IPSWICH RIVER COASTAL BANK STABILIZATION PILOT PROJECT

Prepared for:
THE TOWN OF IPSWICH

TASK 3 REPORT

Prepared by:

CONECO
Engineers, Scientists & Surveyors

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February 21, 2017

CONTENTS

1. PROJECT OVERVIEW

Through a 2016 Coastal Resiliency Grant from the Massachusetts Office of Coastal Zone Management (CZM), the Town of Ipswich is conducting a one-year pilot project to identify areas along the Ipswich River that are presently susceptible to erosion due to a number of factors that may include: river action or overland runoff; pedestrian foot traffic over sensitive bank areas; constructed features such as headwalls and bridges; or any combination of possible causes. The study area focuses on segments of the Ipswich River between the Town Wharf on Water Street and the Ipswich Mills Dam. In addition to existing erosion issues, long-term impacts on coastal stability within the study area due to projected sea-level rise are also being evaluated.

Task 1 of the project included a field assessment of the bank of the Ipswich River, stormwater management structures and municipal infrastructure within the project limits to identify areas where improvements could be implemented to stabilize impacted sections of the river bank. Under Task 2, potential river bank and structural improvements were evaluated and presented for further consideration during subsequent tasks. The results of the Task 2 evaluation are presented in Coneco's report dated January 23, 2017.

For this Task 3 component of the project, selected improvements for each of the identified impacted areas are carried to the conceptual design level so that their implementation can be further evaluated and priority areas for improvement can be identified. Throughout this project, the condition of the shoreline and recommendations for immediate shoreline improvements have been the focus of the Horsley Witten Group, Inc. (HW), while Coneco's focus has been on structural items within the individual impacted areas that may be contributing to the observed shoreline erosion. These structural items may include uncontrolled surface runoff from roadways, failing headwalls, point source discharges from outfalls, etc.

2. RECOMMENDED IMPROVEMENTS

As part of the previous project tasks, nine Areas of Concern (AOC), identified as Areas 1A through 1C, Areas 2, 3 and 4, Areas 5A and 5B and Area 6 where shoreline impacts have occurred were observed within the project limits. For the purposes of this report, Areas 1A, 1B and 1C have been combined into a single Area 1 This is generally consistent with HW's February 17, 2017 Task 3 report where Areas 1A and 1B were combined due to similar approaches to improve the direct shoreline erosion. For our report, although we also considered combining Areas 1A and 1B only, it is our opinion that all three sub-areas within Area 1 are impacted by surface water similarly and that approaches to mitigate surface water impacts would be interconnected within the three sub-areas.

Each of the AOCs and recommended structural improvements to complement proposed shoreline restoration techniques are addressed individually below

2.1 AREA 1

This area is located along Water Street between Green Street and Scottons Lane (see Figure 1). Although the primary source of bank erosion within this area appears to be due to the action of the Ipswich River, uncontrolled overland flow across Water Street may also be a contributor to the observed top-of-bank erosion along the edge of Water Street. In addition, runoff from Summer Street across Water Street and from Green Street were also identified as a potential contributors to the observed top-of-slope erosion. However, during a heavy rainfall event on January 24, 2017, limited uncontrolled runoff was observed to travel either across Water Street from Summer Street or from Green Street onto Water Street. In both cases, the existing municipal drainage system appeared to intercept the majority of runoff from both locations before it reached Water Street.

Image 1: Flow Down Summer Street Toward Water Street and Collected in Catchbasin
(Jan. 24, 2017)

Recommendations to reduce direct runoff from Water Street to the river bank are depicted on the attached Figure 2. While these measures will not address the primary cause of the observed bank erosion, it is strongly recommended that they be implemented to support the bank stability measures that are recommended by HW in their Task 3 report. Reducing direct overland flow from Water Street to the top of the bank will reduce the potential for channelization within the bank improvements and future erosion of the improvements from the top-of-bank down to the river.

Two separate types of stormwater structural best management practices (BMPs) are also located within Area 1. Although the presence and operation of these structures do not have an impact, either positively or negatively on the stability of the river bank, they do potentially impact the quality of stormwater that discharges to the Ipswich River.

As shown on Figure 2, two Vortechs stormwater treatment units have been installed within Water Street opposite the end of Summer Street. These units have been installed inline within the municipal system and they discharge treated stormwater through an outfall within a headwall directly to the Ipswich River. It is important to note that the inspection of the area during the storm event on January 24, 2017 occurred during a low tide cycle when the outfall from the municipal stormdrain system into the Ipswich River was above the level in the river and flowing freely. Although this outfall is fitted with a duckbill check valve, it appears that the check valve has failed as flow has been observed to travel up through the outfall during high tide events, flooding the Vortechs units and on occasion surcharging the stormdrain system. When this occurs, the catchbasins at the base of Summer Street would be incapable of collecting the runoff that travels down Summer Street, and this flow will travel uncontrolled directly to the top of the river bank at the base of Water Street. This occurrence may explain the observed significant erosion at the headwall and river bank at the base of Summer Street and further emphasize the importance of

controlling the overland flow to the bank to protect the bank stabilization measures that are recommended by HW.

Two StormTreat units that have been installed along Water Street at the Ipswich Outboard Club property are not functioning and it is recommended that they be removed.

MAINTENANCE REQUIREMENTS

The proposed improvements would not significantly increase the Town's maintenance activities. The Vortechs units are existing and should be part of a regular inspection and maintenance program. Similarly, the existing catchbasins are inspected and cleaned annually, and the proposed two new catchbasins would be added to that program.

The proposed asphalt curbing, while relatively low in initial cost, can be damaged by regular vehicular traffic, and more readily, by snow plows. While this material is less costly, it is also less durable, and therefore, consideration can be given to installing more costly granite curbing in place of the proposed asphalt curb.

2.2 AREA 2

Area 2 is located immediately upstream of the Green Street Bridge and includes a 30-40 foot length of bank erosion along the edge of the Shurcliff River Walk (see Image 2).

As detailed in the Task 2 report, the observed erosion appears to result from two factors: (1) pedestrian foot traffic down the bank to access the river and; (2) the flow of the Ipswich River with added impacts resulting from the manmade structures within the area. A less significant factor may also be surface flow down the Shurcliff River Walk from Green Street and flow down the embankment from the Town Hall property toward the river.

Image 2#: Area 2 – Section of Bank Erosion

For this area, conceptual surface water improvements include:

- regrading of the riverwalk surface from Green Street to Area 2 to slow and spread the overland flow and eliminate channelized runoff;
- improvements along Green Street and within the lower section of the Town Hall parking lot to reduce runoff from the impervious surface toward the river walk. This may include the installation of a catchbasin at the lower corner of the parking lot and its connection to the municipal drainage system in Green Street; and
- stormwater management techniques at the rear of the Town Hall, located at the top of the slope above Area 2 to treat and reduce stormwater peak runoff over the slope.

To reduce channelization of runoff from the river walk, the walk within Area 2 should be regraded to distribute sheetflow more evenly and minimize channelization at the top of the bank. This will help to protect any bank stabilization techniques being recommended by HW for the area.

While improving the grading, consideration should be given to the Massachusetts Architectural Access Board (521 CMR) and the 2010 ADA Standards for Accessible Design. These regulations stipulate that the surface running slope be no greater than 1:20, that the cross slope be no greater than 1:48 and that the surface materials meet the broad definition of "firm and stable".

To provide a "firm and stable" surface, asphalt pavement or concrete are generally preferred as surface materials for accessible walkways. However, these surfaces are typically more expensive than other alternatives, and as is the case with the Shurcliff Riverwalk, may not meld with the natural surroundings. Therefore, in less developed areas, crushed stone, fine crusher rejects, packed soil, soil stabilizers, and other natural materials, including those combined with synthetic bonding materials may be more appropriate to provide the necessary surface. The "firm and stable" nature of the potential surface material, along with its ability to infiltrate stormwater and its resistance to erosion should all be considered when selecting the final surface material for installation.

To construct the walkway, the material could be graded to produce an even 1% cross slope toward the river which would produce a well distributed runoff from the Town Hall slope to the river. At the base of the Town Hall slope, an earthen retention swale or biofilter would intercept and infiltrate surface runoff from the hillside before it reaches the walkway. However, during larger storm events, the collected water would overtop the swale and sheetflow over the walkway. An alternate approach could be to slope the walkway at a 1% cross slope away from the river and toward the base of the Town Hall slope and the proposed earthen swale or biofilter to provide further erosion protection for the river bank.

Within the Town Hall property, improvements have been considered to improve stormwater management and quality. These improvements include the development of a pervious parking area, a rain garden to improve stormwater runoff from already developed areas and the inclusion of stormwater treatment structures to collect and treat stormwater generated at the rear of the Town Hall building before it flows to the embankment. The proposed improvements are depicted on Figures 3, 4, 5 and 6.

MAINTENANCE REQUIREMENTS

While improving the river walk surface will both improve access for all users while reducing surface runoff impacts to the river bank, it will require regular maintenance to ensure that the surface remains accessible and does not begin to channel and create point discharges to the top of the bank. Annual regrading and compacting can be expected to re-establish the designed surface. This is typically required in the early to late spring to repair winter damage and prepare the surface for the higher usage spring through fall seasons.

2.3 AREA 3

Area 3 is similar to Area 2 in that improvements to the river walk surface could be made to evenly distribute the surface flow and reduce channelization at the top of the embankment. Any improvements to the walk would need to consider accessibility. The conceptual improvements recommended for this area include the following:

- regrading of the river walk to slow and reduce flow to the river bank; and
- the placement of more stable walking surface materials such as compacted crusher fines or engineered surface materials to stabilize the river walk surface and slow the rate of surface flow.

2.4 AREA 4

Area 4 is an eroded area at the outlet from the municipal drainage system at the base of the downstream side of the County Street Bridge.

To improve this area it is recommended that the full length of the existing failed corrugated metal outfall pipe be replaced and that the outfall be extended an estimated 5 feet toward the river to reduce the fall height for water exiting the outfall. It is assumed that the new pipe would be PVC and that it will discharge through a new headwall and onto an improved, stabilized embankment (Figure 7). Coneco has assumed that the headwall and embankment improvements will be addressed by HW in their Task 3 report.

Image #3: Area 4 – Eroded Bank at Outfall

2.5 AREAS 5A, 5B, AND 6

As stated in the Task 2 report, structural improvements to these areas do not appear to be warranted to improve the stability of the bank, or to support proposed living shoreline bank stabilization techniques that may be proposed.

Cost Estimates

Coneco developed the following preliminary cost estimates based on the conceptual-level designs for improvements for each of the AOCs addressed in this report. These cost estimates are intended to provide an order-of-magnitude understanding of potential costs that could be incurred if the recommended improvements are pursued. They are not intended to be suitable for construction and must be re-evaluated as designs for the improvements progress.

Ipswich Coastal Resiliency Grant Project
Area 1 - Conceptual Cost Estimate
2/21/2017

ITEM DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
Administrative				
Submittals	1	LS	$ 2,500	$ 2,500
Insurance	1	LS	$ 5,000	$ 5,000
Survey	1	LS	$ 5,000	$ 5,000
Supervision	1	LS	$ 10,000	$ 10,000
Demolition				
Mobilization/Demobilization	1	LS	$ 10,000	$ 10,000
Headwall Removal & Disposal	1	LS	$ 5,000	$ 5,000
Improvements Construction				
Asphalt Curb Installation	400	LF	$ 15	$ 6,000
New Catchbasin and Pipe	2	LS	$ 6,000	$ 12,000
New Headwall	1	LS	$ 15,000	$ 15,000
Gravel Fill in Eroded Areas	80	CY	$ 40	$ 3,200
Topsoil and Seed Eroded Areas	8	CY	$ 55	$ 440
New Check Valve	1	LS	$ 5,500	$ 5,500
Engineering Design and Permitting (20%)				$ 15,928
Contingency (40%)				$ 31,856
ESTIMATED TOTAL				$ 127,424

CONECO
Engineers & Scientists

Ipswich Coastal Resiliency Grant Project
Area 2 - Conceptual Cost Estimate
2/21/2017

ITEM DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
Administrative				
Submittals	1	LS	$ 1,500	$ 1,500
Insurance	1	LS	$ 5,000	$ 5,000
Survey	1	LS	$ 5,000	$ 5,000
Supervision	1	LS	$ 5,000	$ 5,000
Demolition				
Mobilization/Demobilization	1	LS	$ 5,000	$ 5,000
Remove Initial Soil Sub Layer	1	LS	$ 5,000	$ 5,000
Walkway Improvements				
Install and Compact and Fine Grade Fine Crusher	40	CY	$ 60	$ 2,400
Construct Bioswale	1	LS	$ 25,000	$ 25,000
Town Hall Improvements				
Water Quality Swale	1	LS	$ 44,000	$ 44,000
Proprietary WQ Device	1	LS	$ 90,000	$ 90,000
Bioretention System	1	LS	$ 21,000	$ 21,000
Porous Pavers	1	LS	$ 60,000	$ 60,000
Engineering Design and Permitting (20%)				$ 53,780
Contingency (40%)				$ 107,560
ESTIMATED TOTAL				$ 430,240

Annual Maintenance of Walk and Town Hall Improvements

Regrade and Compact Walk (assume 20% of Capital)	$ 480
Bioswale (assume 7% of Capital)	$ 1,750
Water Quality Swale (7% of Capital)	$ 3,080
Proprietary WQ Device ($750/cleanout)	$ 1,500
Bioretention System (7% of Capital)	$ 1,470
Porous Pavers (Vacuum 2 times/year)	$ 4,000
ESTIMATED TOTAL	$ 12,280

CONECO
Engineers & Scientists

Ipswich Coastal Resiliency Grant Project
Area 3 - Conceptual Cost Estimate
2/21/2017

ITEM DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
Administrative				
Submittals	1	LS	$ 1,500	$ 1,500
Insurance	1	LS	$ 5,000	$ 5,000
Survey	1	LS	$ 5,000	$ 5,000
Supervision	1	LS	$ 5,000	$ 5,000
Demolition				
Mobilization/Demobilization	1	LS	$ 5,000	$ 5,000
Remove Initial Soil Sub Layer	1	LS	$ 5,000	$ 5,000
Walkway Improvements				
Install and Compact and Fine Grade Fine Crusher	40	CY	$ 60	$ 2,400
Construct Bioswale	1	LS	$ 25,000	$ 25,000
Engineering Design and Permitting (20%)				$ 10,780
Contingency (40%)				$ 21,560
ESTIMATED TOTAL				$ 86,240

Annual Maintenance of Walk

Regrade and Compact Walk (assume 20% of Capital)	$ 480
Bioswale (assume 7% of Capital)	$ 1,750

CONECO
Engineers & Scientists

Ipswich Coastal Resiliency Grant Project
Area 4 - Conceptual Cost Estimate
2/21/2017

ITEM DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
Administrative				
Submittals	1	LS	$ 1,500	$ 1,500
Insurance	1	LS	$ 5,000	$ 5,000
Survey	1	LS	$ 2,500	$ 2,500
Supervision	1	LS	$ 2,500	$ 2,500
New Pipe Installation				
Mobilization/Demobilization	1	LS	$ 5,000	$ 5,000
Excavate and Remove Existing CMP Outfall Pipe	125	CY	$ 30	$ 3,750
Install New PVC Pipe	75	LF	$ 60	$ 4,500
Backfill and Compact	125	CY	40	$ 5,000
Topsoil	13	CY		
Engineering Design and Permitting (20%)				$ 5,950
Contingency (40%)				$ 11,900
ESTIMATED TOTAL				$ 47,600

CONECO
Engineers & Scientists

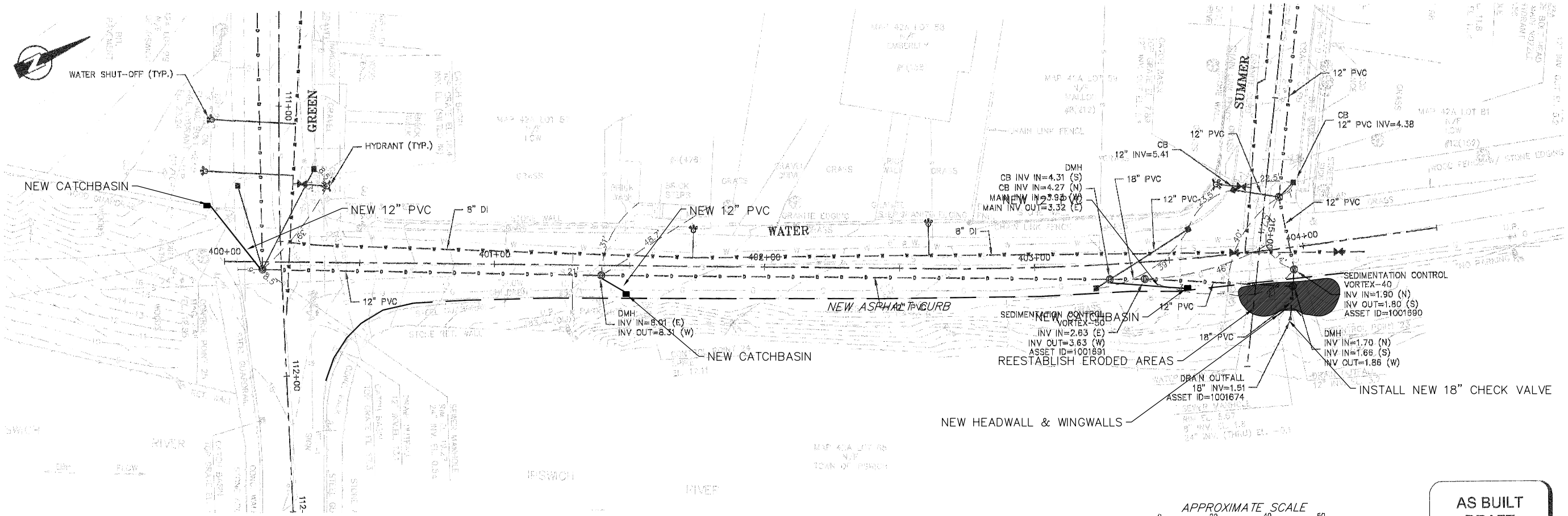
Figures

Coastal Resiliency & Coastal Bank Stabilization Pilot Project – Areas of Concern

CONECO
Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

PREPARED FOR:	PLAN SET:		
Town of Ipswich	Task 3 Report		
SCALE 1" = 300'	DATE 1/30/2017	PROJECT NO. 9420.0	TITLE: FIGURE # 1

ADAPTED FROM DRAFT ASBUILT BY SEA CONSULTANTS TITLED "AS BUILT RECORD DRAWING COUNTY STREET AND WATER STREET" SHEET REC-04

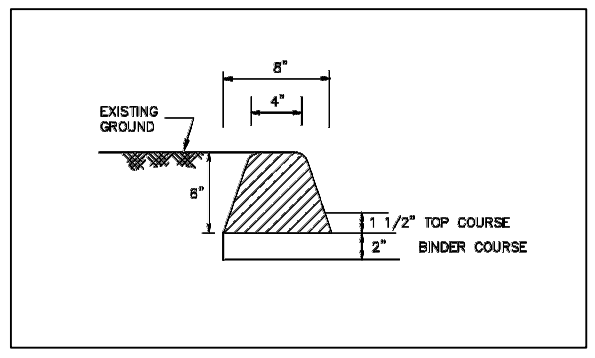


WATER STREET
SCALE: 1"=20'

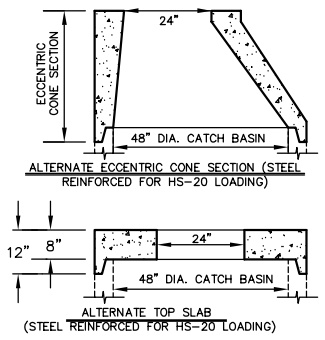
SCALE IS APPROXIMATE

APPROXIMATE SCALE
0 20 40 60
SCALE IN FEET
SCALE: 1"=20'

AS BUILT DRAFT

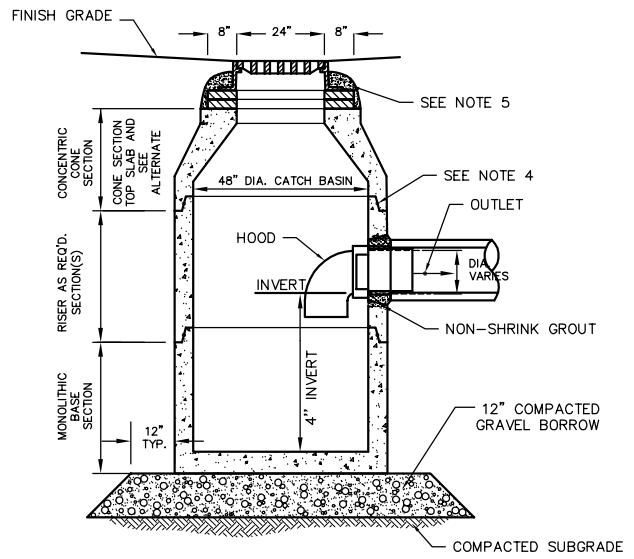


ASPHALT CURB DETAIL
N.T.S.

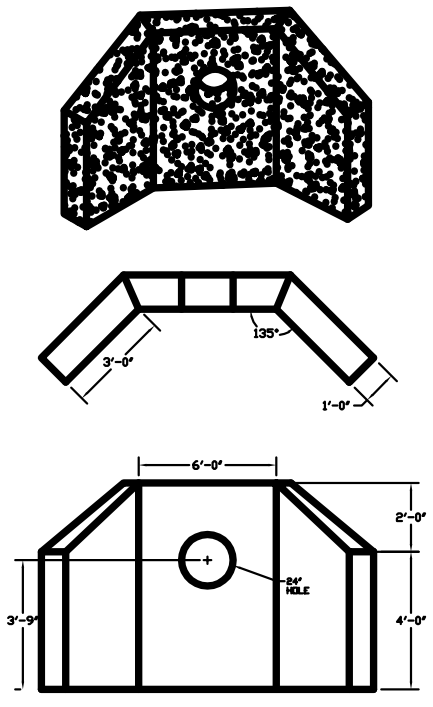


NOTES:

1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
2. COPOLYMER MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.
3. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PERFORMED BUTYL RUBBER.
5. DRAIN MANHOLE FRAME AND COVER SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY)



CATCH BASIN (CB) WITH HOOD
N.T.S.



NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.

HEADWALL AND WINGWALL DETAIL
N.T.S.

REVISIONS

NO.	DATE	DESCRIPTION	DR/CK

IPSWICH, MASSACHUSETTS
CONSERVATION COMMISSION

PREPARED FOR

PROJECT: COASTAL RESILIENCY & COASTAL BANK STABILIZATION PILOT PROJECT TASK 3

DRAWING TITLE: AREA 1 CONCEPTUAL IMPROVEMENTS

CONECO Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3350; FAX 508-697-5996
WEBSITE: www.coneco.com

DATE	1/3/2017
DESIGNED: KM	CHECKED: KM
DRAFTED: WCB	IN CHARGE: KM
SCALE:	1" = 20'
PROJECT NO.	8439.0
SHEET NO.	2

REVISIONS

NO.	DATE	DESCRIPTION	DR/CK

PREPARED FOR:
TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

DRAWING: CONCEPTUAL LAYOUT

PROJECT: COASTAL RESILIENCY & COASTAL BANK STABILIZATION PILOT PROJECT TASK 3

PLAN SET: AREA 2-CONCEPTUAL IMPROVEMENTS

CONECO Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
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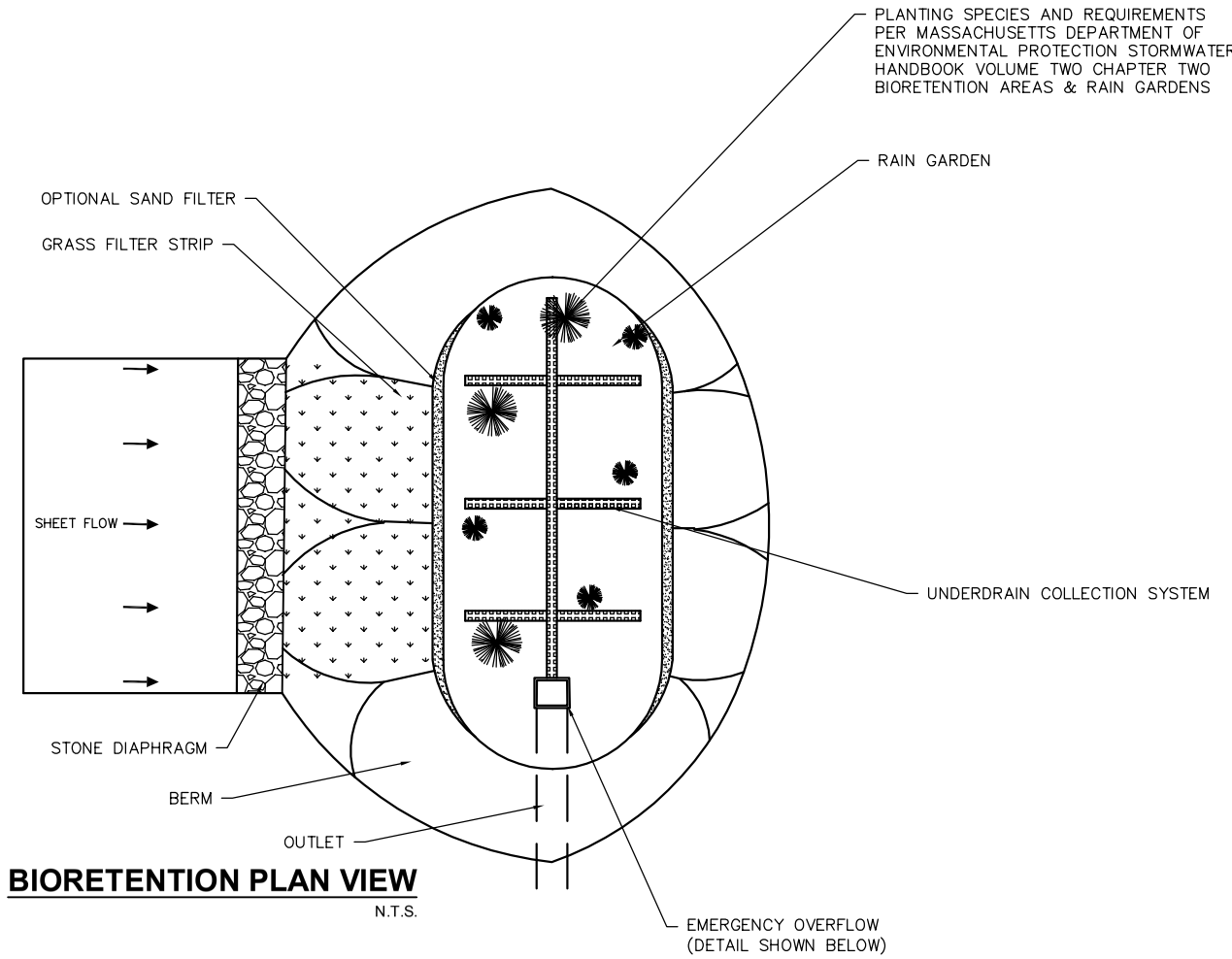
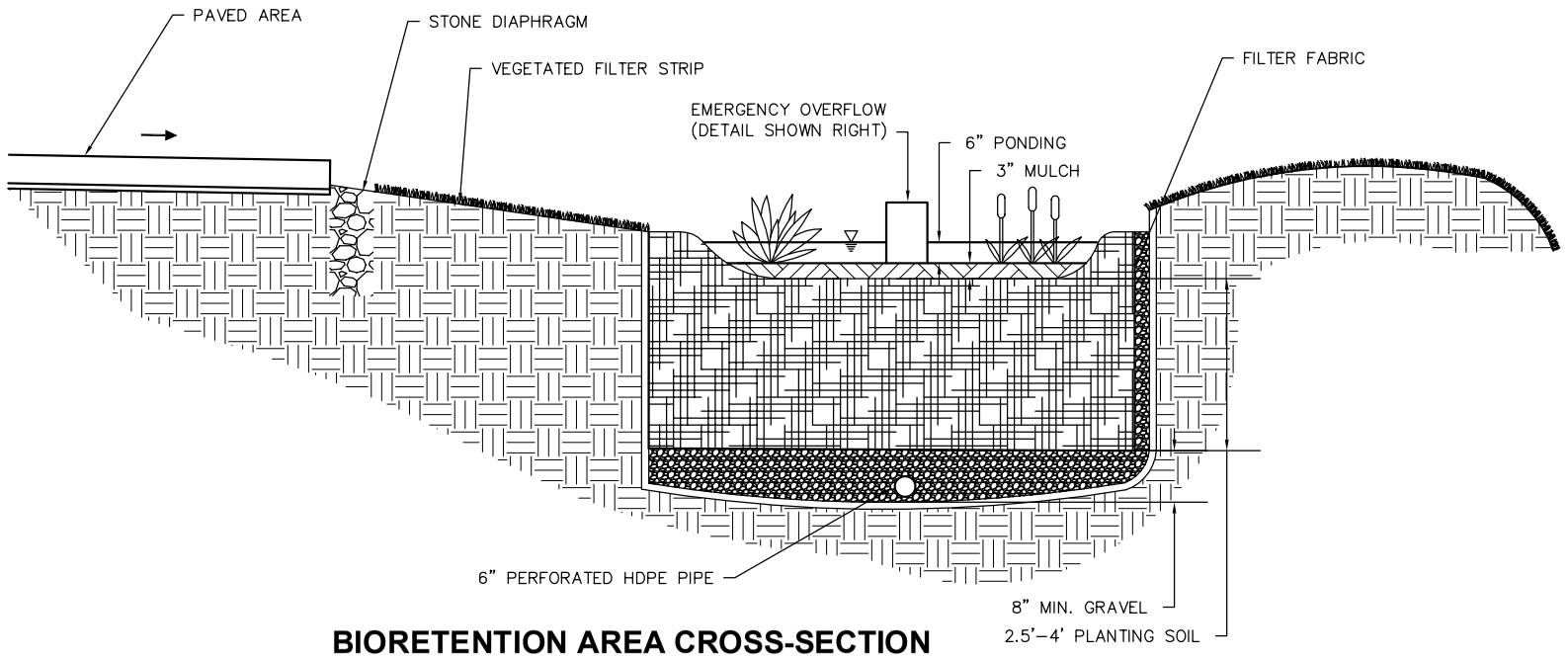
DATE:	1/30/2017
DRAWN/ CHECK:	DJD/TLD
SCALE:	1" = 30'
PROJECT NO.	8310.0
FIGURE NO.	3



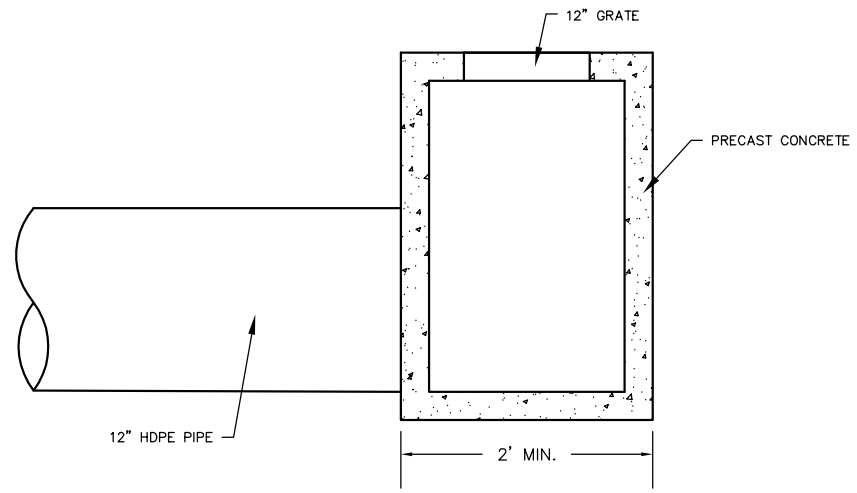
BIORETENTION PLAN VIEW

N.T.S.



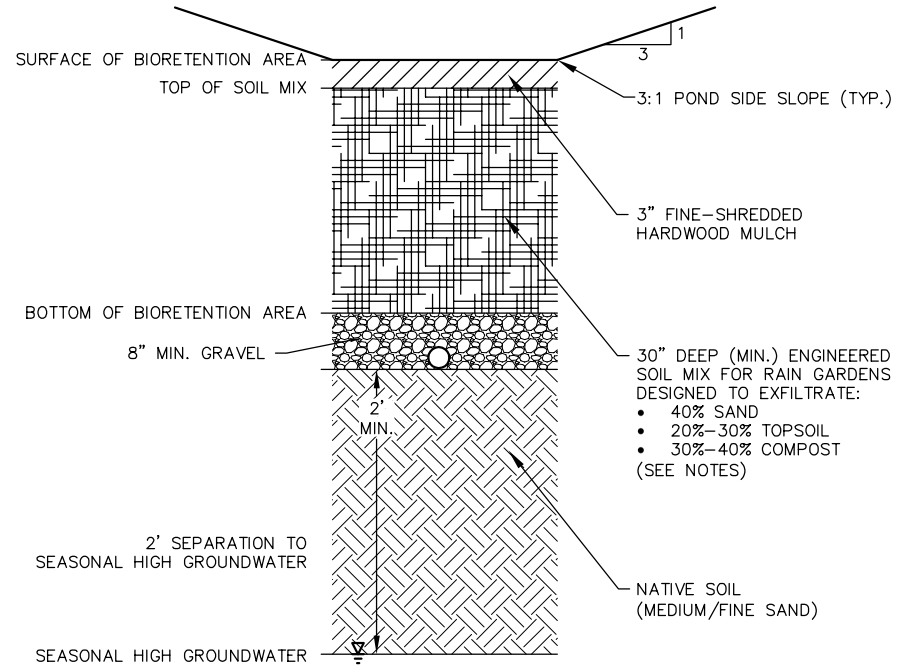
BIORETENTION AREA CROSS-SECTION

N.T.S.



EMERGENCY OVERFLOW SECTION

N.T.S.



NOTES:

1. DETAIL AND SPECIFICATIONS FROM THE MASSACHUSETTS STORMWATER HANDBOOK, VOLUME 2, CHAPTER 2, TREATMENT BMPS "BIORETENTION AREAS & RAIN GARDENS" GUIDELINE.
2. THE ENGINEERED SOIL MIX MUST BE UNIFORM, FREE OF STONES, STUMPS, ROOTS, OR SIMILAR OBJECTS LARGER THAN 2". CLAY CONTENT: LESS THAN 5%. SOIL pH: 5.5-6.5. ORGANIC CONTENT: 1.5%-3%. SOLUBLE SALTS: 500 PPM (MAX.).
3. THE SAND COMPONENT OF THE MIX SHALL BE GRAVELLY SAND THAT MEETS ASTM D 422 WITH THE FOLLOWING PERCENT PASSING (SIEVE SIZE): 100% (2-INCH), 70-100% (3/4-INCH), 50-80% (1/4-INCH), 15-40% (U.S. NO. 40), 0-3% (U.S. NO. 200).
4. THE TOPSOIL COMPONENT SHALL BE A SANDY LOAM, LOAMY SAND, OR LOAM TEXTURE.
5. THE COMPOST COMPONENT SHALL BE PROCESSED FROM YARD WASTE IN ACCORDANCE WITH MASSDEP GUIDELINES AND SHALL NOT CONTAIN BIOSOLIDS.
6. SHGW: SEASONAL HIGH GROUNDWATER

BIORETENTION AREA SOIL DETAIL

N.T.S.

REVISIONS

NO.	DATE	DESCRIPTION	DR/CK

PREPARED FOR:
TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

DRAWING:
DETAIL SHEET 1 OF 2

PROJECT:
COASTAL RESILIENCY & COASTAL BANK STABILIZATION PILOT PROJECT TASK 3

PLAN SET:
IPSWICH TOWN HALL

CONECO Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
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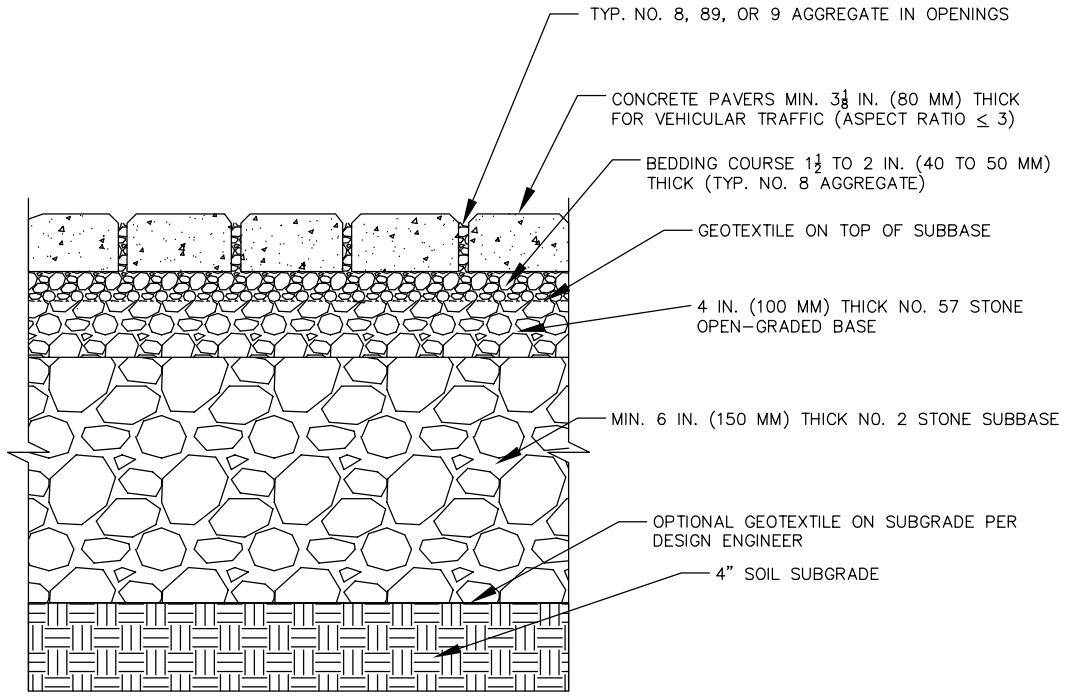
DATE:	1/30/2017
DRAWN/ CHECK:	DJD/TLD
SCALE:	AS SHOWN
PROJECT NO.	8310.0
FIGURE NO.	4



NOTES:
1. 2 3/8 IN. (60 MM) THICK PAVERS MAY BE USED IN PEDESTRIAN AND RESIDENTIAL APPLICATIONS.
2. NO. 2 STONE SUBBASE THICKNESS VARIES WITH DESIGN. CONSULT ICPI PERMEABLE INTERLOCKING CONCRETE PAVEMENT MANUAL.
3. NO. 2 STONE MAY BE SUBSTITUTED WITH NO.3 OR NO.4 STONE.

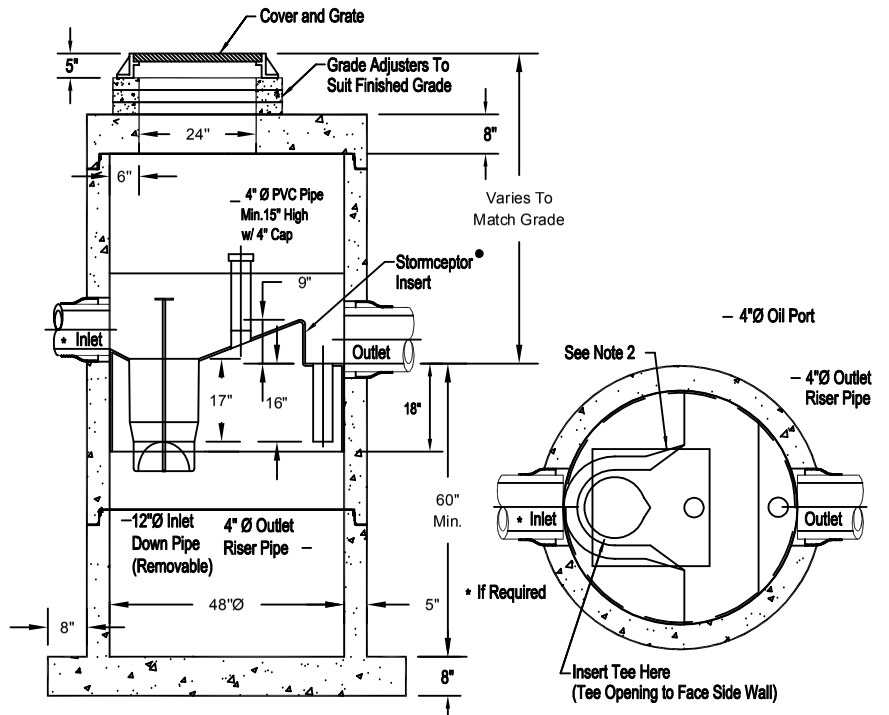
PERMEABLE PAVERS WITH FULL EXFILTRATION TO SUBGRADE

N.T.S.

Rinker MATERIALS™

Concrete Pipe Division

STC 450i Precast Concrete Stormceptor®
(450 U.S. Gallon Capacity)



Notes:
1. The Use Of Flexible Connection is Recommended at The Inlet and Outlet Where Applicable.
2. The Cover Should be Positioned Over The Inlet Drop Pipe and The Oil Port.
3. The Stormceptor System is protected by one or more of the following U.S. Patents: #4985148, #5498331, #5725760, #5753115, #5849181, #6068765, #6371690.
4. Contact a Concrete Pipe Division representative for further details not listed on this drawing.

Rinker 027

REVISIONS

NO.	DATE	DESCRIPTION	DR/CK

PREPARED FOR:
TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

DRAWING:
DETAIL SHEET 2 OF 2

PROJECT:
COASTAL RESILIENCY & COASTAL BANK STABILIZATION PILOT PROJECT TASK 3

PLAN SET:
IPSWICH TOWN HALL

CONECO Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

DATE:	1/30/2017
DRAWN/ CHECK:	DJD/TLD
SCALE:	AS SHOWN
PROJECT NO.	8310.0
FIGURE NO.	5

FIGURE NO.	6	DATE:	1/30/2017
PROJECT NO.	8310.0	DRAWN/CHECK:	DJD/TLD
SCALE:	1" = 30'		

CONECO Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

PROJECT:
COASTAL RESILIENCY & COASTAL BANK STABILIZATION PILOT PROJECT
TASK 3

PLAN SET:
AREA 2–CONCEPTUAL IMPROVEMENTS

PREPARED FOR:
TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

DRAWING:
CONCEPTUAL LAYOUT

REVISIONS

NO.	DATE	DESCRIPTION	DR/CK

Coastal Resiliency & Coastal Bank Stabilization Pilot Project – Area 4

CONECO
Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
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PREPARED FOR:	PLAN SET:		
Town of Ipswich	Task 3 Report		
SCALE 1" = 50'	DATE 1/30/2017	PROJECT NO. 9420.0	TITLE: FIGURE # 7