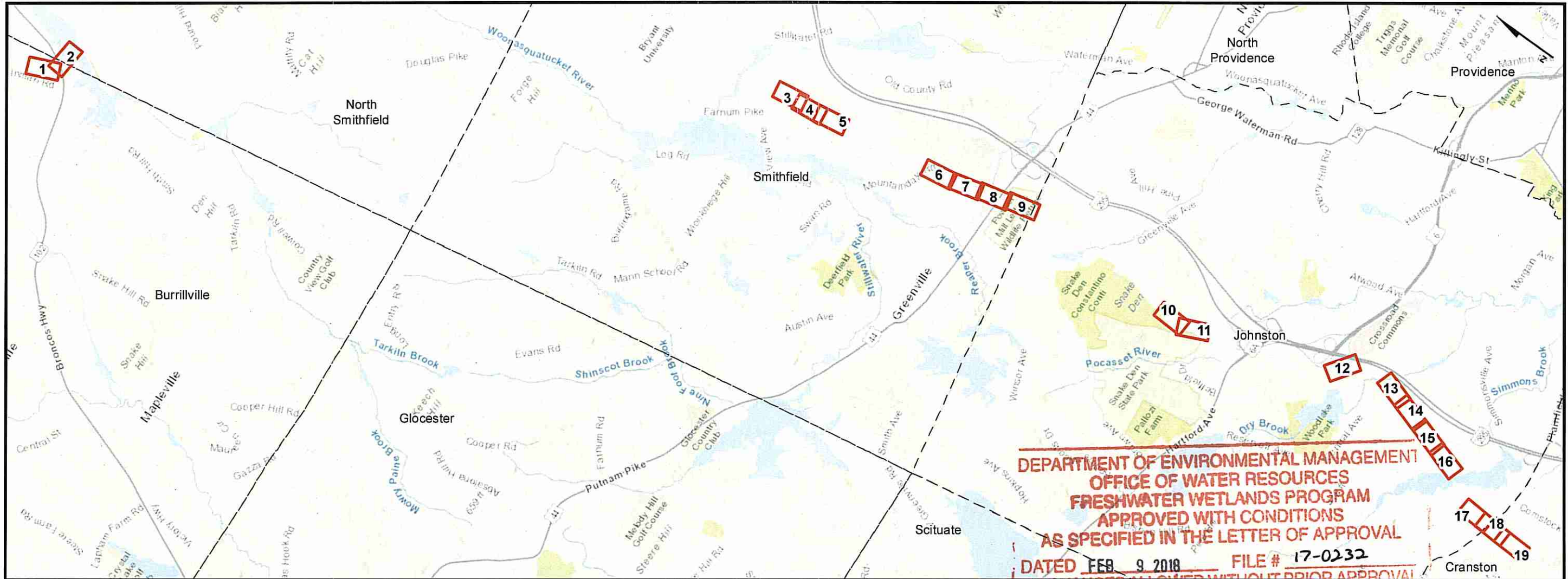


Environmental Management
DEC 18 2017
Office of Water Resources

TGP DIG LOCATIONS

Burrillville, North Smithfield, Smithfield, Johnston, & Cranston, RI
December 14, 2017



**DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED FEB 9 2018 FILE # 17-0232
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE**

Charles A. Herbert

PREPARED FOR:

 **Tennessee Gas Pipeline, L.L.C.**
a Kinder Morgan company
78 Lafayette St
Carteret, NJ 07008

INDEX OF FIGURES

- 1 - TITLE SHEET
- 2 - 20 - PLAN SET SHEETS
- 21 - 22 - TYPICAL BEST MANAGEMENT PRACTICES - STREAM DIVERSION/DEWATERING DETAILS
- 23 - 24 - SECTION / DEVICE DETAILS
- 25 - SEDIMENT & EROSION CONTROL BEST MANAGEMENT PRACTICES
- 26 - TYPICAL BEST MANAGEMENT PRACTICES DETAILS

PREPARED BY:

 **BSC GROUP**
33 Waldo Street
Worcester, MA 01608

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Charles A. Haber

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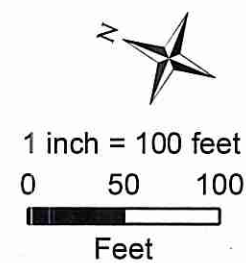
Begin Dig #1

End Dig #1

OLD NASONVILLE RD
 BRONCOS HWY



Legend	
	TGP Dig Location
	Access Road
	Swamp Mats
	Excavation Area
	Additional Workspace
	Potential Dewatering Location
	Limit of Disturbance
	SandBag Check Dam
	Dissipator Pad/Dewatering Bag
	Water Flag
	Stream Flow Direction
	Streams
	Field Delineated Swale
	Field Delineated Perennial Stream
	Field Delineated Water Feature
	Wetland Flag
	Field Delineated Wetland Boundary
	Field Delineated Wetland Area
	RIDEM Estimated Wetland Boundary
	USFWS Wetlands
	Perimeter Wetland
	Riverbank Wetland
	Conservation Land
	No Disturbance Area
	FEMA 100yr Floodplain
	Town Boundary



TGP DIG LOCATIONS

Environmental Resources Map

Burrillville, RI
 Page 2 of 26

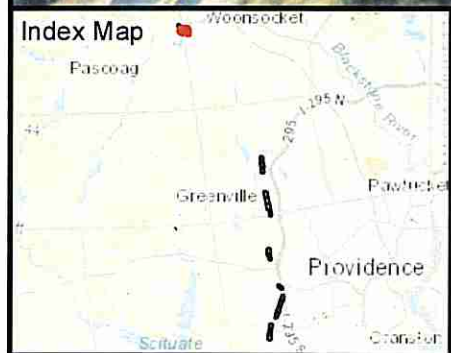
Source:
 -GIS Base map & Environmental Data
 -Aerial & Topo Imagery
 ESRI, DigitalGlobe, GeoEye, i-cubed, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., AEX, GEBCO, USDA, USGS, FAO, NPS, NRCAN, GeoBase, Getmapping, Aerogrid, IGP, IGN, Kadaster NL, Ordnance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, & the GIS User Community

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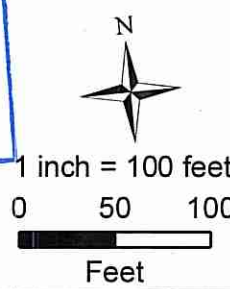
Slatersville
 River and
 Reservoirs



Legend

TGP Dig Location	Water Flag	RIDEM Estimated Wetland Boundary
Access Road	Stream Flow Direction	USFWS Wetlands
Swamp Mats	Streams	Perimeter Wetland
Excavation Area	Field Delineated Swale	Riverbank Wetland
Additional Workspace	Field Delineated Perennial Stream	Conservation Easement
Potential Dewatering Location	Field Delineated Water Feature	No Disturbance Area
Limit of Disturbance	Wetland Flag	FEMA 100yr Floodplain
SandBag Check Dam	Field Delineated Wetland Boundary	Town Boundary
Dissipator Pad/Dewatering Bag	Field Delineated Wetland Area	

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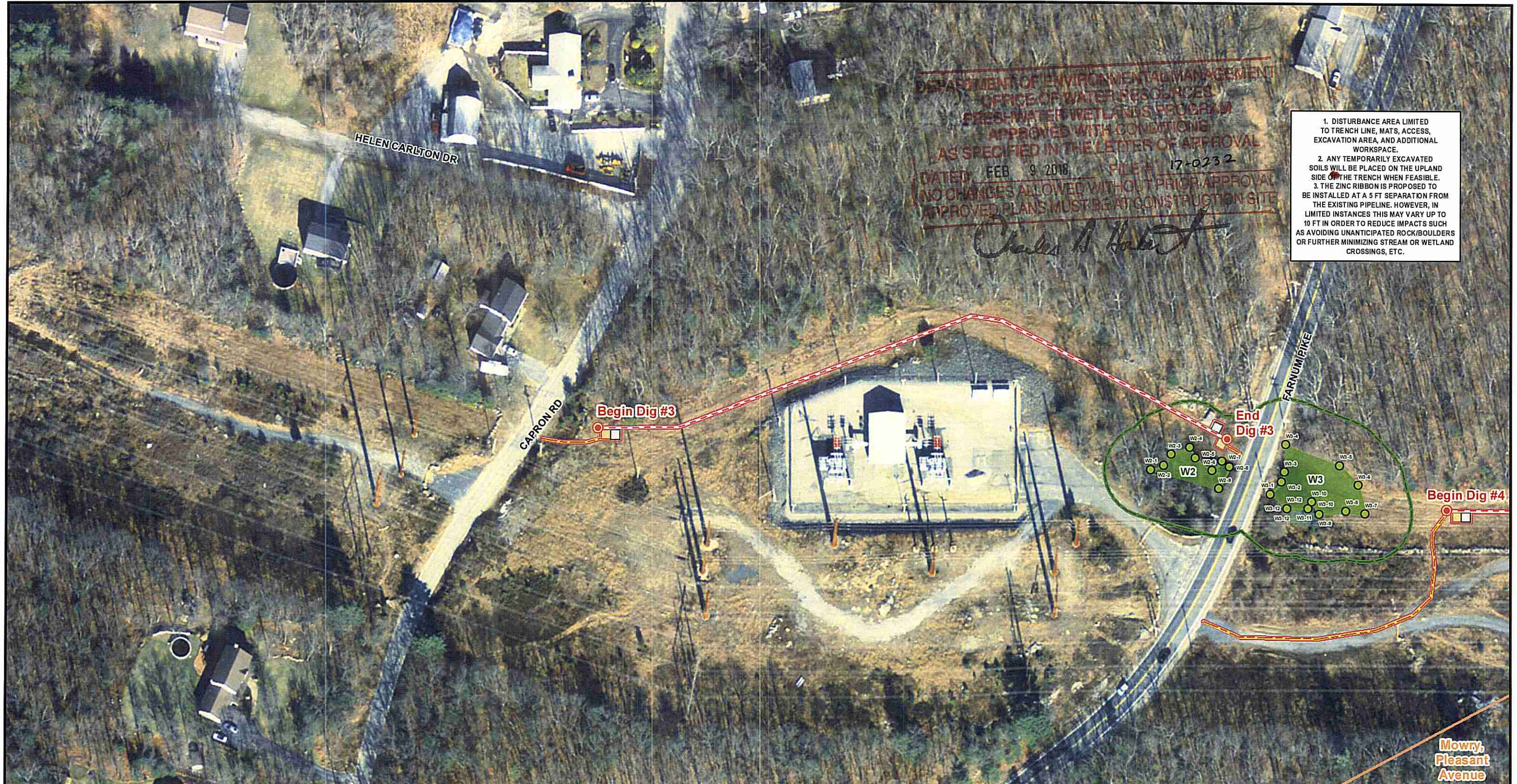


TGP DIG LOCATIONS
Environmental Resources Map
 Burrillville & North Smithfield, RI
 Page 3 of 26

Source:
 -RIGIS
 -Basemap & Environmental Data
 -Aerial & Topo Imagery
 -ESRI, DigitalGlobe, GeoEye, i-cubed, DeLorme, NAVTEQ, TomTom, Intermap, Increment P Corp., AEX, GEBCO, USDA, USGS, FAO, NPS, NRCAN, GeoBase, Getmapping, Aerogrid, IGP, IGN, Kadaster NL, Ordnance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, & the GIS User Community

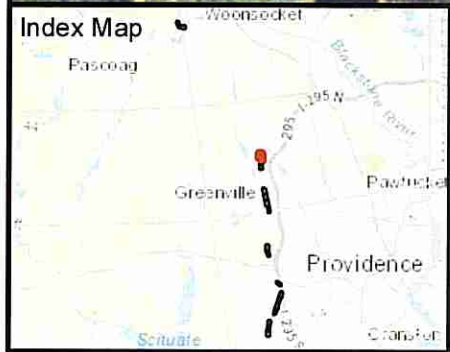
Tennessee Gas Pipeline Company, L.L.C.
 a Kinder Morgan company

BSC GROUP



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Legend

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Dissipator Pad/Dewatering Bag	Field Delineated Wetland Area	

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1 inch = 100 feet
0 50 100 Feet

TGP DIG LOCATIONS

Environmental Resources Map

Smithfield, RI
Page 4 of 26

Source:
 RIGIS
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 -Aerial & Topo Imagery
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Legend

- TGP Dig Location
- Access Road
- Swamp Mats
- Excavation Area
- Additional Workspace
- Potential Dewatering Location
- Limit of Disturbance
- SandBag Check Dam
- Dissipator Pad/Dewatering Bag
- Water Flag
- Stream Flow Direction
- Streams
- Field Delineated Swale
- Field Delineated Perennial Stream
- Field Delineated Water Feature
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- FEMA 100yr Floodplain
- Town Boundary

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 0 50 100 Feet

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TGP DIG LOCATIONS

Environmental Resources Map

Smithfield, RI
 Page 5 of 26

Source:
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 -ESRI, DigitalGlobe, GeoEye, i-cubed, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., AEX, GEBCO, USDA, USGS, FAO, NPS, NRCAN, GeoBase, Getmapping, Aerogrid, IGP, IGN, Kadaster NL, Ordnance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, & the GIS User Community

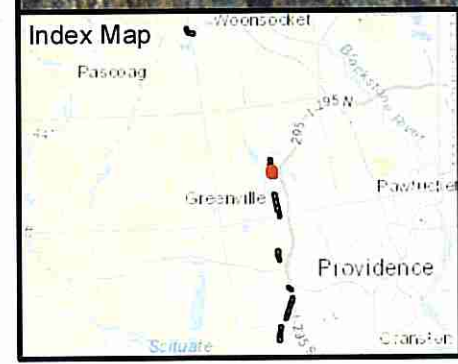
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 a Kinder Morgan company

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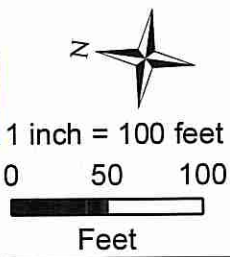
Charles A. Hoster



Legend

TGP Dig Location	Water Flag	RIDE M Estimated Wetland Boundary
Access Road	Stream Flow Direction	USFWS Wetlands
Swamp Mats	Streams	Perimeter Wetland
Excavation Area	Field Delineated Swale	Riverbank Wetland
Additional Workspace	Field Delineated Perennial Stream	Conservation Land
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SandBag Check Dam	Field Delineated Wetland Boundary	Town Boundary
Dissipator Pad/Dewatering Bag	Field Delineated Wetland Area	

Environmental Management
 DEC 18 2017
 Office of Water Resources



TGP DIG LOCATIONS
Environmental Resources Map

Smithfield, RI
 Page 6 of 26

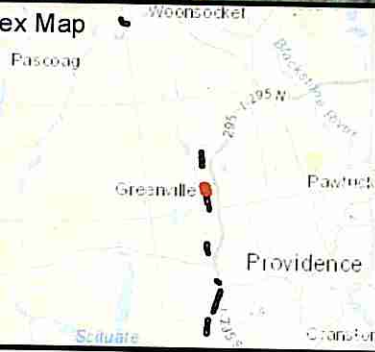
Source:
 -RIGIS
 Basemap & Environmental Data
 -Aerial & Topo Imagery
 ESRI, DigitalGlobe, GeoEye, i-cubed, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., AEX, GEBCO, USDA, USGS, FAD, NPS, NRCAN, GeoBase, Getmapping, Aerogrid, IGN, Kadaster NL, Ordnance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, & the GIS User Community

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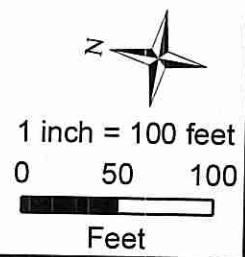
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Charles A. Haber



Legend

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Environmental Management
 DEC 18 2017
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TGP DIG LOCATIONS
Environmental Resources Map
 Smithfield, RI
 Page 7 of 26

Source:
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 -ESRI, DigitalGlobe, GeoEye, i-cubed,
 -DeLorme, NAVTEQ, TomTom, Intermap,
 -Increment P Corp., AEX, GEBCO, USDA,
 -USGS, FAO, NPS, NRCAN, GeoBase,
 -Getmapping, Aerogrid, IGP, IGN, Kadaster
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 -GIS User Community

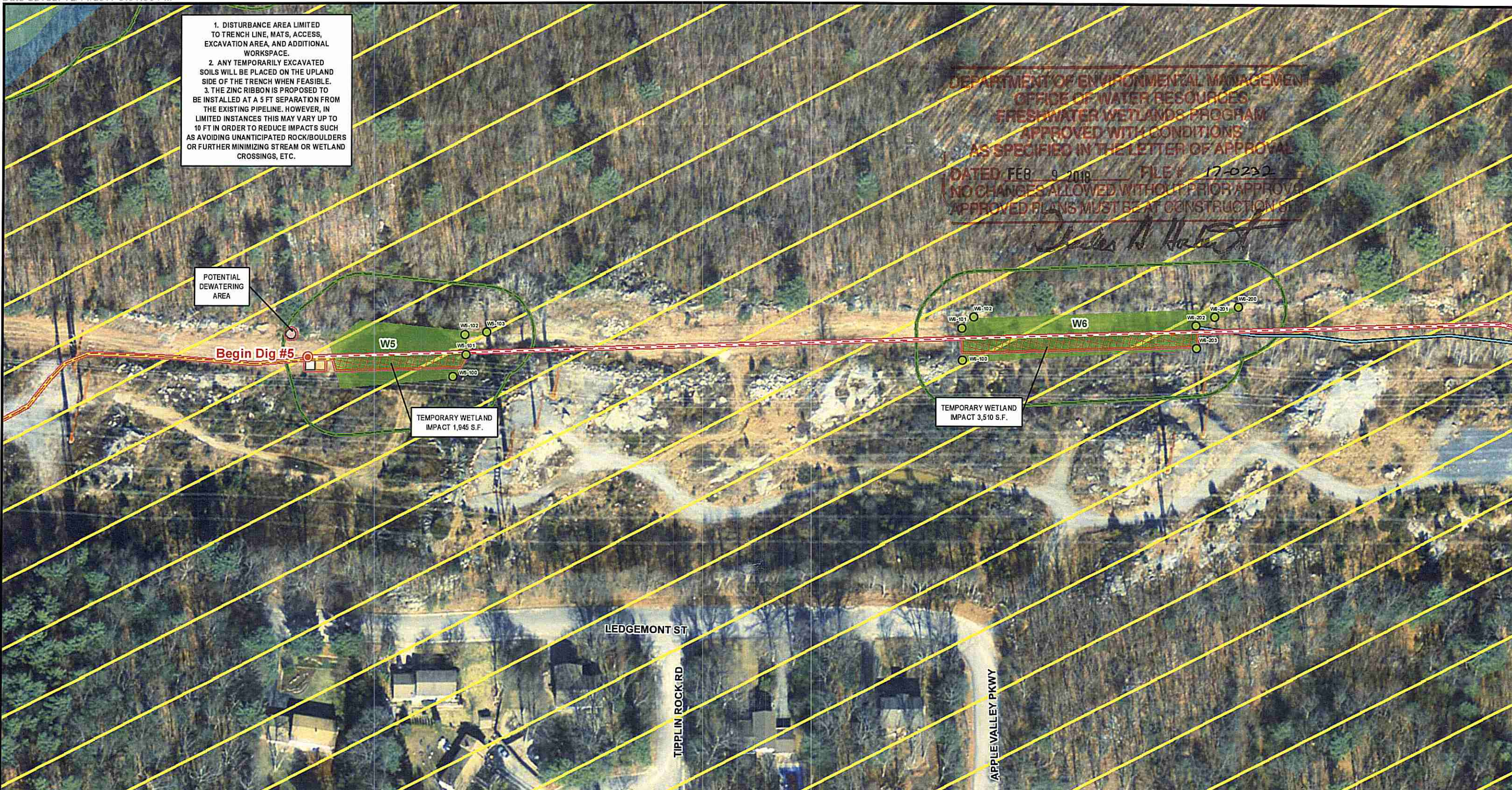
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Charles A. Hart



Legend

- Water Flag
- Stream Flow Direction
- Streams
- Field Delineated Swale
- Field Delineated Perennial Stream
- Field Delineated Water Feature
- Wetland Flag
- Field Delineated Wetland Boundary
- Field Delineated Wetland Area
- TGP Dig Location
- Access Road
- Swamp Mats
- Excavation Area
- Additional Workspace
- Potential Dewatering Location
- Limit of Disturbance
- SandBag Check Dam
- Dissipator Pad/Dewatering Bag
- Environmental Management Boundary
- USFWS Wetlands
- Perimeter Wetland
- Riverbank Wetland
- Office of Water Resources
- No Disturbance Area
- FEMA 100yr Floodplain
- Town Boundary

DEC 18 2017

1 inch = 100 feet
 0 50 100
 Feet

TGP DIG LOCATIONS

Environmental Resources Map

Smithfield, RI
 Page 8 of 26

Source:
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Robert A. Haber

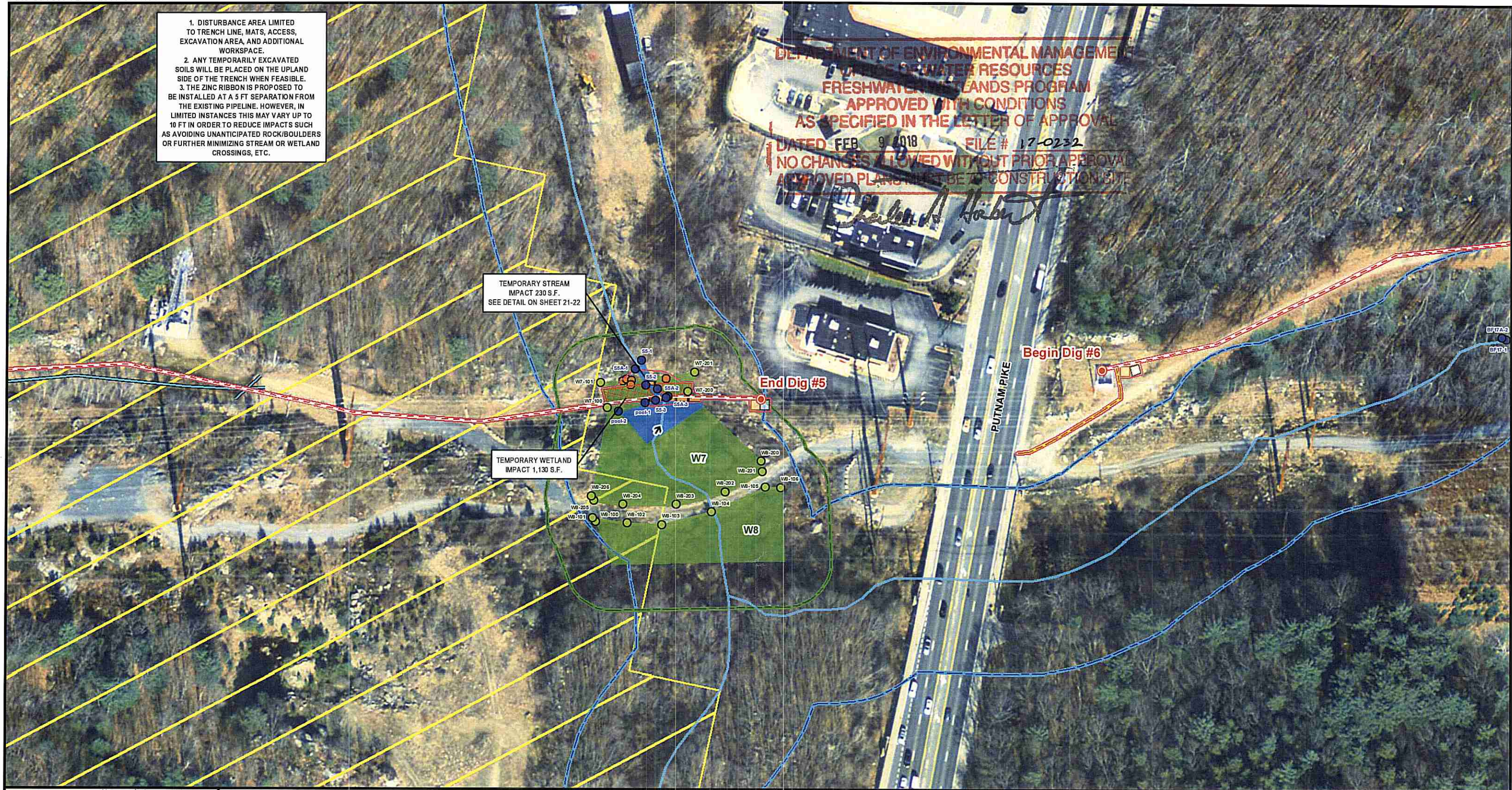
TEMPORARY STREAM
 IMPACT 230 S.F.
 SEE DETAIL ON SHEET 21-22

TEMPORARY WETLAND
 IMPACT 1,130 S.F.

End Dig #5

Begin Dig #6

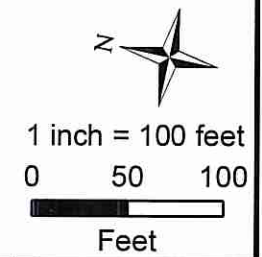
PUTNAM PIKE



Legend

TGP Dig Location	Water Flag	RIDEM Estimated Wetland
Access Road	Stream Flow Direction	Environmental Management
Swamp Mats	Streams	USFWS Wetlands
Excavation Area	Field Delineated Swale	Perimeter Wetland
Additional Workspace	Field Delineated Perennial Stream	Riverbank Wetland
Potential Dewatering Location	Field Delineated Water Feature	Conservation Land
Limit of Disturbance	Wetland Flag	No Disturbance Area
SandBag Check Dam	Field Delineated Wetland Boundary	FEMA 100yr Floodplain
Dissipator Pad/Dewatering Bag	Field Delineated Wetland Area	Town Boundary

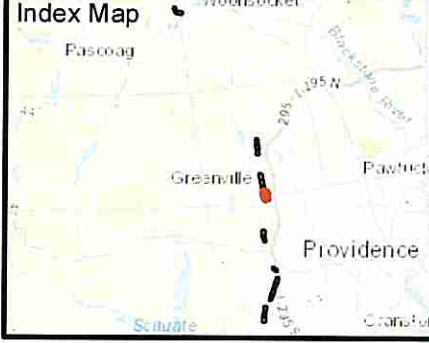
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TGP DIG LOCATIONS
Environmental Resources Map

Smithfield, RI
 Page 9 of 26

Source:
 -RIGIS
 Basemap & Environmental Data
 -Aerial & Topo Imagery
 ESRI, DigitalGlobe, GeoEye, i-cubed, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., AEX, GEBCO, USDA, USGS, FAO, NPS, NRCAN, GeoBase, Geomapping, Aerogrid, IGP, IGN, Kadaster NL, Ordnance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, & the GIS User Community



Legend

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 0 50 100
 Feet

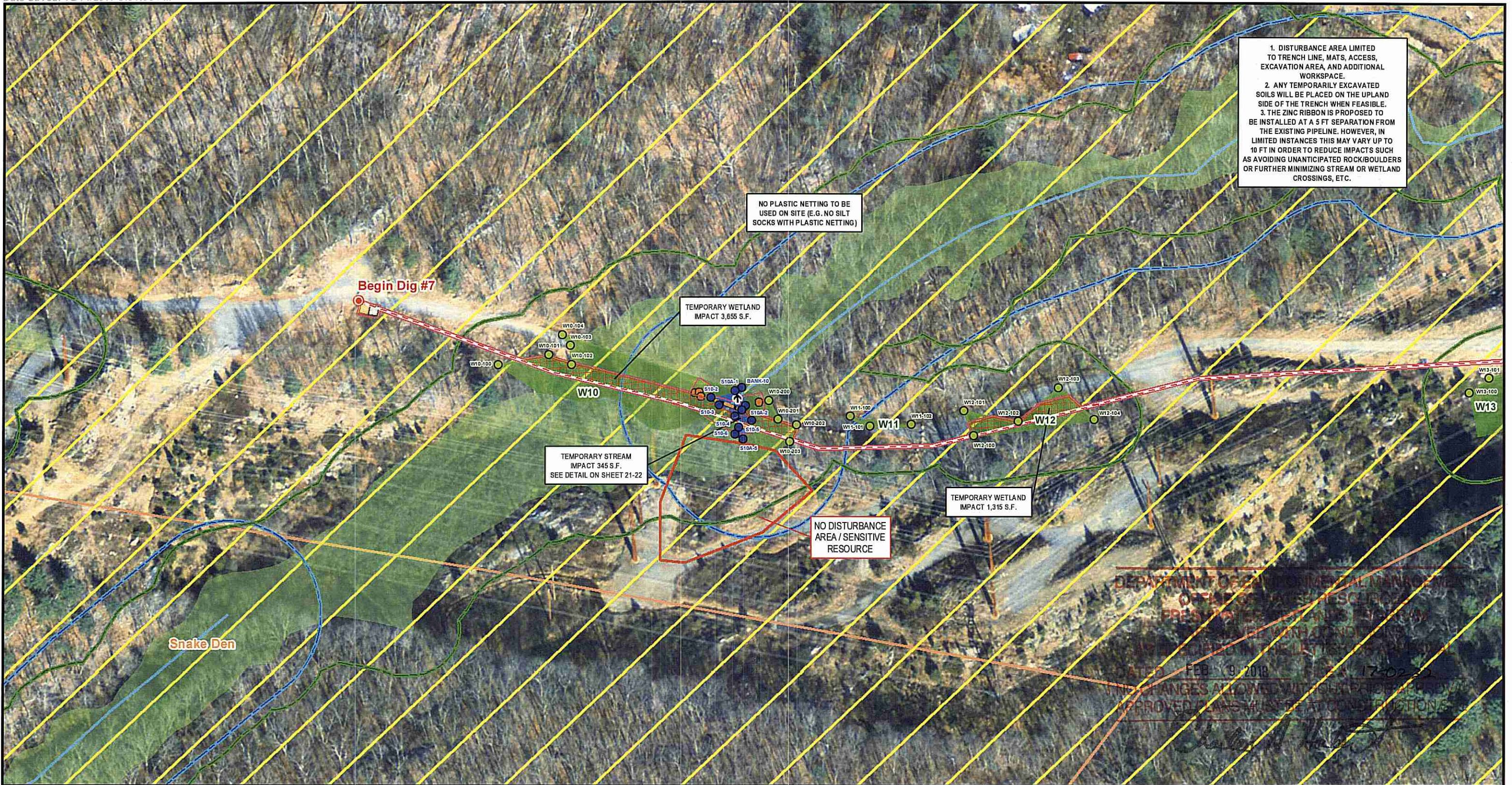
TGP DIG LOCATIONS

Environmental Resources Map

Smithfield & Johnston, RI
 Page 10 of 26

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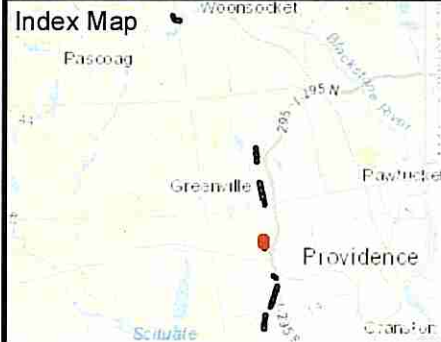
NO PLASTIC NETTING TO BE USED ON SITE (E.G. NO SILT SOCKS WITH PLASTIC NETTING)

TEMPORARY WETLAND
 IMPACT 3,655 S.F.

TEMPORARY STREAM
 IMPACT 345 S.F.
 SEE DETAIL ON SHEET 21-22

NO DISTURBANCE AREA / SENSITIVE RESOURCE

TEMPORARY WETLAND
 IMPACT 1,315 S.F.



Legend

TGP Dig Location	Water Flag	ERIDEM Estimated Wetland Boundary
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TGP DIG LOCATIONS

Environmental Resources Map

Johnston, RI
Page 11 of 26

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0 50 100
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NO PLASTIC NETTING TO BE USED ON SITE (E.G. NO SILT SOCKS WITH PLASTIC NETTING)

NO DISTURBANCE AREA / SENSITIVE RESOURCE

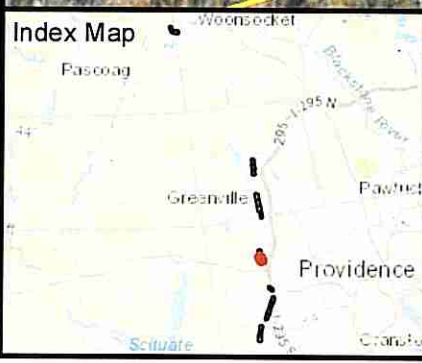
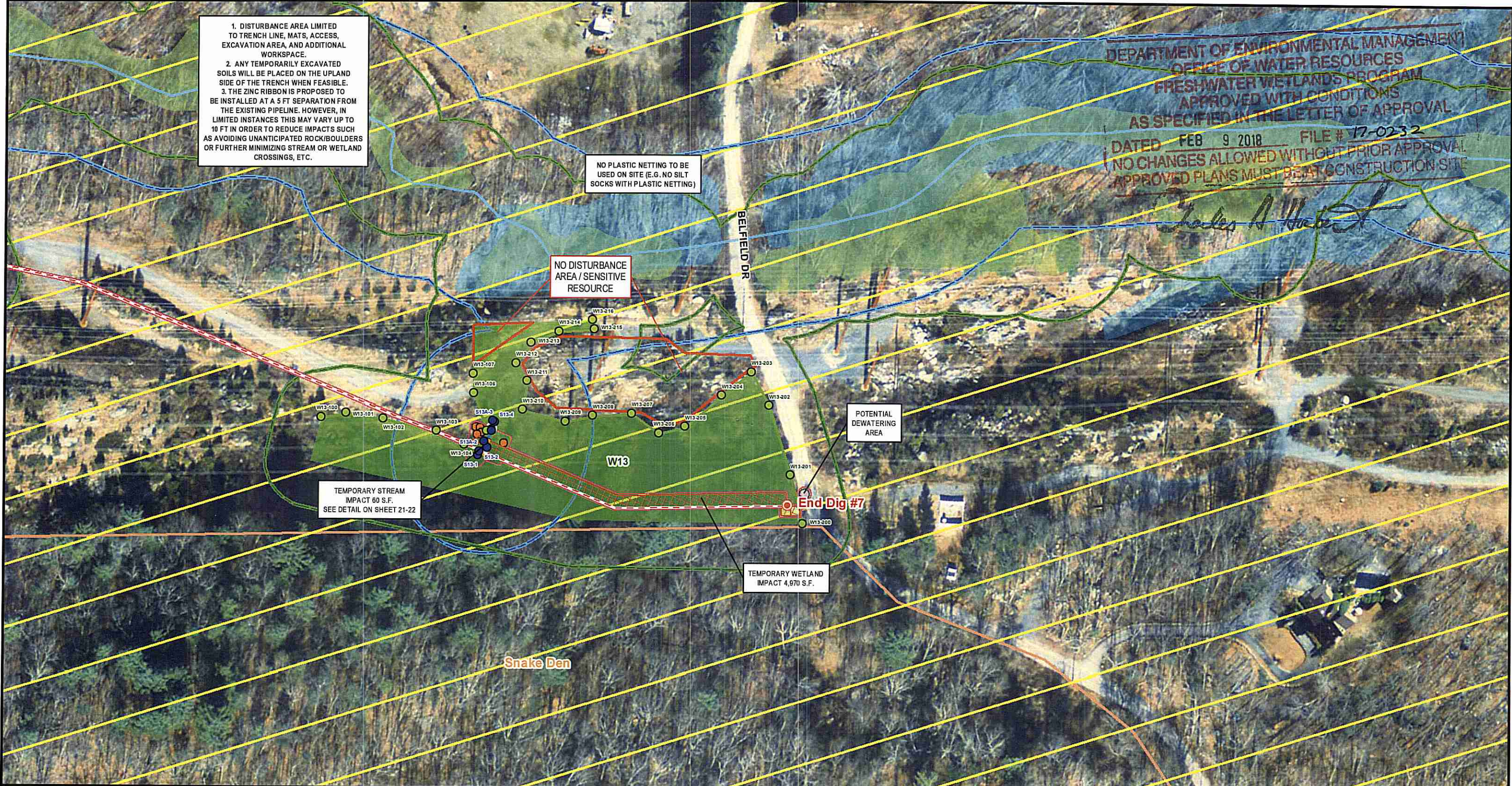
POTENTIAL DEWATERING AREA

TEMPORARY STREAM
 IMPACT 60 S.F.
 SEE DETAIL ON SHEET 21-22

TEMPORARY WETLAND
 IMPACT 4,970 S.F.

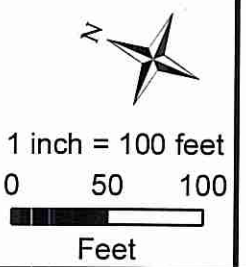
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 FRESHWATER WETLANDS PROGRAM
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 AS SPECIFIED IN THE LETTER OF APPROVAL
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James A. Hester



Legend	
TGP Dig Location	Water Flag
Access Road	Stream Flow Direction
Swamp Mats	Streams
Excavation Area	Field Delineated Swale
Additional Workspace	Field Delineated Perennial Stream
Potential Dewatering Location	Field Delineated Water Feature
Limit of Disturbance	Wetland Flag
SandBag Check Dam	Field Delineated Wetland Boundary
Dissipator Pad/Dewatering Bag	Field Delineated Wetland Area
	RIDEEM Estimated Wetland Boundary
	USFWS Wetlands
	Perimeter Wetland
	Riverbank Wetland
	Conservation Land
	No Disturbance Area
	FEMA 100yr Floodplain
	Town Boundary

Environmental Management
 DEC 18 2017
 Office of Water Resources



TGP DIG LOCATIONS
Environmental Resources Map

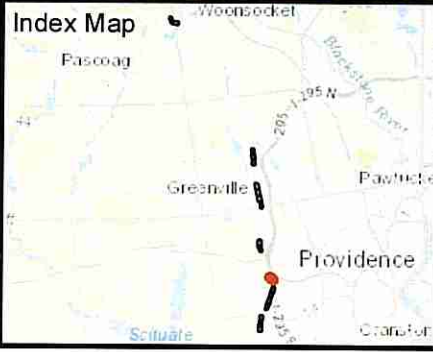
Source:
 -RIGIS
 Basemap & Environmental Data
 -Aerial & Topo Imagery
 ESRI, DigitalGlobe, GeoEye, i-cubed,
 DeLorme, NAVTEQ, TomTom, Intermap,
 increment P Corp., AEX, GEBCO, USDA,
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 NL, Ordnance Survey, ESRI Japan, METI,
 ESRI China (Hong Kong), swisstopo, & the
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Legend

- - - TGP Dig Location	● Water Flag	▨ RIDEM Estimated Wetland Boundary
— Access Road	→ Stream Flow Direction	▨ USFWS Wetlands
▨ Swamp Mats	— Streams	▨ Perimeter Wetland
▨ Excavation Area	— Field Delineated Swale	▨ Riverbank Wetland
▨ Additional Workspace	— Field Delineated Perennial Stream	▨ Conservation Land
▨ Potential Dewatering Location	— Field Delineated Water Feature	▨ No Disturbance Area
▨ Limit of Disturbance	● Wetland Flag	▨ FEMA 100yr Floodplain
▨ SandBag Check Dam	— Field Delineated Wetland Boundary	▨ Town Boundary
● Dissipator Pad/Dewatering Bag	▨ Field Delineated Wetland Area	

Environmental Management
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1 inch = 100 feet
 0 50 100
 Feet

TGP DIG LOCATIONS

Environmental Resources Map

Johnston, RI
 Page 13 of 26

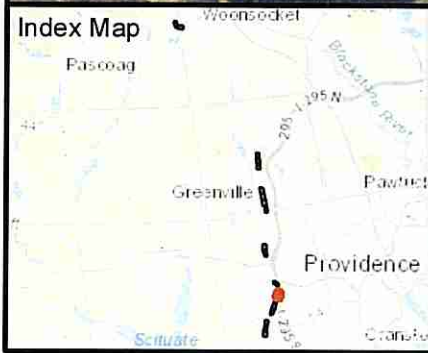
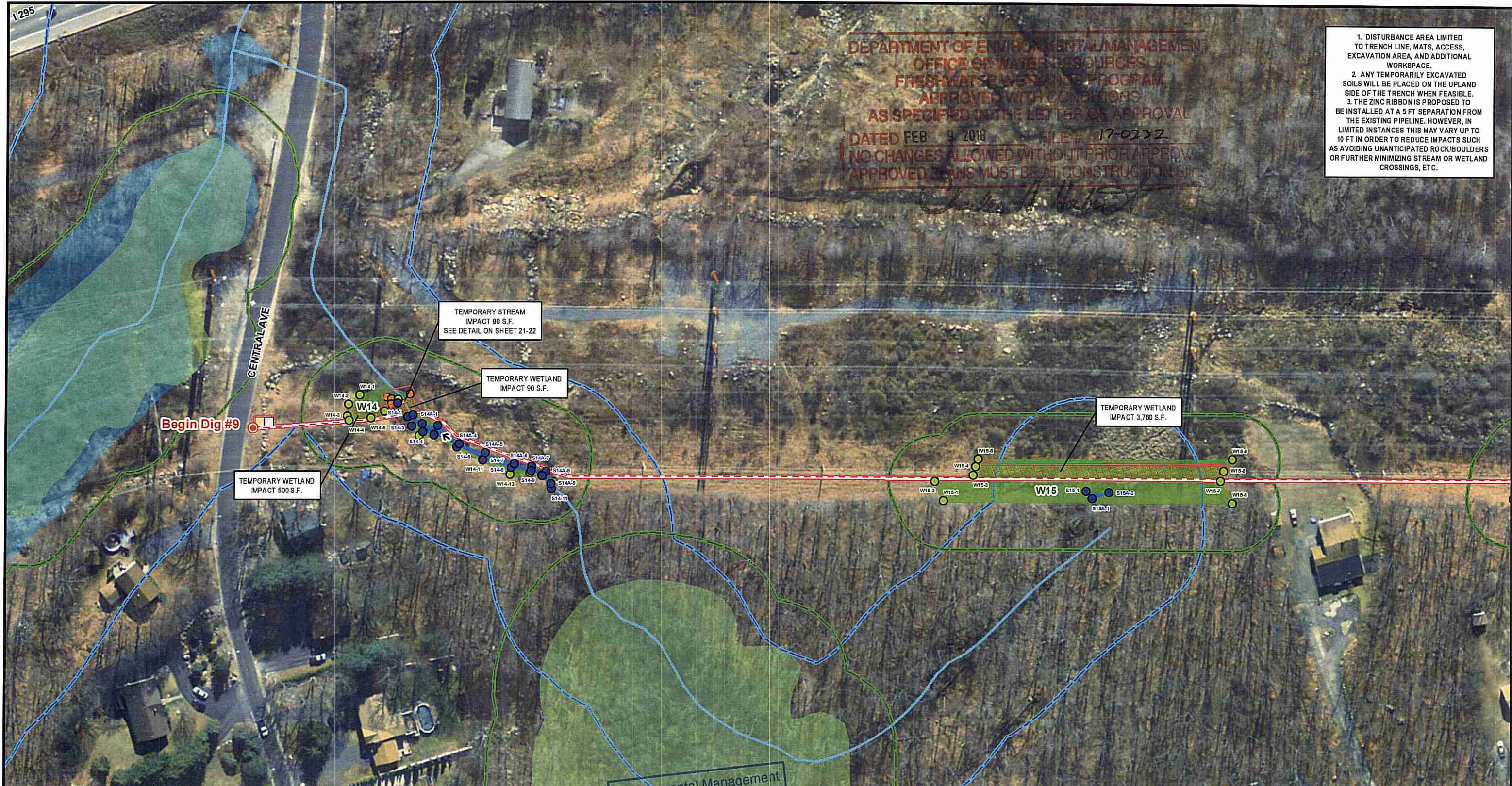
Source:
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BSC GROUP

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Legend

- - - TGP Dig Location	● Water Flag	▨ RIDEM Estimated Wetland Boundary
— Access Road	→ Stream Flow Direction	▨ USFWS Wetlands
▨ Swamp Mats	— Streams	▨ Perimeter Wetland
▨ Excavation Area	— Field Delineated Swale	▨ Riverbank Wetland
▨ Additional Workspace	— Field Delineated Perennial Stream	▨ Conservation Land
▨ Potential Dewatering Location	▨ Field Delineated Water Feature	▨ No Disturbance Area
▨ Limit of Disturbance	● Wetland Flag	▨ FEMA 100yr Floodplain
▨ SandBag Check Dam	▨ Field Delineated Wetland Boundary	▨ Town Boundary
● Dissipator Pad/Dewatering Bag	▨ Field Delineated Wetland Area	

TGP DIG LOCATIONS

Environmental Resources Map

Johnston, RI
Page 14 of 26

1 inch = 100 feet
0 50 100
Feet

Source:
 -RIGIS
 Basemap & Environmental Data
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 ESRI, DigitalGlobe, GeoEye, i-cubed, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., AEX, GEBCO, USDA, USGS, FAO, NPS, NRCAN, GeoBase, Getmapping, Aerogrid, IGP, IGN, Kadaster NL, Ordnance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, & the GIS User Community

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Access Road	Stream Flow Direction
Swamp Mats	Streams
Excavation Area	Field Delineated Swale
Additional Workspace	Field Delineated Perennial Stream
Potential Dewatering Location	Field Delineated Water Feature
Limit of Disturbance	Wetland Flag
SandBag Check Dam	Field Delineated Wetland Boundary
Dissipator Pad/Dewatering Bag	Field Delineated Wetland Area
RIDEM Estimated Wetland Boundary	Conservation Land
USFWS Wetlands	No Disturbance Area
Perimeter Wetland	FEMA 100yr Floodplain
Riverbank Wetland	Town Boundary

1 inch = 100 feet
0 50 100 Feet

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TGP DIG LOCATIONS

Environmental Resources Map

Johnston, RI
Page 15 of 26

Source: -RIGIS Basemap & Environmental Data
 -Aerial & Topo Imagery
 ESRI, DigitalGlobe, GeoEye, i-cubed, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., AEX, GEBCO, USDA, USGS, FAO, NPS, NRCAN, GeoBase, Getmapping, Aerogrid, IGP, IGN, Kadaster NL, Ordnance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, & the GIS User Community

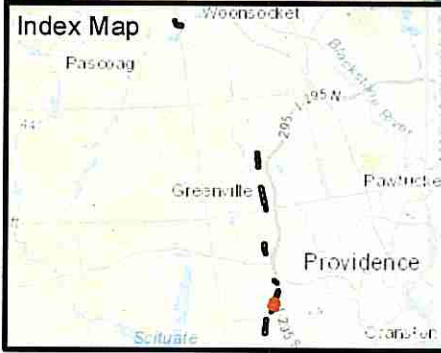
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Legend

TGP Dig Location	Water Flag	RIDEM Estimated Wetland Boundary
Access Road	Stream Flow Direction	USFWS Wetlands
Swamp Mats	Streams	Perimeter Wetland
Excavation Area	Field Delineated Swale	Riverbank Wetland
Additional Workspace	Field Delineated Perennial Stream	Conservation Land
Potential Dewatering Location	Field Delineated Water Feature	No Disturbance Area
Limit of Disturbance	Wetland Flag	FEMA 100yr Floodplain
SandBag Check Dam	Field Delineated Wetland Boundary	Town Boundary
Dissipator Pad/Dewatering Bag	Field Delineated Wetland Area	

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1 inch = 100 feet
 0 50 100
 Feet

TGP DIG LOCATIONS

Environmental Resources Map

Johnston, RI
 Page 16 of 26

Source:
 -RIGIS
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 ESRI, DigitalGlobe, GeoEye, i-cubed, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., AEX, GEBCO, USDA, USGS, FAO, NPS, NRCAN, GeoBase, Getmapping, Aergrid, IGR, IGN, Kadaster NL, Ordnance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, & the GIS User Community

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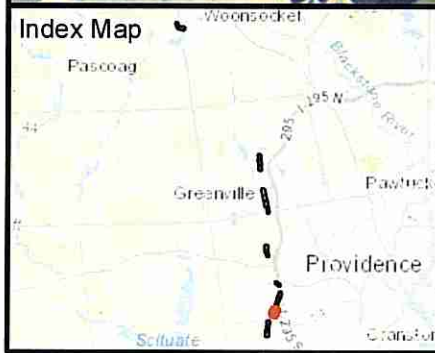
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Charles H. Haber

End Dig #10

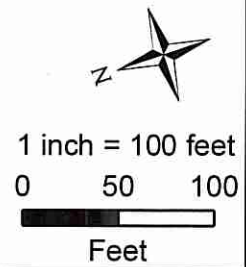
Environmental Management
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 Office of Water Resources

Simmons
 Upper
 Reservoir



Legend

TGP Dig Location	Water Flag	RIDEM Estimated Wetland Boundary
Access Road	Stream Flow Direction	USFWS Wetlands
Swamp Mats	Streams	Perimeter Wetland
Excavation Area	Field Delineated Swale	Riverbank Wetland
Additional Workspace	Field Delineated Perennial Stream	Conservation Land
Potential Dewatering Location	Field Delineated Water Feature	No Disturbance Area
Limit of Disturbance	Wetland Flag	FEMA 100yr Floodplain
SandBag Check Dam	Field Delineated Wetland Boundary	Town Boundary
Dissipator Pad/Dewatering Bag	Field Delineated Wetland Area	



TGP DIG LOCATIONS
Environmental Resources Map

Johnston, RI
 Page 17 of 26

Source:
 -RIGIS
 Basemap & Environmental Data
 -Aerial & Topo Imagery
 -ESRI, DigitalGlobe, GeoEye, i-cubed,
 DeLorme, NAVTEQ, TomTom, Intermap,
 Increment P Corp., AEX, GEBCO, USDA,
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 Getmapping, Aerogrid, IGN, IGN, Kadaster
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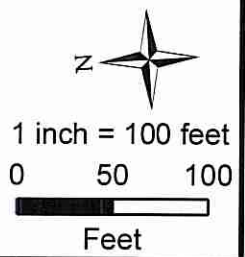


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 Charles A. Herbert



Legend	
TGP Dig Location	Water Flag
Access Road	Stream Flow Direction
Swamp Mats	Streams
Excavation Area	Field Delineated Swale
Additional Workspace	Field Delineated Perennial Stream
Potential Dewatering Location	Field Delineated Water Feature
Limit of Disturbance	Wetland Flag
SandBag Check Dam	Field Delineated Wetland Boundary
Dissipator Pad/Dewatering Bag	Field Delineated Wetland Area
RIDEM Estimated Wetland Boundary	USFWS Wetlands
USFWS Wetlands	Perimeter Wetland
Perimeter Wetland	Riverbank Wetland
Riverbank Wetland	Conservation Land
Conservation Land	No Disturbance Area
No Disturbance Area	FEMA 100yr Floodplain
FEMA 100yr Floodplain	Town Boundary
Town Boundary	



TGP DIG LOCATIONS

Environmental Resources Map

Johnston & Cranston, RI
Page 18 of 26

Source:
 -RIGIS
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 -Aerial & Topo Imagery
 ESRI, DigitalGlobe, GeoEye, i-cubed, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., AEX, GESCO, USDA, USGS, FAO, NPS, NRCAN, GeoBase, Getmapping, Aerogrid, IGP, IGN, Kadaster NL, Ordnance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, & the GIS User Community

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Charles A. Haber

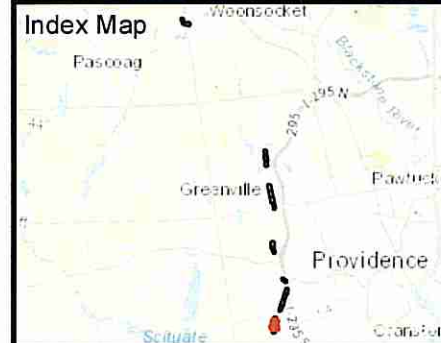


Begin Dig #12

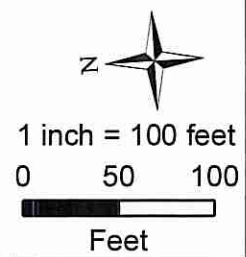
TEMPORARY STREAM
 IMPACT 135 S.F.
 SEE DETAIL ON SHEET 21-22

TEMPORARY WETLAND
 IMPACT 2,290 S.F.

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Legend	
	TGP Dig Location
	Access Road
	Swamp Mats
	Excavation Area
	Additional Workspace
	Potential Dewatering Location
	Limit of Disturbance
	SandBag Check Dam
	Dissipator Pad/Dewatering Bag
	Water Flag
	Stream Flow Direction
	Streams
	Field Delineated Swale
	Field Delineated Perennial Stream
	Field Delineated Water Feature
	Wetland Flag
	Field Delineated Wetland Boundary
	Field Delineated Wetland Area
	RIDEM Estimated Wetland Boundary
	USFWS Wetlands
	Perimeter Wetland
	Riverbank Wetland
	Conservation Land
	No Disturbance Area
	FEMA 100yr Floodplain
	Town Boundary



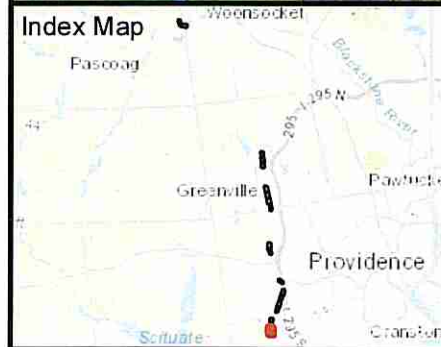
TGP DIG LOCATIONS
Environmental Resources Map

Johnston & Cranston, RI
 Page 19 of 26

Source:
 -RIGIS
 Basemap & Environmental Data
 -Aerial & Topo Imagery
 ESRI, DigitalGlobe, GeoEye, i-cubed,
 DeLorme, NAVTEQ, TomTom, Intermap,
 increment P Corp., AEX, GEBCO, USDA,
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<p>Legend</p> <ul style="list-style-type: none"> TGP Dig Location Access Road Swamp Mats Excavation Area Additional Workspace Potential Dewatering Location Limit of Disturbance SandBag Check Dam Dissipator Pad/Dewatering Bag 	<ul style="list-style-type: none"> ● Water Flag → Stream Flow Direction — Streams Field Delineated Swale Field Delineated Perennial Stream Field Delineated Water Feature ● Wetland Flag Field Delineated Wetland Boundary Field Delineated Wetland Area 	<ul style="list-style-type: none"> RIDEM Estimated Wetland Boundary USFWS Wetlands Perimeter Wetland Riverbank Wetland Conservation Land No Disturbance Area FEMA 100yr Floodplain Town Boundary
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 1 inch = 100 feet
 0 50 100
 Feet

TGP DIG LOCATIONS

Environmental Resources Map

Cranston, RI
 Page 20 of 26

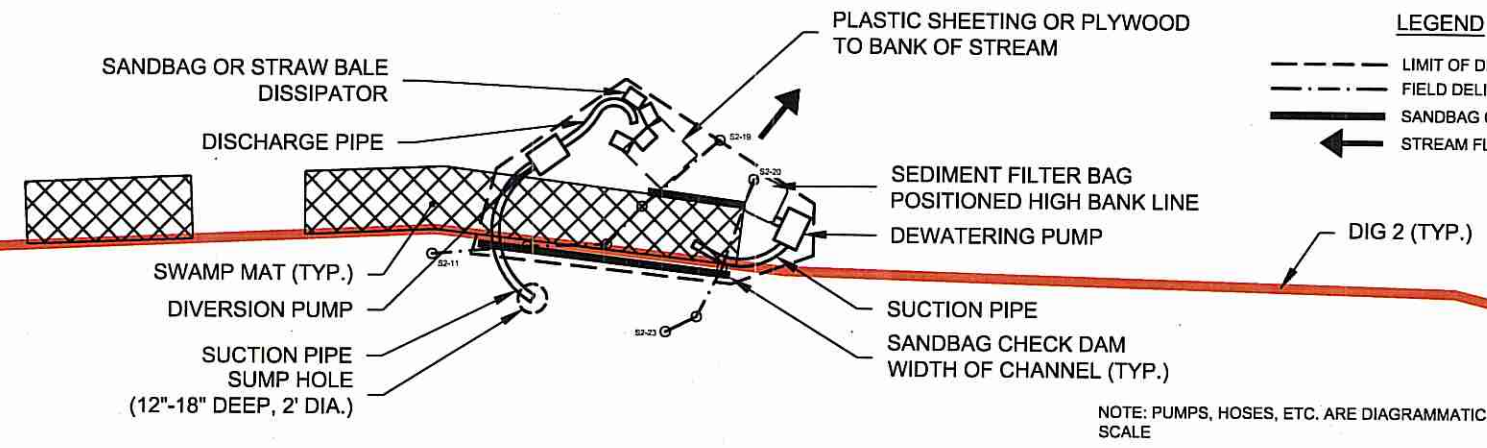
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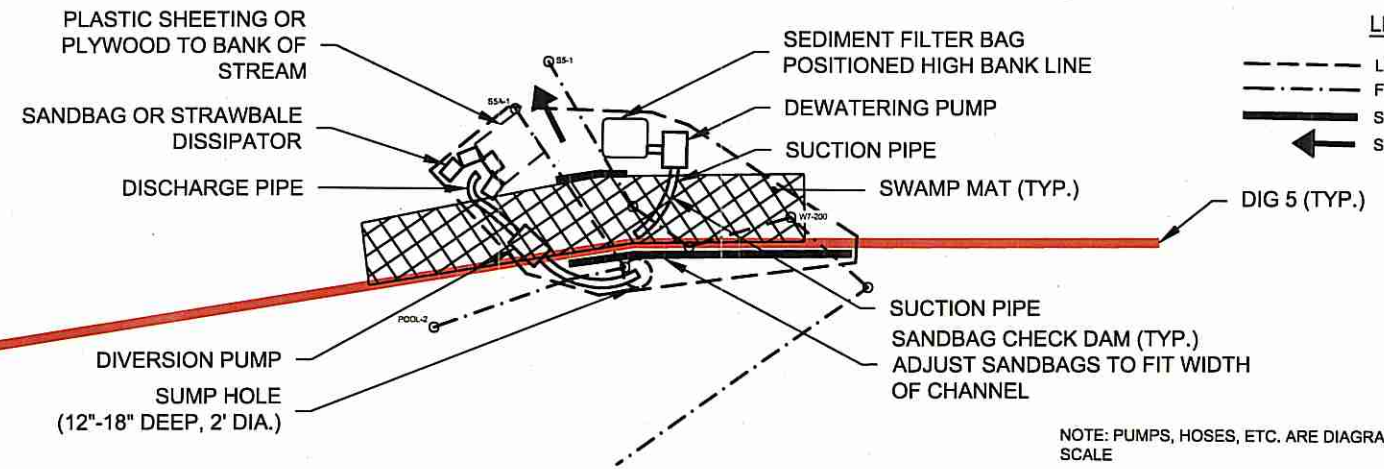
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Charles A. Herbert

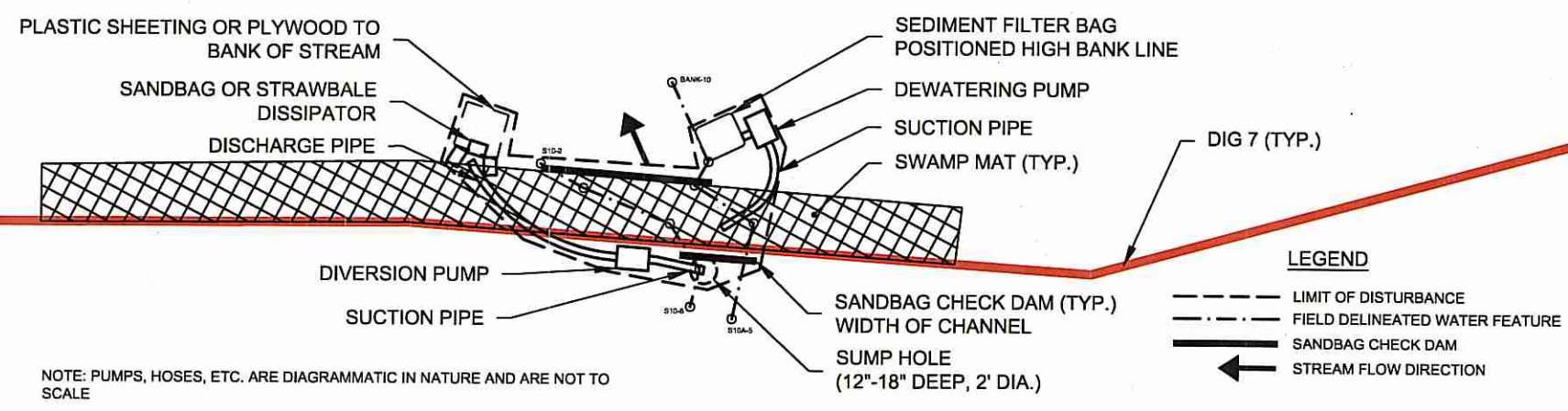
1 DIG 2 - STREAM DIVERSION/
 DEWATERING DETAIL
 SCALE: 1"= 40'



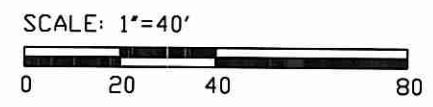
2 DIG 5 - STREAM DIVERSION/
 DEWATERING DETAIL
 SCALE: 1"= 40'



3 DIG 7 (WETLAND 10) - STREAM DIVERSION/
 DEWATERING DETAIL
 SCALE: 1"= 40'



Environmental Management
 DEC 18 2017
 Office of Water Resources



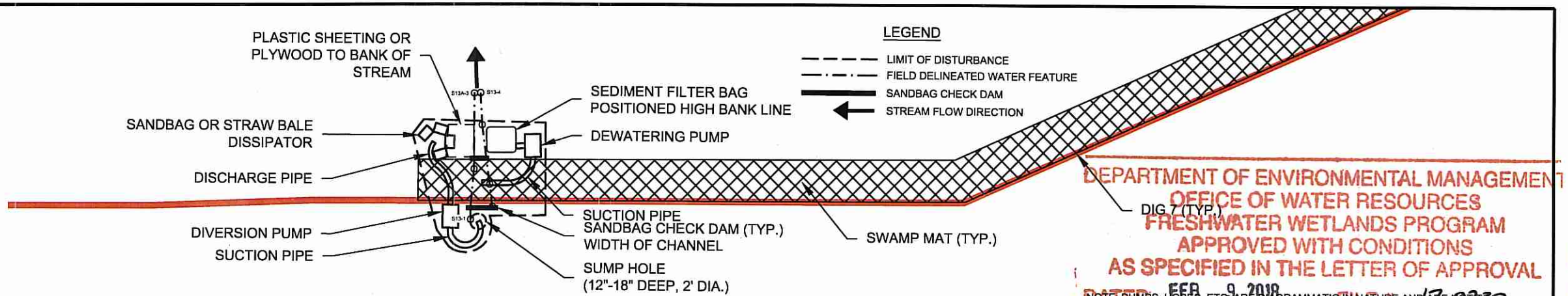
TGP DIG LOCATIONS
 TYPICAL BEST MANAGEMENT
 DETAILS

Burrillville, RI

Tennessee Gas Pipeline, L.L.C.
 a Kinder Morgan company

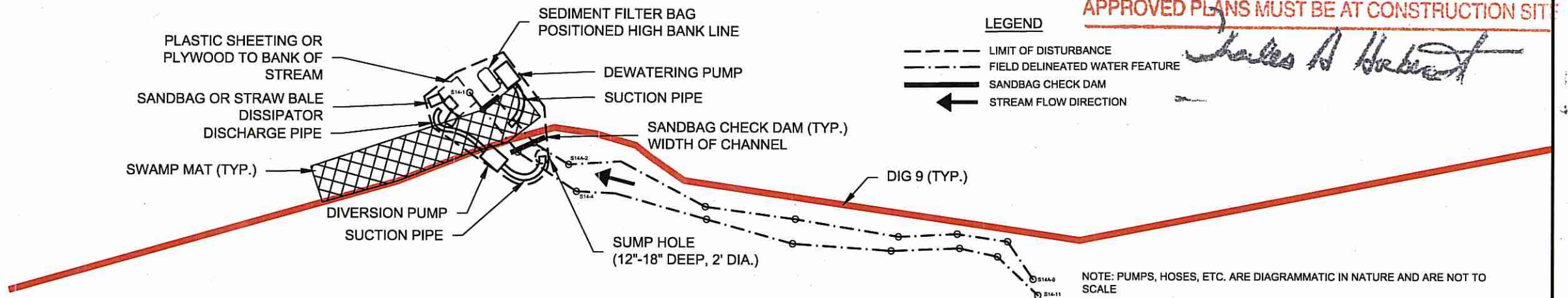
BSC GROUP
 33 Waldo Street
 Worcester, Massachusetts
 01608
 508 792 4500

1 DIG 7 (WETLAND 13) - STREAM DIVERSION/DEWATERING DETAIL
SCALE: 1"= 40'



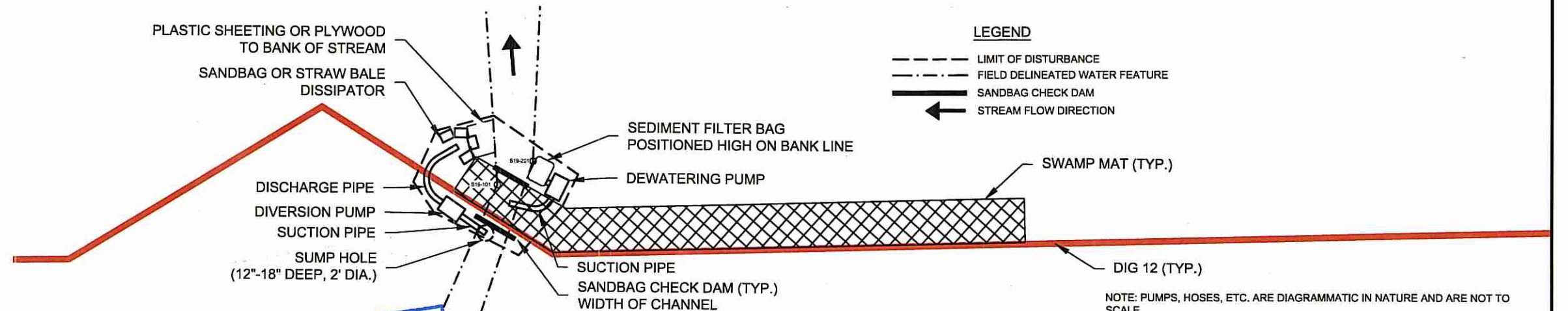
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APPROVED WITH CONDITIONS
AS SPECIFIED IN THE LETTER OF APPROVAL
DATED FEB 9, 2018 FILE # 17-0232
NOTE: PUMPS, HOSES, ETC. ARE DIAGRAMMATIC IN NATURE AND ARE NOT TO SCALE
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE

2 DIG 9 - STREAM DIVERSION/DEWATERING DETAIL
SCALE: 1"= 40'



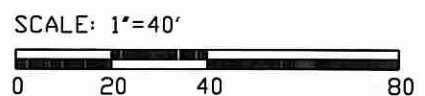
NOTE: PUMPS, HOSES, ETC. ARE DIAGRAMMATIC IN NATURE AND ARE NOT TO SCALE

3 DIG 12 - STREAM DIVERSION/DEWATERING DETAIL
SCALE: 1"= 40'



NOTE: PUMPS, HOSES, ETC. ARE DIAGRAMMATIC IN NATURE AND ARE NOT TO SCALE

Environmental Management
DEC 18 2017
Office of Water Resources



TGP DIG LOCATIONS
TYPICAL BEST MANAGEMENT
DETAILS

Burrillville, RI



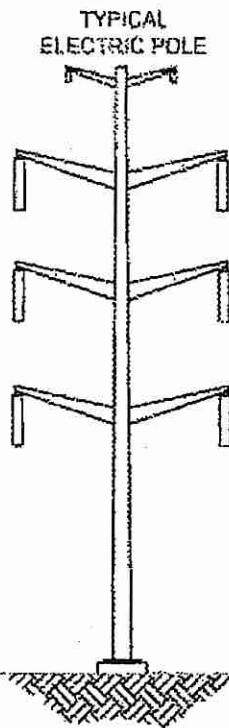
REV	DESCRIPTION	DATE	APPROVED
0	PRELIMINARY AC MITIGATION SYSTEM DESIGN	3/24/17	RFA

SAFETY NOTES:

1. THE PIPELINE AND APPURTENANCES AT OR NEAR THESE LOCATIONS CAN POSSESS POTENTIALLY LETHAL ELECTRICAL SHOCK HAZARDS UNTIL ALL GROUNDING IS INSTALLED.
2. KINDER MORGAN/TGP OR ARK ENGINEERING SHOULD PROVIDE A QUALIFIED ELECTRICAL SAFETY INSPECTOR ON-SITE DURING INSTALLATION OF THESE GROUND SYSTEMS TO ASSURE PERSONNEL SAFETY AND PIPELINE INTEGRITY.
3. ZINC RIBBON DEPTH AND SPACING ARE MINIMUM REQUIREMENTS. ADDITIONAL DEPTH OF ZINC RIBBON AND ADDITIONAL SPACING FROM THE PIPELINES IS ACCEPTABLE.

INSTALLATION NOTES:

1. HORIZONTAL DISTANCE FROM PIPELINE TO ZINC RIBBON CAN VARY BETWEEN 5' AND 25'.
2. INSTALL ZINC RIBBON TO SPECIFIED MINIMUM DEPTH.

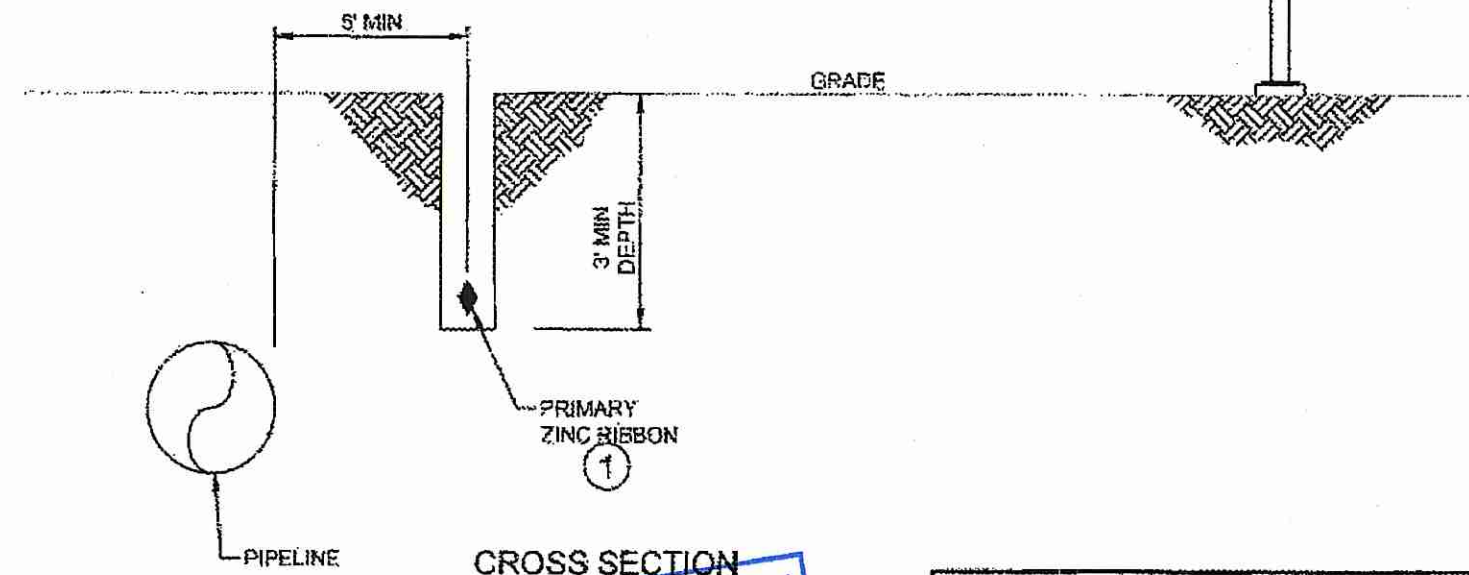


**DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
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Charles A. Haber

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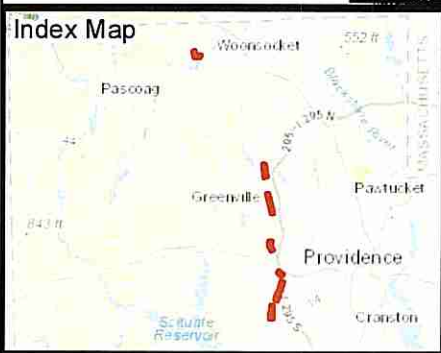


CAUTION:
ZINC RIBBON MUST NOT TOUCH PIPE.

**CROSS SECTION
ZINC RIBBON INSTALLATION
SINGLE STRAND**
DEC 18 2017
Office of Water Resources

**- PRELIMINARY -
FOR CLIENT REVIEW ONLY
NOT FOR CONSTRUCTION
ENGR: RA
DATE: 3/24/17**

CLIENT TENNESSEE GAS PIPELINE	ARK ENGINEERING & TECH SERVICES, INC 639 GRANITE STREET SUITE 209 BRANTREE, MA 02184 U.S.A.	TITLE ZINC RIBBON INSTALLATION SECTION DETAILS
SITE 285E-102 285E-103 285E-104	DRAWN BY SRM	DATE 3/24/17
PROJECT NO 15-E-097-AC	APPROVED BY RFA	DATE
	SCALE NTS	CAD FILE NAME 16097-200-1-R0
	DWG. NO. 16097-200	REV 0
		SHEET 1 OF 1



TGP DIG LOCATIONS

Zinc Ribbon Installation Section Details

Burrillville, North Smithfield, Smithfield, Johnston, & Cranston, RI
Page 23 of 26



ACCESS

- Existing, historically utilized access roads within the gas pipeline corridor as well as the adjacent overhead electrical ROW will be used to access the work area when possible.
- Where wetlands are present along the depicted digs, construction mats (portable HDPE mats) will be utilized to access the work locations and perform the excavations. Construction matting will be used when soils cannot safely support the small equipment. The mats will be placed on top of the existing vegetation to minimize disturbance to the soil to the extent practicable
- When possible, equipment less than 6 pounds per square inch (PSI) can be used, avoiding the need for installing swamp mats. However, mats are shown conservatively in all wetland crossings and will be used when greater than 6 PSI rated equipment is needed.

WETLANDS

- To install the zinc ribbons, TGP anticipates using a small trencher/plow attachment capable of creating a 1-foot wide by 3-foot deep ditch along the pipeline and spooling the ribbon into the trench. Access and ribbon installation will avoid the wetland boundary whenever feasible as an offset of up to 25 feet from the pipeline is allowable.
- The proposed activities can be completed relatively quickly at each site, reducing the amount of soil exposed or stockpiled for any length of time. The trench will be almost immediately backfilled as the equipment moves linearly and soils would not be stockpiled in the vicinity of wetlands. In favorable conditions, it is estimated that each dig can be completed in one workday. If rocky conditions prevent use of a trencher, small equipment with a 1-foot bucket will be used instead. The trench cut in rocky areas may remain open for 24 hours at most.
- To install the decoupling devices and connections to the pipeline, an approximate 10-foot by 10-foot area will need to be excavated to expose a portion of the pipeline near both ends of each of the 12 dig locations. There is also some flexibility in the placement of the excavation and pipeline connection, which can be used to further reduce wetland impacts.

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WATERWAY CROSSINGS

- When stream crossings are required, any flow will be briefly dammed with a sandbag check dam (see detail) while the ribbon installation trench is formed and

then backfilled.

- If the amount of flow is significant, the water will be pumped around the work area to a downstream dissipater pad consisting of sand bags or straw bales.

DEWATERING

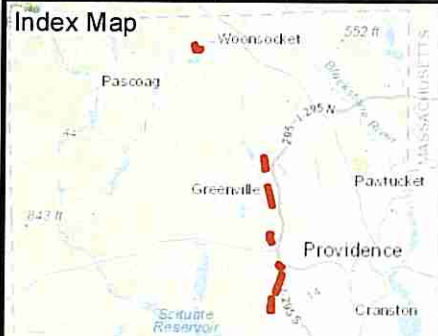
- Dewatering will not be necessary for the installation of the zinc ribbon. If any dewatering is necessary, it would occur at the pipeline connection excavations. Water will be directed to filter bags which will be placed in a well vegetated area. Minor amounts of water will be directed to haybales. Accumulated sediments will be disposed of in an appropriate manner.
- No trench dewatering will be directly discharged to any wetlands or streams.

EROSION AND SEDIMENT CONTROLS

- Stockpiled soil will likely not remain exposed for more than one workday and TGP anticipates backfilling the installation trench immediately after the zinc ribbon is placed. However, in areas where wetlands are in the vicinity of the pipeline connection digs or soil will remain sidecast overnight, strawbales or filter socks/wattles will be placed between the adjacent resource and disturbed soil. Controls may be removed following completion of active work, and reused at subsequent dig sites.
- If present, any topsoil will be segregated and replaced in the trench last, so that root stock and seed banks are preserved

RESTORATION

- Excavated and trenched areas will be restored to pre-construction conditions and contours to the extent practicable.
- Once the work is complete, disturbed areas will be seeded with an appropriate seed mix and mulched.
- Rolled erosion control products will be considered if stabilization is a concern. Plastic netting is not allowed for use at Dig 7 which is habitat for state listed snake species.
- All construction materials, vehicles, and non-biodegradable sediment controls will be removed from the site upon completion of work.



TGP DIG LOCATIONS

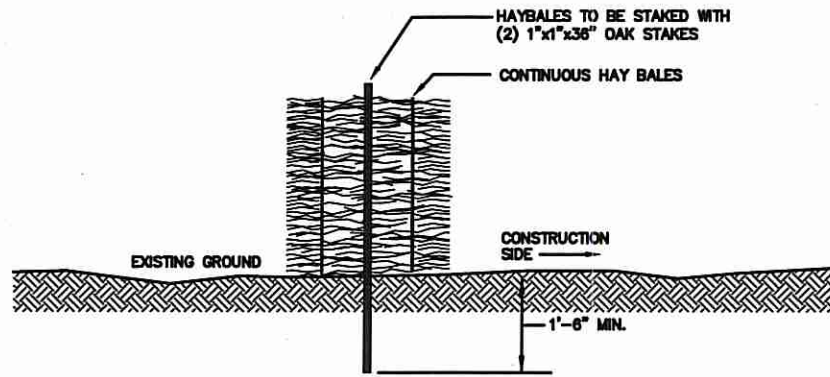
Sediment & Erosion Controls Best Management Practices

Burrillville, North Smithfield, Smithfield, Johnston, & Cranston, RI

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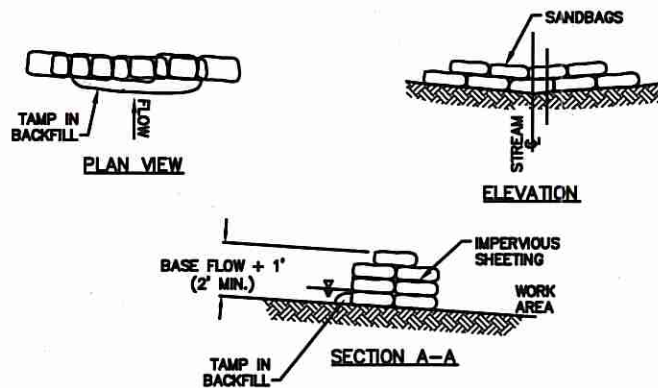
Charles A. Hester





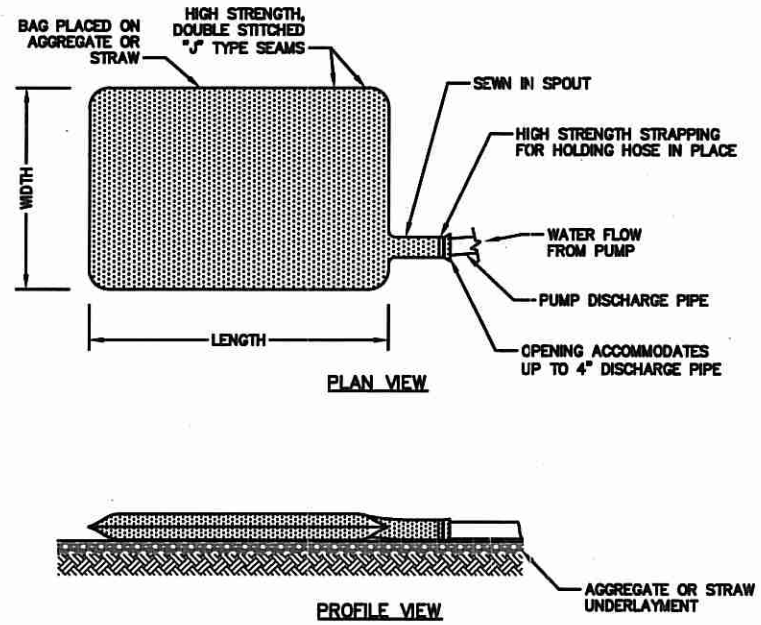
- NOTES:**
- BALES SHALL BE PLACED IN A ROW WITH THE ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
 - BALES SHALL BE SECURELY ANCHORED IN PLACE BY 1"x1"x36" WOODEN STAKES DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
 - INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
 - BALES SHALL BE REMOVED AND REPLACED WHEN THEY BECOME FILLED WITH SEDIMENT AND BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
 - BALES SHALL BE REMOVED WHEN THE EMBANKMENTS STABILIZE.
 - BALES TO BE TWINE BOUND.

SINGLE ROW HAYBALE
SCALE: NONE

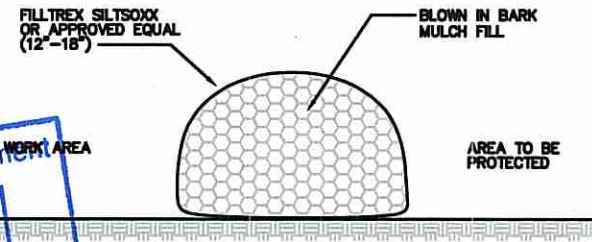


- NOTES:**
- USE CHECK DAMS TO SLOW WATER FLOWS AND AS SMALL SEDIMENT TRAPS IN DITCHES ALONG ACCESS ROADS.
 - CLEAN SEDIMENT AND REPLACE DAMS AS NECESSARY.
 - COORDINATE SPACING WITH ENVIRONMENTAL SCIENTIST.

SANDBAG CHECK DAM
SCALE: NONE

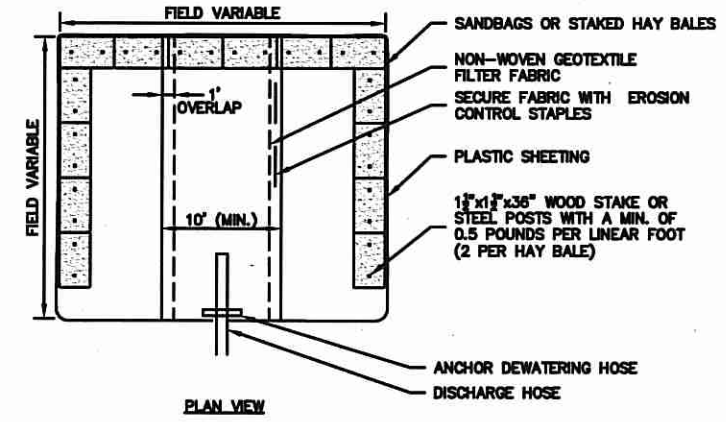


SEDIMENT FILTER BAG
SCALE: NONE



- NOTES:**
- ALL MATERIAL TO MEET FILTREX SPECIFICATIONS.
 - SILTSOXX COMPOST/SOIL/ROCK/SEED FILL TO MEET APPLICATION REQUIREMENTS
 - SILTSOXX DEPICTED IS FOR MINIMUM SLOPES. GREATER SLOPES MAY REQUIRE LARGER SOCKS PER THE ENGINEER.
 - COMPOST MATERIAL TO BE DISPURSED ON SITE, AS DETERMINED BY THE ENGINEER.

SILTSOXX
SCALE: NONE



- NOTES:**
- NUMBER OF SANDBAGS OR STRAW BALES MAY VARY DEPENDING ON SITE CONDITIONS.
 - EXTEND PLASTIC SHEETING TO EDGE OF STREAM.
 - THE BASIN TO BE SIZED ACCORDING TO PUMP DISCHARGE RATE (gpm).
 - SIZE SHOWN ON PLANS SHALL BE ADJUSTED AS REQUIRED FOR THE ACTUAL PUMPING RATE.
- SANDBAG OR STRAW BALE DISSIPATOR**
SCALE: NONE
EC-114-CT
- DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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- James A. Haber*

TUFFTRAK XT "OVERLAPPING BUOYANT MAT" - FOR BOGGY SOAKED GROUND

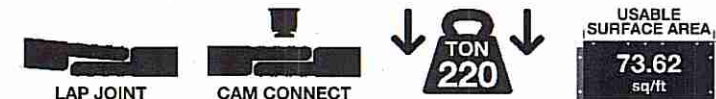
The Tufftrak XT is an exceptionally strong, foam filled mat that is so buoyant it floats. This mat is ideal for use on boggy, marshy and wet ground. It is unyielding and can be easily connected if needed through any of its 16 fixing points to create large platforms. The Chevron traction surface offers exceptional grip for both vehicles and pedestrians.

See the Tufftrak XT getting a thorough testing by a tracked vehicle on our youtube video featured on this page. This product is foam filled to prevent water ingress even if it gets punctured by forks or other equipment.

TUFFTRAK XT IS:

- Exceptionally Strong - Ideal for heavy tracked vehicles
- Durable - Can be bent to 90 degrees without breaking
- Lighter than alternatives - offers a 30% weight saving against the nearest competing product.
- Cost Effective - Take it to many sites and use it over and over again.
- 50 Mats per 40' Container! - Fewer vehicles on site, lower transport costs.

You can see how the Tufftrak Xt compares with our other heavy duty mud mats further down the page in our comparison chart. If you would like to organize a free quote, site visit or just speak to someone about this product, then please call our sales line on (888) 605-3463.



TEMPORARY CONSTRUCTION MAT
SCALE: NONE



TGP DIG LOCATIONS
TYPICAL BEST MANAGEMENT DETAILS

Burrillville, RI

