The Narragansett Bay Commission
One Service Road
Providence, Rhode Island 02905

401 • 461 • 8848
401 • 461 • 6540 FAX
TTY (RI RELAY OPERATOR) 711

http://www.narrabay.com

January 11, 2012

Luly Massaro, Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, Rhode Island 02888

Subject: NBC's Response to Division Data Request Set I – Docket No 4305

Dear Ms. Massaro:

Attached please find an original and nine (9) copies of the response to the above data requests sent by the Division on January 3, 2012

Sincerely,

Karen L. Giebink
Director of Administration and Finance

DIV. 1-1. Please state whether NBC has pursued or is considering pursuing any modifications of the existing consent agreement to reduce combined sewer overflows including, but not limited to, a time extension, alternatives measures for achieving reductions, or waiver of the requirements.

Answer: NBC is considering pursuing modifications to the existing Consent Agreement. NBC is not considering a time extension as the CSO Program is currently on schedule and there would be no basis for an extension request. NBC is also considering a review of alternatives which may be less expensive than the currently proposed Phase III tunnel. The evaluation of these alternatives is expected to begin in about two years. This will allow two years for the evaluation of alternatives before Phase II construction is completed. NBC is not considering a waiver of requirements at this time. There are two reasons to request a waiver. First, NBC could request a waiver if it is meeting water quality standards. It is unlikely that this will be the case upon completion of Phase II. Second, NBC could request a waiver if expenditures for Phase III would result in projected rates that are deemed to be "unaffordable" according to EPA criteria. Based on the 2010 projections for Phase II and III costs, it appeared that NBC's rates may be considered high impact in certain communities in NBC's service area according to the EPA affordability criteria. NBC will update this analysis upon completion of Phase II and consider pursuing the waiver if it appears that the analysis shows high impact on these communities. (see also response to DIV.1-4).

Response prepared by: Tom Brueckner

DIV. 1-2. If the answer to the prior question was yes, please provide details, including any memos, analyses, Board of Directors' meeting minutes or other documentation

Answer: There is currently no documentation regarding evaluation of other alternatives.

Response prepared by: Tom Brueckner

DIV. 1-3. If the answer to question 1 was no, please explain why not.

Answer: See answer to DIV. 1-1.

Response prepared by: Tom Brueckner

DIV. 1-4. Please state whether NBC has prepared any studies or otherwise evaluated the affordability of its existing rates and/or its expected future rates as additional CSO construction is undertaken and must be financed. If yes, please provide all such analyses. If not, explain why not.

Answer: The original residential burden analysis was completed in April 1997 and although there has been a lot of interest in this issue, EPA has not updated the affordability guidance since it was issued in 1997. NBC has periodically updated the residential burden analysis portion. This was done as part of the first CSO Reaffirmation in 2005, for internal discussion in 2009 and again in as part of the second CSO Reaffirmation Report in 2010 (see attached).

Response prepared by: Tom Brueckner and Walter Edge

NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW
CONTROL FACILITIES PROGRAM

CONCEPTUAL DESIGN REPORT
AMENDMENT
REAFFIRMATION

January 14, 2005

The Narragansett Bay Commission
One Service Road
Providence, Rhode Island 02905

401 • 461 • 8848
401 • 461 • 6540 FAX

http://www.narrabay.com

Vincent J. Mesolella
Chairman

Paul Pinault, P.E.
Executive Director

HAND DELIVERED

Mr. Jay Manning
RIDEM
235 Promenade St.
Providence, RI 02908-5767

RE: Reaffirmation of Conceptual Design Report

Dear Mr. Manning:

In response to your letter of October 27, 2004 regarding the above-referenced matter, please find enclosed two (2) copies of the "Narragansett Bay Commission Combined Sewer Overflow Control Facilities Program Conceptual Design Report Amendment Reaffirmation" and two (2) completed copies of the Facilities Plan Reaffirmation Review Checklist. We do not believe that any significant changes have occurred in the five year interval since the FONSI was issued.

Should you have any questions on this matter, please contact Mr. Thomas Brueckner of my staff at 461-8848 x 362.

Very truly yours,

Thomas Brueckner

for Paul Pinault
Executive Director

c. R. Marshall/NBC
R. Bernier/NBC w/enclosures
J. Pratt/LBG w/enclosures

JAN 14 2005

Rhode Island Department of Environmental Management
Office of Water Resources

Facilities Plan Reaffirmation Review Checklist

If it has been less than five (5) years since the Facilities Plan has been approved, then reaffirmation is not necessary .

The following areas must be addressed for the Selected Alternative (If minor changes have occurred, reference the original Facilities Plan):

	Yes/No/NA* & Page No.
I. Statement of Current Need	CDR & CDRA 1.1
II. Planning Area	
A. A description of the planning area?	CDR & EA 1.2
B. A description of political jurisdictions?	CDR 1.4
C. A description of institutional (governmental unit) structure?	CDR & EA 1.2
D. A description of wastewater utility management structure?	CDR & EA 1.2
E. A description of the current rate structure?	Yes 11-1
F. Description of entities conducting planning?	CDR & EA 1.2
G. Relationship between the Facilities Plan (FP) and the Community Comprehensive Plan (CCP)?	EA 4.2
H. Is there a map which shows:	
1) Service Area (current & forecasted)?	CDR & EA 1.1
2) Political boundaries?	CDR & EA 1.1
3) Natural resources (e.g. wetlands, coastal features, sole source aquifers) consistent with CCP inventory?	CDRA EA 7-1
4) Cultural resources consistent with CCP inventory?	CDR EA 4-70
5) Historical and Archaeological resources consistent with CCP inventory?	Yes 10.3 CDRA EA 4-70

*NA = Not Applicable

III. Effluent Limitations

A. Copy of current RIPDES permit? — No

B. Is the receiving water "water quality limited"? — CDRA 3-8

IV. Assess Current Situation

A. Existing conditions in planning area

1. Socio - Economic Considerations

a) Changes in tax base — CDRA 11-10

b) Demographic changes — CDR EA 4-47; CDR 1-15

c) Land - use changes — CDR EA 4-50

2. Surface water quality, quantity, and uses? — CDRA 3-1

3. Groundwater quality, quantity, and uses? — CDR EA 4-28

4. Other environmental conditions

a) Air quality? — CDR EA 4-40

b) Noise levels? — CDR EA 4-43

c) Historical and archaeological sites? — Yes 10-1; CDRA EA 7-15

d) Related federal/state projects? — NA

e) Affected plant/animal communities? — NA

f) Documentation of ISDS problems in the planning area(s)? — NA

B. Existing System and Flows

1. Existing System

a) WWTF

1) location of all treatment plants, sludge treatment and disposal areas, pretreatment facilities, pumping stations, and collection systems? — CDR 2-37

2) WWTF performance compared to RIPDES permit? — CDR 2-37

3) Adequacy of plant hydraulics? — CDR 2-37

4) Quality of operation and process control? — NA

5) Actual number and qualifications of operating staff versus planned/needed? — NA

6) Adequacy of laboratory facilities? — NA

7) Adequacy of sampling & testing? NA

8) Adequacy of maintenance program? NA

9) Adequacy of cost recovery and user charges? Yes, 11-1

10) Impact of septage on WWTF? NA

11) Effluent treatment/reuse methods? NA

12) Sludge treatment/disposal/reuse methods? NA

13) Flow/waste reduction measures? NA

b) Collection system

1) Population served presently? CDR EA 4-49
CDR 1-15

2) Additional population to be served in the future? CDR EA 4-49
CDR 1-15

3) Location and description of major industrial discharges NA

4) Location of all bypasses and overflows, if applicable CDR 2-11

5) Description and location of new service area extensions NA

6) Developed areas served by on-site systems and documentation of problems in these areas NA

2. Existing flows

a) Average and peak? CDR 2-37

b) Dry and wet weather? CDR 2-37

c) Septage (in & out of town)? NA

d) Combined sewer overflows? CDRA 4-2

e) Infiltration/inflow? CDRA Appendix

f) Wastewater characteristics (BOD, TSS, etc.) CDRA Appendix

EXECUTIVE SUMMARY

The Narragansett Bay Commission prepared a "Concept Design Report Amendment" (CDRA) in April 1998 for its Combined Sewer Overflow Control (CSO) Facilities Program. NBC has prepared this "Conceptual Design Report Amendment Reaffirmation" (Reaffirmation) in order to satisfy RIDEM requirements related to the SRF funding program. This Reaffirmation affirms that the CSO Control Facilities Program presented in the CDRA has not substantially changed.

The Program is still to be constructed in three phases. Phase I facilities consist of a 62 Million Gallon storage tunnel, an associated pump station and seven drop shafts to convey flow to the tunnel. Changes from the CDRA are extension of the tunnel an additional 2,500 feet for a total length of 16,000 feet with a new termination location on land owned by the NBC and the elimination of two stub tunnels. Phase II facilities are basically unchanged, consisting primarily of two consolidation interceptors that collect overflows along the Seekonk and Woonasquatucket Rivers to convey these flows to the tunnel. There have been two minor changes to facilities proposed for Phase II. The east end of the Woonasquatucket consolidation conduit has been adjusted slightly to terminate on land owned by NBC near the new termination shaft of the tunnel. Also, a wetland facility proposed in Central Falls has also been moved slightly on the same parcel originally proposed for its location. There are no changes proposed for the Phase III facilities. Updated construction costs for the three phases have also been provided. These costs have been revised based on actual costs for Phase I facilities and adjustment for inflation to the middle of the construction period for each phase. These changes are discussed in Section 10 of the Reaffirmation.

The effect of the updated costs on user fees is discussed in Section 11. There have been no changes to Sections 1-9.

SECTION 1
BACKGROUND

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Control Facilities Program, conceptual Design Report Amendment," dated April 17, 1998.

SECTION 2
EXISTING SEWERAGE FACILITIES

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Control Facilities Program, conceptual Design Report Amendment," dated April 17, 1998.

SECTION 3
WATER QUALITY OBJECTIVES AND CRITERIA

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Control Facilities Program, conceptual Design Report Amendment," dated April 17, 1998.

SECTION 4
EXISTING CONDITIONS

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Control Facilities Program, conceptual Design Report Amendment," dated April 17, 1998.

SECTION 5
PREVIOUSLY PROPOSED CSO ABATEMENT FACILITIES

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Control Facilities Program, conceptual Design Report Amendment," dated April 17, 1998.

SECTION 6
ALTERNATIVE TECHNOLOGIES AND APPROACHES

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Control Facilities Program, conceptual Design Report Amendment," dated April 17, 1998.

SECTION 7
SUMMARY OF ENVIRONMENTAL IMPACTS AND BENEFITS

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Control Facilities Program, conceptual Design Report Amendment," dated April 17, 1998.

SECTION 8
COST OF ALTERNATIVES

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Control Facilities Program, conceptual Design Report Amendment," dated April 17, 1998.

SECTION 9
EVALUATION OF ALTERNATIVES AND SELECTION OF RECOMMENDED ALTERNATIVE

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Control Facilities Program, conceptual Design Report Amendment," dated April 17, 1998.

SECTION 10
CONCEPT DESIGN OF RECOMMENDED ALTERNATIVE

10.1 DESCRIPTION OF RECOMMENDED ALTERNATIVE

10.1.1 Introduction

In Section 9, system alternatives were evaluated and Alternative 17 was selected as the recommended alternative. The recommended alternative consists of two deep rock tunnels; CSO interceptors in each service area to transmit flow from remote CSO's to the tunnels; sewer separation; one wetland and upgrading the BPWWTF to accept flows from OF 002. The two tunnels are the Pawtucket Tunnel in the BPSA and Main Spine Tunnel in the FPSA. The remaining outfalls that have smaller CSO flows are either blocked or are controlled using regulator adjustments and nine minimum controls.

A number of issues relating to siting, final design and operation of the recommended alternative facilities will be resolved during preliminary and detailed design. If resolution of these issues results in a substantial change to the alternative, the changes will be submitted to RIDEM for prior approval. Additionally, an operating plan will be developed and submitted for approval during detailed design.

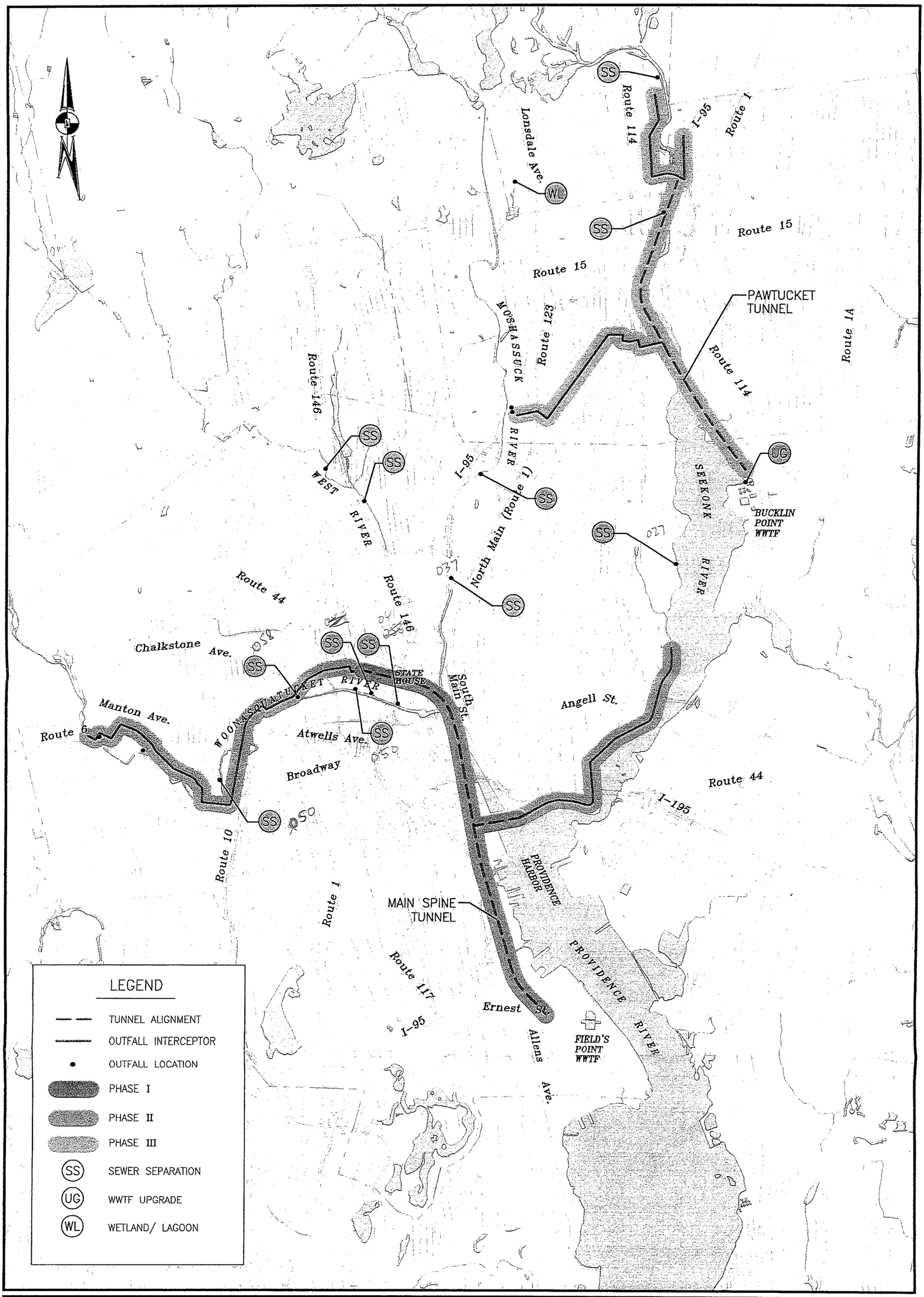
The implementation of Alternative 17 would proceed on a phased basis to allow for the economic impacts of the project financing to occur over an extended period of time. Phasing of the CSO control program also allows for technology reviews and water quality monitoring to occur after as well as during each phase. Before initiating Phase II and Phase III of Alternative 17, NBC will conduct an evaluation of water quality improvements and technologies as well as possible storm water controls to determine if future phases of the alternative should be modified to meet the requirements of the Clean Water Act and the RI Water Quality Regulations.

The facilities proposed to be built under the three phases of Alternative 17 are shown in Figure 10.1-1 and are described in the following sections.

10.1.2 Recommended Alternative - Phase I

10.1.2.1 Main Spine Tunnel

The Main Spine Tunnel consists of a 26-foot internal diameter (ID) tunnel, 16,000-feet long with a storage volume of 62 MG. It will begin at a site near the Field's Point WWTF and terminate just to the west of the Foundry Complex in Providence. The Main Spine tunnel will convey the stored flow directly to a pump station located at the downstream end of the tunnel. The flows will be pumped from this pump station to the FPWWTF for treatment. The pump station will be capable of pumping the tunnel volume within 36 hours (50 MGD). Figure 10.1-2 shows the proposed alignment of the Main Spine Tunnel. Figure 10.1-3 shows the proposed profile of the tunnel, as well as the approximate location of bedrock.



The LOUIS BERGER GROUP, Inc.

NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW CONTROL FACILITIES

RECOMMENDED ALTERNATIVE
ALTERNATIVE 17

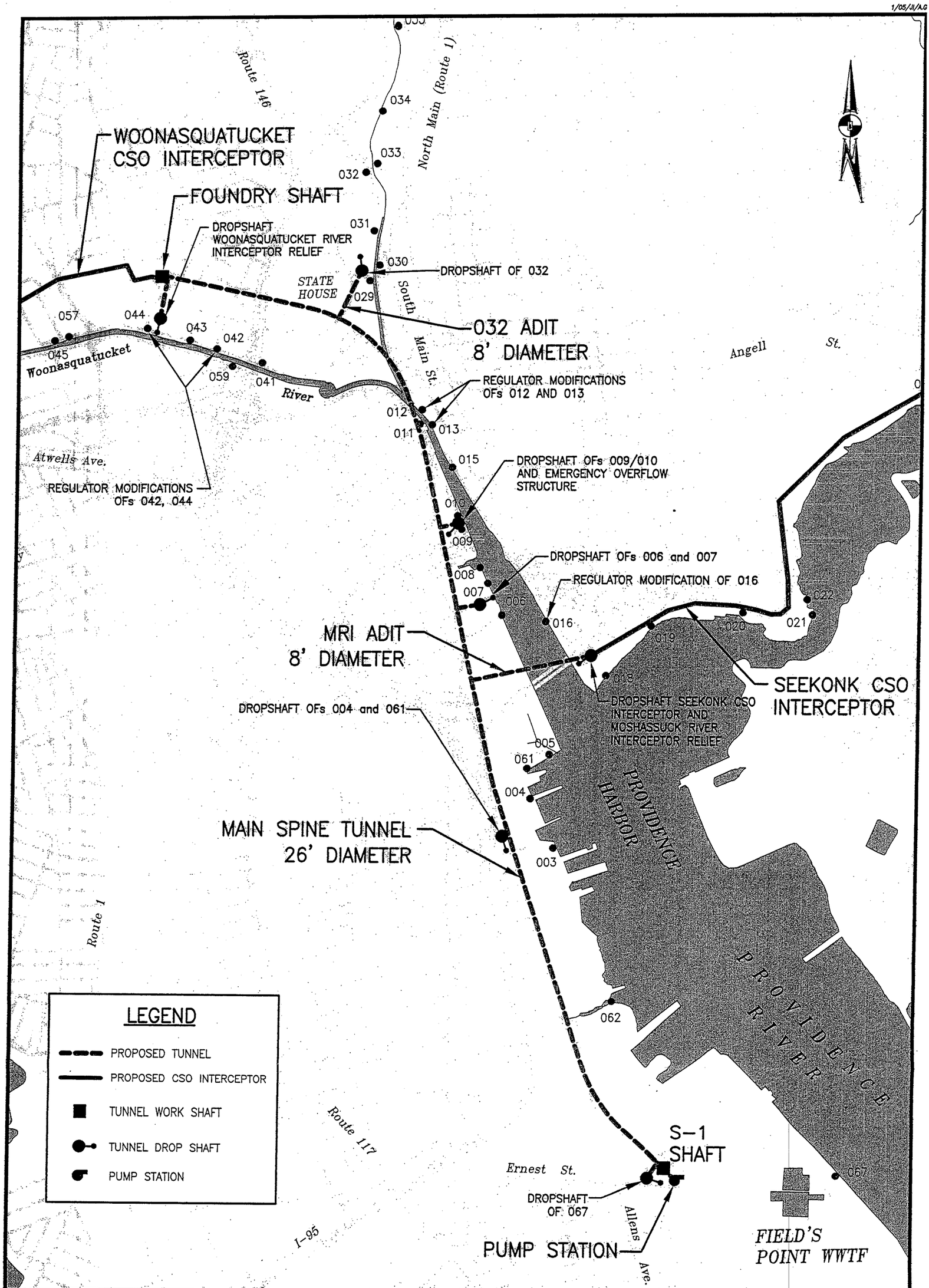
Figure: 10.1-1

File: A17P1C-R2-5.dwg

Source: PM

Scale: 1" = 3,500'

January 2005



The LOUIS BERGER GROUP, Inc.

NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW CONTROL FACILITIES

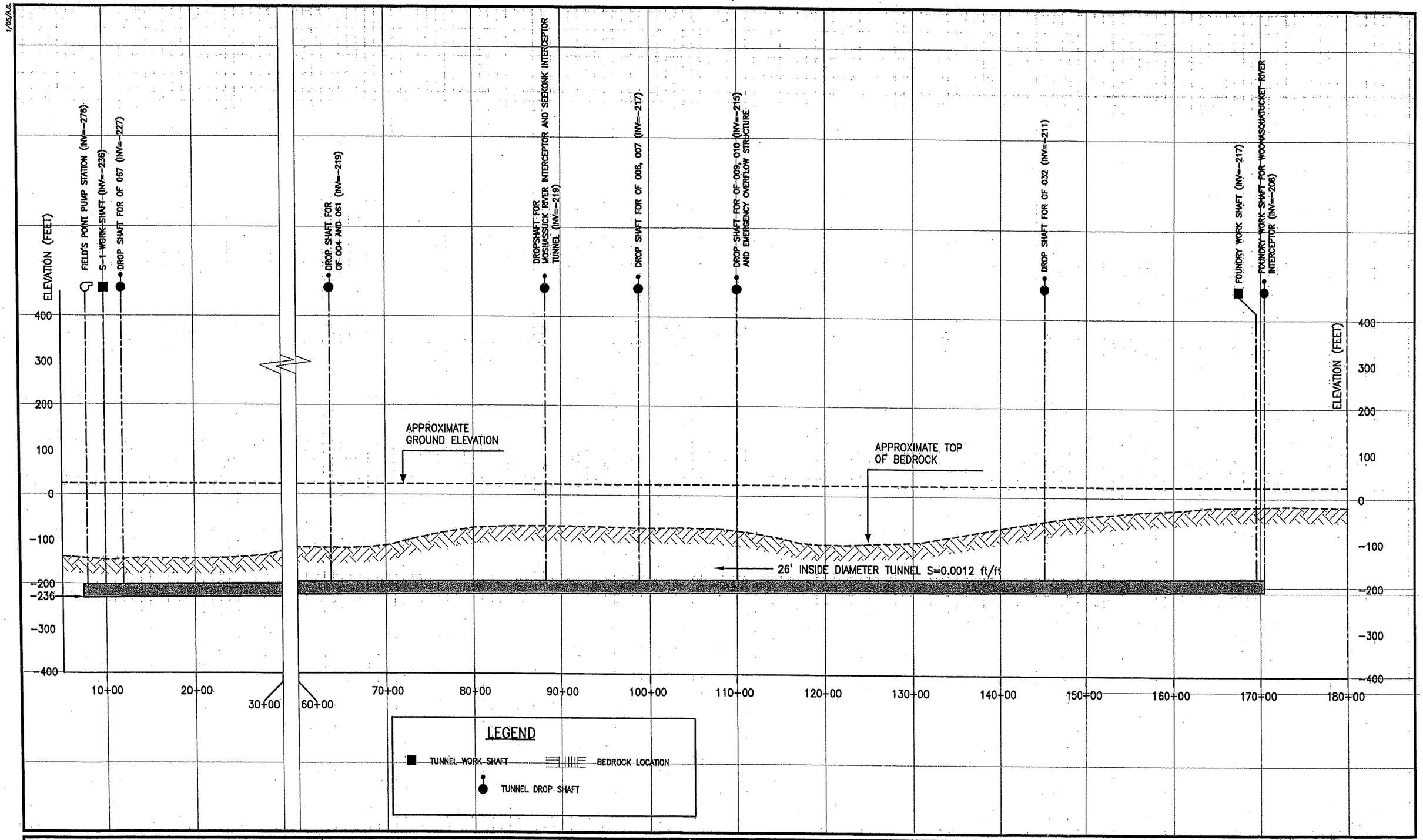
MAIN SPINE TUNNEL ALIGNMENT

Figure 10.1-2

File: P1C-R2-29.dwg

Source: PM | Scale: 1" = 1300' | January 2005

1/05/A.C.



NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW CONTROL FACILITIES

The LOUIS BERGER GROUP, Inc.

PROFILE - MAIN SPINE TUNNEL

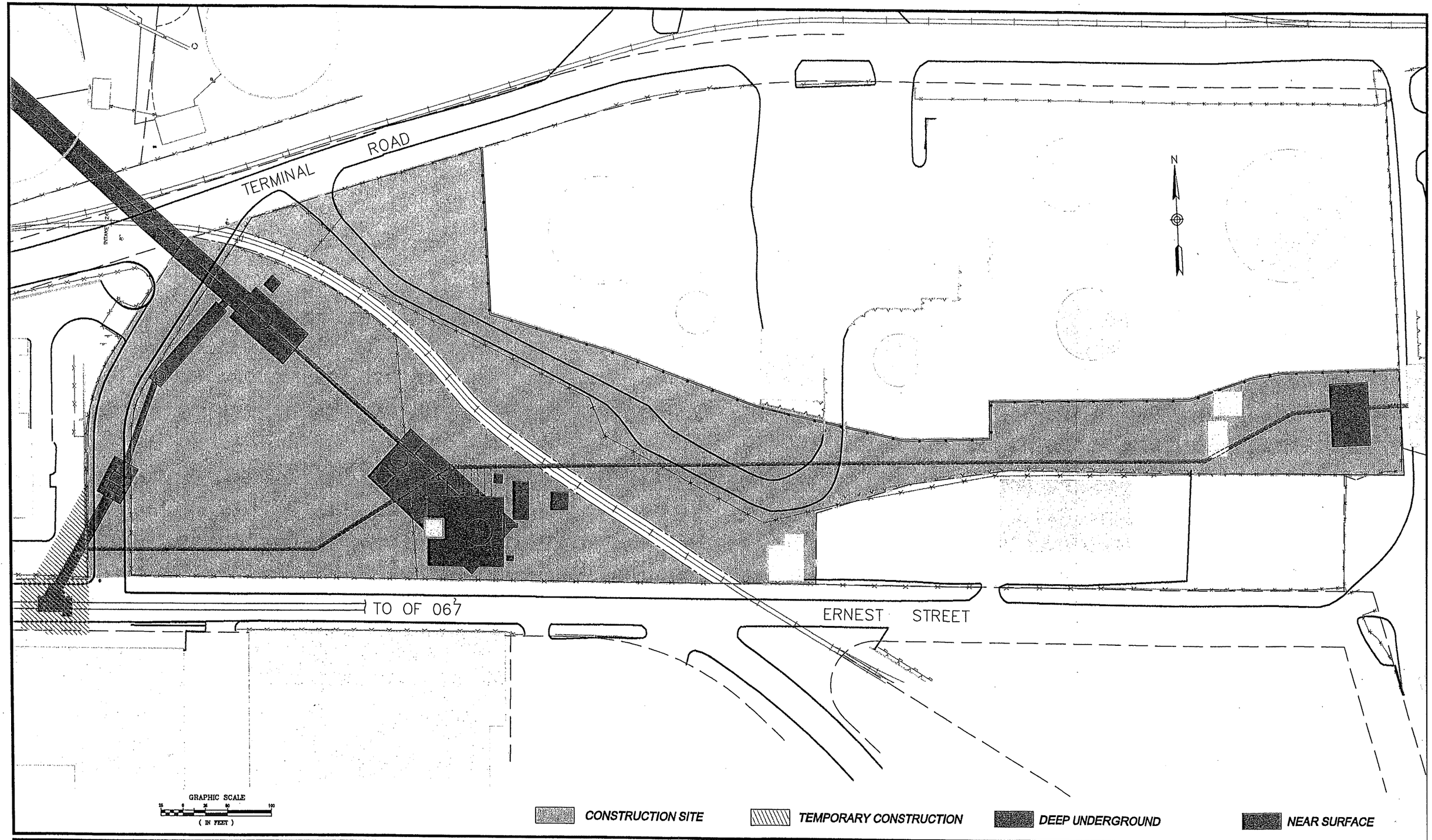
Figure: 10.1-3

File: P1C-R2-32.dwg

Source: PM

Scale: AS SHOWN

January 2005



NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW
CONTROL FACILITIES

The LOUIS BERGER GROUP, Inc.

SITE S1 AND OUTFALL 067

Figure: 10.1-4

File: P1C-R2-32.dwg

Source: PM

Scale: 1"=100'

January 2005

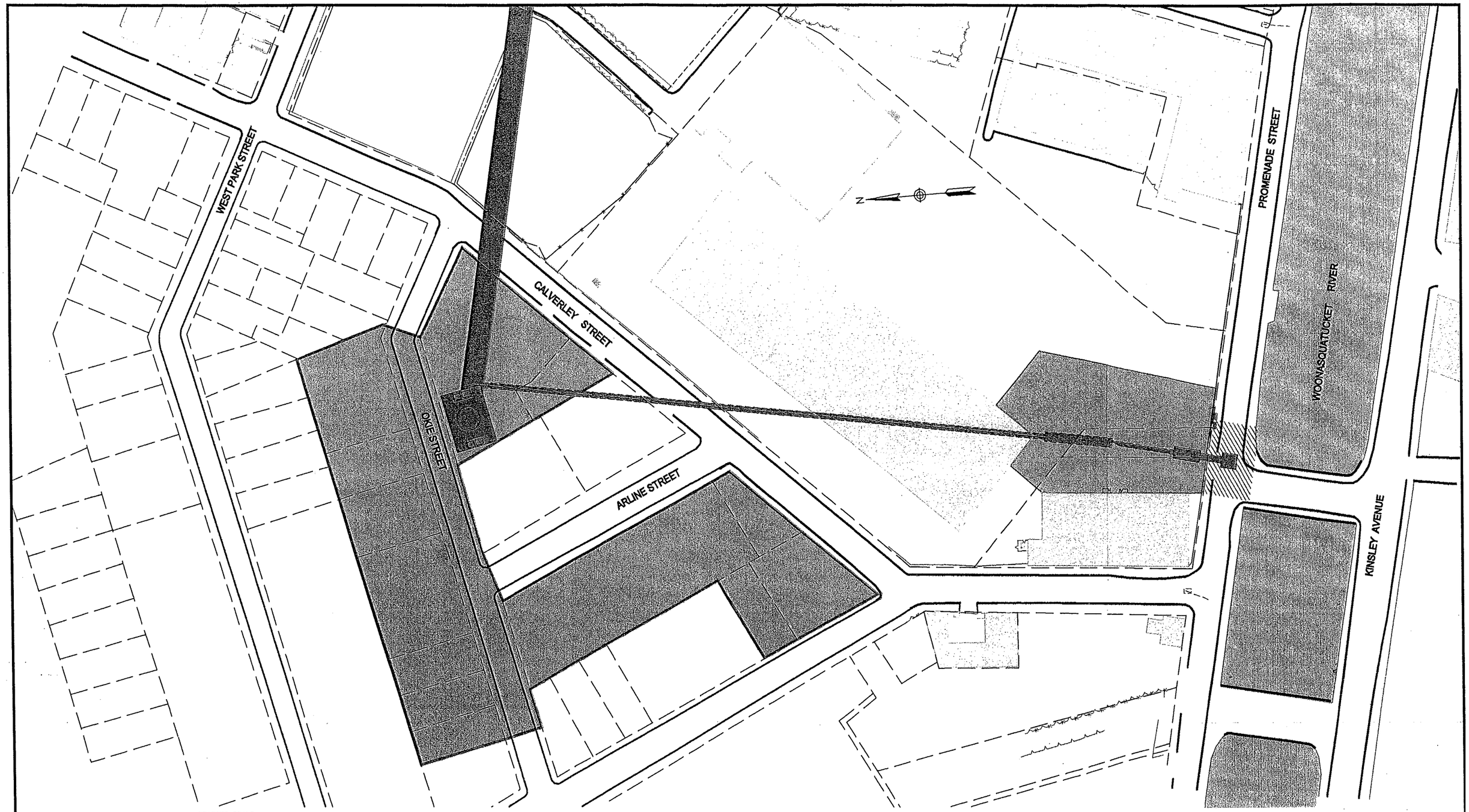
The tunnel will be bored at depths greater than 100-feet below ground surface in bedrock with at least two tunnel diameters of bedrock above the crown of the tunnel. The tunnel will be lined with pre-cast concrete segments during construction followed by a cast in place finish liner after tunnel boring has been completed. Access during construction will be through two work shafts, one at each end of the tunnel. Two additional shafts will be constructed for access to the Tunnel Pump Station.

The main construction site for the Main Spine Tunnel will be the S-1 site which is located in the southeasterly end of the City of Providence on a parcel of land abutted by Terminal Road, Ernest Street, and Ellis Street. The S-1 parcel is owned by NBC and contains approximately 7.0 acres. The S-1 site will accommodate excavation of four (4) shafts (the main excavation shaft S-1, two tunnel pump station shafts and the OF 067 drop shaft), pump station excavation and fit out, and all associated staging and storage activities, including the removal of all spoil material associated with the tunnel boring operation. The Pump Station shafts are located about 370 feet from the S-1 shaft in a line extending from the Main Spine Tunnel. The location and plan of the S-1 Site are shown at Figure 10.1-4.

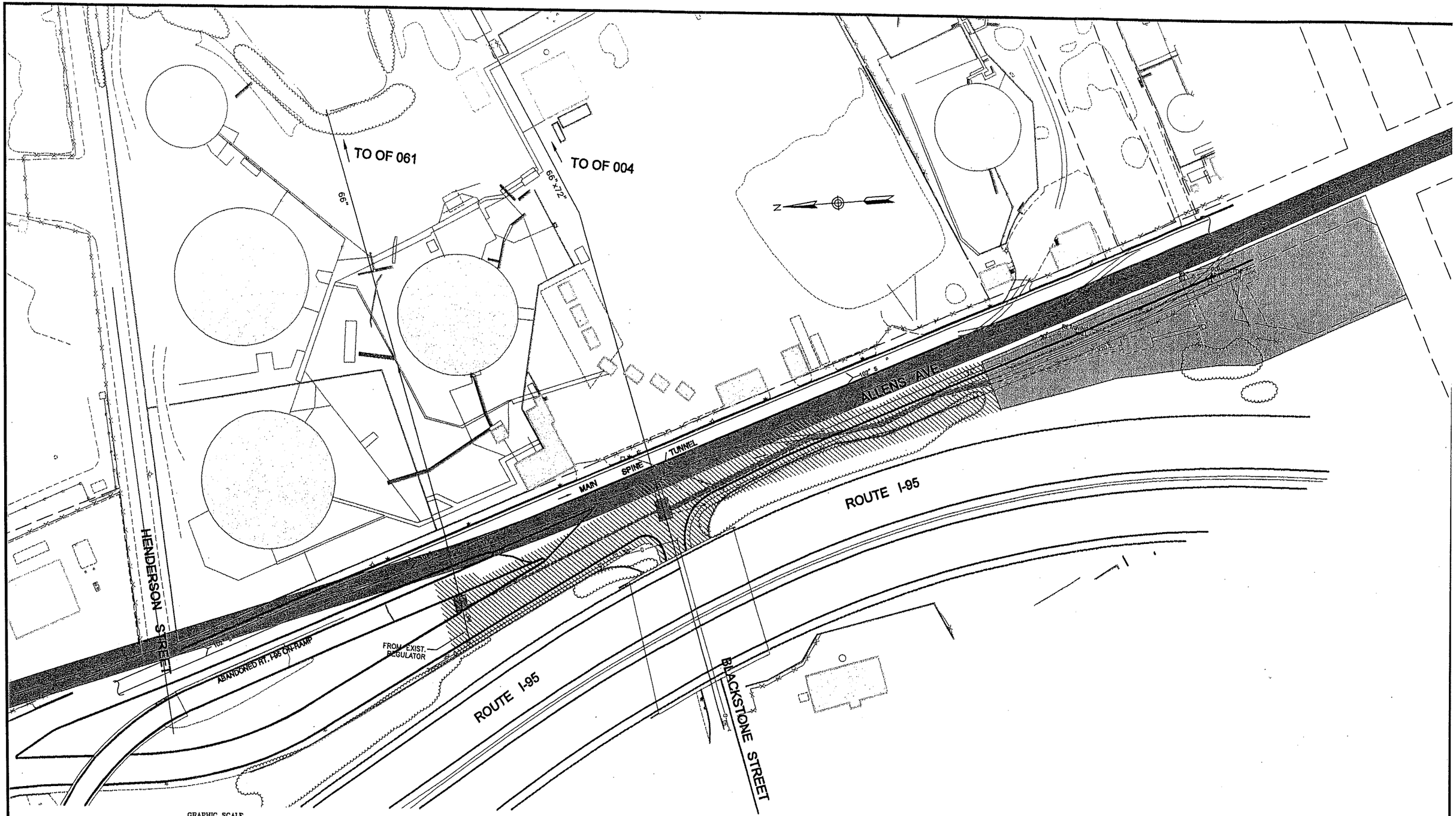
The Main Spine Tunnel will terminate at the Foundry site. The Foundry work shaft site is located just to the west of the Foundry Complex in the Smith Hill area of the City of Providence. It is bounded by Bath, Okie and Calverly Streets on land formerly owned by RIDOT and formerly occupied by their maintenance headquarters. NBC acquired the approximately 2.7 acre site from RIDOT in September 2001. Activities at this site will include construction of the termination shaft, removal of the Tunnel Boring Machine, and the excavation of the Woonasquatucket River Interceptor Relief Adit. The location and plan of the Foundry Site are shown on Figure 10.1-5.

The Main Spine Tunnel will store flow from twelve outfalls (OF's 004, 006, 007, 009, 012, 013, 016, 032, 042, 044, 061 and 067) to be diverted to the tunnel from seven (7) drop shafts to be constructed along the tunnel route as part of Phase I. A description of the location of the drop shafts is provided in Table 10.1-1. The location of the 067 drop shaft is shown on the S-1 site plan, Figure 10.1-4. The location of the WRI drop shaft is shown on the Foundry Site plan, Figure 10.1-5. The location of the remaining five (5) drop shafts are shown on Figures 10.1-6 through 10.1-10.

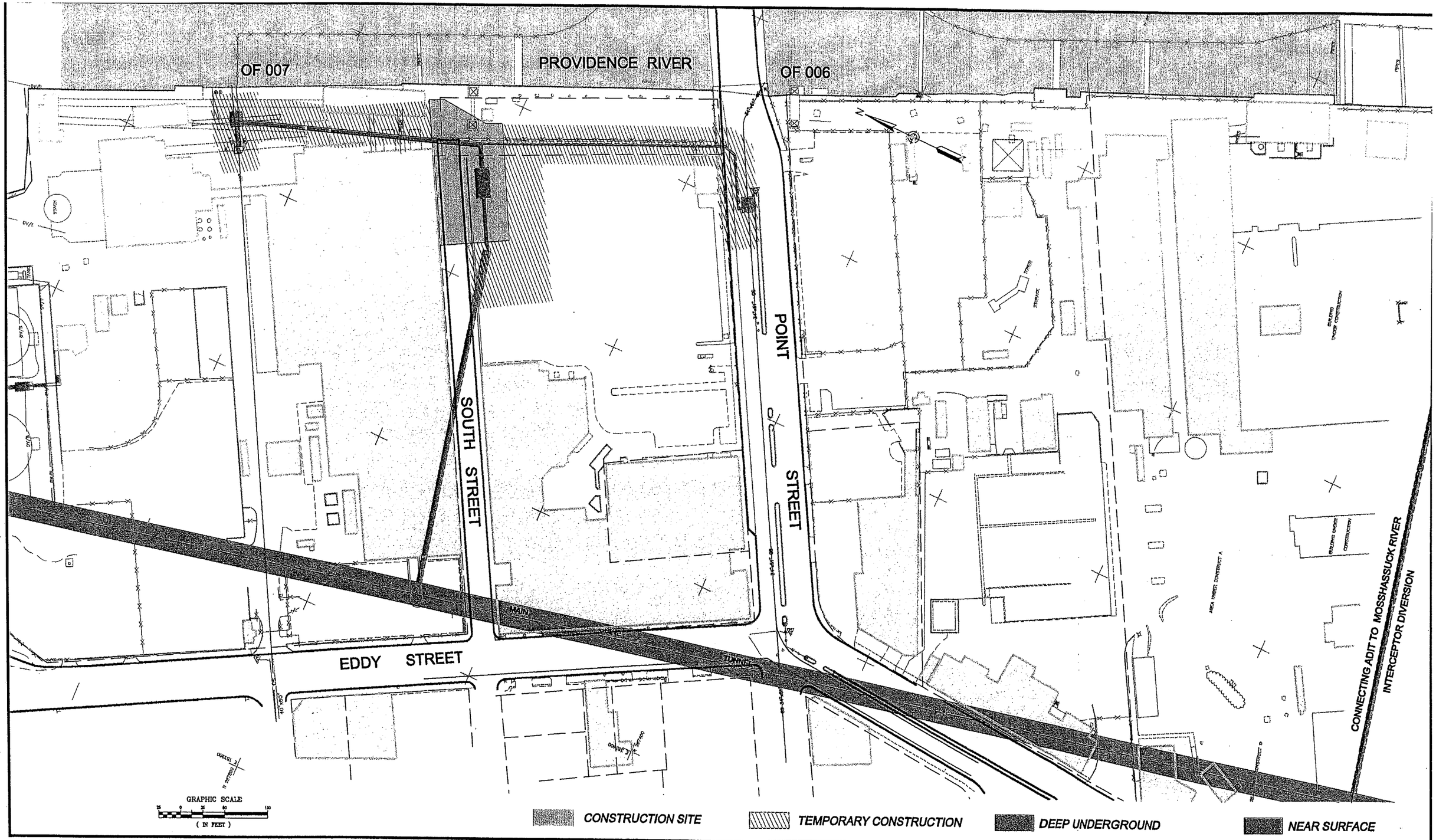
Table 10.1-2 provides a summary of how the CSO's in Phase I will be controlled. Most will discharge directly to drop shafts but five (5) of the overflows will be controlled through regulator modifications and two (2) interceptor relief structures.



NARRAGANSETT BAY COMMISSION COMBINED SEWER OVERFLOW CONTROL FACILITIES	The LOUIS BERGER GROUP, Inc.	FOUNDRY WORK SHAFT/ WOONASQUATUCKET RIVER INTERCEPTOR DROP SHAFT	Figure: 10.1-5
			File: P1C-R2-LBG203.dwg
		Source: PM / Scale: 1"=100'	January 2005



NARRAGANSETT BAY COMMISSION COMBINED SEWER OVERFLOW CONTROL FACILITIES	The LOUIS BERGER GROUP, Inc.	OUTFALL 004/061	Figure: 10.1-6
		Source: PM / Scale: 1"=100'	File: P1C-R2-LBG203.dwg
			January 2005



NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW CONTROL FACILITIES

The LOUIS BERGER GROUP, Inc.

OUTFALL 006/007

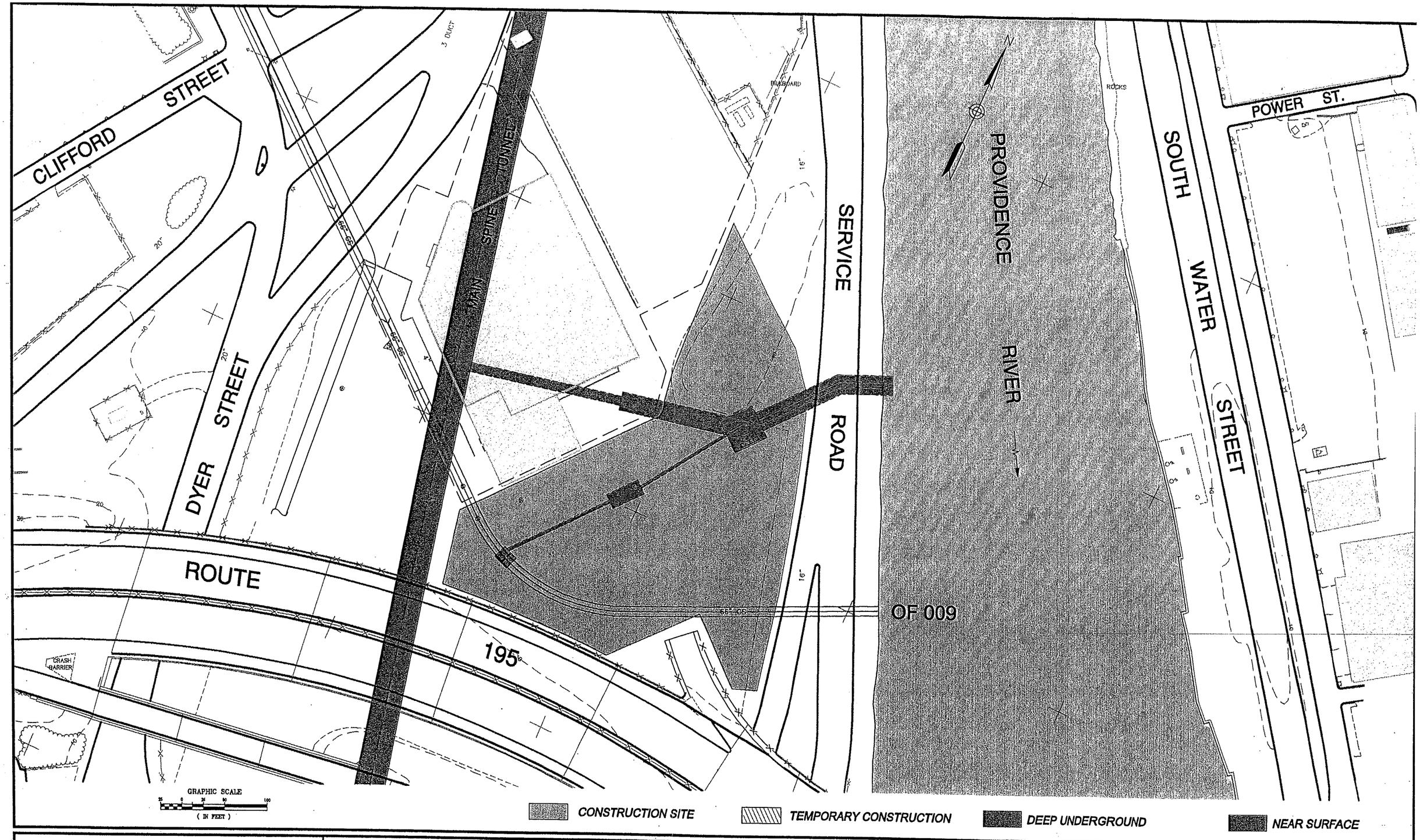
Figure: 10.1-7

File: P1C-R2-LBG203.dwg

Source: PM

Scale: 1"=100'

January 2005



NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW CONTROL FACILITIES

The LOUIS BERGER GROUP, Inc.

OUTFALL 009/EOS

Figure: 10.1-8

File: P1C-R2-LBG203.dwg

Source: PM

Scale: 1"=100'

January 2005

I-195

TOCKWOTTON STREET

SOUTH MAIN STREET

FUTURE INTERSTATE I-195 (START CONSTRUCTION SUMMER/FALL 2002)

FUTURE INTERSTATE I-195

INDIA STREET

EXIST. 62"

STORAGE AREA

WATER STREET

HURRICANE BARRIER

OF 016

PROVIDENCE RIVER

GRAPHIC SCALE
(IN FEET)

CONSTRUCTION SITE | TEMPORARY CONSTRUCTION | DEEP UNDERGROUND | NEAR SURFACE

NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW CONTROL FACILITIES

The LOUIS BERGER GROUP, Inc.

MOSHASSUCK RIVER INTERCEPTOR

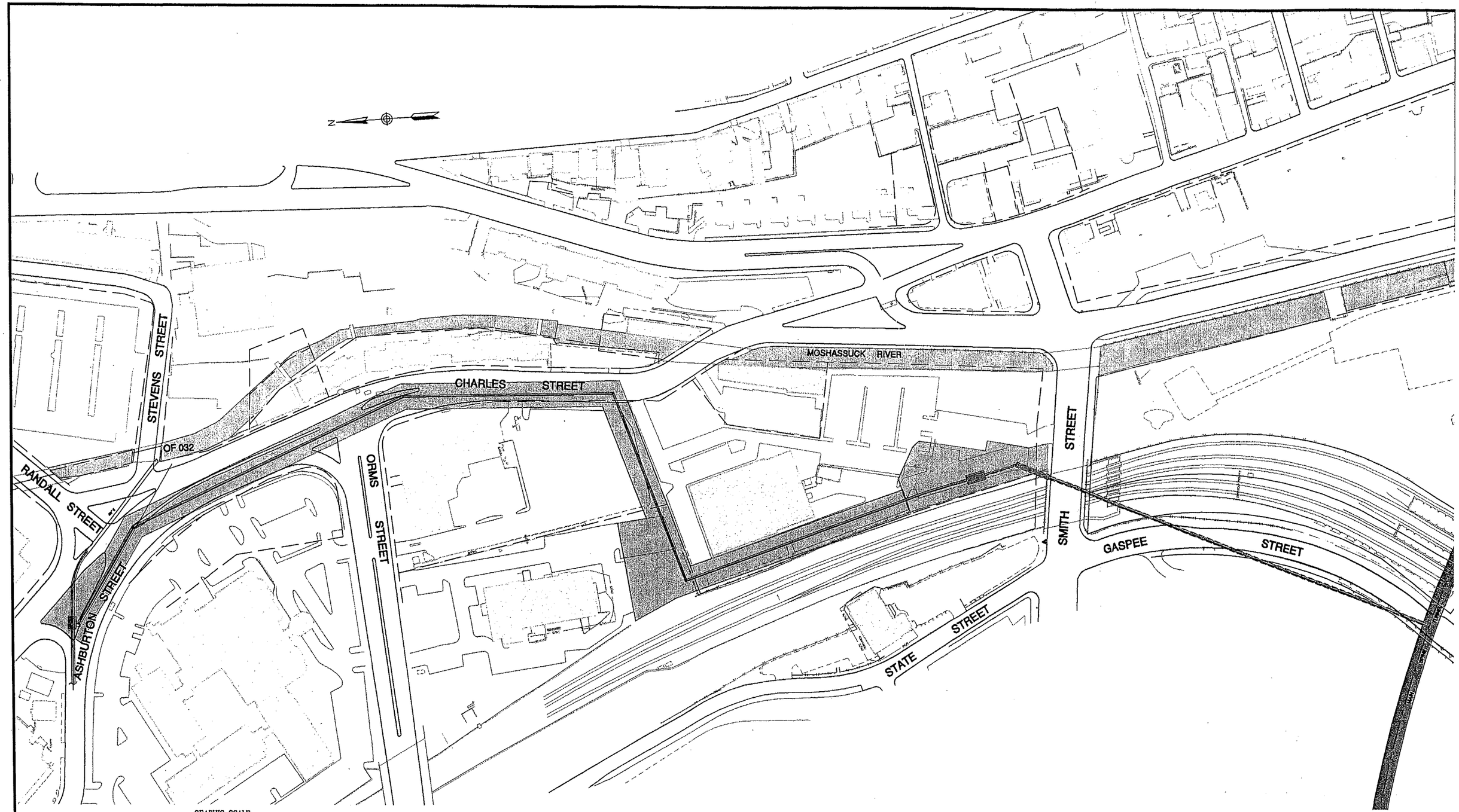
Figure: 10.1-9

File: P1C-R2-LBG203.dwg

Source: PM

Scale: 1"=100'

January 2005



NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW CONTROL FACILITIES

The LOUIS BERGER GROUP, Inc.

OUTFALL 032

Figure: 10.1-10

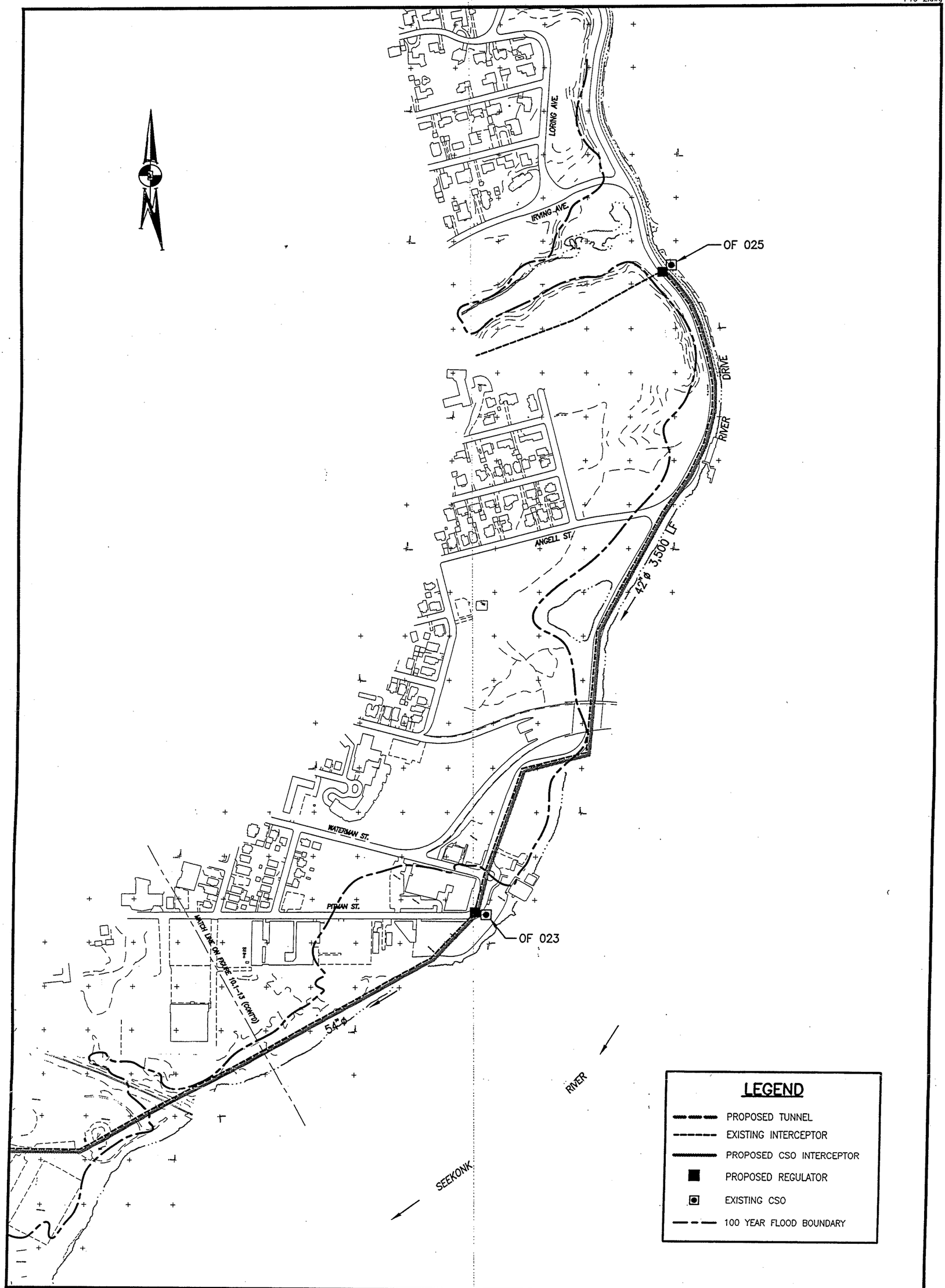
File: P1C-R2-LBG203.dwg

Source: PM

Scale: 1"=160'

January 2005

P1C-2.dwg



LOUIS BERGER & ASSOCIATES, INC.

NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW
CONTROL FACILITIES

SEEKONK CSO INTERCEPTOR SITE PLAN

Figure: 10.1-13

File: P1C-58.dwg

Source: LDM

Scale: 1"=400 Feet

March 1998

TABLE 10.1-1
MAIN SPINE TUNNEL
LOCATION OF DROP SHAFTS

Drop Shaft	Location
067	Ellis Street and Ernest Street, Providence
004, 061	Allens Avenue at Public St. adjacent to Route I-95, Providence
006 and 007	Davol Square Parking lot near east end of South St., Providence
009/010	Dyer Street at Route I-195 Exit 1 off ramp in a parking lot owned by RIDOT, Providence
032	In Delta Dental Parking Lot near Smith St., Providence
Moshassuck River Interceptor Relief	South of Hurricane Barrier at India St. and South Water St., Providence
Woonasquatucket River Interceptor Relief	Foundry Complex Parking Lot at Promenade St near Bath St., Providence

TABLE 10.1- 2
MAIN SPINE TUNNEL CSO CONTROL SUMMARY

Structure	CSOs Controlled	Dropshafts
Main Spine Tunnel 16,000 LF	OF 004, 006, 007, 009, 032, 061 067	5
MRI Relief and Regulator Modifications	OF 012, 013, 016	1
WRI Relief and Regulator Modifications	OF 042, 044	1
Sewer Separation	OF 043	

The Woonasquatucket River Interceptor (WRI) relief structure will draw down the flow in the WRI, providing additional capacity for OF's 042 and 044. Regulator modifications at these two overflows will direct flow into the interceptor. Similarly, a relief structure on the Moshassuck River Interceptor (MRI) will free up interceptor capacity to accommodate additional flows from regulator modifications at OF's 012, 013 and 016. OF 043 will be eliminated in Phase I by sewer separation.

Near surface facilities are required at each of the seven drop shaft sites. These facilities include diversion structures, consolidation conduits, gate and screening structures, approach channels, and drop shafts. Diversion structures are required to convey overflows from the existing interceptor system through the consolidation conduits to the gate and screening structures. The gate and screening structures protect the entrance to the drop shaft by removing large objects from the flows. Sluice gates within the structures prevent overfilling of the tunnel. The primary function of the approach channel is to direct flows tangentially as they enter the top of the drop shaft. This imparts a rotation to the flow, beginning a vortex motion as it drops down the shaft.

Surface facilities will be constructed relatively close to the ground surface, depending on the depths of the connecting points and obstructions, such as existing utility lines. Conventional temporary supports in overburden soils, such as steel sheeting and soldier pile and lagging, may be used for the excavation of these facilities. Various diameter pipes, which may be installed either by pipe jacking, microtunneling, or open cut techniques, will serve as connectors between these structures.

Construction of Phase I began in May 2001. Facilities associated with the Main Spine Tunnel that have been completed to date are:

- MRI Drop Shaft and appurtenances
- OF 004/061 Drop Shaft and appurtenances
- OF 006/007 Drop Shaft and appurtenances
- OF 009/EOS Drop Shaft and appurtenances
- Tunnel Shaft S-1, two tunnel pump station shafts and Tunnel Pump Station Cavern
- Foundry Work Shaft
-

Phase I construction is expected to be complete in June 2008.

10.1.2.2 Bucklin Point Wastewater Treatment Facility Upgrade

The recommended upgrade to the Bucklin WWTF includes: construction of new head works sized for a peak wet weather flow of 116 MGD; construction of new primary clarifiers for dry weather treatment; modifications to the existing primary clarifiers, disinfection facilities, and effluent pumping station for wet weather treatment only; conversion of the existing aeration system to fine bubble system; and construction of a new UV disinfection and pumping facility for dry weather flows. Construction began in

February 2002 and is expected to be completed in March 2006.

Up to 46 MGD of dry weather flow would be treated in the new primary clarifiers, the existing secondary facilities, and new disinfection facilities. Wet weather flow in excess of 46 MGD, up to an additional peak capacity of 70 MGD, would be treated in the reconstructed existing primary clarifiers and the existing disinfection system before combining with the dry weather secondary effluent for discharge through the existing outfall to Seekonk River.

10.1.2.3 Nine Minimum Controls/Regulator Modifications

Minimum level of treatment will be provided at outfalls that activate less than four times per year and/or have minimal overflow volume. Based on flow monitoring data, three outfalls in Phase I have been identified as needing minimal level of treatment (nine minimum controls): OFs 005, 011 and 033.

A hydraulic analysis of potential regulator modifications to reduce or eliminate CSO's was performed as part of the SWMM study in Phase IA. As a result of this analysis, the following regulators were recommended for modifications: OF's 207, 209, 212 and 215. Flow monitoring is now being conducted to determine if these regulators can be modified to eliminate these overflows.

Overflows 036, 048 and 052 are also candidates for nine minimum controls because SWMM modeling has predicted that these outfalls would activate infrequently. These outfalls are currently being monitored to determine how frequently they overflow. If flow monitoring indicates that these outfalls discharge on the average more than 4 times per year, then NBC will proceed with sewer separation or some other means to control these overflows. NBC will evaluate if the additional sewer separation meets the requirements of the Clean Water Act and the RI Water Quality Regulations.

10.1.2.4 Blocked Outfalls

A total of 19 outfalls have been blocked in the FPSA, including the following: OF's 010, 015, 020, 021, 022, 024, 026, 028, 029, 031, 034, 038, 047, 057, 059, 062, 063, 065 and 066. One outfall, OF 102, has been blocked in the BPSA.

10.1.2.5 Monitoring Plan

(This section has not been amended)

10.1.2.6 Other Studies

(This section has not been amended)

10.1.3 Recommended Alternative – Phase II

10.1.3.1 FPSA CSO Interceptors

Two CSO Interceptors are proposed to be constructed in the Fields Point Service Area during this phase. These CSO Interceptors will convey the flows from outfalls along the Woonasquatucket and Seekonk Rivers to the Main Spine tunnel.

The Woonasquatucket CSO Interceptor (24 to 72-inch; 19,150 LF) will convey flows from OF's 045, 046, 051, 053, 054, and 055 to the tunnel. There are three crossings of the Woonasquatucket River, assumed at this conceptual stage to be accomplished by either pipe cradle or hanging from bridge structures. The method of crossing in each case will be determined during Phase II design based on existing hydraulics and outfall regulator elevations. The CSO Interceptor will convey flows to a drop shaft located near the Foundry Work Shaft. This land is currently owned by the NBC. Figure 10.1-11 shows the alignment of the Woonasquatucket CSO Interceptor and Figure 10.1-12 shows the profile.

The Seekonk CSO Interceptor (42 to 60-inch; 11,200 LF) will convey flows from OF's 019, 023 and 025 to the Main Spine Tunnel at the MRI drop shaft. Figures 10.1-13 and 10.1-14 show the proposed Seekonk CSO Interceptor alignment and profile.

10.1.3.2 Sewer Separation

Sewer separation will be completed in the drainage areas of 6 CSO outfalls. These include outfalls OF's 027, 037, 041, 043, 050 and 058. Figure 10.1-1 shows the locations where sewer separation is proposed.

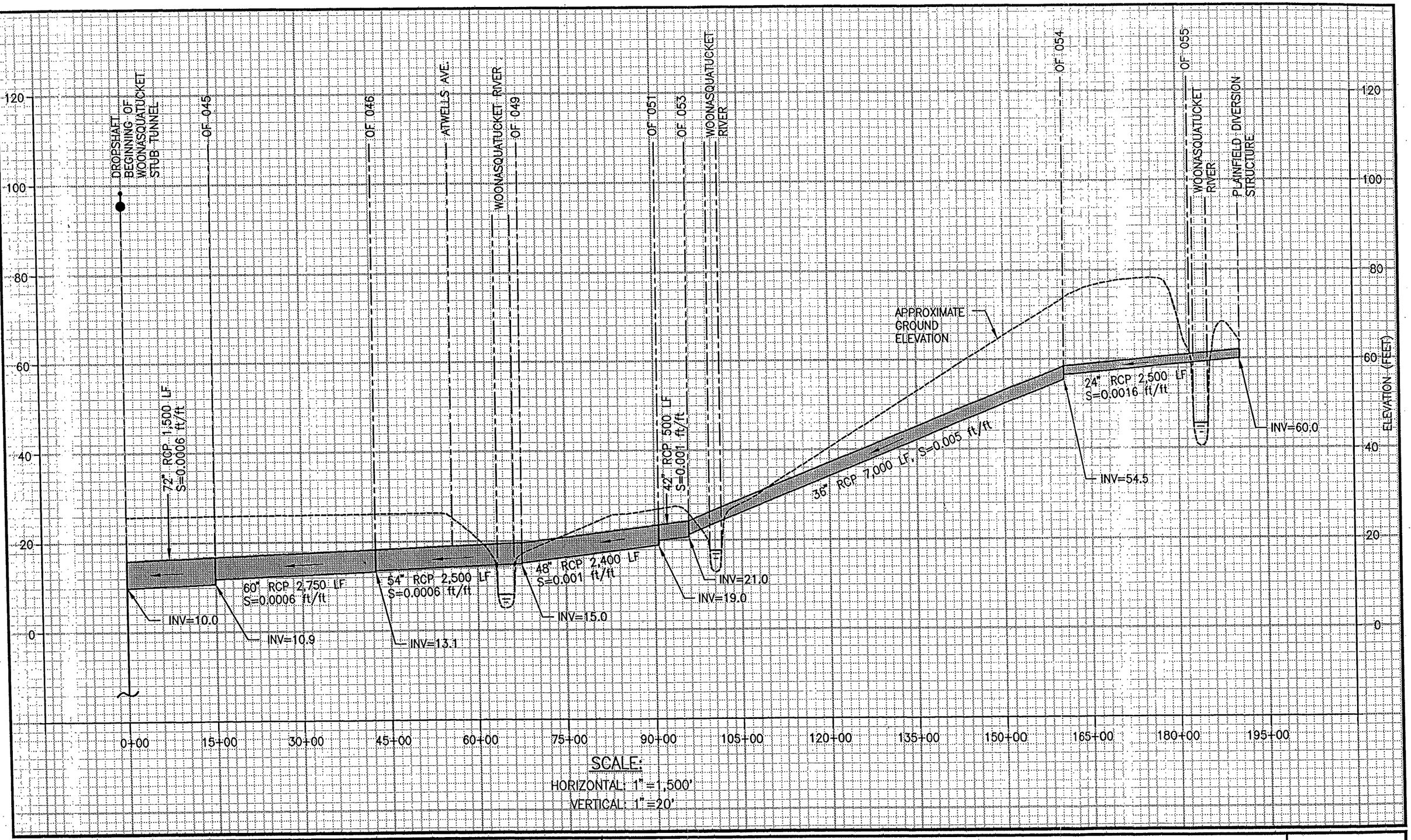
10.1.3.3 Wetland Facility

A wetland facility is proposed for OF 106 in Central Falls. This facility will be located on privately-owned vacant land south of Higginson Ave. and west of Old Crow Point Rd. The location of the wetland will have to be moved further west than originally proposed in the CDRA (April 1998) because of improvements to the Higginson Ave. recreational facilities soon to be constructed by the City of Central Falls. These facilities include new playing fields that would occupy part of the original site chosen for the wetland facility. In order to construct the wetland further to the west, NBC's Moshassuck Valley Interceptor will have to be relocated a few hundred feet to the west on the same parcel where the wetland will be constructed. Figure 10.1-15 shows the proposed layout of this facility and Figure 10.1-16 shows the proposed profile.

10.1.4 Recommended Alternative – Phase III

(This section has not been amended)

7/97/JJ/A.G.



SCALE:
HORIZONTAL: 1" = 1,500'
VERTICAL: 1" = 20'

NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW CONTROL FACILITIES

LOUIS BERGER & ASSOCIATES, INC.

PROFILE-WOONASQUATUCKET CSO INTERCEPTOR

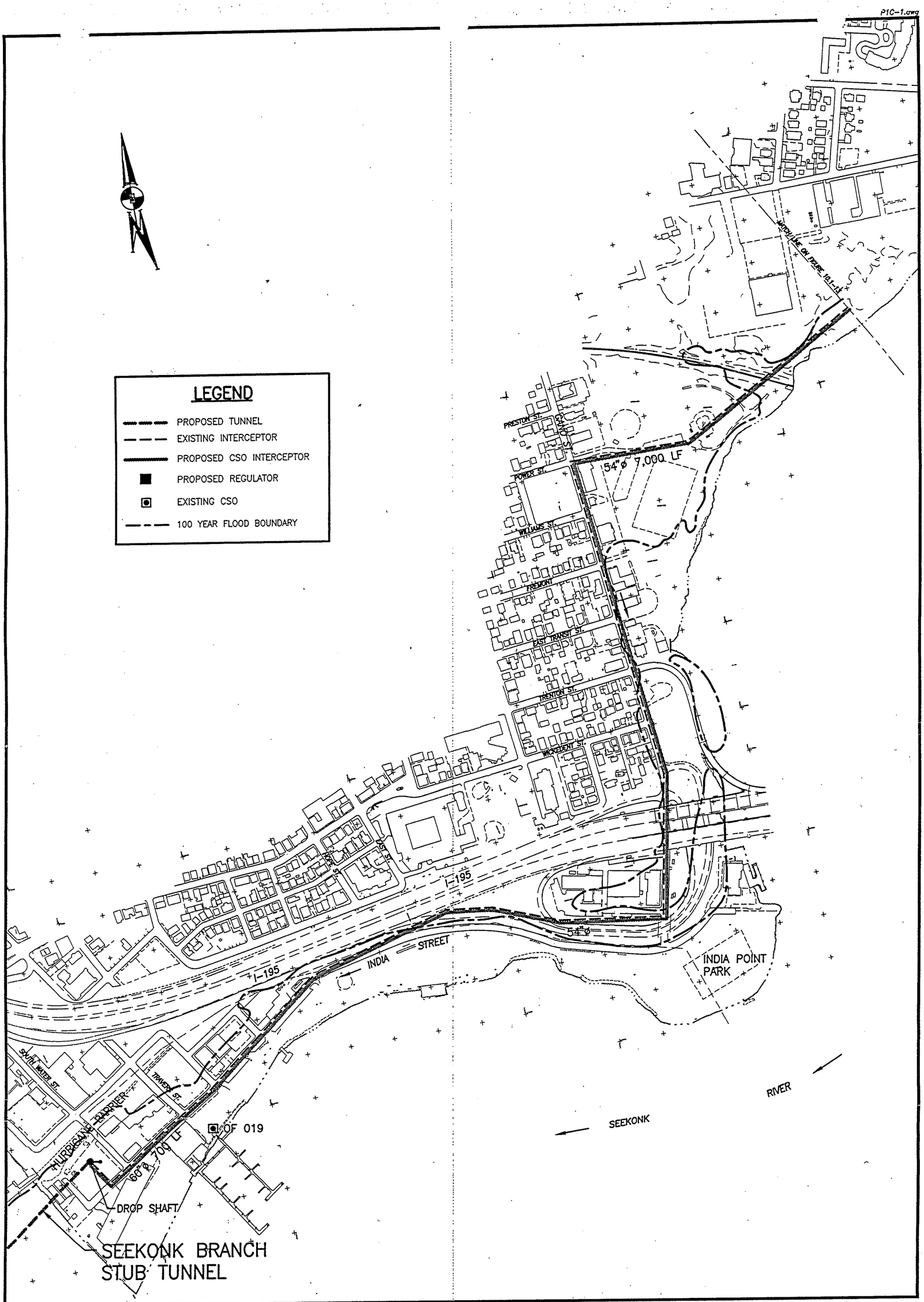
Source: LDM

Scale: AS SHOWN

Figure: 10.1-12

File: P1C-118.dwg

April 1998



LOUIS BERGER & ASSOCIATES, INC.

NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW
CONTROL FACILITIES

SEEKONK CSO INTERCEPTOR (CONTINUED)

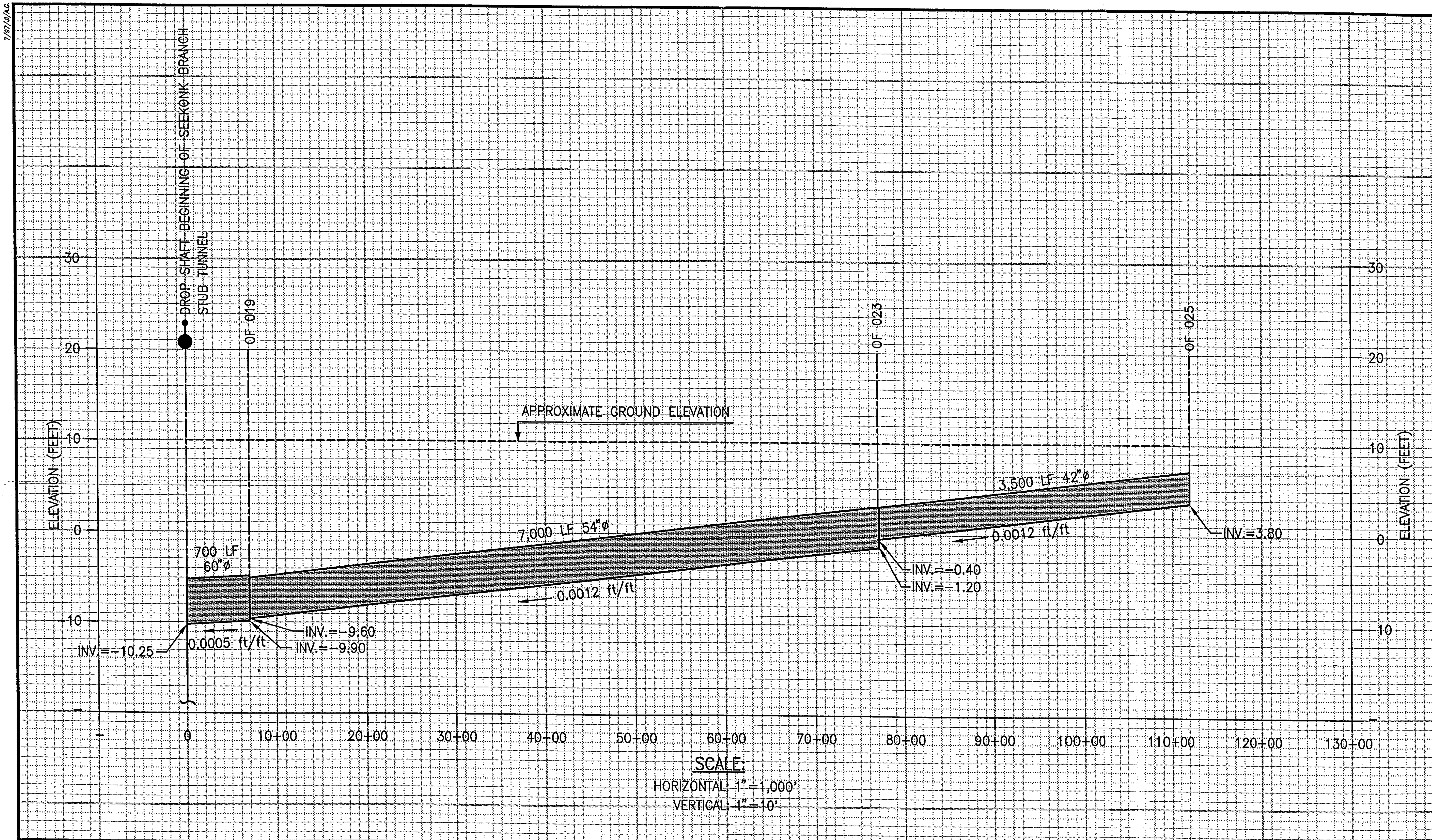
Source: LDM

Scale: 1"=400 Feet

Figure: 10.1-13 (CONT'D)

File: P1C-59.dwg

March 1998



NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW CONTROL FACILITIES

LOUIS BERGER & ASSOCIATES, INC.

PROFILE - SEEKONK CSO INTERCEPTOR

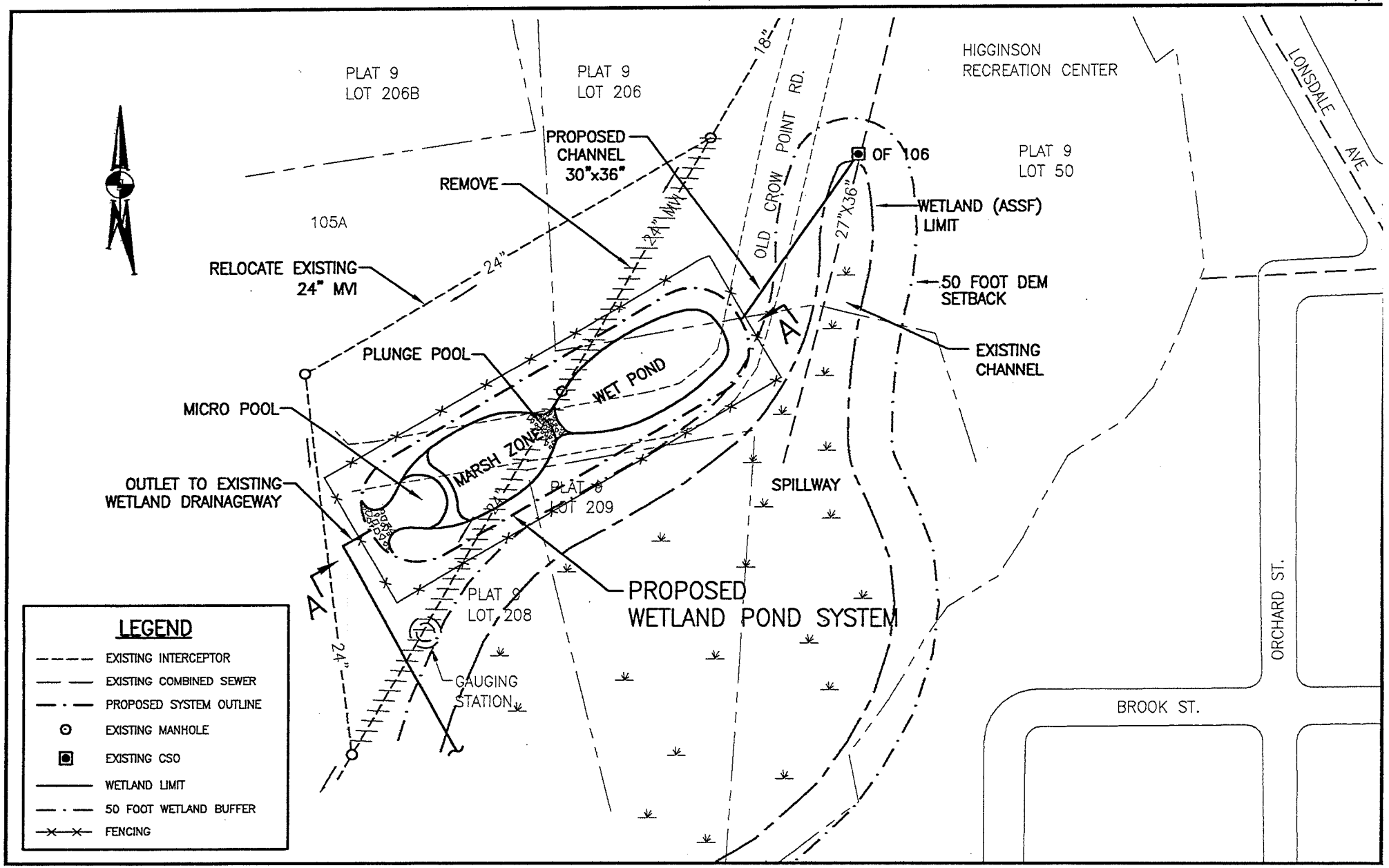
Figure: 10.1-14

File: P1C-35.dwg

Source: LDM

Scale: AS SHOWN

March 1998



The LOUIS BERGER GROUP, Inc.

NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW
CONTROL FACILITIES

WETLAND/POND SYSTEM - OF 106
SITE PLAN

Figure: 10.1-15

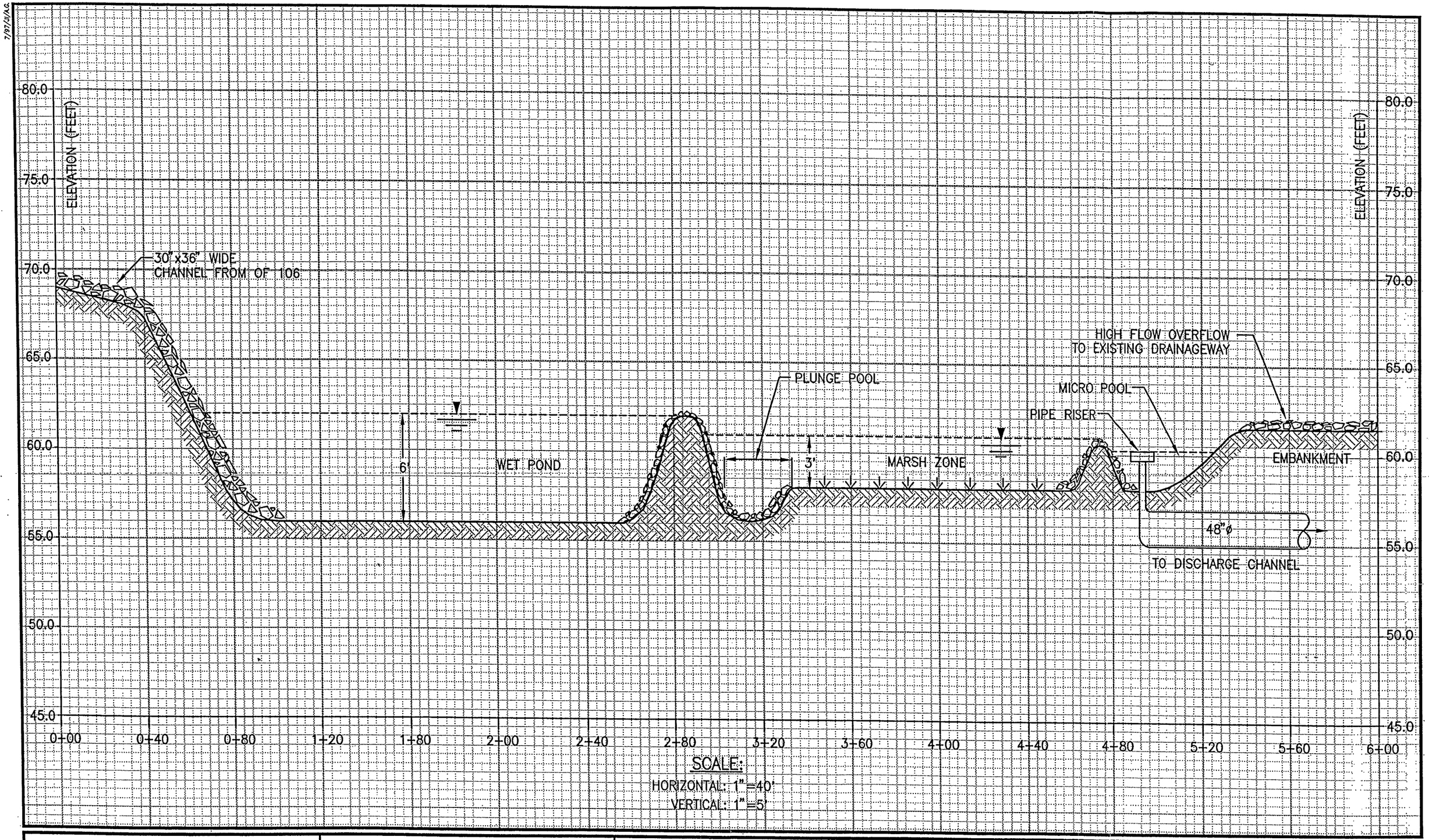
File: P1C-R2-53.dwg

Source: PM

Scale: 1" = 150 Feet

January 2005

7/97/JA/G



NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW
CONTROL FACILITIES

LOUIS BERGER & ASSOCIATES, INC.

SECTION A-A WETLAND/POND SYSTEM FOR OF 106

Figure: 10.1-16

File: P1C-34.dwg

Source: LDM

Scale: AS SHOWN

March 1998

10.1.4.1Pawtucket Tunnel

(This section has not been amended)

10.1.4.2 BPSA CSO Interceptors

(This section has not been amended)

10.1.4.3 Outfalls 219/220 – CSO Interceptor

(This section has not been amended)

10.1.4.4 Sewer Separation

Sewer separation will be completed in the drainage areas of 4 CSO outfalls: 035, 039, 056 and 206. Figure 10.1-1 shows the locations where sewer separation is proposed.

10.1.5 Summary

A summary table outlining the proposed facilities for the recommended alternative by Phase and the CSO's controlled is provided in Table 10.1-7. Flow monitoring is currently being conducted for overflows to be addressed in Phases II and III to determine volume and frequency of overflows. Based on the results of this monitoring, a determination will be made as to whether the overflow should be blocked, only floatables control is required (overflows less than 4 times per year) or if the overflow will need to be directed to the CSO control facilities (interceptor or tunnel). The flow monitoring and analysis is expected to be completed by the end of Phase I.

TABLE 10.1.7
ALTERNATIVE 17
SUMMARY OF FACILITIES

FACILITY	CSO OF CONTROLLED
PHASE I	
Main Spine Tunnel	004, 006, 007, 009, 012, 013, 016, 032, 042, 044, 061, 067
BP Wastewater Treatment Facility Upgrade	002
Nine Minimum controls	005,011, 033
Blocked Outfalls	010,015, 020, 021, 022,024, 026, 028, 029, 031, 034, 038, 047, 051, 059, 062, 063, 065, 066, 102
Sewer Separation	043
PHASE II	
CSO Interceptors	
Seekonk	019, 023, 025
Woonasquatucket	045, 046, 049, 051, 053, 054, 055
Storage Facility	106
Sewer Separation	027, 037, 041, 050, 058
PHASE III	
Pawtucket Tunnel	103, 104, 105, 201, 203, 205, 210/211, 213, 217, 218
BPSA CSO Interceptors	103, 104, 105, 201, 203, 205
Outfalls 219/220 – CSO Interceptor	219, 220
Sewer Separation	035, 039, 056, 058, 206
Blocked or Nine Minimum Controls*	101, 107, 202, 204, 207, 208, 209, 212, 214, 215, 216

*Flow monitoring analysis currently being conducted.

10.2 COST ESTIMATES

10.2.1 Estimated Construction, Operation and Maintenance Costs

Estimated construction costs for the recommended alternative are presented in Table 10.2-1. The costs have been updated using the projected ENRCCI for the middle year of each construction phase. A financial analysis evaluating the impacts of these costs on user rates is presented in Section 11.

TABLE 10.2-1
ESTIMATED COSTS

FACILITY	COST
Phase I	
Main Spine Tunnel, Pump Station and Administration	$258,220,000
Drop Shafts, Nine Minimum Controls, Regulator Modifications	$51,225,000
Land, Legal, Police, etc.	$8,865,000
Total Costs – Phase I Tunnel	**$318,140,000**
OF 002 (included in BPWWTF upgrade contract)	**$2,400,000**
Phase II	
Woonasquatucket CSO Interceptor & Seekonk CSO Interceptor	$87,083,000
Wetland Facility	$200,000
Sewer Separation	$77,717,000
Total Costs – Phase II	**$165,000,000**
Phase III	
Pawtucket Tunnel	$272,824,000
CSO Interceptor (OFs 219, 220)	$46,908,000
BPSA CSO Interceptor	$17,822,000
Sewer Separation	$71,446,000
Total Costs – Phase III	**$409,000,000**
Total Costs – Alternative 17	**$894,540,000**

10.3ENVIRONMENTAL EVALUATION

10.3.1 Water Quality Benefits

(This section has not been amended)

10.3.2 Environmental Assessment

(This section has not been amended)

10.3.2.1 Short-term/Construction Impacts

Short term impacts are a direct result of construction of the recommended alternative. Construction impacts are related to the duration of construction, the amount of surface area disturbed by these activities, and their proximity to sensitive receptors.

Private land would be used for the construction of all or part of 11 major CSO facilities. These sites were selected because they are either vacant, underutilized, or within parking lots. Short-term impacts at these sites would be minor, assuming that suitable replacement parking is available.

Publicly-owned sites are under consideration for four major construction sites, in addition to CSO interceptor and sewer separation projects which would be constructed on public land within the rights-of-way of public streets. No major CSO facilities are proposed on publicly-owned parks or recreation areas. Three major sites (Site S1, the Foundry Site and the Bucklin Point WWTF site) are owned by NBC. Three sites (004/061, 009/EOS and 032) involve the use of state-owned land. The impact associated with the use of these sites is expected to be minor, primarily related to providing alternate parking.

Minor visual quality disturbances would occur at most of the sites during the construction of tunnel shafts. Major impacts would occur at five sites in Providence and one site in Pawtucket which are either in or adjacent to property listed in or eligible for inclusion in the National Register of Historic Places or have aesthetic value. NBC executed a Programmatic Agreement with the RI Historic Preservation Office (SHPO) in March 2003 that will govern NBC with regard to historic properties that may be affected by construction during the three phases of the CSO project. Of major concern to SHPO was the former RIDOT Headquarters and Garage at 30 Arline St. at the Foundry Site. SHPO required that an historic preservation easement would have to be transferred with the property to any future owner of the property. A copy of the agreement is provided at Attachment A.

Minor short-term traffic impacts are expected at most Alternative 17 sites. Major traffic impacts would occur at the sewer separation and interceptor sites in Providence, Central Falls, and Pawtucket where over 13 miles of city streets will be disrupted for construction. All of the construction sites would be expected to experience minor noise

level increases and most would experience minor air quality impacts. No sensitive receptors (including residential areas, schools or hospitals) are adjacent to or within 200 feet of proposed construction sites. The NBC will coordinate with Federal Products Co., located on Eddy St.1000 feet from Site S1, because of concerns the firm has regarding the impact of construction blasting on precision measurements.

A total of six sites would experience minor impacts to cultural resources. Major impacts to cultural resources would occur at twelve construction sites due to their proximity to sites or districts listed on the National Register of Historical Places or their potential to disturb subsurface resources.

Major impacts due to contaminated materials at or near construction sites could occur at the Central Falls wetland facility. No significant impacts are projected.

Although CRMC has jurisdiction over any sewage treatment facility constructed in the state (per Section 330.20, Inland Activities and Alterations That Are Subject to Council Permitting), NBC will request a waiver from assent for facilities greater than 200 feet landward of coastal features along tidal waters. Only construction sites for CSO storage (tunnel shafts, interceptors, and sewer separation) within 200 feet of coastal features along tidal waters and treatment facilities (sedimentation/disinfection facilities and wetland construction) would fall within CRMC jurisdiction. CRMC assent would be required for construction of eight facilities.

No impacts on surface water or aquatic resources are anticipated at Alternative 17 sites where construction is more than 200 feet from waterways. Minor short-term impact may be expected at 14 of the Alternative 17 sites. Major impacts to freshwater wetlands would occur at a drop shaft proposed on Bucklin Brook in Pawtucket where construction is at or adjacent to brook or river. Minor impacts are anticipated at most of the remainder of the sites due to their proximity to the waterway (within 200 feet).

Short-term impacts on wildlife resources may be anticipated at Bucklin Brook and at Tidewater and Thornton Streets at the Pawtucket tunnel which currently provide wildlife habitat. Suitable replacement habitat is readily available. Minor impacts to wildlife resources are expected.

Major short-term impacts are projected at five Alternative 17 sites where above-ground facilities or CSO interceptors would be constructed within the 100-year flood zone: on the Main Spine Tunnel in Providence at Allens Avenue and Blackstone Street and at the MRI relief structure; on the Pawtucket Tunnel at Roosevelt Avenue; along the Seekonk CSO Interceptor; and at the Esten Avenue CSO interceptor pump station. Compensatory flood storage may be required on the Moshassuck River in the vicinity of this pump station in accordance with the RIDEM Freshwater Wetlands Act policy of "no net loss" of flood storage capacity.

10.3.2.2 Long-Term/Operational Impacts

The proposed facilities have been sited to minimize operational impacts on surrounding neighborhoods and CBDs. Above-ground structures will be compatible in design with the surrounding area and all sites will be appropriately landscaped. Facilities will also be designed to minimize pump noise and vibration and to minimize air quality impacts associated with CSO's. Facility sites have been carefully selected to enable continuation of existing land uses following construction of tunnel shafts. In most cases, the site may be restored as parking lots or open space (vacant land).

Facility sites have been carefully selected to enable continuation of existing land uses following construction of either near surface facilities or tunnel shafts. In most cases, the site may be restored as parking lots or open space (vacant land). The site of working shafts S1, S5 and the Foundry site are currently owned by the NBC and proposed use would be in accordance with NBC plans for these sites. A park which is proposed at the north end of the Pawtucket Tunnel, along the Blackstone River, would be a compatible use with Working Shaft S7.

There would be no long-term impacts regarding future public/recreational land use, traffic noise/sensitive receptors, cultural, surface water/aquatic, or wildlife resources. A benefit of the construction would be the development of a park at Front Street in Pawtucket, located along the Blackstone River bike path. Minor visual quality impacts would result at the sites with above-ground structures, although measures would be taken to blend them in architecturally with the surrounding environment.

All surface CSO Alternative facilities would have minor air quality impacts (no odors would be anticipated from sewer separation or interceptor operation). Tunnel vent shafts would be designed and operated to mitigate odor impacts. All facilities would be covered and vented through odor control equipment or buried in rock (tunnel) to minimize odors. Minor air quality impacts are projected at all sites. To minimize odors at tunnel vent shafts, louvers would be installed which would remain closed unless the tunnel is filling during storm, or being pumped out (within three-days of the storm). When the tunnel is filling, air would be emitted upward from the vent shafts. At this time, odor potential is considered to be low since the flow would be comprised of a weak mixture of stormwater runoff and sewage and is presumed to be highly oxygenated. During pump back operations, the vent shaft would be used to supply air downward to the tunnel system. Minimal odors would therefore be emitted from the system. Ventilation from CSO facilities would include odor control equipment.

10.3.2.3 Conclusion, Alternative 17 Impacts

(This section has not been amended)

10.4 CONSTRUCTION PHASING AND PRIORITIES

10.4.1 Program Phasing

Table 10.4-1 shows the proposed design and construction schedule for the recommended alternative. This schedule was developed to be consistent with the requirements set forth in the NBC/RIDEM Consent Agreement (RIA 330) for NBC's CSO Program. This schedule is also based on the assumption that funding would be available as needed and that permits and approvals would be obtained in a timely manner. The three phases of the recommended alternative are to be constructed over twenty years. Each phase consists of either four or five years of construction followed by a two year evaluation and assessment period concurrent with design. A design period of two years plus time for regulatory approvals has been included at the beginning of each of the three phases.

Phasing of the CSO control program allows for technology reviews and water quality monitoring to occur during each implementation step. In this manner, the effectiveness of the CSO controls can be evaluated after implementation to determine if the facilities proposed for subsequent phases should be modified. O&M costs would be incurred as soon as each facility is constructed and comes on-line.

The phasing priorities were developed by selecting facilities that would provide significant impact, that could be brought to construction in a timely manner, and that permit flexibility in future planning.

10.4.2 Storm Water Rate Structure

NBC has nearly completed a stormwater attenuation pilot study to determine the feasibility of residential downspout disconnection for reducing combined sewer overflow volumes. This study should be complete in 2006. NBC has also evaluated a stormwater rate structure to assess users a fee for stormwater. A proposed rate structure plan was prepared for the PUC review but they decided that it was not feasible to implement. However, NBC is considering other possible options for such a fee.

10.4.3 Monitoring Plan

(This section has not been amended)

10.4.4 Other Studies

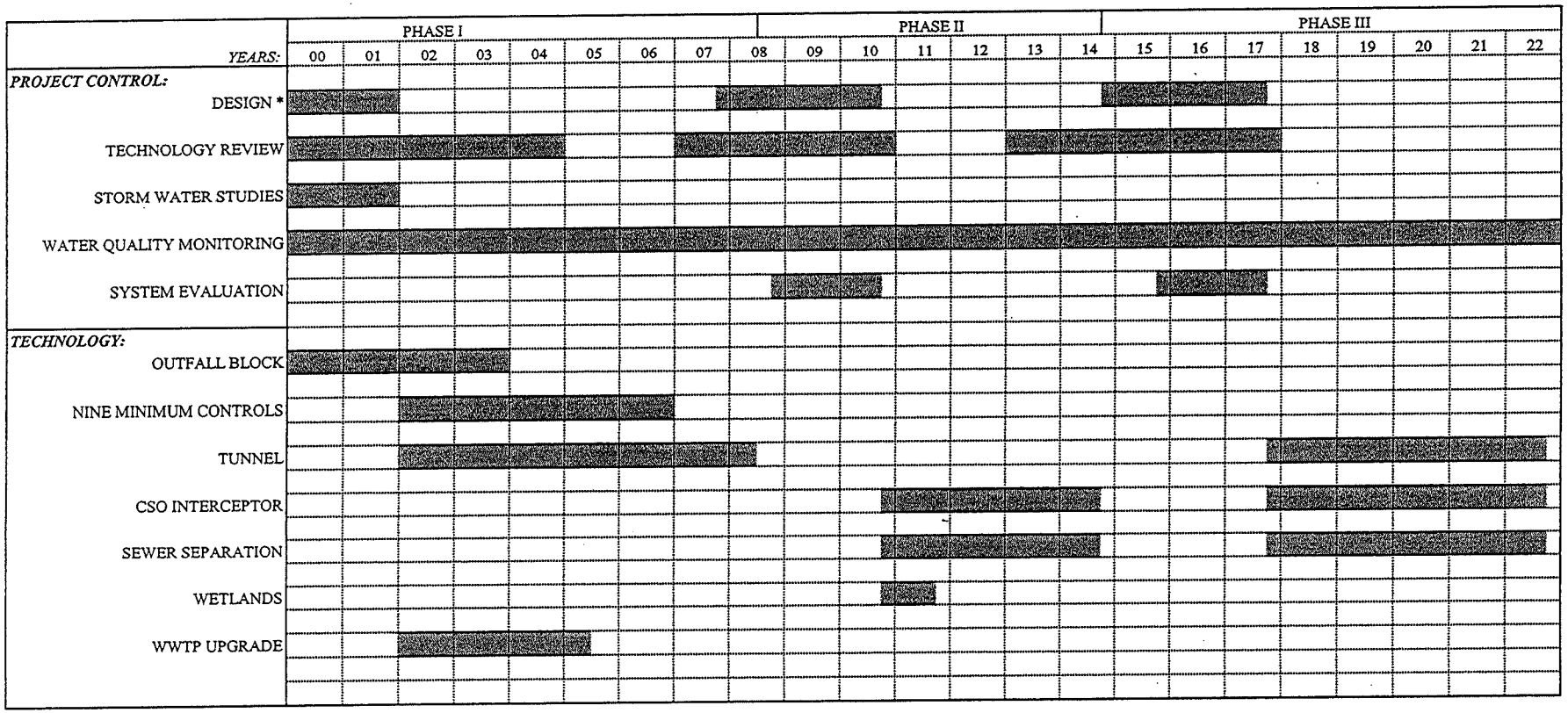
(This section has not been amended)

10.5 RIDEM POLICY COMPLIANCE

(This section has not been amended)

TABLE 10.4-1

ALTERNATIVE 17 CONSTRUCTION PHASING PLAN



* Assumes 6 month RIDEM review period for both Preliminary and Final Design

SECTION 11
FINANCIAL ANALYSIS

11.1 DESCRIPTION OF RECOMMENDED ALTERNATIVE

The recommended alternative, Alternative 17, combines several major construction elements including deep rock tunneling with pump stations, CSO interceptors, sewer separation, wastewater treatment facility upgrading, and the implementation of minimum controls and blocking of select outfalls. A phasing schedule for the construction of Alternative 17 is presented in Table 10.4-1.

11.2 COST ESTIMATES AND PHASING

The total estimated cost for Phase I of Alternative 17 is $318 million. The total pre-design estimated cost for Phase II is $165 million and for Phase III is $409 million. The costs for Phase II and Phase III are based on the following assumptions:

- Construction costs are based on the 1998 Conceptual Design Report Amendment in which the cost estimates were prepared without the benefit of any design work. These costs were further updated based on construction cost experience from Phase I of the CSO program.
- Cash flow start and end dates are based on the schedule in the RIDEM Consent Agreement of January 12, 2004.
- Costs have been updated through the mid-point of construction for Phase II, November 2012 (ENRCCI 7918) and the midpoint of construction for Phase III, January 2019 (ENRCCI 8749).

11.3 METHOD OF FINANCING CAPITAL COSTS

The NBC will utilize the subsidized State Revolving Loan Fund to the extent that the Rhode Island Clean Water Financing Agency (RICWFA) has capacity. The NBC will utilize various other debt instruments to fund any "gaps" created by the RICWFA's capacity limitations. The NBC has issued Variable Rate Demand Obligations (VRDO) to finance the project when there was insufficient funding from the RICWFA.

11.3.1 State General Obligation Bonds

(This section has been deleted)

11.3.2 State Revolving Loan Funds

The principal low-cost financing source for the CSO capital project will be the State Revolving Fund (SRF) which is a low interest loan program administered by the RICWFA capable of lending at one-third below the market cost of borrowing. The SRF program funds wastewater treatment, sewer, CSO and other water quality improvement projects for Rhode Island communities statewide.

As part of a referendum the NBC is guaranteed at least $70 million in zero-percent interest loans from the RI Clean Water Finance Agency. The RICWFA is extending the zero-percent interest loan program by issuing loans to the NBC at a blended rate of zero-percent and the traditional subsidized rate of two-thirds the market rate.

The RICFWA Annual payments of interest and principal were calculated based on current available State Revolving Funds (SRF) rules. From FY 2006 forward, a market rate of 6 percent was assumed, allowing a subsidized SRF rate of 4 percent. The principal of loans includes costs of issuance, underwriter discounts and a 0.5 percent annual service fee.

Issuance of new debt and annual debt service payments to support construction will occur in accordance with construction phasing. Loans are expected to be issued as construction progresses:

- Phase I - SRF loans will fund the majority of construction totaling $318 million over the first seven years of major construction in the project. VRDO and Open Market Bonds will also be utilized in Phase I as well.

- Phase II - Expected to last over six years, the second phase will involve $165 million in project construction.

- Phase III- Project construction is estimated to total $409 million during the six year duration of the third phase.

11.3.3 Debt Term and Phasing

The debt term for project construction loans is anticipated to be 20 years for SRF loans, which is the normal term for debt financing of this kind. Longer terms may be set for NBC revenue bonds. The table on the following page illustrates the estimated borrowing requirements.

After project construction is completed and total outstanding debt reaches its peak, the outstanding debt burden beings to slope steadily downwards as previous year debt liabilities begin to fully amortize.

Required Future Bond Issues

Year	Total Par Amount	Carry-Forward	SRF Bonds	Open Market Bonds	VRDO
2001	$57,000,000		$ 57,000,000	$ -	$ -
2002	57,000,000		57,000,000	-	-
2003	40,000,000		40,000,000	-	-
2004	110,000,000		40,000,000	-	70,000,000
2005	40,000,000	9,893,126	40,000,000	-	
2006	45,615,000	12,896,209	40,000,000	5,615,000	-
2007	61,095,000	7,260,908	25,000,000	36,095,000	-
2008	30,950,000	8,063,296	12,000,000	18,950,000	-
2009	27,635,000	9,026,750	12,000,000	15,635,000	-
2010	12,000,000	9,494,872	12,000,000	-	-
2011	29,285,000	9,933,277	12,000,000	17,285,000	-
2012	83,810,000	10,117,714	12,000,000	71,810,000	-
2013	117,720,000	10,626,316	12,000,000	105,720,000	-
2014	151,520,000	11,254,080	12,000,000	139,520,000	-
2015	77,560,000	11,966,112	12,000,000	65,560,000	-
2016	58,490,000	12,866,141	12,000,000	46,490,000	-
2017	57,110,000	14,300,190	12,000,000	45,110,000	-
2018	56,050,000	15,429,489	12,000,000	44,050,000	-
2019	26,405,000	16,517,172	12,000,000	14,405,000	-
2020	-	17,426,187	-	-	-
2021	-		-	-	-
	$ 1,139,245,000	$ 187,071,838	$ 443,000,000	$ 626,245,000	$ 70,000,000

11.3.4 Debt Service Coverage Requirements

NBC's rates are designed to generate revenues that support a two-year average debt service and 125% coverage on principal and interest. Principal and interest payments are funded from current year revenues and a "restricted carry-forward" is generated each year. The NBC is authorized to expend the restricted carry-forward for operating capital outlays and the direct funding of capital projects. It is anticipated the restricted carry-forward funds will aid in reducing future borrowings.

The debt coverage ratio measures the amount between available net operating income and debt service. A debt service coverage ratio helps the lending agency measure the risk associated with lending and is required as part of the NBC's Trust Indenture (All rate covenants are set forth by the Trust Indenture documents).

11.3.5 Non-CSO Debt

(This section has been deleted)

11.3.6 Impact on Rates

In addition to the financing assumptions presented in Section 11.3, the residential burden evaluation includes the following assumptions:

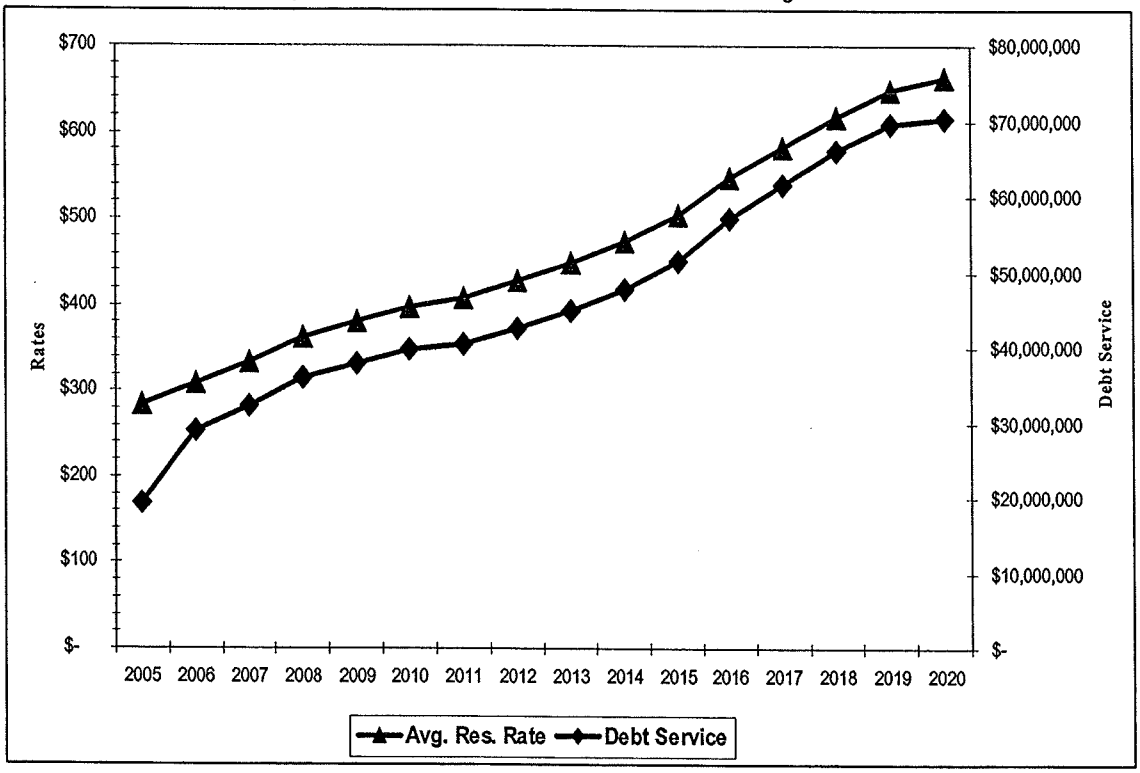
1. Both CSO and Non-CSO projects are included in this analysis to assess the potential burden on residential ratepayers. Adequate coverage ratios must be met for all debt.

2. The ratio of residential ratepayers to total ratepayers is assumed to remain constant over the life of the project. The number of residential ratepayers also remains constant.

3. Current costs include operations and maintenance and debt service for all projects. Operations and maintenance costs are assumed to increase by 3.5 percent through the life of the project.

As of July 1, 2005 the average annual sewer user charge will be $284 per household. This number rises to its peak in Year 2020. In that year of maximum burden, households will pay an estimated $662 per household. The vast majority of the increase in rates is attributed to the increase in debt service for capital construction projects. The graph below illustrates this correlation.

FIGURE 11.3-1
Increase in Projected Rates vs. Increase in Projected Debt Service



11.4 FINANCIAL IMPACT ANALYSIS

11.4.1 Overview of the EPA Guidance Methodology

(This section has not been amended)

11.4.2 Phase I: The residential Indicator

(This section has not been amended)

11.4.2.1 Methodology for Residential Indicator Analysis

(This section has not been amended)

11.4.2.2 Residential Indicator Analysis

(This section has not been amended)

11.4.2.3 Key Findings of Residential Indicator Analysis

Based on the EPA scoring criteria for the residential indicator analysis, Alternative 17 will have a "low" burden on the average household of the NBC district.
At the time that the CDR was prepared, the average residential household paid $131, which was 0.4 percent of median household income (MHHI) for ratepayer households. In July 2005, the average residential rate will be $284 per household, which is 0.7% of the 1999 MHHI of $39,415. Even if the MHHI does not increase from 1999 to 2005, the burden will remain in the "low" category.

The projected average residential sewer user charge for 2020 will be $652. If there were no increase in the MHHI over the next 15 years, this rate would be 1.6% of the MHHI, which would be a mid-range financial impact. However, it is unlikely that the MHHI will not increase over the 1999 value. In order for the sewer use rate to remain below 1% of the MHHI, the MHHI would have to increase by an average of $1439 per year over 20 years. While it is not possible to accurately predict the MHHI over the next 20 years, it is likely that the burden will range between "low" (MHHI average increase of $1439 per year) and "mid-range" (no MHHI increase).

11.4.3 Phase 2: Permittee Financial Capability Indicator

(This section has not been amended)

11.4.4 Schedule Development

(This section has not been amended)

11.5 COMPARISON OF FINANCIAL BURDEN AT THE TOWN LEVEL

(This section has not been amended)

11.6 FINANCIAL BURDEN ON THE BUSINESS COMMUNITY

(This section has not been amended)

ATTACHMENT A

PROGRAMMATIC AGREEMENT BETWEEN NARRAGANSETT BAY COMMISSION AND THE RI STATE HISTORICAL PRESERVATION OFFICE REGARDING THE COMBINED SEWER OVERFLOW FACILITIES PROJECT

PROGRAMMATIC AGREEMENT
BETWEEN
THE NARRAGANSETT BAY COMMISSION
AND
THE RHODE ISLAND STATE HISTORIC PRESERVATION OFFICE
REGARDING
THE COMBINED SEWER OVERFLOW FACILITIES PROJECT
Providence, Rhode Island

Submitted to the Advisory Council on Historic Preservation
pursuant to 36 CFR 800, Sections 6(b)(iv) and 14(b)(ii)

WHEREAS, the Narragansett Bay Commission (Bay Commission), an agency created by the State of Rhode Island in 1982, proposes to improve water quality in Narragansett Bay by building facilities to capture combined stormwater and wastewater during periods of high precipitation and runoff, storing it until it can be properly treated and released into the bay (CSO Facilities); and

WHEREAS, the Bay Commission will finance its construction of the CSO Facilities through a loan from the Rhode Island Clean Water Finance Agency (CWFA) which administers the State Revolving Fund (SRF); and

WHEREAS, the SRF includes capitalization grants provided to the State of Rhode Island by the U.S. Environmental Protection Agency (EPA) under Title VI of the Federal Water Pollution Control Act (33 USC Section 1251 et seq.)(Clean Water Act); and

WHEREAS, the Rhode Island Department of Environmental Management (RIDEM) must issue a Certificate of Approval for any project being proposed pursuant to the requirements of Section 201 of the Clean Water Act in order for an applicant to receive an SRF loan; and

WHEREAS, the Bay Commission has certified in writing that it will comply with the National Historic Preservation Act as a condition of receiving federal funds through the SRF and is therefore, pursuant to 36 CFR 800.2, serving as the Agency Official in this Agreement; and

WHEREAS, the Bay Commission has determined that Phase I of the Undertaking may have adverse effects on the former Rhode Island Department of Transportation (RIDOT) Headquarters and Garage (RIDOT Garage) at 30 Arline Street which is eligible for listing in the National Register of Historic Places; and

WHEREAS, the Bay Commission has determined that Phase I of the Undertaking may also have adverse effects on prehistoric and historical archaeological resources yet to be identified at the proposed location of Outfall 032 (Charles Street); and

WHEREAS, the Bay Commission has determined that Phases II and III of the CSO Program may

also have adverse effects on archaeological or historical resources at locations yet to be selected for Outfalls 213, 210, Seekonk Interceptor, Woonasquatucket Interceptor, 219/220 Interceptor and proposed Sewer Separations in Providence and Pawtucket; and

WHEREAS, The Bay Commission has consulted with the SHPO, and with the Narragansett Indian Tribe and Waterfire Providence in accordance with 36 CFR 800.6 to resolve the adverse effects of the Undertaking on historic properties; and

WHEREAS, the Rhode Island Department of Transportation has participated in the consultation and has been invited to concur in this Agreement;

NOW, THEREFORE, the Bay Commission and the SHPO agree that the Bay Commission will ensure that the following stipulations are implemented in order to take into account the effects of the Undertaking on historic properties, and that these stipulations shall govern the Undertaking and all of its parts until this Agreement expires or is terminated.

STIPULATIONS

The Bay Commission will ensure that the following measures are implemented:

I. FORMER RIDOT HEADQUARTERS AND GARAGE

A. Protection

1. The Bay Commission shall ensure that the former RIDOT Headquarters and Garage at 30 Arline Street is protected against damage during the Bay Commission's use of the surrounding site for purposes of constructing the Foundry Shaft.

2. After completion of the Foundry Shaft, the Bay Commission shall ensure the historic property is protected against damage until treatment measures agreed upon with the SHPO (see Stipulation I.B below) have been properly executed.

B. Marketing and Disposal

1. In consultation with the SHPO, and consistent with applicable laws governing disposal of State property in Rhode Island, the Bay Commission shall prepare and implement a marketing plan for the former RIDOT Headquarters and Garage. The plan shall include the following elements:

   An information package about the building containing notification that the purchaser will be

required to convey an historic preservation easement on the building (a copy of which is found at Appendix A to this Agreement) to the Rhode Island Historic Preservation and Heritage Commission;

- A distribution list of potential purchasers or transferees;
- An advertising plan and schedule;
- A schedule for receiving and reviewing offers.

2. The Bay Commission shall employ the results of this marketing effort in its decision regarding the ultimate disposal of the former RIDOT Headquarters and Garage. The Bay Commission shall make this decision, including identification of measures to minimize or mitigate any adverse effects arising from disposal, in consultation with the SHPO.

II. OUTFALL 032

A. Prior to initiation of any construction-related ground disturbing activities, the Bay Commission will undertake a program to determine the presence or absence of soil levels associated with pre-colonial Native American settlement, and of any potentially significant archaeological deposits associated with the Town Work House. This program, developed in consultation with the SHPO, may include continuous soil borings and/or machine trenching. The Bay Commission will prepare and submit reports of the results to the SHPO and the Narragansett Indian Tribe. As necessary, based on the report findings and consultations with the SHPO, the Bay Commission will complete identification of historic properties in accordance with 36 CFR 800.4. In the event that historic properties are identified, the Bay Commission will consult with the SHPO and Narragansett Indian Tribe to resolve any adverse effects.

III. CSO FACILITIES, PHASE II AND PHASE III

A. In consultation with the SHPO, the Bay Commission will complete any studies required to identify historic properties that may be affected by construction in Phases II and III of Outfalls 213 and 210, Seekonk Interceptor, Woonasquatucket Interceptor, 219/220 Interceptor and proposed Sewer Separations in Providence and Pawtucket, in accordance with 36 CFR 800.4. In the event that historic properties are identified, the Bay Commission will consult with the SHPO, Narragansett Indian Tribe, and other consulting parties, as appropriate, to resolve any adverse effects.

IV. REVIEW AND COMMENT PERIODS

Unless otherwise specified in this Agreement, the SHPO and other consulting parties shall have thirty (30) calendar days from receipt to provide written comment on any reports, letters or other written communications prepared by the Bay Commission in its execution of this Agreement.

V. TECHNICAL REPORTING

All reports of archaeological investigations conducted under Stipulations II and III shall be prepared in accordance with the Rhode Island Historical Preservation and Heritage Commission's *Performance Standards and Guidelines for Archaeological Projects.*

VI. PROFESSIONAL QUALIFICATIONS

A. All archaeological investigations conducted pursuant to this Agreement shall be accomplished by or under the supervision of an individual or individuals meeting the standards for archaeologist set forth in the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (NPS 1983:44738-9).

B. All studies involving identification, evaluation and treatment of historic buildings and structures conducted pursuant to this Agreement shall be accomplished by or under the supervision of an individual or individuals meeting the standards for historian, architectural historian, or other professional as appropriate for the work, set forth in the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (NPS 1983:44738-9).

VII. ANNUAL REPORTING

A. On or before January 1of each year until the Bay Commission and the SHPO agree in writing that the terms of this Agreement have been fulfilled, the Bay Commission shall prepare and provide an annual report to the SHPO and Narragansett Indian Tribe addressing the following topics:

1. Progress in completing Stipulations I through III;
2. Any problems or unexpected issues encountered during the year;
3. Anticipated schedule for planning and design work over the coming year;
4. Any changes that Bay Commission believes should be made in implementation of this agreement.

B. The Bay Commission shall ensure that its annual report is made available for public inspection, that potentially interested members of the public are made aware of its availability, and that

interested members of the public are invited to provide comments to the SHPO and Narragansett Indian Tribe as well as to the Bay Commission.

VIII. DISPUTE RESOLUTION

A. Should any party to this agreement object in writing to the Bay Commission regarding any action carried out or proposed with respect to the undertaking or implementation of this agreement, the Bay Commission shall consult with the objecting party to resolve the objection. If after initiating such consultation the Bay Commission determines that the objection cannot be resolved through consultation, the Bay Commission shall forward all documentation relevant to the objection to the Advisory Council on Historic Preservation (Council), including the Bay Commission's proposed response to the objection. Within 30 days after receipt of all pertinent documentation, the Council shall exercise one of the following options:

1.The Council will consult with the objecting party, and with other parties as appropriate, to resolve the objection.

2 Provide the Bay Commission with recommendations, which the Bay Commission shall take into account in reaching a final decision regarding its response to the objection; or

3.. Notify the Bay Commission that the objection will be referred for comment pursuant to 36 CFR 800.7(a)(4), and proceed to refer the objection and comment. The Bay Commission shall take the resulting comment into account in accordance with 36 CFR 800.7(c)(4) and Section 110(l) of NHPA.

B. Should the Council not exercise one of the above options within 30 days after receipt of all pertinent documentation, the Bay Commission may assume the Council's concurrence in its proposed response to the objection.

C. The Bay Commission shall take into account any Council recommendation or comment provided in accordance with this stipulation with reference only to the subject of the objection; the Bay Commission's responsibility to carry out all actions under this agreement that are not the subjects of the objection shall remain unchanged.

IX. AMENDMENT AND TERMINATION

A. Any of the signatories to this Agreement may request that this Agreement be amended, whereupon these parties will consult in accordance with 36 C.F.R. Section 800.6(c)(7) .

B. Any of the signatories to this Agreement may terminate this Agreement by providing 30 days written notice to all consulting parties, provided that the signatories consult during the 30-day notice period in order to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the Bay Commission will comply with 36 C.F.R. Sections 800.3 through 800.7(c)(3), with regard to individual actions covered by this Agreement.

Execution of this Agreement by the Bay Commission and the SHPO, and its submission to the Council in accordance with 36 CFR 800.6(b)(1)(iv) shall pursuant to 36 CFR 800.6, be considered to be an Agreement with the Council for the purposes of Section 110(1) of NHPA. Execution and submission of this Agreement, and implementation of its terms, evidence that the Bay Commission has afforded the Council an opportunity to comment on the Undertaking and its effects on historic properties, and that the Bay Commission has taken into account the effects of the Undertaking on historic properties.

Signed:

NARRAGANSETT BAY COMMISSION

By:_____ Date: 2/21/03

RHODE ISLAND STATE HISTORIC PRESERVATION OFFICER

By:_____ Date: 3/3/03

Concur:

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

By:_____ Date:_____

ACCEPTED FOR THE ADVISORY COUNCIL ON HISTORIC PRESERVATION

By:_____ Date:_____

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

HISTORICAL PRESERVATION COMMISSION

HISTORICAL EASEMENT

THIS HISTORIC PRESERVATION EASEMENT is made this_____day of_____by and between meaning and intending to include therein their successors and assigns (hereinafter Grantor), and the STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS through its Historical Preservation & Heritage Commission (hereinafter sometimes called Grantee).

W I T N E S S E T H :

WHEREAS the Grantor is the owner of land in fee simple, and holds title under the document recorded with the land evidence records of the Town/City of _____ as recorded in Book_____, Page _____, which instrument is not violated by this conveyance, which land (hereinafter "land") is described in Exhibit "A" attached hereto which land is improved with historic structure(s) (said structure sometimes hereinafter called the building), more fully described in Exhibit "B" attached hereto (said land and structures together being hereinafter called the "Premises") which premises have been registered on the National Register of Historic Places by the United States Department of the Interior;

WHEREAS the State of Rhode Island, through its Historical Preservation and Heritage Commission, is presently responsible for precluding any activity at the premises which would destroy or impair the value of the premises as a registered place on the National Register of Historic Places; and

WHEREAS the Grantor is willing to grant to the State of Rhode Island the easement as hereinafter expressed for the purpose of insuring that the value of the premises for such purpose will not be destroyed or impaired;

NOW, THEREFORE, in consideration of the sum of One Dollar, and other valuable consideration paid to the Grantor, the receipt whereof is hereby acknowledged, and Grantor does hereby give, grant, bargain, sell, and convey unto the State of Rhode Island and Providence Plantations an easement in the following described premises of the Grantor, of the nature and character and to the extent hereinafter expressed as a covenant running with the land, to be binding upon the parties hereto and their respective successors and assigns, and to that end and for the purpose of accomplishing the intent of the parties hereto to preserve,

protect, and maintain the value of the premises of the Grantor as a registered place on the State Register of Historic Places, the Grantor does hereby covenant on behalf of itself, its successors and assigns, with the Grantee, its successors and assigns, to refrain from doing, and to permit the Grantee to do upon the premises of the Grantor, the various acts hereinafter mentioned.

THE EASEMENTS AND RESTRICTIONS shall be effective in perpetuity (or for a term of ____ years).

and are as follows:

A. Grantor's Covenants. In furtherance of the Preservation Easement herein granted, Grantor covenants:
   1. Review Without the written permission of Grantee, executed by a duly authorized officer under its corporate seal, which written permission or refusal to grant such permission, including a statement of reasons for refusal, shall be delivered to Grantor by Grantee within thirty (30) days of receipt of Grantor's written request for such approval, there shall be:
      a. no demolition or partial demolition or removal of any building or structure located on the real property except in connection with interior renovation and exterior alterations described in Exhibit "C"
      b. no change in the facade or to the landscape features and improvements or interior portions that are being protected, as set forth in Exhibit "B" subject to the Preservation Easement, including no alteration, partial removal, construction, remodeling or physical or structural change, or change in color or surfacing with respect to the appearance or construction of the facade or the landscape features and improvements or interior portions, except as described in Exhibit "C"
      c. no addition of signs or addition to the facade including fences, or awnings except as described in Exhibit "C"
      d. no expansion of the building either horizontally or vertically except as described in Exhibit "C"
      e. no construction of additional building's on the premises, except as described in Exhibit "C"
      f. no significant alteration of the topography, except as may be required by good husbandry.
   2. Specification of Materials. Grantor covenants that Grantee in providing its written authorizations for work may specify all materials, methods, cleaning substances and colors to be used in any such work, provided, nevertheless, that repair or replacement of surface

materials will be with materials of the same or similar texture and quality as currently existing and reasonably available.

3. Casualty Damage. In the event of casualty damage, no repairs or reconstruction of any type, other than temporary emergency work to prevent further damage to the real property and to protect public safety, shall be undertaken by Grantor without the prior written approval of the work by Grantee (which written approval shall be given as provided in paragraph (2) above).

4. Inspection. Grantor covenants that representatives of Grantee shall be permitted to inspect the building at reasonable times upon reasonable notice for the purpose of determining conformance to this Preservation Easement.

5. Insurance. Grantor covenants that it will maintain in force standard property and liability insurance policies. The property insurance policy shall be adequate to provide for reconstruction of the building and the liability policy shall provide coverage in the amount of at least One Million Dollars ($1,000,000). The liability policy shall name the Grantee as a named additional insured. The amount of property and liability insurance maintained by Grantor shall be adjustable, upon the request of Grantee, to reflect proportionate increases in the cost of construction and the cost of living, respectively, provided that such a request may not be made more frequently than once every three (3) years.

6. Real Estate Taxes. The Grantor shall promptly pay all real estate taxes assessed and levied against the building on or prior to the due date, regardless of the status of protests or appeals.

7. Public View. Grantor agrees not to obstruct the substantial and regular opportunity of the public to view the exterior architectural features of any building, structure, or improvements of the premises from adjacent publicly accessible areas such as public streets. Grantor shall make the premises accessible to the public from time to time and by appointment to permit persons affiliated with educational organizations, professional architectural associations and historical societies to study the property. Any such public admission may be subject to restrictions, mutually agreed upon as reasonably designed for the protection and maintenance of the property. Such admission may be subject to a reasonable fee, if any, as may be approved by the Grantee.

8. Publication. The Grantee may make photographs, drawings or other representations documenting the significant historical, cultural, or architectural character and features of the property and distribute them to magazines, newsletters, or other publicly available publications, or

use them in any of its efforts or activities for the preservation and conservation of Rhode Island's heritage.

9. Indemnity. The Grantor covenants that it shall indemnify and hold Grantee harmless for any liability, costs, attorney's fees, judgments or expenses to the Grantee or any officer, employee, agent or independent contractor of the Grantee resulting from actions or claims of any nature by third parties arising from defaults under this Preservation Easement by the Grantor, or arising out of the conveyance of, possession of, or exercise of rights under this Preservation Easement, excepting any such matters arising solely from the negligence of the Grantee.

B. Grantee's Remedies. In the event of a violation of any provision of this Preservation Easement, in addition to any remedies now or hereafter provided by law, (i) Grantee may, following reasonable notice to Grantor, institute a suit for injunctive relief, specific performance or damages, or (ii) representatives of Grantee may enter upon the real property to correct any such violation, and hold Grantor and Grantor's successors, heirs and assigns in title responsible for the cost thereof, and such cost, until repaid, shall constitute a lien on the real property. In the event Grantor is adjudicated to have violated any of Grantor's obligations herein, Grantor shall reimburse Grantee for any costs or expenses incurred in connection with the enforcement of its rights, including court costs and attorney's fees. The exercise by Grantee of one remedy hereunder shall not have the effect of waiving any other remedy, and the failure to exercise any remedy shall not have the effect of waiving the use of such remedy at any other time.

C. Standards for Review. In exercising any authority created by the Easement to inspect the premises, the buildings, or the facades; to review any construction, alteration, repair or maintenance; or to review casualty damage or to reconstruct or approve reconstruction of the buildings following casualty damage, Grantee shall apply the Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings, issued and as may be amended from time to time by the Secretary of the United States Department of the Interior. In the event that the Standards are abandoned or materially altered or otherwise become, in the sole judgment of the Grantee, inappropriate for the purposes set forth above, the Grantee may apply reasonable alternative standards, and notify the Grantor of the substituted standards.

D. Assignability. Grantor agrees that Grantee may, in its discretion, and without prior notice to Grantor, convey and assign this Preservation Easement to any agency of the State of Rhode Island, to a unit of local government, or not-for-profit corporation or trust provided that the mandated purpose of such assignee includes the preservation of properties of

historical, architectural, or cultural significance. Such conveyance, assignment, or transfer shall require that the preservation and conservation purposes for which the Easement was granted will continue to be carried out.

E. Duration. This Preservation Easement shall be effective for a period of ____ years. Grantor and Grantee hereby recognize that an unexpected change in the conditions surrounding the premises may make impossible the continued ownership or use of the premises for preservation and conservation purposes and necessitate extinguishment of the Easement. Such a change in conditions includes, but is not limited to, partial or total destruction of the building resulting from a casualty of such magnitude that in the opinion of Grantee the building and premises have lost their historical and architectural significance, or condemnation or loss of title through an eminent domain proceeding. Grantor agrees that this Easement shall not be released to the Grantor or its successors or assigns without the consent of the Grantee, which consent shall be appended to such release.

F. Runs with the Land. The obligations imposed by this Preservation Easement shall be deemed to run as a binding servitude with the land. This instrument shall extend to and be binding upon Grantor and all persons hereafter claiming under or through Grantor, and the word "Grantor" when used herein shall include all persons. Anything contained herein to the contrary notwithstanding, a person shall have no obligations pursuant to this instrument after such person shall cease to have any interest in the Premises by reasons of a bona fide transfer for full value.

G. Statutory Authority. This instrument is valid in Rhode Island by virtue of the enactment of Chapter 39 of title 34 of the General Laws of Rhode Island, but the invalidity of such Act or any part thereof shall not effect the validity and enforceability of this instrument according to its terms, it being the intent of the parties that this instrument constitutes a charitable trust, a preservation restriction, a common law easement in gross and a restrictive covenant.

H. Notices. Any notice called for herein shall be in writing and shall be mailed postage prepaid by registered or certified mail with return receipt requested, or hand delivered and receipted. If to Grantor, then at _____ and if to Grantee, then at the Rhode Island Historical Preservation and Heritage Commission, 150 Benefit Street, Providence, Rhode Island. Each party may change its address set forth herein by a notice to such effect to the other party. The failure to service a change of address notice shall not waive the notice requirement.

I. Compliance with Applicable Ordinances. To the extent this easement permits future development of the Premises, such development shall conform with appropriate local, state or

IN WITNESS THEREOF, on the date first shown above, Grantor has caused this Preservation Easement to be executed, sealed and delivered by its

ATTEST GRANTOR:

Accepted by Grantee, Rhode Island Historical Preservation and Heritage Commission, pursuant to Chapter 39, Conservation and Preservation Restriction on Real Property, this day of , 19 .

By _____
Edward F. Sanderson, Executive Director
Rhode Island Historical Preservation
and Heritage Commission

ATTEST:

_____

State of Rhode Island

Town/City of

I, the undersigned, a Notary Public in and for said Town/City, in the State aforesaid, do hereby certify that personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person, and acknowledged that is duly authorized, signed, sealed and delivered the said instrument as his/her own free and voluntary act, for the uses and purposes therein set forth.

Given my hand and official seal, this day of 19 .

_____

Notary Public

My commission expires;

_____

State of Rhode Island)
) SS
City of Providence)

I, the undersigned, Notary Public, appointed in the City of for the State of Rhode Island, do hereby certify that Edward F. Sanderson, personally known to me to be the same person whose name is, as Executive Director of the Rhode Island Historical Preservation and Heritage Commission, a not-for-profit corporation of the State of Rhode Island, subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he is duly authorized, signed, sealed with the corporate seal and delivered the said instrument as the free and voluntary act of the corporation and as his own free and voluntary act for the uses and purposes therein set forth.

Given under my hand and official seal, this day of , 19 .

_____

Notary Public

My commission expires;

_____

Assumptions:

1. O & M Nitrogen Impact based on estimates from FY 2011 CIP
2. CSO Phase II O & M impact based on FY 2011 CIP, Phase III impact based on estimated impact of Phase I
3. FY 2010 rate based on actual projected rate

FY 2009 Budget:

	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Total Debt Service 5/27/09 Model	34,702,793	36,525,037	42,178,693	48,880,196	54,722,217	58,421,455	60,214,843	60,660,931	61,036,506	61,036,506	61,036,506	61,036,506	61,036,506
Coverage Requirements per 5/27/09 Model	8,675,698	9,131,259	10,544,673	12,220,049	13,680,554	14,605,364	15,053,711	15,165,233	15,259,126	15,259,126	15,259,126	15,259,126	15,259,126
$400 M Borrowed for Phase III								5,288,817	27,559,915	27,559,915	27,559,915	27,559,915	27,559,915
Coverage Requirements for Phase III								1,322,204	6,889,979	6,889,979	6,889,979	6,889,979	6,889,979
Total Debt Service	43,378,491	45,656,296	52,723,366	61,100,245	68,402,771	73,026,819	75,268,554	82,437,185	110,745,526	110,745,526	110,745,526	110,745,526	110,745,526
O&M Base Inflated at 3%	36,206,201	37,292,387	38,411,159	39,563,493	40,750,398	41,972,910	43,232,097	44,529,060	45,864,932	47,240,880	48,658,107	50,117,850	51,621,385
O & M Nitrogen FP from 2011 CIP				550,000	1,676,000	1,760,000	1,840,000	1,895,200	1,952,056	2,010,618	2,070,936	1,840,000	1,840,000
O & M Nitrogen BP from 2011 CIP						110,000	300,000	309,000	318,270	327,818	337,653	300,000	300,000
O & M CSO Phase II						83,000	155,000	159,650	164,440	169,373	174,454	179,687	185,078
O & M CSO Phase III													824,000
Total O & M	36,206,201	37,292,387	38,411,159	40,113,493	42,426,398	43,925,910	45,527,097	46,892,910	48,299,698	49,748,689	51,241,149	52,437,537	54,770,463
Total Per 4026 for FY 2010	76,937,679	82,948,683	91,134,525	101,213,738	110,829,169	116,952,729	120,795,651	129,330,096	159,045,223	160,494,214	161,986,675	163,183,063	165,515,989
Other Revenue	2,917,703	3,411,024	3,411,024	3,411,024	3,411,024	3,411,024	3,411,024	3,411,024	3,411,024	3,411,024	3,411,024	3,411,024	3,411,024
Rate Base 3905 User Fee Only	74,019,976	74,019,976	79,537,659	87,723,501	97,802,714	107,418,145	113,541,705	117,384,627	125,919,072	155,634,199	157,083,190	158,575,651	159,772,039
Total Revenue	76,937,679	77,431,000	82,948,683	91,134,525	101,213,738	110,829,169	116,952,729	120,795,651	129,330,096	159,045,223	160,494,214	161,986,675	163,183,063
Difference	**-**	**(5,517,683)**	**(8,185,842)**	**(10,079,214)**	**(9,615,431)**	**(6,123,560)**	**(3,842,922)**	**(8,534,444)**	**(29,715,128)**	**(1,448,991)**	**(1,492,461)**	**(1,196,388)**	**(2,332,926)**
Percent Increase	0.0%	7.5%	10.3%	11.5%	9.8%	5.7%	3.4%	7.3%	23.6%	0.9%	1.0%	0.8%	1.5%
New Base	74,019,976	79,537,659	87,723,501	97,802,714	107,418,145	113,541,705	117,384,627	125,919,072	155,634,199	157,083,190	158,575,651	159,772,039	162,104,965
Proj. Avg. NBC Residential Rate	$ 409.94	$ 440.50	$ 485.83	$ 541.65	$ 594.91	$ 628.82	$ 650.10	$ 697.37	$ 861.94	$ 869.96	$ 878.23	$ 884.86	$ 897.78
Weighted Average MHI for all Communities	$ 47,393	48,815	50,280	51,788	53,342	54,942	56,590	58,288	60,037	61,838	63,693	65,604	67,572
% Rate of Weighted Average MHI	0.9%	0.9%	1.0%	1.0%	1.1%	1.1%	1.1%	1.2%	1.4%	1.4%	1.4%	1.3%	1.3%
	Low	**Low**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**
Three Lowest MHI City/Towns													
Central Falls	$ 31,322	$ 32,262.12	$ 33,229.98	$ 34,226.88	$ 35,253.69	$ 36,311.30	$ 37,400.64	$ 38,522.66	$ 39,678.33	$ 40,868.69	$ 42,094.75	$ 43,357.59	$ 44,658.32
	1.3%	1.4%	1.5%	1.6%	1.7%	1.7%	1.7%	1.8%	2.2%	2.1%	2.1%	2.0%	2.0%
	Mid-range	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**High**	**High**	**High**	**Mid-range**	**Mid-range**
Pawtucket	$ 43,984	$ 45,303.55	$ 46,662.66	$ 48,062.54	$ 49,504.41	$ 50,989.55	$ 52,519.23	$ 54,094.81	$ 55,717.65	$ 57,389.18	$ 59,110.86	$ 60,884.19	$ 62,710.71
	0.9%	1.0%	1.0%	1.1%	1.2%	1.2%	1.2%	1.3%	1.5%	1.5%	1.5%	1.5%	1.4%
	Low	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**
Providence	$ 37,190	$ 38,305.92	$ 39,455.10	$ 40,638.75	$ 41,857.91	$ 43,113.65	$ 44,407.06	$ 45,739.27	$ 47,111.45	$ 48,524.79	$ 49,980.53	$ 51,479.95	$ 53,024.35
	1.1%	1.1%	1.2%	1.3%	1.4%	1.5%	1.5%	1.5%	1.8%	1.8%	1.8%	1.7%	1.7%
	Mid-range	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**	**Mid-range**

CSO Affordability Analysis December 2009

	1999 Median HH Income	Average CPI	Est. 2010 MHI	# of Dwelling Units (2000)	CPI Weighted Community MHI	Median MHI	Proj FY 2022 MHI
Central Falls	$ 22,628	3%	$ 31,322	7,333	$ 1,321	$ 54,559	$ 65,603.57
Cumberland	$ 54,656	3%	$ 75,657	12,306	$ 5,356		
E. Providence	$ 39,108	3%	$ 54,135	21,210	$ 6,605		
Johnston	$ 43,514	3%	$ 60,234	11,233	$ 3,892		
Lincoln	$ 47,815	3%	$ 66,187	8,524	$ 3,246		
N. Providence	$ 39,721	3%	$ 54,983	14,618	$ 4,624		
Pawtucket	$ 31,775	3%	$ 43,984	32,048	$ 8,109		
Providence	$ 26,867	3%	$ 37,190	66,553	$ 14,239		
				173,825	$ 47,393		

	FY 2022
Current WWT Costs (from filing)	36,206,201
Annual Debt Service (model)	43,378,491
	79,584,692
Projected WWT (FY 2022) (from projection based on model)	54,770,463
Annual Debt Service (projection based on projection from mode	110,745,526
	165,515,989
Cost per Household (CPH)	
(Res. Share for 2009 = 57% of Op. Rev.)	542.75
Residential Indicator (CPH/MHI)	1.1%
Mid-range Financial Impact	

Implemented:	Year
CSO Phase II	FY 2015
BP Nitrogen	FY 2015
FP Nitrogen	FY 2014

NARRAGANSETT BAY COMMISSION
COMBINED SEWER OVERFLOW
CONTROL FACILITIES PROGRAM

CONCEPTUAL DESIGN REPORT
AMENDMENT
SECOND REAFFIRMATION

DECEMBER 22, 2010

EXECUTIVE SUMMARY

The Narragansett Bay Commission prepared a "Concept Design Report Amendment" (CDRA) in April 1998 for its Combined Sewer Overflow Control (CSO) Facilities Program. In January 2005, NBC prepared a "Conceptual Design Report Amendment Reaffirmation" (Reaffirmation) to comply with the SRF funding program requirement that a reaffirmation must be prepared every five years. Since five years have elapsed since the Reaffirmation, NBC has prepared this updated "Conceptual Design Report Amendment Second Reaffirmation"(Second Reaffirmation). This Second Reaffirmation affirms that the CSO Control Facilities Program presented in the Reaffirmtion has not substantially changed.

The Program is still to be constructed in three phases. The Phase I facilities have been constructed and consist of a 62 million gallon storage tunnel, an associated pump station and seven drop shafts to convey flow to the tunnel.

Design of the Phase II facilities is nearly completed. These facilities, which are basically unchanged since the Reaffirmation, consist primarily of two consolidation interceptors that collect overflows along the Seekonk and Woonasquatucket Rivers to convey these flows to the tunnel. There have been two minor changes to facilities proposed for Phase II. The east end of the Woonasquatucket CSO Interceptor (WCSOI) has been adjusted slightly to terminate at a dropshaft on land that has been acquired by NBC at the former Gov. Dyer Marketplace between Rathbone St. and Hemlock St. This drop shaft will be connected to the Foundry termination shaft by an 1800 foot adit. Also, instead of using the existing combined sewer in Davis Park to convey flows for OF045 to the tunnel, new consolidation conduits will be constructed to convey flows up to the design storm to the drop shaft. The Seekonk CSO Interceptor (SCSOI) will terminate at OF023 instead of OF025 reducing the length of the sewer from 11,200 feet to 7,600 feet. OF025 will be addressed through regulator modifications which will allow the design storm flows to be conveyed to the existing Seekonk River Interceptor.

There have been no changes to the Phase III facilities.

There have been no changes to Sections 1-9.

The construction costs for the three phases have been updated in Section 10 and the effect of the updated costs on user fees is discussed in Section 11. The most significant change in this Second Reaffirmation is that the updated costs for the three phases provided in Section 10 will most likely result in a residential burden that will be in the "mid-range" and "high" burden category.

SECTION 1
BACKGROUND

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

SECTION 2
EXISTING SEWERAGE FACILITIES

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

SECTION 3
WATER QUALITY OBJECTIVES AND CRITERIA

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

SECTION 4
EXISTING CONDITIONS

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

SECTION 5
PREVIOUSLY PROPOSED CSO ABATEMENT FACILITIES

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

SECTION 6
ALTERNATIVE TECHNOLOGIES AND APPROACHES

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

SECTION 7
SUMMARY OF ENVIRONMENTAL IMPACTS AND BENEFITS

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

SECTION 8
COST OF ALTERNATIVES

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

SECTION 9
EVALUATION ALTERNATIVES AND SELECTION OF RECOMMENDED ALTERNATIVE

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

SECTION 10
CONCEPT DESIGN OF RECOMMENDED ALTERNATIVE

10.1 DESCRIPTION OF RECOMMENDED ALTERNATIVE

10.1.1 Introduction

In Section 9, system alternatives were evaluated and Alternative 17 was selected as the recommended alternative. The recommended alternative consists of two deep rock tunnels; CSO interceptors in each service area to transmit flow from remote CSO's to the tunnels, sewer separation, one wetland, and upgrading the BPWWTF to accept flows from OF002. The two tunnels are the Pawtucket Tunnel in the BPSA and Main Spine Tunnel in the FPSA. The remaining outfalls that have smaller CSO flows have either been blocked or modifications will be made to the regulator structures to eliminate overflows for flows up to the design storm and to provide floatables control for flows greater than the design storm.

The recommended alternative will be constructed in three phases. Phase I facilities consist of a 16,000 foot long, 26 foot diameter tunnel, seven drop shafts, a tunnel pump station, some regulator modifications and construction of wet weather facilities at the Bucklin Point Wastewater Treatment Facility. Construction of Phase I was completed in November 2008. Phase II facilities include two new interceptors, two sewer separation

projects and one wetlands facility. Design for Phase II will be completed by December 2010. Construction will be broken out into twelve (12) contracts. Construction on the first contract is expected to begin in early 2011.

Phase III consists of a 13,000 foot long 26 foot diameter tunnel, three CSO Interceptors and five sewer separation projects. Design of these facilities will not begin until 2015.

Issues relating to siting, final design and operation of the Phase III facilities will be resolved during preliminary and detailed design. If resolution of these issues results in substantial changes, the changes will be submitted to RIDEM for prior approval. Additionally, an operating plan will be developed and submitted for approval during detailed design.

Before initiating Phase III, NBC will review and evaluate water quality data and alternative technologies to determine if the proposed Phase III facilities should be modified to meet the requirements of the Clean Water Act and the RI Water Quality Regulations.

The facilities proposed to be built under the three phases of Alternative 17 are shown in Figure 10.1-1 and are described in the following sections.

10.1.2 Recommended Alternative – Phase I

10.1.2.1 Main Spine tunnel

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment Reaffirmation," dated January 14, 2005.

10.1.2.2 Bucklin Point Wastewater Treatment Facility Upgrade

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment Reaffirmation," dated January 14, 2005.

10.1.2.3 Nine Minimum Controls/Regulator Modifications

Floatables control will be provided at outfalls that activate less than four times per year and/or have minimal overflow volume. Floatables control facilities were installed at three Phase I outfalls (OF 005, 011 and 033). The regulators for five overflows (012, 013, 016, 042 and 044) were modified with larger diameter connector pipes to direct flows up to the 3 month storm to the existing interceptors.

10.1.2.4 Blocked Outfalls

A total of 18 outfalls have been blocked in the FPSA: 010, 015, 020, 021, 022, 024, 026, 028, 029, 031, 034, 038, 047, 057, 059, 062, 063, 065, and 066. One outfall, OF102, has been blocked in the PSA. The drainage basin for OF 043 has been separated so it is no longer a CSO.

10.1.2.5 Monitoring Plan

NBC will continue with its ongoing water quality monitoring program to document water quality conditions and determine improvements associated with construction of the facilities. Before initiating Phase III, NBC will conduct an evaluation of water quality improvements and technologies to determine if any modifications should be made to meet the requirements of the Clean Water Act and the RI Water Quality Regulations.

10.1.2.6 Other Studies

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment Reaffirmation," dated January 14, 2005.

10.1.3 Recommended Alternative – Phase II

10.1.3.1 FPSA CSO Interceptor

Two CSO Interceptors are proposed to be constructed in the Field's Point Service Area during this phase. The Woonasquatucket CSO Interceptor (WCSOI) will convey flows from outfalls along the Woonasquatucket River to the tunnel. The WCSOI will be 12,410 feet in length and will vary from 48-72 inches in diameter. Another 4,140 LF of consolidation conduit will be constructed to convey flows from OF's 045, 046, 049, 051, 053, 054 and 055 to the WCSOI. A drop shaft will be constructed at the end of the WCSOI on land owned by NBC at the former Governor Dyer Market between Hemlock and Rathbone Streets. An 1,800 foot tunnel adit will be constructed to convey the flow from the drop shaft to the tunnel at the Foundry termination shaft constructed under Phase I. This project will require five crossings of the Woonasquatucket River which will most likely be done by cut and cover. Figure 10.1-11 shows the alignment of the Woonasquatucket CSO Interceptor

In addition to the seven overflows that will be connected to the WCSOI, there are five other overflows in this sewershed, OF's 041, 048, 050, 052 and 058. OF's 050 and 058 will be addressed through regulator modifications. OF's 041 and 048 and 052 will be blocked.

The Seekonk CSO Interceptor (SCSOI) will convey flows from OF's 019 and 023 to the Main Spine Tunnel at the MRI drop shaft. The SCSOI will be 7,200 feet long and the diameter will vary from 48-60 inches. A 260 foot consolidation conduit will also be constructed to convey the flow from OF 023 to the SCSOI. Regulator modifications will be provided at OF 025 to divert flows to the existing Seekonk River Interceptor for flows up to the design storm. Figure 10.1-13 shows the Seekonk CSO Interceptor alignment .

10.1.3.2 Sewer Separation

Sewer Separation will be completed in the drainage areas of OF's 027 and 037.

10.1.3.3 Wetland Facility

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment Reaffirmation," dated January 14, 2005.

10.1.4 Recommended Alternative- Phase III

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

10.1.4.1 Pawtucket Tunnel

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

10.1.4.2 BPSA CSO Interceptors

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

10.1.4.3 Outfalls 219/220-CSO Interceptor

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

10.1.4.4 Sewer Separation

Sewer Separation will be completed in the drainage area of OF's 035, 039, 056, and 206. Figure 10.1-1 shows the locations where sewer separation is proposed.

10.1.5 Summary

A summary of the proposed facilities for the recommended alternative by Phase and the CSO's controlled is provided in Table 10.1-7. Flow monitoring is currently being conducted for overflows to be addressed in Phase III to determine volume and frequency of overflows. Based on the results of this monitoring, a determination will be made as to whether the overflow should be blocked, only floatables control is required (overflows less than 4 times per year), if regulator modifications are sufficient , or if the overflow will need to be directed to the CSO control facilities (interceptor or tunnel).

TABLE 10.1.7
ALTERNATIVE 17
SUMMARY OF FACILITIES

FACILITY	CSO OF CONTROLLED
PHASE I	
Main Spine Tunnel	004, 006, 007, 009, 032, 061, 067
BP Wastewater Treatment Facility Upgrade	002
Regulator Modifications	012, 013, 016, 042, 044
Floatables Control	005, 011, 033
Blocked Outfalls	010, 015, 020, 021, 022, 024, 026, 028, 029, 031, 034, 038, 047, 051, 059, 062, 063, 065, 066
Sewer Separation	043
PHASE II	
SCSOI	019, 023
WCSOI	045, 046, 049, 051, 053, 054, 055
Regulator Modifications Floatables Control	025, 050, 058
Wetlands Treatment Facility	106
Sewer Separation	027, 037
Floatables Control	041, 048
Blocked Outfalls	052
PHASE III	
Pawtucket Tunnel	103, 104, 105, 201, 203, 205, 210/211, 213, 217, 218
BPSA CSO Interceptors	103, 104, 105, 201, 203, 205
Outfalls 219/220- CSO Interceptor	219, 220
Sewer Separation	035, 039, 056, 206
Blocked, Floatables Control* or Regulator Modifications	036, 101, 102, 107, 202, 204, 207, 208, 209, 212, 214, 215, 216

*Flow monitoring analysis currently being conducted.

10.2 COST ESTIMATES

10.2.1 Estimated Construction Costs

Estimated construction costs for the recommended alternative are presented in Table 10.2-1. A financial analysis evaluating the impacts of these costs on user rates is presented in Section 11.

TABLE 10.2-1 ESTIMATED COSTS

FACILITY	COST
Phase I*	
Main Spine Tunnel and Pump Station	$232,453,,000
Drop Shafts, Nine Minimum Controls, Regulator Modifications	$51,159,000
Design, Administration, Construction Management, Owner Controlled Insurance and Land	$75,472,000
OF002 (included in BPWWTF upgrade contract)	$2,400,000
Total Costs Phase I Tunnel	**$361,484,000**
Phase II	
Woonasquatucket CSO Interceptor & Seekonk CSO Interceptor	$203,000,000
Wetland Facility	$10,040,000
Sewer Separation	$57,840,000
Design, Administration, Construction Management and Land	$55,600,000
Total Costs- Phase II	**$326,480,000**
Phase III	
Pawtucket Tunnel	$272,824,000
CSO Interceptor (OFs 219,220)	$114,100,000
BPSA CSO Interceptor	$45,640,,000
Sewer Separation	$71,446,000
Design, Administration, Construction Management, Land and Insurance	$98,952,000
Total Costs- Phase III	**$602,962,000**
Total Costs- Alternative 17	**$1,290,926,000**

Phase I costs are actual costs

10.3 ENVIRONMENTAL EVALUATION

10.3.1 Water Quality Benefits

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

10.3.2 Environmental Assessment

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

10.3.2.1 Short-term/Construction Impacts

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment Reaffirmation," dated January 14, 2005.

10.3.2.2 Long-Term/Operational Impacts

The proposed facilities have been sited to minimize operational impacts on surrounding neighborhoods and CBDs. Above-ground structures will be compatible in design with the surrounding area and all sites will be appropriately landscaped. Facilities will also be designed to minimize pump noise and vibration and to minimize air quality impacts associated with CSO's.

Facility sites have been carefully selected to enable continuation of existing land uses following construction of either near surface facilities or tunnel shafts. In most cases, the site may be restored as parking lots or open space (vacant land). The construction of the Phase II facilities will require the relocation of two businesses. The site of working shafts S1, S5 the Foundry site and the WCSOI drop shaft are currently owned by the NBC and proposed use would be in accordance with NBC plans for these sites. A park which is proposed at the north end of the Pawtucket Tunnel, along the Blackstone River, would be a compatible use with Working Shaft S7.

There would be no long-term impacts regarding future public/recreational land use, traffic noise/sensitive receptors, cultural, surface water/aquatic, or wildlife resources. A benefit of the construction would be the development of a park at Front Street in Pawtucket, located along the Blackstone River bike path. Minor visual quality impacts would result at the sites with above-ground structures, although measures would be taken to blend them in architecturally with the surrounding environment.

All surface CSO Alternative facilities would have minor air quality impacts (no odors would be anticipated from sewer separation or interceptor operation). Tunnel vent shafts would be designed and operated to mitigate odor impacts. All facilities would be covered and vented through odor control equipment or buried in rock (tunnel) to minimize odors. Minor air quality impacts are projected at all sites. To minimize odors at tunnel vent shafts, louvers would be installed which would remain closed unless the tunnel is filling during a storm, or being pumped out (within three days of the storm). When the tunnel is filling, air would be emitted upward from the vent shafts. Based on operating experience of the Main Tunnel after completion of Phase I construction, additional odor control facilities were installed at the Foundry site, which is the main tunnel exhaust ventilation shaft. These odor control facilities consist of a continuously operating fan to draw air from the tunnel and force it through two activated carbon towers. It is anticipated that a similar odor control facility will be required for the Pawtucket Tunnel. During pump back operations, the vent shaft would be used to supply air downward to the tunnel system. Minimal odors would therefore be emitted from the system.

10.3.2.3 Conclusion, Alternative 17 Impacts

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

10.4 CONSTRUCTION PHASING AND PRIORITIES

10.4.1 Program Phasing

Table 10.4-1 shows the proposed design and construction schedule for the recommended alternative. This schedule was developed to be consistent with the requirements set forth in the NBC/RIDEM Consent Agreement (RIA 330) for NBC's CSO Program. This schedule is also based on the assumption that funding would be available as needed and that permits and approvals would be obtained in a timely manner.

The three phases of the recommended alternative are to be constructed over twenty years. A design period of two years plus time for regulatory approvals has been included at the beginning of each of the three phases. Construction of each phase will take either four or five years. Phasing of the CSO control program will allow for technology review and water quality monitoring to occur between Phase II and Phase III to determine if the facilities proposed for Phase III should be modified. O&M costs would be incurred as soon as each facility is constructed and comes on-line.

10.4.2 Storm Water Rate Structure

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment Reaffirmation," dated January 14, 2005.

10.4.3 Monitoring Plan

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

10.4.4 Other Studies

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

10.5 RIDEM POLICY COMPLIANCE

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

SECTION 11
FINANCIAL ANALYSIS

11.1 DESCRIPTION OF RECOMMENDED ALTERNATIVE

The recommended alternative, Alternative 17, combines several major construction elements including deep rock tunneling with pump stations, CSO interceptors, sewer separation, wastewater treatment facility upgrading and the implementation of minimum controls and blocking of select outfalls. A phasing schedule for the construction of Alternative 17 is presented in Table 10.4-1.

11.2 COST ESTIMATES AND PHASING

The total cost for Phase I of Alternative 17 was $362 million. The total estimated cost for Phase II is $326 million based on the recently completed design plans for Phase II. The total estimated cost for Phase III design and construction is $603 million. This cost is based on design and construction cost experience from Phase I of the CSO program. Cash flow start and end dates are based on the schedule in Table 10.4.1.

11.3 METHOD OF FINANCING CAPITAL COSTS

The NBC will finance the project with subsidized loans through the State Revolving Loan Fund program administered by the Rhode Island Clean Water Financing Agency (RICWFA) to the extent that it has capacity. The NBC will issue tax-exempt revenue bonds and other sources to finance any "gaps" created by the RICWFA's capacity limitation. The NBC has issued tax-exempt revenue bonds to finance the project when there was insufficient funding from RICWFA.

11.3.1 State General Obligation Bonds

(This section has been deleted)

11.3.2 State Revolving Loan Funds

The principal low-cost financing source for the CSO Phase I Facilities was the State Revolving Fund (SRF) which is a low interest loan program administered by the RICWFA. Traditional SRF loans are at one-third below the market cost of borrowing. The SRF program funds wastewater treatment, sewer, CSO and other water quality improvement projects for Rhode Island communities statewide.

The RICWFA Annual payments of interest and principal were calculated based on current available State Revolving Funds (SRF) rules. A market rate of 6.00% was assumed, resulting in a subsidized SRF rate of 4.00%. The par loan amount includes cost of issuance, underwriter discounts and a 0.5 percent annual service fee.

Due to RICWFA capacity limitations, it is anticipated that the majority of the construction costs for Phase II and Phase III will be funded from revenue bonds. Issuance of new debt and annual debt service payments to support construction will occur in accordance with construction phasing. Bonds are expected to be issued as construction progresses:

- Phase I – SRF loans funded $222 million of the construction, NBC revenue bonds funded $114 million with the balance funded from other sources.
- Phase II – Construction is expected to last four years and is estimated to cost $307 million. Design cost was $19 million.
- Phase III – Design and construction costs are estimated to total $603 million during the six year duration of the third phase.

11.3.3 Debt Term and Phasing

The debt term for project construction loans is anticipated to be 20 years for SRF loans, which is the current limit under the program. The debt term for revenue bonds is

anticipated to be 30 years. Revenue Bonds are assumed at a rate of 6.00%. The table on the following page illustrates the estimated borrowing requirements.

Projected Future Bond Issues

Fiscal Year	SRF Bonds	Revenue Bonds	Total Par Amount
2011	$ 30,000,000	$ -	$ 30,000,000
2012	12,000,000	31,680,000	43,680,000
2013	12,000,000	118,780,000	130,780,000
2014	12,000,000	91,225,000	103,225,000
2015	12,000,000	64,145,000	76,145,000
2016	12,000,000	2,050,000	14,050,000
2017	12,000,000	-	12,000,000
2018	12,000,000	23,735,000	35,735,000
2019	12,000,000	104,450,000	116,450,000
2020	12,000,000	113,485,000	125,485,000
2021	12,000,000	117,165,000	129,165,000
2022	12,000,000	81,240,000	93,240,000
2023	12,000,000	-	12,000,000
	$ 174,000,000	$ 747,955,000	$ 921,955,000

11.3.4 Debt Service Coverage Requirements

NBC's rates are designed to generate annual revenues equivalent to 125% of annual principal and interest. Principal and interest payments are funded from current year revenues and the 25% coverage generates a "restricted carry-forward" each year. The PUC limits the expenditure of the restricted carry-forward to operating capital outlays, the direct funding of capital projects and a reserve.

11.3.5 Non-CSO Debt

(This section has been deleted)

11.3.6 Impact on Rates

In addition to the financing assumptions presented in Section 11.3, the residential burden evaluation includes the following assumptions:

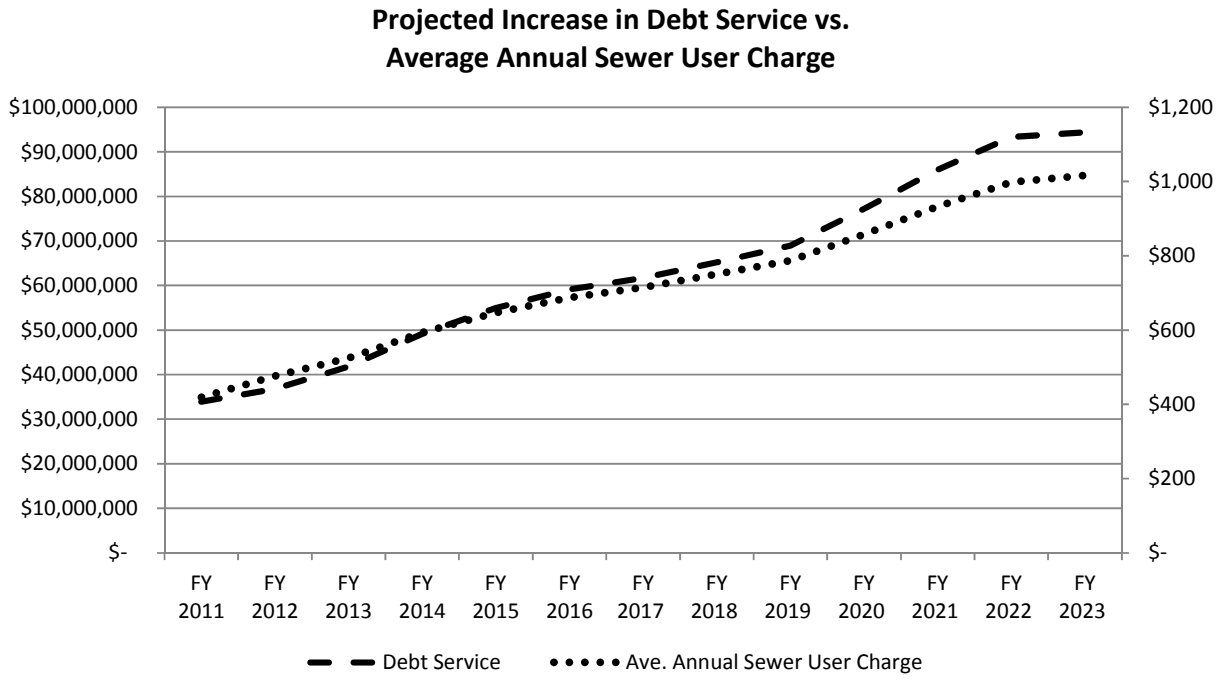
1. Both CSO and Non-CSO projects are included in this analysis to assess the potential burden on residential ratepayers. Adequate coverage must be maintained for all debt.

2. The ratio of residential ratepayers to total ratepayers is assumed to remain constant over the life of the project. The number of residential ratepayers also remains constant.

3. Current costs include operations and maintenance and debt service for all projects. Operations and Maintenance costs are assumed to increase by 3.5% through the life of the project and operational costs for completed capital improvements are also included.

As of July 1, 2010 the average annual sewer user charge is $419 per household. This number rises to its peak, $1,017 per household, in Year 2023. The vast majority of the increase in rates is attributed to the increase in debt service for capital construction projects. The graph below illustrates this correlation.

FIGURE 11.3-1



11.4 FINANCIAL IMPACT ANALYSIS

11.4.1 Overview of the EPA Guidance Methodology

(This section has not been amended)

11.4.2 Phase I: The Residential Indicator

(This section has not been amended)

11.4.2.1 Methodology for Residential Indicator Analysis

(This section has not been amended)

11.4.2.2 Residential Indicator Analysis

(This section has not been amended)

11.4.2.3 Key Findings of Residential Indicator Analysis

At the time that the CDR was prepared, Alternative 17 was determined to have a "low" burden on the average household of the NBC district based on the EPA scoring criteria for the residential indicator analysis. The average residential household paid $131, which was 0.4% of median household income (MHHI) for ratepayer households. The average annual residential sewer user charge in July 2011 will be $476 per household. Assuming that the weighted average 1999 MHHI in NBC's Service Area of $34,174 has not increased, the burden will be in the "mid-range" category at the commencement of Phase II construction.

The projected average residential sewer user charge upon completion of Phase III in 2023 is $1,017. If there were no increase in the MHHI over the next 15 years, this rate would be 3.0% of the weighted average MHHI, which would be a high financial impact. However, it is unlikely that the MHHI will not increase over the 1999 value. In order for the sewer use rate to remain at 1% of the MHHI, the weighted average MHHI would have to increase by an average of $2,590 per year over 23 years, which is more than double the actual increase in the weighted average MHHI of $991 between the census in 1989 and 1999. If the MHHI increases at the historical average, the burden will be high in Providence, Pawtucket and Central Falls at 2.7%, 2.3% and 3.2%, respectively. These three communities contain 64% of NBC's accounts. While it is not possible to accurately predict the MHHI in 2023, it is likely that the burden will be in the "mid-range" and "high" burden category.

11.4.3 Phase 2: Permittee Financial Capability Indicator

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

11.4.4 Schedule Development

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

11.5 COMPARISON OF FINANCIAL BURDEN AT THE TOWN LEVEL

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

11.6 FINANCIAL BURDEN ON THE BUSINESS COMMUNITY

This section has not been amended. Refer to the same section in "Narragansett Bay Commission, Combined Sewer Overflow Facilities Program, Conceptual Design Report Amendment," dated April 17, 1998.

CSO Second Reaffirmation Rate Imact Projections 12-2010

	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Debt Service 2011 4151 DSM for outer years	33,888,145	36,840,038	41,821,045	49,146,930	54,933,079	59,124,513	61,689,716	65,225,607	68,969,202	77,186,046	85,970,587	93,335,509	94,388,668
Coverage Requirements	8,472,036	9,210,010	10,455,261	12,286,732	13,733,270	14,781,128	15,422,429	16,306,402	17,242,301	19,296,511	21,492,647	23,333,877	23,597,167
Total Debt Service	42,360,181	46,050,048	52,276,306	61,433,662	68,666,348	73,905,641	77,112,144	81,532,008	86,211,503	96,482,557	107,463,233	116,669,386	117,985,835
O&M (3.5% per out year)	36,244,184	37,483,620	38,795,547	40,153,391	41,558,759	43,013,316	44,518,782	46,076,939	47,689,632	49,358,769	51,086,326	52,874,348	54,724,950
CIP Impact per budget			560,000	1,780,000	2,187,000	2,293,000	2,293,000	2,293,001	2,293,002	2,293,003	2,293,004	2,293,005	2,293,006
Total O & M	36,244,184	37,483,620	39,355,547	41,933,391	43,745,759	45,306,316	46,811,782	48,369,940	49,982,634	51,651,772	53,379,330	55,167,353	57,017,956
Total Cost of Service	78,604,365	83,533,668	91,631,853	103,367,053	112,412,108	119,211,957	123,923,926	129,901,949	136,194,137	148,134,329	160,842,563	171,836,739	175,003,791
Less Misc. Revenues per NBC 4026	2,903,822	2,903,822	2,903,822	2,903,822	2,903,822	2,903,822	2,903,822	2,903,822	2,903,822	2,903,822	2,903,822	2,903,822	2,903,822
COS to be Recovered via User Fees	75,700,543	80,629,846	88,728,031	100,463,231	109,508,286	116,308,135	121,020,104	126,998,127	133,290,315	145,230,507	157,938,741	168,932,917	172,099,969
less: Cons. Adjustment 4025	(4,746,431)												
User Fee Revenue	70,954,112	70,954,112	80,629,846	88,728,031	100,463,231	109,508,286	116,308,135	121,020,104	126,998,127	133,290,315	145,230,507	157,938,741	168,932,917
Increase in COS	**(4,746,431)**	**(9,675,734)**	**(8,098,185)**	**(11,735,200)**	**(9,045,055)**	**(6,799,850)**	**(4,711,969)**	**(5,978,022)**	**(6,292,188)**	**(11,940,192)**	**(12,708,234)**	**(10,994,175)**	**(3,167,052)**
Percent Increase in User Fees	2.25%	13.6%	10.0%	13.2%	9.0%	6.2%	4.1%	4.9%	5.0%	9.0%	8.8%	7.0%	1.9%
New Base	70,954,112	80,629,846	88,728,031	100,463,231	109,508,286	116,308,135	121,020,104	126,998,127	133,290,315	145,230,507	157,938,741	168,932,917	172,099,969
Proj. Avg. NBC Residential Rate	$ 419.17	$ 476.33	$ 524.17	$ 593.50	$ 646.93	$ 687.10	$ 714.94	$ 750.26	$ 787.43	$ 857.97	$ 933.04	$ 997.99	$ 1,016.70

	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Percent Increase	2.3%	13.6%	10.0%	13.2%	9.0%	6.2%	4.1%	4.9%	5.0%	9.0%	8.8%	7.0%	1.9%
Proj. Avg. NBC Residential Rate	$ 419	$ 476	$ 524	$ 593	$ 647	$ 687	$ 715	$ 750	$ 787	$ 858	$ 933	$ 998	$ 1,017

CSO Second Reaffirmation Rate Imact Projections 12-2010

2009 Census	1989 MHI	1999 MHI	Ave. Annual Increase	# of Accounts	Weighted Ave.	Year 2012	Year 2023	Annual Increase to Achieve 1%	Annual Increase to Achieve 2%	Acutal Annual Increase 89-99	1% Over Ave.	2% Over Ave.	%MHHI at Ave. Annual Increase	Impact
Providence	$ 22,147	$ 26,867	$ 472	34,474	$ 10,974	1.8%		3,252	1,733	$ 472	689%	367%	2.7%	High
Pawtucket	$ 26,541	$ 31,775	$ 523	17,318	$ 6,520	1.5%		3,039	1,927	$ 523	581%	368%	2.3%	High
East Providence	$ 31,007	$ 39,108	$ 810	3,595	$ 1,666	1.2%		2,720	2,138	$ 810	336%	264%	1.8%	Mid-Range
Central Falls	$ 18,617	$ 22,628	$ 401	2,668	$ 715	2.1%		3,437	2,179	$ 401	857%	543%	3.2%	High
Cumberland	$ 40,683	$ 54,656	$ 1,397	6,776	$ 4,388	0.9%		2,044	2,019	$ 1,397	146%	144%	1.2%	Mid-Range
Lincoln	$ 37,082	$ 47,815	$ 1,073	4,768	$ 2,701	1.0%		2,342	2,093	$ 1,073	218%	195%	1.4%	Mid-Range
North Providence	$ 32,321	$ 39,721	$ 740	9,366	$ 4,408	1.2%		2,693	2,019	$ 740	364%	273%	1.8%	Mid-Range
Johnston	$ 32,596	$ 43,514	$ 1,092	5,432	$ 2,801	1.1%		2,529	2,088	$ 1,092	232%	191%	1.5%	Mid-Range
RI	$ 32,181	42,090	$ 991	84,397	$ 34,174	1.1%	3.0%	2,590	724	$ 991	261%	73%	1.8%	Mid-Range