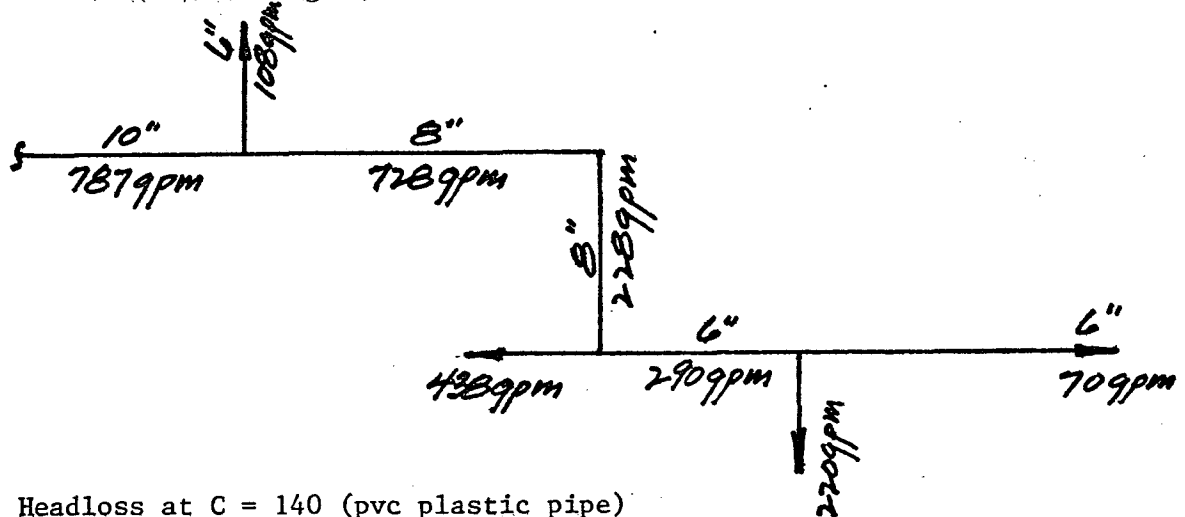
Ferry Pier

Concurrent domestic demand	147 gpm
Hose Streams 2 @ 60	<u>120</u>
	267 gpm

Residual Pressures at Fire Demand

Visitor Center/Administration Building

Schematic Flow Diagram



Headloss at C = 140 (pvc plastic pipe)

$$5400 \text{ lf, } 10" @ 787 \text{ gpm/ } 54 \times 0.35 = 18.9 \text{ ft}$$

$$2800 \text{ lf, } 8" @ 728 \text{ gpm/ } 28 \times 0.89 = 24.9$$

$$400 \text{ lf, } 8" @ 728 \text{ gpm/ } 4 \times 0.89 = 3.6$$

$$200 \text{ lf, } 6" @ 290 \text{ gpm/ } 2 \times 0.66 = \underline{1.3}$$

$$48.7 \text{ ft}$$

$$21.1 \text{ psi}$$

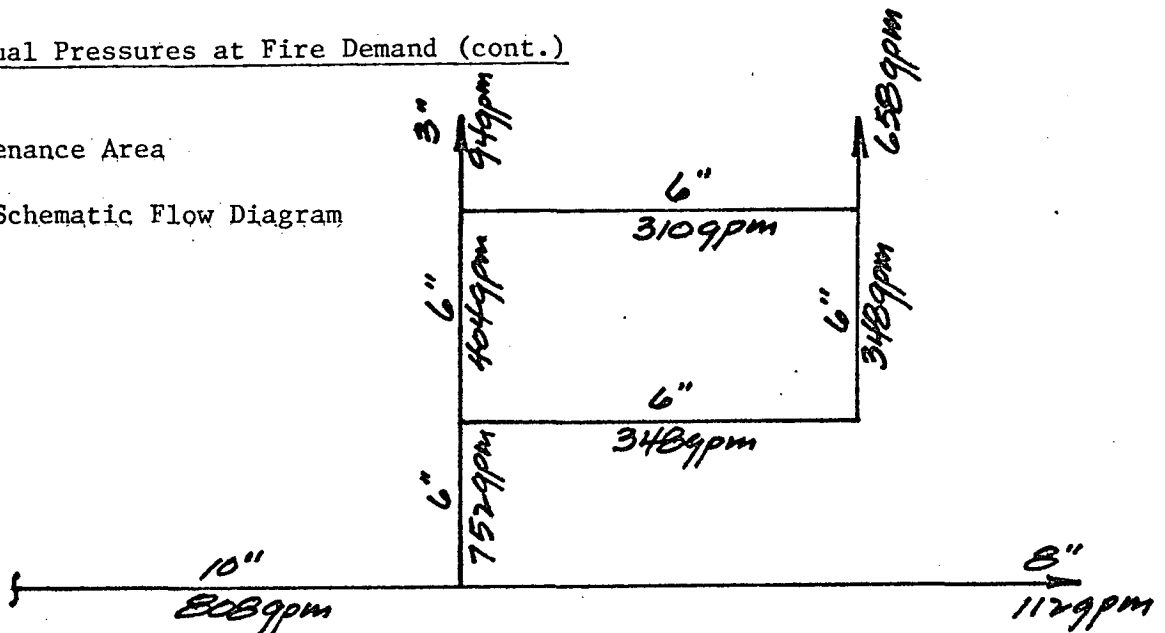
$$\text{Residual Pressure} = 80.0 - 21.1 = 58.9 \text{ psi}$$

@ hydrant

Residual Pressures at Fire Demand (cont.)

Maintenance Area

Schematic Flow Diagram



Headloss at C = 140 (pvc plastic pipe)

$$5400 \text{ lf, } 10'' @ 808 \text{ gpm/ } 54 \times 0.37 = 19.8 \text{ ft}$$

$$700 \text{ lf, } 6'' @ 752 \text{ gpm/ } 7 \times 3.85 = 27.0$$

$$800 \text{ lf, } 6'' @ 348 \text{ gpm/ } 8 \times 0.93 = \underline{7.4}$$

$$54.2 \text{ ft}$$

$$23.5 \text{ psi}$$

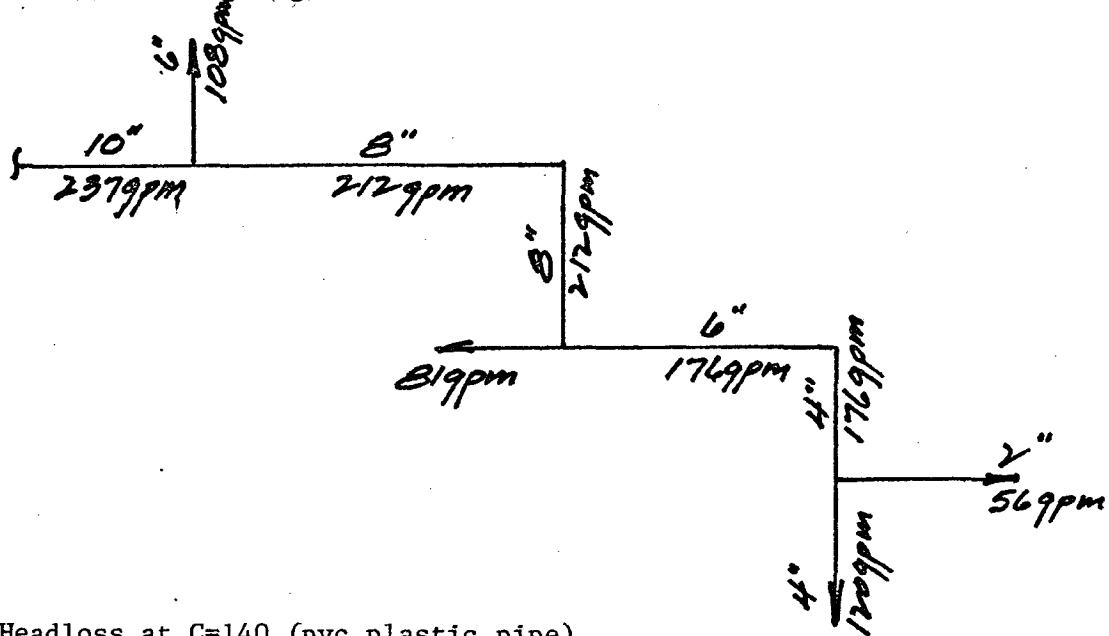
$$\text{Residual Pressure} = 80.0 - 23.5 = 56.5 \text{ psi}$$

@ hydrant

Residual Pressures at Fire Demand (cont.)

Ferry Pier

Schematic Flow Diagram



Headloss at C=140 (pvc plastic pipe)

5400 lf, 10" @ 267 gpm/	54 x 0.05	= 2.5 ft
2800 lf, 8" @ 212 gpm/	28 x 0.10	= 2.8
400 lf, 8" @ 212 gpm/	4 x 0.10	= 0.4
1200 lf, 6" @ 176 gpm/	12 x 0.26	= 3.1
200 lf, 4" @ 176 gpm/	2 x 1.89	= 3.8
1000 lf, 4" @ 120 gpm/	10 x 0.93	= <u>9.3</u>

21.9 ft

9.5 psi

Residual Pressure = 80.0 - 9.5 = 70.5 psi

@ hydrant

Distribution System

Range of static pressures = 58-88 psi

Min. residual service pressure = 40 psi

Max. fire demand including concurrent

domestic demand = 808 gpm

Min. residual pressure at fire hydrants = 56.5 psi

Minimum pipe cover = 36 inches

Min. horizontal separation between

water and sewer lines = 10 ft.

Pipe materials: pvc plastic, galvanized steel and cast or
ductile iron at sewer line crossings

Gate valves: non-rising stem with roadway screw type box

Post indicator: sprinkler/standpipe laterals

Curb stops: ball type with cast iron service box

Water meters: meters complete with box and main tap by
City of Gulf Breeze

Minimum spacing of

fire hydrants: two hose streams within 200 feet of major structures.

Fire hydrants: dry barrel type, AWWA C502, 2-2½" hose and 1-4"
steam outlets.

Air release-vacuum vent

valves: 1" inlet, 150 psi w.p. S.S. float with manhole
type box at high points

Line markers: delineate pipelines and valves within highway
easement.

Naval Live Oaks - Wastewater System

General

There are two alternative locations for connection of the Reservation's 4-inch force main to the City of Gulf Breeze wastewater collection system. As shown on the drawings, Alternative A proposes connection to the existing City lift station west of the English Cove development. Alternative B proposes connection to the proposed shopping center gravity collection system immediately west of the Reservation boundary. Alternatives A and B respectively require 10,000 and 6,350 lineal feet of force main. The City's consent and direction and an estimate of connection charges have been requested.

The City operates a 0.5 mgd contact stabilization plant under the interim effluent limitations of their NPDES permit, but they can not comply with the restrictive final permit limitations. Santa Rosa County has submitted a 201 Regional Planning Study to EPA for approval. The study proposes a regional collection, treatment and disposal system which will eliminate the Gulf Breeze plant. Based on information in the Study, EPA has approved tie-in of the Naval Live Oaks development to the City of Gulf Breeze system. Initial operation of the regional system is scheduled for May 1981.

The force main easement along US 98 has been discussed with the Florida Department of Transportation and has their tentative approval. Boring and jacking of casing at 36 inches below the bottom of roadway base will be required for highway utility line crossings.

Peak Daily Waste Flow

Visitor Center/Administration Building

Visitors 1,420 x 5 = 7,100 gpd

Employees 20 x 15 = 300

Picnic Area - Ferry Pier

Visitors 570 x 5 = 2,850

Picnicers 70 x 10 = 700

Seepage

Pipeline 1.3 x 100 = 130

Manholes and

Wet Well 3 x 100 = 300

Subtotal = 10,950 gpd

Youth Group Camp

Campers 50 x 35 = 1,750 gpd

ESA

Students 40 x 15 = 600

Seepage

Pipelines 2.2 x 100 = 220

Manholes and

Wet Well 7 x 100 = 700

Subtotal 3,270 gpd

Peak Daily Waste Flow (cont.)

Maintenance Area

Employees 15 x 15 = 225 gpd

Car Wash 7 x 120 = 840

Seepage

Pipeline 2.3 x 100 = 230

Manholes and

Wet Well 6 x 100 = 600

Subtotal = 1,895 gpd

TOTAL =16,115 pgd

Collection System

General

Min. size of service laterals: 4 inch
Clean outs at buildings/
Min. pipe cover: 36 inches
Min. Horiz. separation between water
and sewer lines: 10 feet
Min. velocity: 2 fps

Gravity Mains

Min. size: 6 inch
Min. slope: 0.01 f/t
Pipe material: PVC or ABS plastic;
ductile iron of water line crossings
Manholes and Wet Wells: Pre-cast, reinforced concrete;
48-inch diam. sections, eccentric cones, cast iron
frames and covers (24 inch); 72-inch diam. wet wells.

Force Mains

Air relief vacuum vent valves at high points
Min. size: 4 inch
Pipe materials: PVC plastic; ductile iron at water line crossings

Pumping Stations

Visitor Center-Administration Building/Picnic Area-Ferry Pier

$$\text{Pumping rate} = \frac{3.75 \times 10,950}{1440} = 28.5 \text{ gpm}$$

USE 100 gpm

Total dynamic head at C=140, 4" pipe

$$\text{Static } 17.2 - (-4.0) = 21.2 \text{ ft}$$

$$\text{Dynamic } 40.5 \times 0.66 = \underline{26.9}$$

$$\text{TDH} = 48.1 \text{ ft.}$$

Pumps: Two (2) Flygt 4" CP3101, 432 impeller, 3.8 HP, 1Ø, 1750 rpm

ESA-YGC

$$\text{Pumping rate} = \frac{3.75 \times 3,270}{1440} = 8.5 \text{ gpm}$$

USE 100 gpm

Total dynamic head of C=140, 4" pipe

$$\text{Static } 16.3 - (-1.5) = 17.8 \text{ ft}$$

$$\text{Dynamic } 12.5 \times 0.66 = \underline{8.3}$$

$$\text{TDH} = 26.1 \text{ ft}$$

Pumps: Two (2) Flygt 4" CP3082, 436 impeller, 2 HP, 1Ø, 1750 rpm

Maintenance Area (Master Station)

$$\text{Pumping rate} = \frac{3.75 \times 16,115}{1440} = 42.0 \text{ gpm}$$

USE 100 gpm

Total dynamic head at C=140, 4" and 8" pipe

Pumping Stations (cont.)

Maintenance Area (Master Station) (cont.)

Pumping to English Cove (Alternative A)

Static head $3.5 - 5.5 = -2.0$ ft

Dynamic head

4" pipe $72 \times 0.66 = 47.5$

8" pipe $28 \times \text{nil} = \underline{0.0}$

TDH = 47.5 ft

Pumping to Shopping Center (Alternative B)

Static head $11.5 - 5.5 = 6.0$ ft

Dynamic head

4" pipe $63.5 \times 0.66 = \underline{41.9}$

TDH = 47.9 ft

Pumps: Two (2) Flygt 4" CP 3101, 431 impeller, 5 HP, 3Ø, 1750 rpm

Station Construction

Stations are to be the duplex, non-clog submersible pump type. Pumps are to be installed in a six (6) foot diameter pre-cast, reinforced concrete pipe sump having top slab with single leaf galvanized steel cover. Pumps are to be furnished complete with discharge elbows, guide rails and lift chains required for their removal from the sump without entering it and with electrical control panel in above grade rain tight enclosure.

Collection System Storage

System Storage

Wet Well	7.5 ft x 211.5 gal/ft	= 1,586 gal
Manholes	7 ft x 94 gal/ft	= 658
Pipeline	650 ft x 0.087 gal/ft	= <u>57</u>
		2,301 gal

Peak hourly flow

Administration/Visitor Center

10 wc @ 36 gph	= 360 gph
2 ur @ 10 gph	= 20
4 lav @ 15 gph	= 60
2 ss @ 10 gph	= 20

Ferry Pier

5 wc @ 36 gph	= 180
1 ur @ 10 gph	= 10
4 lav @ 15 gph	= 60
1 ss @ 10 gph	= <u>10</u>
	660 gph

Retention time

$$\frac{2301 \text{ gal}}{660 \text{ gph}} = 3.5 \text{ hrs}$$

> 3 hrs OK

Administration/Visitor Center-Ferry Pier collection system will provide more than three (3) hour storage at peak flow in the advent of power failure; therefore standby power facilities are not required.

ATTACHMENT #1

Visitor Center capacity is 200 at any one time 200

Midden Trail 1300 LF capacity 100 at any one time

actual use, 30% of Visitor Center visits 60

NLO exhibit trail 2600 LF capacity 50 at any one time

actual use, 15% of Visitor Center visits 30

Breckenridge Plantation Trail 2.5 miles, capacity 100 at any one time

actual use, 10% of Visitor Center visits 20

Extended loop trail 2.6 miles, capacity 80 at any one time

actual use, 5% of Visitor Center visits 10

Total "instant" capacity 320

based on an average visit of 1-1/2 hours,

visitation at peak operation would be limited

to 215 visitors/hour.

Using attached visitor distribution charts a peak hourly

visitation of 215 visitors translates as follows: peak day 955

peak week 4777

peak month 20473

year 147,287

By reducing the time of visit to one hour visitation would be at the rate of 320/hour or 219,242/year, which is probably the practical limit to a meaningful visit to the NLO visitor center area.

VISITOR DISTRIBUTION

Monthly (% of yearly)		Daily (% of weekly) estimated		Hourly (% of daily) estimated	
January	2.6	Sunday	18	7-8	
February	3.3	Monday	13	8-9	1.5
March	6.3	Tuesday	11	9-10	2.8
April	9.4	Wednesday	11	10-11	11.25
May	11	Thursday	12	11-12	19.7
June	13.9	Friday	15	12-1	22.5
July	13.9	Saturday	20	1-2	22.5
August	12.5			2-3	11.25
September	8.6			3-4	5.6
October	7.6			4-5	2.8
November	6.1			5-6	
December	4.8				



United States Department of the Interior

NATIONAL PARK SERVICE

DENVER SERVICE CENTER

755 Parfet Street

P.O. Box 25287

Denver, Colorado 80225

IN REPLY REFER TO:

D30-DSC-MPR

MAY 15 1978

Memorandum

To: Assistant Manager, Southeast/Southwest Team,
Denver Service Center

From: James M. Ellis, Soils Engineer, Branch of Roads,
Professional Support Division

Reference: Gulf Islands National Seashore, Package 112, Naval Live
Oaks Area, Proposed New Visitor Center, Parking Areas and
Entrance Roads

Subject: Investigative Report - April 17 through April 20, 1978

PURPOSE

The purpose of the trip was to evaluate soil conditions relative to building construction and roads.

SUMMARY

The area is underlain by old marine beach sands which have developed a limited depth of topsoil due to the heavy vegetative cover. Bearing values can be made acceptable for the proposed construction. A report of the findings is enclosed.

James M Ellis

Recommended for distribution:

J. M. Ellis
Assistant Manager
Southeast/Southwest Team

5.16.78

Date

Enclosures 2



Save Energy and You Serve America!

cc: Reg. Dir., Southeast Region, w/c encl.
Supt., Gulf Islands, w/c encl.

SOILS INVESTIGATIVE REPORT

Navel Live Oaks Area

Gulf Islands National Seashore

- - -

The proposed construction site is within the back shore area of the peninsula. The foundation soil to a depth of five feet is composed of medium to fine grained beach sand which classifies as a poorly graded sand (SP) or as an A-3(0) relative to Unified or American Association of State Highway and Transportation Officials (AASHTO) procedures respectively.

One sample each was taken from the extreme corners of the proposed site of the visitor center. Excavations were made to a depth of 5-½ feet. Underground water was encountered in each hole at elevation four. Approximately 14 inches of topsoil has developed.

Drainage conditions are good throughout the site. During the site work period, a heavy continuous rain occurred and the runoff conditions were noted. No ponding was in evidence within the site area and in fact the percolation rate obviously exceeded the precipitation rate which in this case was one inch of rainfall per hour for a period of approximately three hours. This condition is to be expected when the uniformity of the sizing of the soil particles is considered.

Since there is no basement area proposed for the visitor center, there should be no particular problem in the foundation design. The fact that the water table is reasonably close to footing elevation serves only to reduce the bearing capacity of the soil for this soil type. No long-term consolidation or plastic deformation will be considered. Extreme fluctuations in the water table is not expected due to the high permeability of the soil and the perched condition of the fresh water above the saline ocean water. Dissipation of head due to recharge precipitation is essentially instantaneous.

Foundation recommendations relative to the visitor center should include the construction of an embankment berm for the purpose of supporting the proposed structure. This recommendation is based on the concept of dissipating the loading stress with depth through compacted nonsaturated soil rather than imposing high load concentration on the shallow water table situation. The berm or embankment should extend laterally beyond the outside limits of the superstructure, a minimum of ten feet, and should extend vertically above existing natural ground a minimum of four

feet. Prior to construction of the embankment, the natural ground should be excavated to a depth of at least 18 inches and replaced at a density of no less than 90 percent of the maximum dry density, as determined by AASHTO procedure T-180. The embankment slope should be no steeper than 4 feet horizontal to 1 foot vertical, and should be constructed under the T-180 compaction requirement to a minimum of 90 percent density. Footing elevation should be at least two feet below the finished grade of the embankment. Considering the water table condition and the soil type, it is further recommended that the allowable bearing value be set at 1.5-ton per square foot. The berm will also develop a better surface runoff condition and will eliminate the possibility of the footing becoming submerged.

The proposed structural section for the access roads and parking areas is dictated to a great extent by the lack of lateral stability of the sand soil and to a much less extent by the bearing capacity. The bearing strength for auto traffic is excellent provided the soil can be supported against movement in a horizontal direction under load. To assist in providing resistance to lateral movement it is recommended that the top foot of the subgrade material, below natural ground, be removed, replaced and compacted to a density meeting or exceeding a value of 90 percent of maximum dry density according to AASHTO procedure T-180. All soil placed above natural ground shall also be compacted to this density.

Following the construction of the soil subgrade, it is recommended that a seal coat of asphalt (MC-250) be applied for full width of the grade. This will assist in sealing in the compaction moisture and to tie the soil particles together in the top of the soil grade. The structural section above the seal should consist of three inches of asphalt concrete which could be placed in one lift if accuracy of grade elevations has been maintained. Otherwise it is recommended that two 1- $\frac{1}{2}$ inch lifts be applied. Asphalt grade AC-10 is recommended for this material and the design mix should call for a Marshall stability of 500 or a Hveem stability of 35, at an air void percentage of 3-6 percent.

The use of products such as "Grass Crete" in lieu of asphalt paving in the parking areas is acceptable if 18 inches of AASHTO T-180 compaction is developed prior to placement. Without a firm foundation, it is unlikely that a planer surface can be maintained. It is also possible that drip problems, from the underside of parked autos, could create an unsightly surface where grass should be. Drainage would pose no problem and the lateral stability would be effective. This material should be considered for slope protection around the proposed berm.

It is further recommended that no permanent excavations be made below existing ground surface without appropriate lateral support. It is highly recommended that no grading excavation be made for the visitor center.

A final recommendation relative to subgrade stabilization beneath roadways could consist of the addition of clay into the top six inches of the sand to an extent that the plasticity index does not exceed a value of eight.

Test data from a commercial laboratory is enclosed.

Pensacola Testing Laboratories, Inc.

ENGINEERING TESTING



AMERICAN COUNCIL OF INDEPENDENT LABORATORIES
AMERICAN SOCIETY FOR TESTING AND MATERIALS
AMERICAN CONCRETE INSTITUTE
FLORIDA ENGINEERING SOCIETY
AMERICAN WELDING SOCIETY
AMERICAN CHEMICAL SOCIETY
AMERICAN SOCIETY OF CIVIL ENGINEERS

OFFICE AND LABORATORY
217 E. BRENT LANE
PENSACOLA, FLORIDA 325
PHONE: 477-5100

May 3, 1978

United States Department of Interior
National Park Service
Denver Service Center
755 Parfet Street
Denver, Colorado 80225

Attention: Mr. James M. Ellis

Subject: Report No. 49722
Classifications & LBR Testing
Proposed Gulf Islands National Seashore
Visitors Information Center
Naval Live Oak Reservation
Gulf Breeze, Florida
Your Purchase Order No. PX 2000-8-0799

Gentlemen:

As requested by Mr. Ellis and authorized by your purchase order referenced above we have completed classification and LBR testing on two samples which were delivered to our laboratory by Mr. Ellis. These samples were obtained on April 18, 1978 and were designated Sample #1 and Sample #2.

Sample #1 represents material from a depth from 14 inches to 4 feet below grade in an area where the water table was encountered at 4 feet a.m.s.l. this sample was located at building corner 6237. Sample #2 is located at building corner 6225 and was obtained between the depths of 14 inches to 5 feet below grade. The water table (4/18/78) was encountered at elevation 5.5 feet a.m.s.l. The above information was supplied to us along with the samples by Mr. Ellis.

The two samples were judged to be similar enough to combine and one LBR test series was performed. The samples are designated as relatively clean, fine sands, AASHTO A-3 (0) and Unified Classification-SP. The laboratory moisture density relationship (AASHTO T-180) produced a maximum density of 106 pounds per cubic foot at an optimum moisture content of 11.5 percent. The maximum LBR was 26.3 percent at 12.2 percent moisture. The range of LBR values was from 13.8 at a density of 102.6

May 3, 1978

pounds per cubic foot (96.8 percent compaction) and 8 percent moisture content up to 26.3 percent LBR at 105.9 pounds per cubic foot (99.9 percent compaction) at 12.2 percent moisture.

The LBR values can easily be converted to CBR values by multiplying the LBR times 0.8. The LBR test procedure uses a base of 800 while the CBR procedure uses a base of 1000.

We have enclosed all pertinent test data plus our invoice for the services. We appreciate this opportunity to help and would be pleased to provide additional testing or geotechnical services for the U.S. Department of the Interior, National Park Service as you may require. Limited brochure information is also enclosed for your information.

Sincerely,

PENSACOLA TESTING LABORATORIES, INC.



Charles L. Meister, P.E.

Vice-President

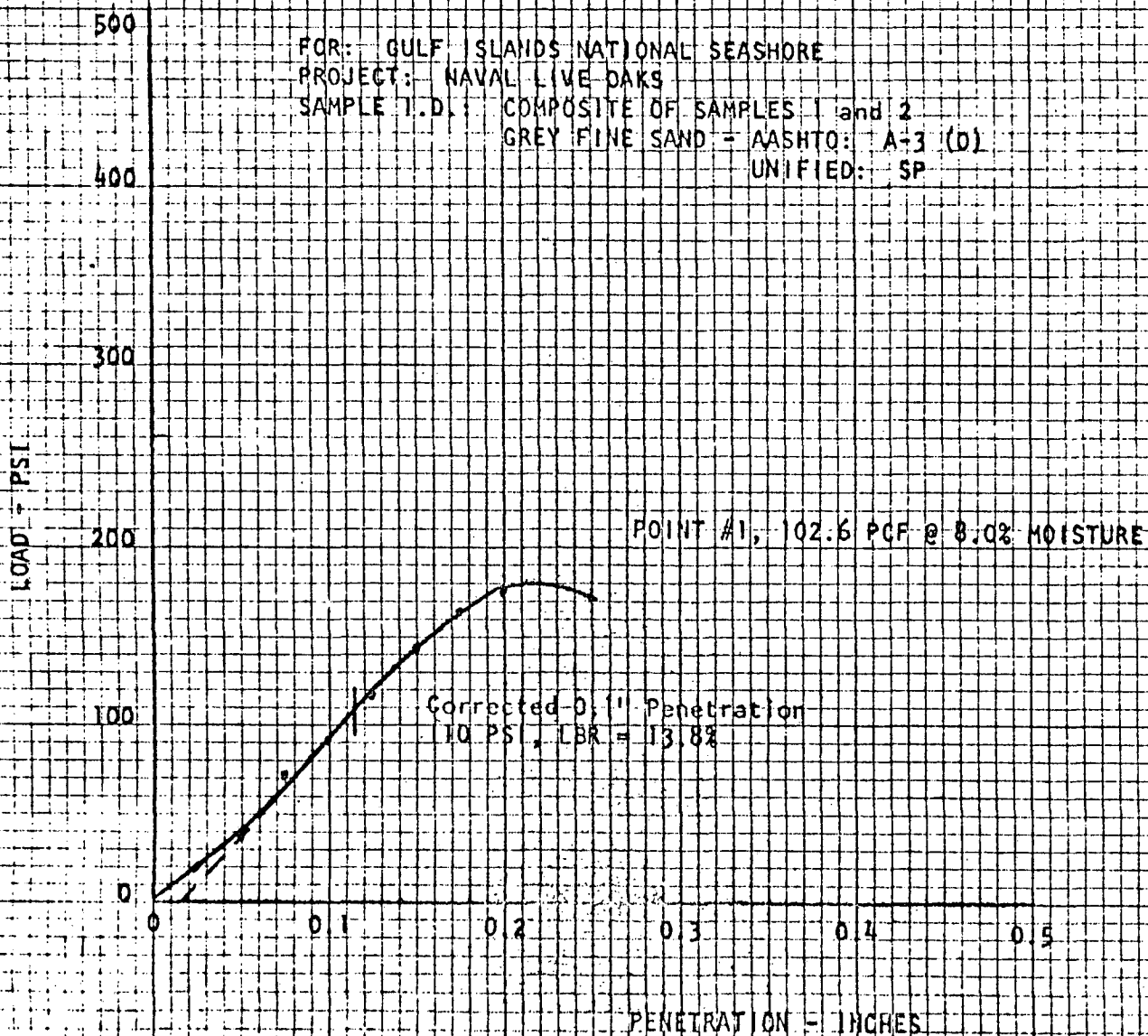
Florida Registration #4021

CLM/bh

cc: Mr. Jack F. Wilburn
Gulf Islands National Seashore
P. O. Box 100
Gulf Breeze, Florida 32561

PENSACOLA TESTING LABORATORIES
LIMEROCK BEARING RATIO

FOR: GULF ISLANDS NATIONAL SEASHORE
PROJECT: NAVAL LIVE OAKS
SAMPLE I.D.: COMPOSITE OF SAMPLES 1 and 2
GREY FINE SAND - AASHTO: A-3 (D)
UNIFIED: SP



Ch

PENSACOLA TESTING LABORATORIES
LIMEROCK BEARING RATIO

FDR: GULF ISLANDS NATIONAL SEASHORE
PROJECT: NAVAL LIVE OAKS
SAMPLE I.D.: COMPOSITE OF SAMPLES 1 and 2
GREY FINE SAND - AASHTO: A-3 (0)
UNIFIED: SP

POINT #2, 105.9 PCF @ 10.3% MOISTURE

Corrected 0.1" Penetration
155 PSI, LBR = 19.4%

LOAD - P.S.I.

500
400
300
200
100
0

0 0.1 0.2 0.3 0.4 0.5
PENETRATION - INCHES

CPM

PENSACOLA TESTING LABORATORIES
LIMEROCK BEARING RATIO

FOR: GULF ISLANDS NATIONAL SEASHORE
PROJECT: NAVAL LIVE OAKS
SAMPLE I.D.: COMPOSITE OF SAMPLES 1 and 2
GREY FINE SAND - AASHTO: A-3 (0)
UNIFIED: SP

POINT #3, 105.9 PCF @ 12.2%

LOAD - P.S.F.

500
400
300
200
100
0

Corrected 0.1" Penetration
210 PSI, LBR = 26.3

PENETRATION - INCHES

Ch

PENSACOLA TESTING LABORATORIES
LIMEROCK BEARING RATIO

FOR: GULF ISLANDS NATIONAL SEASHORE
PROJECT: NAVAL LIVE OAKS
SAMPLE I.D.: COMPOSITE OF SAMPLES 1 and 2
GREY FINE SAND - AASHTO: A-3 (0)
UNIFIED: SP

LOAD - P.S.F.

500

400

300

200

100

0

POINT #4, 105.4 PCF @ 14.5% MOISTURE

Corrected 0.1" Penetration
120 PSI, LBR = 15.0%

PENETRATION - INCHES

Ch

PENSACOLA TESTING LABORATORIES
LIMEROCK BEARING RATIO

FOR: GULF ISLANDS NATIONAL SEASHORE
PROJECT: NAVAL LIVE OAKS
SAMPLE I.D.: COMPOSITE OF SAMPLES 1 and 2
GREY FINE SAND - AASHTO: A-3 (0)
UNIFIED: SP

L.B.R. VS MOISTURE CONTENT

MAX. LBR = 26.3% @ 12.2% MOISTURE

% L.B.R.

% MOISTURE

Chm

PENSACOLA TESTING LABORATORIES, INC

CHEMICAL ANALYSES - INSPECTIONS - TESTS

PROCTOR

OFFICE AND LABORATORY

217 East Brent Lane

Pensacola, Florida 32503

Phone: 477-5100

PROJECT NAVAL LIVE OAKS, FLORIDA

FOR GULF ISLANDS NATIONAL SEASHORE

SAMPLE IDENTIFICATION GREY SAND, COMPOSITE OF SAMPLES #1 & #2

APPLICABLE SPECIFICATION AASHTO T-180 METHOD D

SAMPLED AND TESTED BY J. SIMS

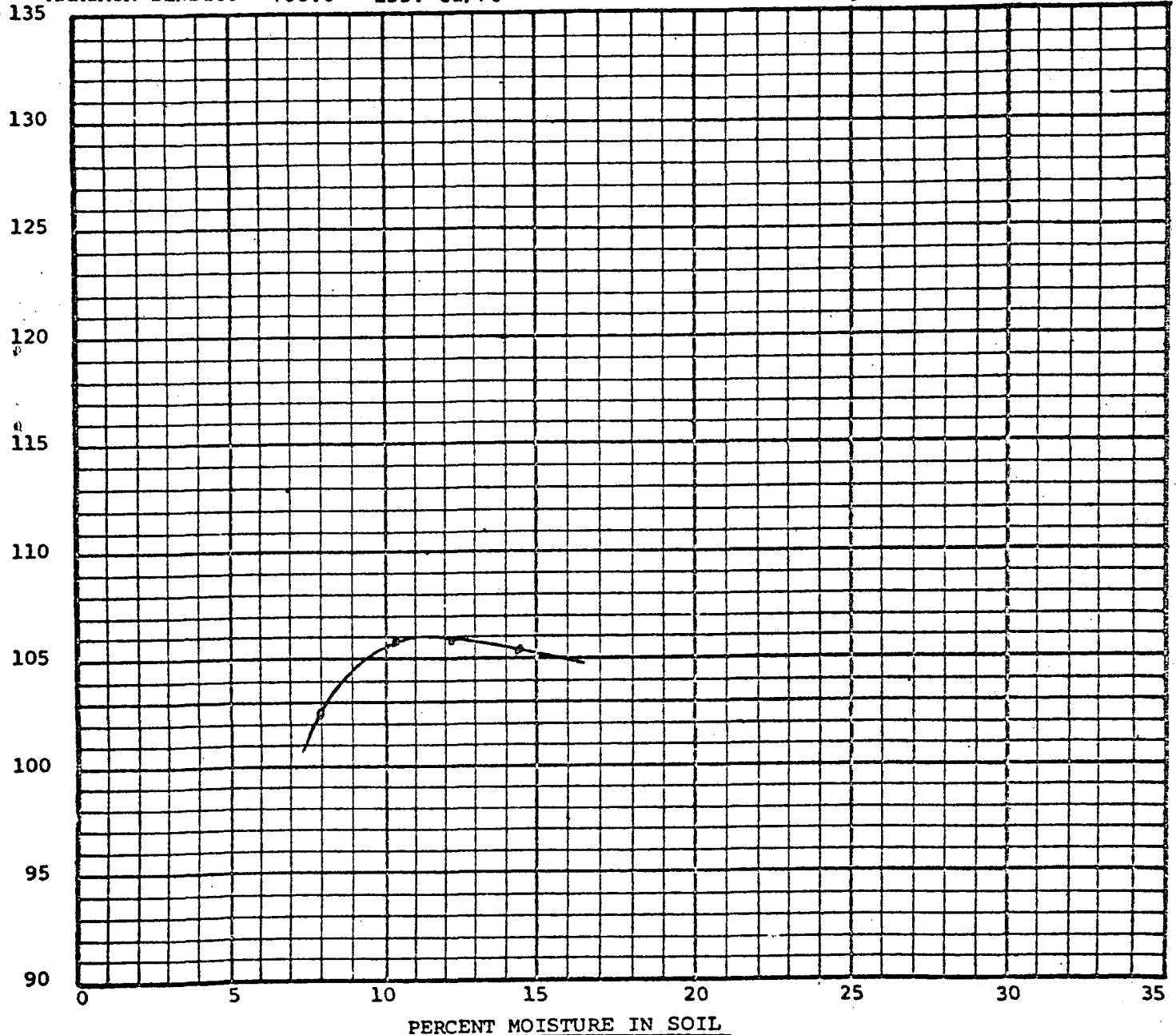
REPORT NO. 49722 bh

DATE 5/3/78

ORDER NO. PX 2000-8-0799

DATE

MAXIMUM DENSITY 106.0 Lbs. Cu/Ft. OPTIMUM MOISTURE 11.5 %



This report submitted for the exclusive use of the person, partnership, or corporation to who it is addressed, and neither the report nor the name of this laboratory nor of any members of its staff may be used in connection with the advertising or sale of any product or process without written authorization.

Reports to:

PENSACOLA TESTING LABORATORIES, INC.

217 E. Brent Lane
PENSACOLA, FLA.
PHONE 477-5100

PENSACOLA TESTING LABORATORIES, INC.



REPORT OF CLASSIFICATION OF SOIL

For GULF ISLANDS NATIONAL SEASHORE

Report No. 49722 bh
Date 5/3/78
Purchase Order No.

Sample Identification AS NOTED

Sample By J. SIMS

Date

PROJECT: NAVAL LIVE OAKS

SAMPLE #	LOCATION	% PASSING SIEVES						PLASTICITY INDEX	AASHTO CLASSIFICATION
		#10	#20	#40	#60	#80	#200		
1	Building Corner 6237 14" to 4'	100	99.3	72.4	16.4	7.0	5.8	NP	A-3 (0)
2	Building Corner 6225 14" to 5'	100	99.7	80.7	19.8	5.2	2.7	NP	A-3 (0)

Combined Samples for LBR Testing
AASHTO Classification (combined) = A-3 (0)
Unified Classification = SP

This report submitted for the exclusive use of the person, partnership, or corporation to whom it is addressed, and neither the report nor the name of this laboratory nor of any members of its staff may be used in connection with the advertising or sale of any product or process without written authorization.

Reports to:

PENSACOLA TESTING LABORATORIES



PENSACOLA TESTING LABORATORIES INC.

217 E. BRENT LANE • P. O. BOX 6309 • PENSACOLA, FLORIDA 32503

Phone 477-5100

Invoice No.: 5433 bh

Date: 5/3/78

To: United States Department of Interior
ROCKY MOUNTAIN REGIONAL OFFICE
655 PARFET STREET
P.O. BOX 25287
DENVER, COLORADO 80225

YOUR ORDER NO.		YOUR ORDER NO. PX-2000-8-0799		TERMS: NET 30 DAYS FOLLOWING INVOICE		Ch			
QUANTITY		DESCRIPTION				PRICE		AMOUNT	
Report # 722		PROJECT: PROPOSED GULF ISLANDS NATIONAL SEASHORE VISITORS INFORMATION CENTER							
		AASHTO Classification				\$ 40.00			
		LBR Value with Proctor Method "A"				175.00			
		Report				60.00			
		TOTAL						\$ 315.00	