Project Design

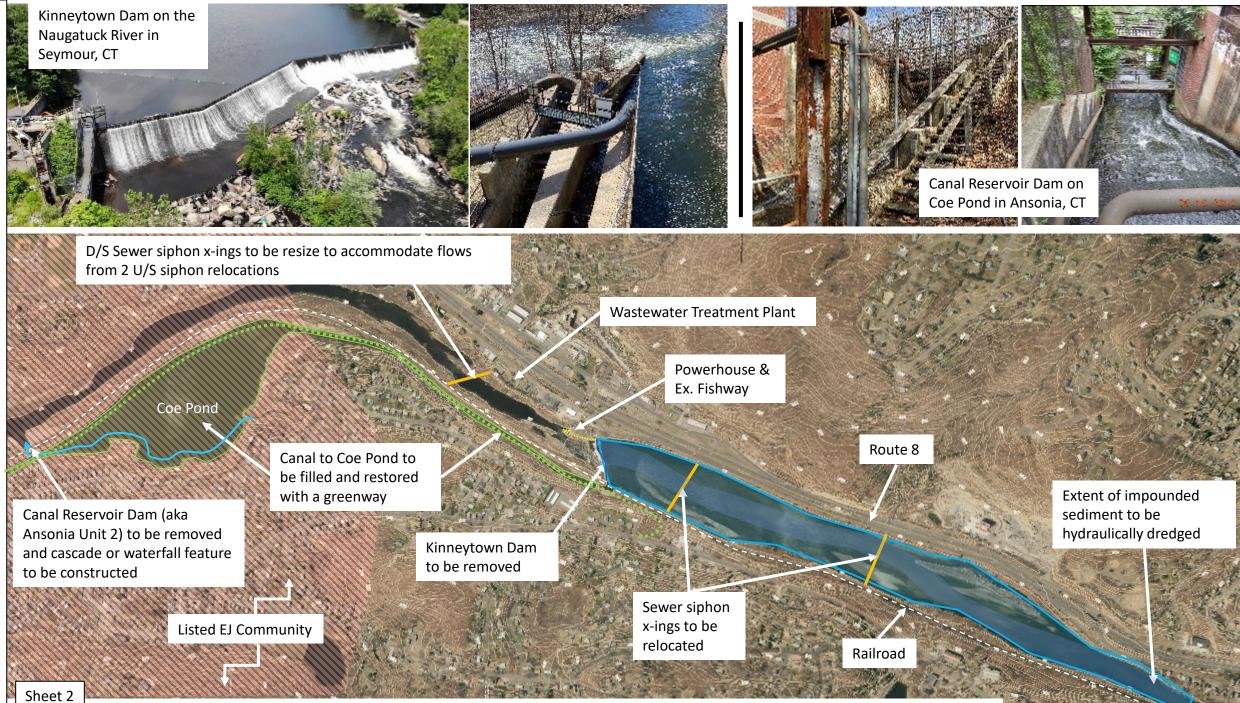
Engineering Design Description:

The Conceptual Design Plans attached below include the full removal of the Kinneytown Dam, the first barrier upstream of the Long Island Sound, and the removal of the associated Canal Reservoir Dam at Unit 2 in Ansonia. Floods have twice wiped out the Kinneytown Dam, once in 1910 and again in 1955, and the dam was twice rebuilt (see original dam design plans and 1957 As-Builts attached below, along with repair plans from 1980 and 1984). CTDEEP, USFWS, and the dam owner have already identified complete removal of the dam as the most feasible and effective solution to restore the Naugatuck River while reducing the numerous liabilities and safety issues relating to the aging dam infrastructure. Sediment quantity, quality, and physical characteristic data exist from the dams that were previously removed upstream, along with engineering reports, hydrologic and hydraulic models of the entire Naugatuck River, and extensive archeological and historic analysis of the Naugatuck River dams. Additional existing data includes 1-foot contour mapping from 2016; video records of the fish reaching the base of the dam; eDNA data collected downstream of the dam to identify the species of fish present; as-built engineering plans of the two sewer siphons that will need to be relocated during dam removal (see attached below); CTDEEP dam safety records stating that the dam is classified as a Significant Hazard Dam in need of repair; and a Plan to Restore Diadromous Fishes to the Naugatuck River that has just been updated and presented by CTDEEP. The Diadromous Fish Plan recommends the removal of the Kinneytown Dam as the preferred option to restore historic fish runs to the Naugatuck River.

The project team has identified potential transformational habitat zones within the impoundment and downstream extending to the Long Island Sound Estuary that have the potential for enhancement/nourishment due to passive transport of impounded sediment post-dam removal. In addition, the project team has developed a Conceptual Plan for Dam Removal, and budgets for the Engineering, Permitting, Bid Assistance, and Construction Administration. In addition, we have worked with a contractor experienced in large-scale dam removal projects in the northeast to develop the initial estimate of cost for the demolition of the Kinneytown Dam and the restoration of the Naugatuck River. The preferred sediment management method for dam removal still needs to be agreed upon by the regulatory agencies, but at this time we are assuming that the sediment can be managed by hydraulically dredging and relocating on-site a portion of the sediment while allowing the remaining sediment to be passively transported downstream to enrich and transform the riverine wetlands and estuary downstream. We have prepared estimates of probable cost for two hydraulic dredge options (see Construction Cost attached below). The first lower-cost option would focus on hydraulically dredging the top four feet of sediment from the wetted impoundent, which is where the majority of exceedances existed for the 5 mainstem dams removed between 1999 and 2004. The second higher-cost option would hydraulically dredge the potentially mobile portion of the impounded sediment. The hydraulically dredged spoils would be sluiced down the existing canal that parallels the river's eastern bank into the Coe Pond as tabilized and capped. The Canal Reservoir Dam, which currently impounds Coe Pond, will also be removed and transformed into a cascade or waterfall feature paralleled by pedestrian access extending under the existing railroad bridge in this area. The tributary extending into Coe Pond will be restored on the newly graded surface of the former impoundment and the for

Contents:

Sheet 2-7	Conceptual Design Plans for the Removal of Kinneytown Dam and Canal Reservoir Dam
Sheet 8- 13	Transformational Habitat Zones for the Kinneytown Dam Removal Project
Sheet 14-15	Engineering Outline Scope of Work & Budget
Sheet 16	Estimate of Probable Construction Cost (based on Conceptual Design Plans)
Sheet 17-18	Kinneytown Dam Removal Project Timeline
Sheet 19	Project Organizational Chart for Work Flow
Sheet 20-25	Historic Kinneytown Dam Plans (1910, 1957 As-built, 1980, 1984)
Sheet 26-28	As-Built Sanitary Sewer Siphon Plans and Profiles



Page 1/6

and the

Remove or bury intake structures and subsurface penstock

80

40

Sheet 3

120

Poute

Staging area

•

Remove dam from east to west with access from west side of river (U/S or D/S of dam)

Remove floating boom

Location of low level outlet and initial dam breach

to on crest of spillway

Reinforce RR bridge abutments, central pier, and retaining wall/eastern dam abutment to protect railroad embankment

Railroad

Remove gate house

Dewatered canal to be filled with hydraulic dredge spoils and established as a greenway

Remove fish ladder and powerhouse and dispose of material off-site. Disconnect transmission lines.

K The State State

Dam for Kinneytown **Conceptual Dam Removal Plans**

Place toe stone at the toe of the new streambank in select reaches • if needed to protect Route 8 and the railroad embankments

Stagin

CCESS TOad This

400

Route 8

Extension of Naugatuck River Greenway

200

300

100

Sheet 4

0

Remove sewer siphon x-ings and construct new sewer interceptor along eastern stream bank and down canal to intercept with downstream sewer siphon x-ing

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Hydraulically dredge ~750,000 CY of impounded sediment and sluice down canal to Coe Pond

Approx. location of new sewer interceptor

S.C.S.

11:00

Proposed Greenway

Sheet 5

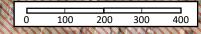
Listed EJ Community

Canal Reservoir Dam to be removed and replaced with a cascade or waterfall to accommodate the small tributary Greenway to be established through the restored site connecting the adjacent community to the Naugatuck River

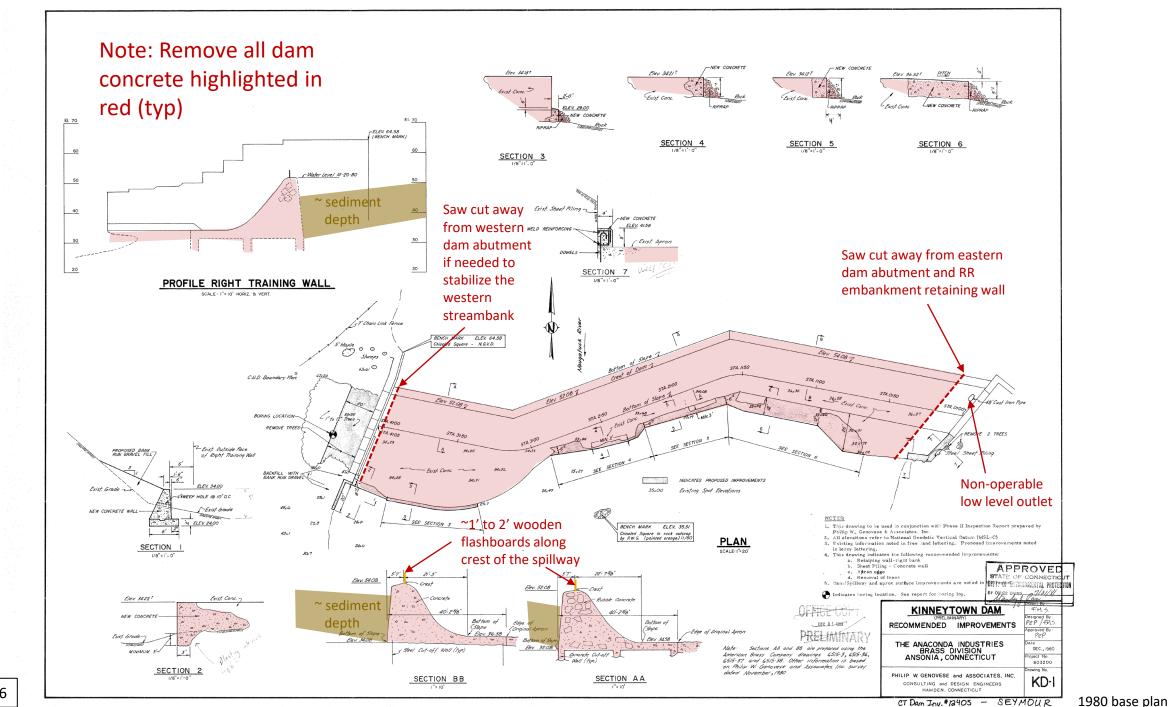
~750,000 CY of hydraulically dredge spoils to be sluiced down canal to Coe Pond. The manmade Coe Pond will be filled, capped, and restored as a solar field or park for the adjacent EJ Community.

Small tributary brook to be rerouted on the top of the fill, and cascade down to the Naugatuck River.

Listed EJ Community



Existing chain-link fencing that blocks river access to the adjacent community to be removed



Sheet 6

Anaconda Dam Removal Sediment Profile Photos Oct 2002



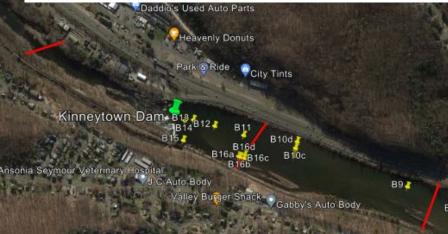
This is the layer that had a higher level of contamination that was evident on the 5 dam removals in 1999-mid 2000s. It was typically seen ~2 feet below the top of impounded sediment.



1998 Sediment Testing Results from the Upstream Dams, prior to their Removal

					1													Facial Street Days																	
	Direct Expos	sure Criteria ¹	Polutant M	obility Criteria			Tingue Dan	m - Seymour				Union City Da	am - Naugatuc	x			Platt's Mil Dam	- Seymour				Freight Street Waterburg	Dam /	Plur	ne & Attwood Dam	- Thomaston			Bray's Bu	uckie Dam - Wate	erbury		*	aconda Dam - W	sterbury
Test Parameter	Residential Area			GB Area	TG01 0-2	TG01 4'-6' TG	700	20.2 7003	7-8 700	TG05	10010-2	2 UC02 0-2	UC03 0-2	UC04	PM010-2	01.7×7 . DM	12 0-2' PMD2 2	-	2-4' PMD4	PM05	F801 0-2	F8030-2 F	-804 F805	P401 0-61	PA02 0'-9" PA	13 0'-6" PA		2 8801 5-6	8802.0-2	8802.4'-6' 88	803 0-2 8803 4-6	8804	AD01 0-2	AD02 0'-2' AD0	0-2 AD04
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Acrylonitrie	1.1	11	0.01	0.1		10					-				10		ND ND						10 10		ND	10				10				10	
Benzene Bromoform	78	720	0.02	0.2	ND	ND	ND	ND ND	ND ND	ND	ND	ND	ND	ND	ND	ND	ND NC	N	D ND	ND	ND	ND	ND ND	ND	ND	ND N	D ND	ND	NO	ND	ND ND	ND	ND	ND	
2-Butanone (MEK) Carbon tetrachioride (Tetrachioromethane	500	44	0.1	1	ND	ND ND	ND 1002	ND 1	ND ND	ND	ND	ND	ND	ND	ND	ND	ND ND	N		ND	ND	ND U.U	ND ND	ND	ND	ND N		ND	ND	ND	ND 0.00355	ND	ND	ND	40 0.00153 ND ND
Chlorobenzene Chloroform (Trichloromethane)	500	1000 940	0.12	20	ND ND	ND ND	ND ND	ND ND	ND ND ND ND	ND ND	ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	N N	D ND D ND	0.00114	ND ND	ND ND	ND 0.00111	ND ND	ND ND	ND ND	D ND D ND	ND	ND ND	ND ND	ND ND	ND	ND ND	ND	VD ND VD ND
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1,1-Dichloroethane 1,2-Dichloroethane	500 6.7	1000	1.4	14	ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND	ND	ND ND	ND ND	ND ND	ND	ND ND	N N	D ND	ND ND	ND ND	ND ND	ND ND	ND	ND ND	ND N	D ND	ND ND	ND	ND ND	ND ND	ND	ND ND	ND	4D ND 4D ND
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1,3-Dichioropropane	3.4	32	0.01	0.1	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND	ND ND	ND ND	ND ND	ND ND	ND	ND ND	N	D ND	ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND N	D ND	ND	ND ND	ND ND	ND ND	ND	ND ND	ND ND	
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Methyl Isobutyl ketone Methylene chloride (Dichloromethane) ²	500	1000	7	14																											10 10				
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1,1,2-Trichloroethane	500	1000	4 0.1	40	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	N	D ND D ND	ND ND	ND ND	ND ND		ND ND	ND ND	ND N	D ND D ND	ND ND	ND ND	ND ND	ND ND ND ND	ND ND	ND ND	ND ND	ND ND ND
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Benzo(b)fuoranthene Benzo(k)fuoranthene	1	7.8	1	1	2.216	0.372 ND	ND ND	ND ND	ND ND	1.672	0.278 ND	1.701 0.778	0.730	0.473	1.458 C	1835 4	111 0.393 289 NC	0.78	0.985 D 0.532		ND	ND C	.776	1.101	ND 0	361 N	D 0.366	0.379	0.359		0.473 1.122	0.549	0.300	0.363 1.	36 0.231 08 ND
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Dimocify pitulate 2.4-Octorophenol Rourant/Rene Rourant Heaschiorophenol Pertachiorophenol Pertachiorophenol Phenol Phenol Phenol Inorgania Subdanoes (ppm) Amanic (Ao Amanic (A Amanic (A Amanic (A Amanic (Ao Amanic (A A	27 10 4,700 2 34	8,200 10 140,000 2 1,000	2 1 5.6 5.6 1 1 5.6 1 4 80 4 4 0.006 0.005	20 4 56 56 1 1 56 1 40 800 40 40 40 40 40 40 40 40 40 40 50 50 50 50 50 50 50 50 50 50 50 50 50	NO NO NO NO NO NO NO NO NO NO NO 0.580 NO 0.580 NO 0.580 NO 0.580 NO 0.580 NO 0.580 NO 0.580 NO 0.580 NO NO NO NO NO NO NO NO NO NO NO NO NO	ND ND ND 0.257 ND ND ND ND ND ND ND ND ND 0.270 ND 0.179 0.179 ND 1.5 22.3 ND 0.4	ND 1 ND 1 A22 02 ND 1 ND 1 ND 1 ND 1 ND 1 293 1 ND 1 1.2 28.2 3 ND 1 0.3	NO 11 ND 12 218 02 218 02 NO 11 NO 1	NO N	ND ND 1.084 1.084 0 1.08 0 ND ND ND 0 0.2 ND ND 0 0.3	ND ND 0.756 ND ND ND 0.628 ND 0.512 1.0 0.512 1.0 0.512 0.512 0.512	ND ND 2.044 0.191 ND ND ND 1.725 ND 1.579 1.579 1.579 1.579 1.579 1.579 1.579 1.579 1.579	ND ND ND ND ND ND ND ND ND ND	ND ND 0.383 ND ND ND ND ND 0.522 ND 0.278 0.278 0.2 18.2 0.3	ND ND ND 1.554 0 1.554 0 0.151 ND 0.151 ND ND 1.171 0 ND 1.410 0 ND 1.1 24.7 ND ND ND	ND ND 9955 3 ND 00 9955 3 ND 00 ND 00 ND 100 100 100 100 100 100 100 100 100 10	ND ND ND ND ND ND 054 0.533 158 ND ND ND 875 0.477 3.5 ND 03 ND		In or	ntimon	jubsta ∕(Sb)				Dire	ct Expos lential ea 27	sure Crite Indust Area 8,20	eria trial a	Polluta GA,G Are 0.00	ant Mobil GAA a	GB Area	1	PM1 ND	BB2	4'-6'
Orn-excl phraste 2.4-Ok forosheni Floatse Constraintere Floatse Floats	27 10 4,700 2 34	8,200 10 140,000 2 1,000 51,000	2 1 5.6 5.6 1 1 5.8 1 4 80 4 4 0.006 0.05 1 0.004 0.005	20 20 56 1 1 58 1 40 800 40 40 40 40 40 40 40 40 40	ND ND 0.790 ND ND ND ND ND ND ND 0.580 0.580 0.5 233.0 ND 0.5 233.0 ND 0.5 233.0 ND 0.5 233.0 ND 0.5 5 233.0 ND 0.5 5 0 ND 0.5 5 0 ND 0.5 5 0 ND 0.5 5 0 ND 0.5 5 0 ND 0.5 5 0 ND 0.5 5 0 ND 0.5 5 0 ND 0.5 5 0 ND 0.5 5 0 ND ND ND ND ND ND ND ND ND ND ND ND ND	ND ND ND 0.257 0 ND 0.257 0 ND 0.257 0 ND 0.201 0 ND 0.201 0 ND 0.201 0 ND 0.179 0 ND 1.5 22.3 ND 0.4 0.4	NO NO A422 02 NO A424 02 233 A424 02 233 A424 02 A	ND 1 ND 1 218 022 NO 1 NO 1 NO 1 NO 1 NO 1 NO 1 NO 1 NO 1	ND N	NO	ND ND 07555 ND ND ND ND 0.612 0.612 0.612 0.612 0.612 0.612 0.612 0.612 0.612	ND ND ND ND ND ND ND 1.579 ND 1.579 ND 1.0 ND ND ND		ND ND 1383 ND ND ND ND ND ND ND ND 0.552 ND 0.552 0.522 0.522 0.52 0.532 0.532 0.532 0.532 0.2 0.3 0.3 0.3 0.3 0.3	ND ND ND 1.554 0 1.554 0 0.151 ND 0.151 0 ND 1.417 0 ND 1.410 0 1.410 0 1.1 24.7 ND ND ND 1.1 24.7 ND ND 1.1	ND ND 1995 3 100 1995 100 100 1995 100 100 100 100 100 100 100 100 100 10	ND ND ND ND ND ND 054 0.533 158 ND ND ND ND ND ND ND ND ND 100 0.443 ND ND ND 3.5 ND 0.8 113 20.1 20.4 ND ND ND 0.3 ND	-	Inor A	ntimon rsenic (ubsta /(Sb) As)				Dire Resio Ar	ct Expos lential ea 27 10	sure Crite Indust Area 8,20	eria trial a 00 00	Polluta GA,G Are	ant Mobil GAA a	GB Area 0.06 0.5		PM1 ND 0.006	BB2	4'-6' D D
Dimocify pheaste 2.4-Dic tronsherol Rourne Rourne Rourne Rourne Rourne Rourne Rourne Peterschorobortane Peterschorobortane Peterschorobortane Peterschorobortane Peterschorobortane Peterschorobortane Peterschorobortane Rourne R	27 10 4,700 2 34 3,900	8,200 10 140,000 2 1,000 51,000	2 1 5.6 5.6 1 1 1 4 80 4 0.006 0.05 1.3 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.5 0.	20 4 55 56 1 1 1 56 56 56 1 1 56 50 40 40 40 40 40 40 40 40 40 5 5 10 0.05	ND ND ND ND ND ND ND ND ND ND ND 0.580 0.5 9 23.0 ND 0.5 9 23.0 8 0.8 9 23.0 8 0.8 54.1	NO NO NO 0.257 0 ND 0.257 0 ND ND 0 ND 0.0 0 ND 0.270 0 ND 0.270 0 ND 1.5 22.3 ND 0.4 0.4 154.5 144.5 144.5	NO 1 NO 1 NO 1 NO 1 NO 1 NO 1 NO 1 NO 1 NO 1 NO 1 233 1 NO 1 12 232 3 NO 1 12 232 3 NO 1 12 12 12 12 12 12 12 12 12 1	ND N 1.5 2 30.4 22 ND N 0.5 0 49.7 38	NO NO S NO S NO S NO S S S S S S S S S S	ND ND 1300 ND	ND ND 0.755 ND ND ND ND ND 0.529 0.512 0.512 0.512 0.512 0.512 0.512 0.512 0.512 0.512 0.512 0.512 0.512 0.555 0.5	NO NO 2044 0.191 NO NO NO 1.675 25.9 NO NO NO NO NO NO NO NO NO NO NO NO NO	NU ND 3.559 ND ND ND ND ND ND ND ND 0.518 0.5 19.1 ND 0.5 19.1 ND 0.5 19.1 ND 0.5 19.1 ND 0.5 19.1 ND ND ND ND ND ND ND ND ND ND ND ND ND	ND ND 0.383 ND ND ND ND ND 0.522 ND 0.522 ND 0.522 ND 0.522 0.278 0.2 12 12 12 12 12 12 12 12 12 12 12 12 12	ND ND ND 1.554 0.151 ND ND ND 0.157 ND 0.157 ND 1.478 ND 1.478 ND 1.478 ND 1.470 ND 1.10 24.7 ND ND 1.1 24.7 ND ND 125.8	ND ND 1995 3 1995 3 1995 3 1995 3 1995 1995 1	ND NC NC ND NC ND NC ND NC ND NC ND ND NC ND ND NC ND ND NC ND ND ND NC ND ND ND NC ND	-	In or A A	ntimon rsenic (arium (bubsta ∕(Sb) As) Ba)				Dire Resio Ar	ct Expos lential ea 27	sure Crite Indust Area 8,20	eria trial a 00 00	Polluta GA,G Are 0.00 0.0	ant Mobil GAA a 06 05 1	GB Area 0.06 0.5 10		PM1 ND 0.006 0.35	BB2 N N 0.0	4'-6' D D 44
Dimocify pheaste 2.4-Dictionational Flourent Flo	27 10 4,700 2 34 3,900	8,200 10 140,000 2 1,000 51,000	2 1 5.6 5.6 1 1 1 5.6 1 1 4 4 4 0.006 0.05 1 0.005 1 0.005 1.3 0.25 0.015	200 4 56 56 1 1 1 55 1 40 0 0.05 0.05 0.05 0.05 0.05 0.05 0.05	ND ND ND ND ND ND ND ND ND ND 0.580 0.5 30 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.	21.5	ND 1 1.2 28.2 3 ND 1 0.3 1 17.7 4 40.0 11 15.5 2	ND ND N 1.5 2 30.4 22 ND N 0.5 (1) 49.7 33 14.9 99 20.5 11	AL NL NL NC ND NC ND NC ND ND ND <	ND ND 1.300 ND ND 1.034 ND 1.054 ND ND ND 1.054 N	ND ND 0.755 ND ND ND ND ND 0.623 0.612 0.6	ND 1.0 25.9 ND ND 21.1 1054 24.5	0.5 0.7 19.1 ND 0.5 18.8 76.0 77.0	ND ND ND ND ND ND ND ND ND ND ND ND ND N	0.151 ND ND 1.478 ND 1.410 ND 1.410 ND 1.410 ND 1.410 ND 1.410 ND 1.410 ND 1.410 ND ND 1.410 ND ND 1.410 ND ND ND 1.410 ND ND ND 1.410 ND ND ND 1.410 ND ND ND 1.410 ND ND ND ND ND ND ND ND ND ND	ND ND 9956 3 3 10 10 10 10 10 10 10 10 10 10 10 10 10	NO NC NC NO NC NC NO NC NC 158 351 353 158 NC NC NO NC NC NO NC NO 03 NC 03 22.6 40.2 35.7 31.9 36.0 36.0	-	In or A A	ntimon rsenic (bubsta ∕(Sb) As) Ba)				Dire Resio Ar	ct Expos lential ea 27 10	sure Crite Indust Area 8,20 1 140,00	eria trial a 00 00	Polluta GA,G Are 0.00	ant Mobil GAA a 06 05 1	GB Area 0.06 0.5 10 0.04		PM1 ND 0.006	BB2 N N 0.0	4'-6' D D
Dimecty phtuate 2.4-Ok toroshenol Rournitene Rourni Rournitene Rourni Rournitene Rourni Rournitene Petrol Petrol Petrol Petrol Petrol Rournite Rour	27 10 4,700 2 34 3,900	8,200 10 140,000 2 1,000 51,000	1 1 5.6 1 4 80 4 4 0.006 0.05 0.05 1.0 0.005 1.3 0.005 1.3 0.005	1 1 56 800 40 0.06 0.5 10 0.04 0.05 10 0.04 0.05 13 2 2 0.15 0.02	ND ND ND ND ND ND ND ND ND ND ND ND ND N	21.5 0.03 19.3	ND 1 1.2 28.2 3 ND 1 0.3 1 17.7 4 40.0 11 16.6 2 ND 0 10.2 1	ND ND N 1.5 2 30.4 21 ND N 0.5 0 49.7 30 49.7 30 49.7 30 20.5 18 0.03 0. 14.9 99	Lo NO MD NO MD NO 209 0.343 209 0.344 ND NO 0.5 0.5 9.5 1356 8.9 1366 8.9 1366 8.3 122 0.018 0.018	NO NO 1.300 NO NO 1.054 NO </th <th>NO NO 0.755 ND ND ND ND 0.528 ND 0.512 10 0.7 25.5 ND 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8</th> <th>ND 1.0 25.9 ND 21.1 105.4 24.6 ND 13.0</th> <th>0.5 0.7 19.1 ND 0.5 18.8 76.0 77.0 0.03 14.0</th> <th>ND ND ND ND ND ND ND ND ND ND ND ND ND N</th> <th>0.151 ND ND 0.157 ND 1.478 ND 1.478 ND 1.410 24.7 ND 27.5 125.8 5 105.9 0.02 127.7</th> <th>ND ND 1995 32</th> <th>0.3 ND 32.6 40.1 25.7 176.3 31.9 38.0 ND 0.02 19.9 12.3</th> <th>-</th> <th>Inor A B</th> <th>ntimon rsenic (arium (</th> <th>Gubstan ∕(Sb) As) Ba) ∩(Be)</th> <th></th> <th></th> <th></th> <th>Dire Resio Ar</th> <th>ential ea 27 10 700</th> <th>sure Crite Indust Area 8,20 1 140,00</th> <th>eria trial a 00 00 2</th> <th>Polluta GA,G Are 0.00 0.00 0.00</th> <th>ant Mobil GAA a D6 D5 1 D4 D5</th> <th>GB Area 0.06 0.5 10 0.04 0.05</th> <th></th> <th>PM1 ND 0.006 0.35</th> <th>BB2 N 0.0</th> <th>4'-6' D D 2 44 D D</th>	NO NO 0.755 ND ND ND ND 0.528 ND 0.512 10 0.7 25.5 ND 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8	ND 1.0 25.9 ND 21.1 105.4 24.6 ND 13.0	0.5 0.7 19.1 ND 0.5 18.8 76.0 77.0 0.03 14.0	ND ND ND ND ND ND ND ND ND ND ND ND ND N	0.151 ND ND 0.157 ND 1.478 ND 1.478 ND 1.410 24.7 ND 27.5 125.8 5 105.9 0.02 127.7	ND ND 1995 32	0.3 ND 32.6 40.1 25.7 176.3 31.9 38.0 ND 0.02 19.9 12.3	-	Inor A B	ntimon rsenic (arium (Gubstan ∕(Sb) As) Ba) ∩(Be)				Dire Resio Ar	ential ea 27 10 700	sure Crite Indust Area 8,20 1 140,00	eria trial a 00 00 2	Polluta GA,G Are 0.00 0.00 0.00	ant Mobil GAA a D6 D5 1 D4 D5	GB Area 0.06 0.5 10 0.04 0.05		PM1 ND 0.006 0.35	BB2 N 0.0	4'-6' D D 2 44 D D
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Recent Sediment Probes and Screening Level Sampling within the Kinneytown Dam Impoundment



Perry Painting Services K

Nickie O'Toole, Nic

KTD-1 (A=C) 1

B5⁴B4²B3²B2²B¹

КТD-2 (А,В)в62

Van Etten Plumbing & Heating

Craven Nesteruk L





Ralph E Hull Funeral Home

Tingue Bypass Fishway

Wendy's

Kerite Dam Remo

French Memorial

Likely upper extent of impounded sediment.

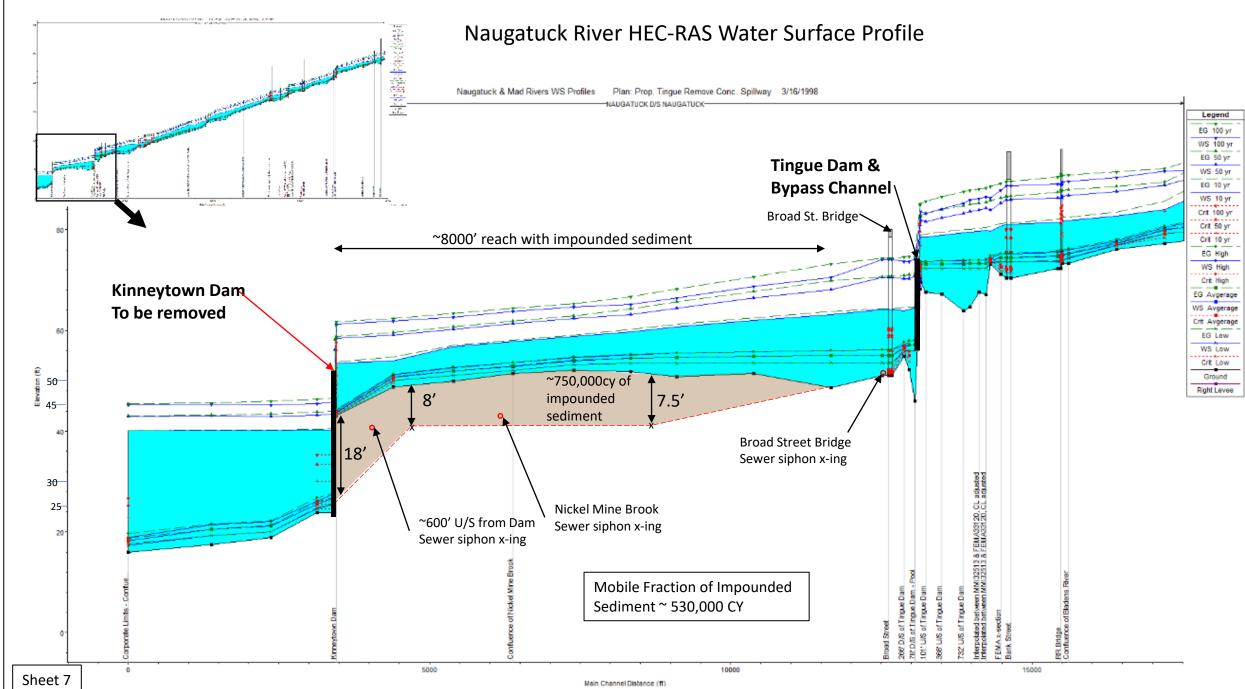
Whittemore Ice Cream

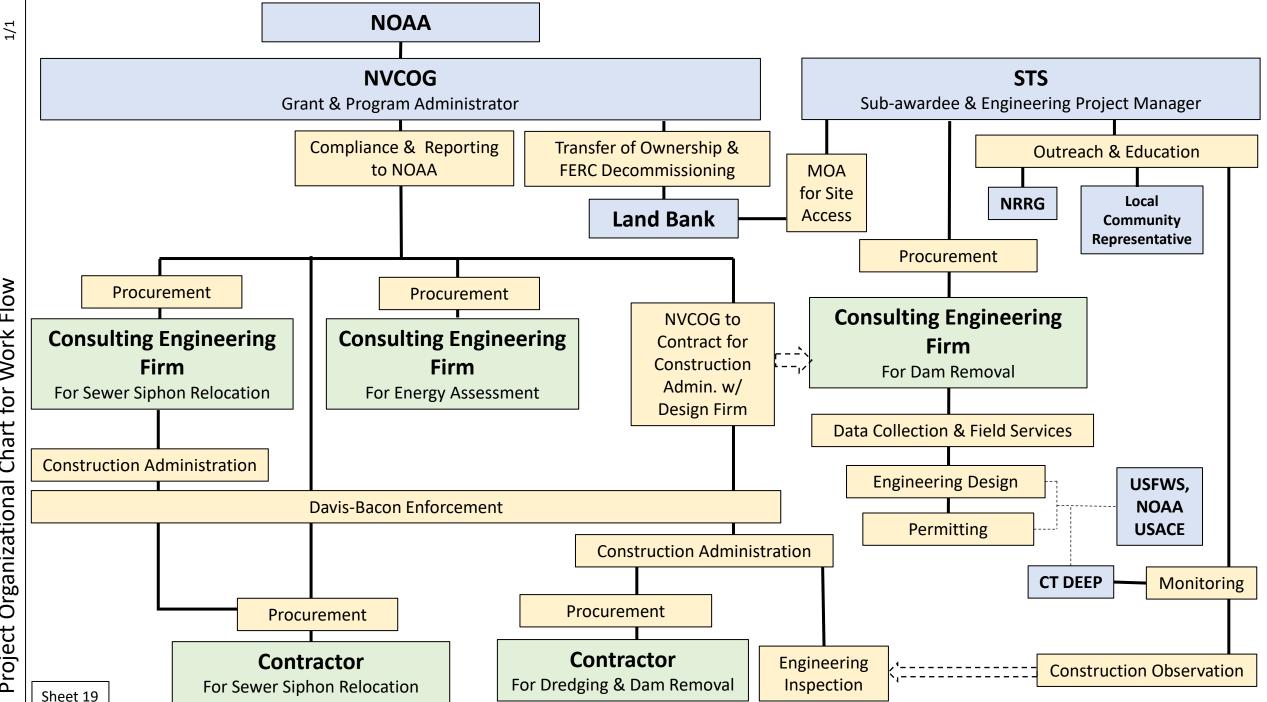
ymour Community Center

Zois Pizza Palace Tea With Tracy Stop & Sh

Organize TuppStyle with Mellisa Arnold-Mullins Clipping Homes Ltd | Photo Editing Company

Tina Marie Photography





Flow Chart for Work Organizational Project

River Name: Naugatuck River

Location: Seymour, CT

	Tel	Quantity (low estimate)	Quantity (high Estimate)				Cost Alt 2 (high actimate	
ask # 1	Task Mobilization/Demobilization Dam Removal	estimate)	Estimate)	1 6	Unit	Cost Alt (low estimate) \$ 1.000.000.00	Cost Alt 2 (high estimate	0 Dam Removal mob/demob is based off 5% on the total before contingency
2	Mobilization/Demobilization Hydraulic Dredge			1 6		\$ 1,000,000.00		0 Hydraulic dredge mobilization/demob is \$3.3million and is site-specific
3	Stakeout Survey			1 1		\$ 150,000.00		
4	Install E&S Controls	15,000	15.0			\$ 105,000.00		0 ~\$7/LF for low end; ~\$8/LF for high end
5	Install Eds Controls Install Site Access Controls (i.e. blaze orange fencing and signage)	15,000	15,0	1 1		\$ 25,000.00		
6	Install Eastern and Western Access Roads			2 6		\$ 35,000.00		0 Access to edge of water
7	Clearing & Grubbing			1 1		\$ 50.000.00		
8	0 0		1	1 1		+ 00,000,000	+	0 Assumes installation of temp. gate
	Electrical Disconnection		1	1 1		+		
9	Replace or Modify Low Level Outlet Sluice Gate for use during Dredging and Dam Removal (if needed)					+		0 Assumes installation of temp. gate
10	Relocation of 2 Sewer Siphons and Construction of New Sewer Interceptor		L	1 1		\$ 2,920,000.00		0 Based on a more detailed budge provided to NVCOG by local contractors and Black & Veach
11	Remove Gate House at Upstream end of Canal	1	1	1 1		\$ 40,000.00		0 Assumes no hazardous materials
12	Preparation of Canal and Coe Pond for Transport and Disposal of Hydraulic Dredge Spoils	1	1	1		\$ 50,000.00		0 Assume dewatering and straw wattles
13	Coordination with DOT and RR (as needed)	1	1	1		\$ 100,000.00		0 Includes force account deposit for subervision from RR when work withing the RR ROW is ongoing
14	Install Maintenance of Traffic signage as needed for RR crossing	1	-	1		\$ 5,000.00		
15	Monitor upstream embankments when dewatering impoundment	1	-	1		\$ 3,500.00	\$ 5,000.0	
16	Remove Floating Boom from Upstream of Dam	1	1	1		\$ 10,000.00	\$ 10,000.0	
17	Water Control (including removal of flashboards)	1	1	1	LS	\$ 100,000.00	\$ 150,000.0	0 Assume work can be done in the wet without a cofferdam
18	Sediment Management Option #1: Hydraulic Dredge and Sluice Spoils into Coe Pond	316,213		423 (\$ 7,570,139.22		channel (~49ac) is hydraulically dredged and sluiced into Coe Pond (over 3.5 to 4.5 months); High end assumes ~70% of the to amount of sediment is dredged based on hydrauic cross sections to determine potentially mobile sediment over 5.5 to 7.5 mo Could get hydraulic dredging permitted quickly to start dredging in year 2.
21	Remove fish ladder (off site disposal)	300	_	_	СҮ	\$ 75,000.00		
22	Remove powerhouse & all Appurtenance Facilities (off site disposal)	1	·	1		\$ 150,000.00		0 Assumes some level of remediation (remediation alone was \$125K on Saccarrappa)
23	Sawcut Spillway on Eastern & Western Ends		-	2 8		\$ 90,000.00	+	-
24	Repair and Stabilize Eastern Spillway Abutment	1	-	1		\$ 50,000.00		0 High end include some concrete facing work
25	Stabilize Railroad Bridge Abutments and Central Pier	1		1		\$ 50,000.00		0 Assume bridge will be dewatered post removal and that there is a concrete apron beneath the bridge
26	Remove Kinneytown Dam Spillway (moving from east to west)	9,000	9,0	000		\$ 1,350,000.00		
27	Remove Timber Cribbing U/S of Kinneytown Dam	1	1	1		\$ 75,000.00		
28	Remove/Bury Remaining Structures From Eastern Bank (i.e. retaining walls, tailraces, penstock, etc.)	1	1	1 1		\$ 250,000.00	\$ 350,000.0	
29	Remove or stabilize through burial the Canal Reservoir Dam	1	1	1		\$ 40,000.00	\$ 75,000.0	
30	Remove Canal Reservoir Dam Powerhouse	1	1	1		\$ 100,000.00	,	Assumes some level of remediation (remediation alone was \$125K on Saccarrappa)
31	Cap former Coe Pond Sites (to protect the public from dredge spoils)	1	1	1		\$ 6,000,000.00		Includes orange demarcation layer, 1ft sand, 6" topsoil (for canal and pond)
32	Restore former Coe Pond & Canal Sites	1,760,000	1,760,0	000	SF	\$ 224,400.00	\$ 250,000.0	0 Assumed just seeding here
33	Restore Tributary through former Coe Pond site and construct waterfall feature at former Canal Reservoir Dam site	1	1	1		\$ 400,000.00	• • • • • • • • • • • • • • • • • • • •	0 Not sure what this would look like but assumed a stone lined channel
34	Construct Greenway through canal and former Coe Pond site	1	1	1	LS	\$ 150,000.00	\$ 200,000.0	0 Assume gravel path
35	Construct Pedestrian River Access through former Coe Pond site to Naugatuck River (under active railroad track)	1	1	1		\$ 70,000.00		0 Stairway under RR Bridge and along side manamade waterfall/cascade
36	Invasive Species Management	1	1	1	LS	\$ 50,000.00	\$ 150,000.0	0 Just invasive plant control during construction
37	Place Stabilization on Eastern and Western Toe of Streambank Upstream to Stabilize RR and Route 8 as needed	1,000	2,0	000 1		\$ 400,000.00		0 Estimated quantity
38	Restore access routes/staging areas as needed	1	1	1 l		\$ 150,000.00	\$ 200,000.0	0
39	Topsoil	1	1	1 l	LS	\$ 400,000.00	\$ 500,000.0	0 Most of the topsoil is carried in the Coe Pond item
40	Seed	1	ı	1	LS	\$ 50,000.00	\$ 100,000.0	Most of the seed is in the Coe Pond item as I believe much of the impondment will revegatate on it's own; assumes no addit 0 plantings
41	As-built Survey	1	1	1 1		\$ 50,000.00		Assume LIDAR drone survey
42	Remove E&S controls post site stabilization	15.000	30	000 1		\$ 75.000.00		

\$

\$ 25,773,039.22	\$ 36,277,266.62	Estimate of Base Cost Range
\$ 5,154,607.84	\$ 7,255,453.32	20% Contingency
\$ 30,927,647.06	\$ 43,532,719.94	Estimate of Construction Cost Range

10,623,480.00 \$ 15,156,000.00 Estimate of Construction Cost Range without the Sediment Work (which we assume will be covered by EPA grants)

Assumptions

Impounded sediment: Mechanical dredging and trucking to an approved disposal facility has been eliminated as an option due to the extreme cost and unlikely chance that a suitable disposal site could be found to take that much sediment; Low estimate is a partial hydraulic dredge of the first 4 feet of sediment sluiced into Coe Pond, with capping and restoration of the former Coe Pond site. High estimate is hydraulic dredge of the likely mobile fraction of the impounded sediment.

Dewatered streambed upstream will not require restoration work and will be allowed to stabilize and vegetate passively Dewatered streambed upstream will not require restoration work and will be allowed to stabilize and vegetate passively Dewatered streambed upstream will be relocated down Hear Segment WS00966104 Funding Opportunity Number: NOAA-NMFS-HCPO-2022-2007195 Red text are tasks associated with sediment management

Scope, Responsibilities, & Timeline with Milestones

				\square				2023					\square				\square		2024		\square	\square							2025			_	\square
	Responsible Party A NVCOG	Assistance By	Jan	Feb	Mar A	Apr May	May Jun	Jul	Aug	Sep	Oct N	Nov Dec	lec Jan	an Feb	o M	Mar Api	pr M	May Jun	un Jul	Aug	Sep	Oct	Nov Dec	Dec Jan	an Feb	Mar	Apr	May J	Jun Jul	Jul Aug	Aug Sep	Oct	Νον
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Grant Reporting Project Meetings	+NVLUG	+						47	A				AT								A	A	Anny			A	Any	A				Any	A
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Property Access Coordination		+						4	4					\rightarrow							\rightarrow	<u> </u>	+	\rightarrow			4	4				4	4-
	NVCOG		4					4	4	4	4										4	4	4			4	4-	4 r				4	4
Coordination with Dam Owner					4			4—		'	++		-+								<u> </u>		+	-+			<u> </u>	- '	+				\rightarrow
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Project Management for Engineering	STS	1																									- - '	- <u>-</u> -					
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		NRRG, NVCOG																															
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		+			++				+	+	+	, — — —			-	. — —					+	+	+			4	\rightarrow	++	+			+	
Envisioning Charettes with Local Communities (including River Access	a	1		· · ·	- I	1					1					.								1			· · ·	- I	1				
and Park idea for the underserved community around Coe Pond)	STS/NVCOG	1		· · ·	- I	1				1	1 1	.					.	. 1						1				- I					
Educational Workshops (2) (for NGO's, Conservation Corps, Interns,		+		_	+	+		4	+	+'	+-+		-+			· — — – ·					+	+	+			+	+	+	++				+
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early career professionals, underserved communities, policy makers,		1		· · ·	- I	1					1					.											· · ·	- I	1				1
	STS	+		· · ·	\rightarrow	+		——				_		-+	+					-+-	<u> </u>	—	+			—	<u> </u>	+	++				+-
	STS/NVCOG	+		4		+					4																'		+				_
	NVCOG																											4					
River Clean-up Events (3)	NRRG S	STS	·	'					4	- '												_					- - '						_
Documentary Film by NRRG (highlighting history, fisheries,	- [1				1		47													47								4				4
collaborative process, analysis, removal, restoration, and monitoring)	a) //	1				1		47																									
	STS		·	'						'		·															'	P					4
		STS, NVCOG		'						'					<u> </u>												'		<u> </u>				
Dam Removal Analysis & Design	Consulting Firm (TBD) S	STS & NVCOG oversight	ant																														
	Consulting Firm (TBD) S			'						· '		·		_					_	_					_		'	_ <u>[</u> '					
	Consulting Firm (TBD) S																										'						
	Consulting Firm (TBD) S					4							1								T	T				T	' T'					T	
Regular Update Meetings/Calls	Consulting Firm (TBD) S	STS & NVCOG oversight	ight																								'						
Data Collection / Field Work	Consulting Firm (TBD) S	STS & NVCOG oversight	ight	· · · ·						· · · · · · · · · · · · · · · · · · ·																	· † '	· []					
Collection & Review of Existing Data	Consulting Firm (TBD) S	STS & NVCOG oversight	ight		▲	1			+	· † _ ·		·															· 十二 ·	· [·					<u>†</u> _
Monitoring Plan	Consulting Firm (TBD) S	STS & NVCOG oversight	ight			1		+	+	+											+	+	+			+	+	+				+	+
QAPP	Consulting Firm (TBD) S								+	+											+	+	+			+	+	+				+	+
Wetland & Regulated Resource Delineation	Consulting Firm (TBD) S	STS & NVCOG oversigh	eht .						+	+		,				. —					+	+	+			+		+					+
Utilities Investigation	Consulting Firm (TBD) S	STS & NVCOG oversigh	oht					+	+	+		. — —									+	+	+			+	+	+				+	+-
	Consulting Firm (TBD) S											. — — —				. — — —	. — — —						+	-			++	++					+
	Consulting Firm (TBD) S							+	+	+	+	. — —				. — —					+	+	+	-		+	+	++	+			+	+
Bathymetric Survey	Consulting Firm (TBD) S	CTC & NVCOG oversig							+	+	+	, — — —				. — —					+	+	+	-			\rightarrow	++	+			+	+
Sediment Sampling Plan (& CT DEEP Signoff) (includes 4	+ Consulting mini (100)	-315 & NVCOG OVC.00						—	+-	+'	+-+	.——				. — — —					+-	+	+			+	+	++	+-+			+	+-
	Consulting Firm (TBD) S	CTC 9. NIVCOG oversig			🖌 – L	1					1					.								1			· · ·	- I	1				
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Mechanical Borings & Sediment Sample Collection (both	(TRD)		· · ·	P								.				.	.										· · ·	- [1				
	Consulting Firm (TBD) S									'	++	<u> </u>	-+		-+								+				- -'		+				+
	Consulting Firm (TBD) S	STS & NVCOG oversign							<u> </u>	'	++	<u> </u>	\rightarrow	-+							<u> </u>	<u> </u>	+			<u> </u>	- - '	- '	++				+
Sediment Lab Analysis (physical and chemical) & Comparison to Criteria		1		· · ·	- I					1	1 1	.					.	. 1						1				- I					
Critoria	Consulting Firm (TBD) S	STS & NVCOG oversign	<u></u> :	'		+		_		'	++		-+		+		+							-+			<u> </u>	- - '	+				+
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Historic & Archeological Report (update 1999 report and make		ICTC 9 NIVCOC outprelant	, it						<u> </u>	'							<u> </u>	<u> </u>			<u> </u>			<u> </u>			<u> </u>	I	+			·	\rightarrow
Historic & Archeological Report (update 1999 report and make and Section 106 recommendations)	Consulting Firm (TBD) S	1313 & NVCOG OVERSIE.			- E - E	1					- I - I -					.	.										· · ·	- [1				
Historic & Archeological Report (update 1999 report and make and Section 106 recommendations) Natural Diversity Database Check for know Rare, Threatened, and	d			and the second se		· · · ·												1	1	1				1				1 1	1 1	1			
Historic & Archeological Report (update 1999 report and make and Section 106 recommendations) Natural Diversity Database Check for know Rare, Threatened, and Endangered Species	d Consulting Firm (TBD) S	STS & NVCOG oversight								I		' <u> </u>				`	·			_									· · · · · · · · · · · · · · · · · · ·				
Historic & Archeological Report (update 1999 report and make and Section 106 recommendations) Natural Diversity Database Check for know Rare, Threatened, and Endangered Species Set Photo Points	d Consulting Firm (TBD) S Consulting Firm (TBD) S	STS & NVCOG oversight STS & NVCOG oversight	ight	\vdash				+	-	+	+	' <u> </u>	\pm			` <u> </u>	<u> </u>		_				+					+	+	<u> </u>		\pm	
Historic & Archeological Report (update 1999 report and make and Section 106 recommendations) Natural Diversity Database Check for know Rare, Threatened, and Endangered Species Set Photo Points Set Monitoring Monuments	d Consulting Firm (TBD) S	STS & NVCOG oversight STS & NVCOG oversight	ight	E			-	-	<u> </u>	+	+	' <u> </u>	+	+	+	` <u> </u>	-	_	+	<u> </u>	ŧ	ŧ	+=+	\pm	Ŧ	t	ŦĘ,	=		-		ŧ	Ŧ
Historic & Archeological Report (update 1999 report and make and Section 106 recommendations) Natural Diversity Database Check for know Rare, Threatened, and Endangered Species Set Photo Points Set Monitoring Monuments Ground Penetrating Radar to Identify Underlying Riverbed and	d Consulting Firm (TBD) S Consulting Firm (TBD) S Consulting Firm (TBD) S	STS & NVCOG oversight STS & NVCOG oversight STS & NVCOG oversight	ight ight	ŧ		+		+	+	ŧ	+	<u> </u>	=	#	=		=	+	+	+	+	+	++	7	+	+	\mp	F	\square	=	=	+	Ŧ
Historic & Archeological Report (update 1999 report and make and Section 106 recommendations) Natural Diversity Database Check for know Rare, Threatened, and Endangered Species Set Photo Points Set Monitoring Monuments Ground Penetrating Radar to Identify Underlying Riverbed and	d Consulting Firm (TBD) S Consulting Firm (TBD) S	STS & NVCOG oversight STS & NVCOG oversight STS & NVCOG oversight	ight ight	ŧ		ŧ	<u> </u>	ŧ	+	ŧ	=	<u> </u>	+	<u> </u>	=		=	+	=	=	Ŧ	Ŧ	Ħ	=	=	Ŧ	\mp	Ŧ	Ħ	=	<u> </u>	ŧ	Ŧ

Engineering Analysis	Consulting Firm (TBD	STS & NVCOG oversight																				
Alternatives Analysis of Dam Removal Options	Consulting Firm (TBD)	STS & NVCOG oversight																				
Alternative Energy Analysis (solar replacement)	Consulting Firm (TBD)	STS & NVCOG oversight																				
Sediment Transport/Mobility Analysis	Consulting Firm (TBD)) STS & NVCOG oversight																				
· · · ·																						
Geomorphic Channel Assessment (with substrate characterizatio	on) Consulting Firm (TBD)	STS & NVCOG oversight																				
Sediment Management Plan (with LEP)		STS & NVCOG oversight								-		-				 					_	
		j 515 a treed oversight			_																	
Streambank Stability Analysis (for Route 8 and RR embankments)) Consulting Firm (TRD)	STS & NVCOG oversight																				
Hydrologic Analysis		STS & NVCOG oversight														 						
Hydraulic Analysis Hydraulic Analysis (Water surface profile modeling and	Consulting Firm (TBD)	313 & NVCOG OVErsight						-	 	_						 			_			
assessment of flood impacts/attenuation)	Consulting Firm (TDD)	STS & NVCOG oversight																				
																 	-		_			
Fish Passage Assessment) STS & NVCOG oversight								_						 			_			
Well Impact Assessment) STS & NVCOG oversight					_									 						
Environmental Assessment of Impacts) STS & NVCOG oversight																				
Broad Street Bridge & RR Bridge Scour Assessment) STS & NVCOG oversight																				
Engineering Design) STS & NVCOG oversight																				
Project Design Renderings) STS & NVCOG oversight																				
Invasive Species Management Plan) STS & NVCOG oversight																				
Restoration & Planting Plan) STS & NVCOG oversight																				
Preliminary Engineering Design Plans) STS & NVCOG oversight																				
Preliminary Basis of Design Report) STS & NVCOG oversight																				
Preliminary Engineers Estimate of Probable Cost (with Contractor																						
Input/Review)) STS & NVCOG oversight																1				
Preliminary Technical Specifications	Consulting Firm (TBD)) STS & NVCOG oversight																				
									1													
Final Design Plans (includes E&S, construction sequencing, profil																						
x-sections, sediment depths, restoration plan, planting, invasive																						
species management, details, notes, etc)	Consulting Firm (TBD)	STS & NVCOG oversight																				
Final Basis of Design Report		STS & NVCOG oversight															+ +					
Final Engineer's Estimate of Probable Cost) STS & NVCOG oversight						-		-									-			
Final Bid Package (Front end and technical specifications) with Bi		j bib a tree o oversigne																				
Form & Quantities		STS & NVCOG oversight																				
Monitoring Recommendations		STS & NVCOG oversight								-												
	Consulting Firm (TBD)	j 313 & WCOO OVEISIGHT														 	+ +					
Revision of Bid Documents (plans, report, cost and bid package based on regulatory input and final permits)	Conculting Firm (TRD)	STS & NVCOG oversight																				
Permitting) STS & NVCOG oversight) STS & NVCOG oversight								_							-		_			
		STS & NVCOG oversight		 		_	_		 							 	-		_			
Coordination with Resource Agencies NEPA (utilizing NOAA's PEIS for restoration)										_							-		-			
) STS & NVCOG oversight				_	_									 	_		_			
Initial Regulatory Consultation (3)) STS & NVCOG oversight								_							-		_			
Pre-Application Meetings (3)	Consulting Firm (TBD)) STS & NVCOG oversight														 			_			
State Permits (Dam Safety, Fisheries Review, Remediation Review	w,																					
401, Diversion, Flood Management, Stormwater, etc)																						
	Consulting Firm (TBD)) STS & NVCOG oversight		 							eview Period					 			_			
ACOE Permit) STS & NVCOG oversight		 						Permit R	eview Period											
Local Permits (may have stormwater review, flood management,																		1				
etc)) STS & NVCOG oversight								Permit R	eview Period					 	+					
Public Meetings (2)	Consulting Firm (TBD)) STS & NVCOG oversight				_				_						 	+					
Section 106 Consultation	-	-								_						 			_		_	
Permit Close Out Requirements) STS & NVCOG oversight																				
Bid Assistance	Consulting Firm (TBD)) STS & NVCOG oversight						-									+		_		_	
Respond to Contractors Questions Re: Design and Bid Package																		1				
) STS & NVCOG oversight																				
Review Bids & Make Recommendations) STS & NVCOG oversight																				
Assist with Negotiations for Construction Costs	Consulting Firm (TBD)) STS & NVCOG oversight												Contra	t							
Construction Management	Consulting Firm (TBD)) STS & NVCOG oversight																				
Construction Management	Consulting Firm (TBD)) STS & NVCOG oversight																				
Construction Oversite/Inspection Services	Consulting Firm (TBD)) STS & NVCOG oversight																				
Review & Approve Submittals	Consulting Firm (TBD)) STS & NVCOG oversight																				
Weekly Construction Meetings		STS & NVCOG oversight																				
Construction Close Out		STS & NVCOG oversight																				
Regulatory Close Out		STS & NVCOG oversight							1									1				
Bidding Administration	NVCOG	STS																				
Bidding Administration																						
Construction/ Dam Removal & Restoration (See detail of final tab)	Contractor (TBD)	STS and NVCOG Oversig	aht																			
	contractor (100)	oro and weed oversig																				
Hydraulic Dredge												Ass	sumes: dredging permitt	ted separate	ely up front							
Dam Removal Construction																						
Pre-, During, and Post-Removal Monitoring (with Development of																						
Monitoring Plan)	STS																					
Monitoring																						

Assumption: This assumes the award will be granted in 2022 with enough time to put the engineering out to bid and select and engineering firm to start work on January 1, 2023

The timeline is dependent on receiving funding for the entire project and on the final sediment management plan, as approved by the regulators.

Kinneytown Dam Removal Project Timeline