COMMONWEALTH OF MASSACHUSETTS
HIGHWAY DEPARTMENT

SCOPING WORKBOOK Form 1.3 Work Hour Estimate

City/Town	**Acton/Westford/Carlisle/Concord**	Contract No.:	
Location:	**BFRT Phase 2A and Phase 2C Final Design**	Assignment No.:	
Bridge No.:		ProjInfo No.:	**604532/605189**

SECTION 100
PROJECT DEVELOPMENT ENGINEERING
PROJECT TYPE CODE: -- PROJECT DESCRIPTION:

		PIC	PM	SE	Eng	AE	ET	TOTAL
101	Project Concept Preparation							
102	Preliminary Project Area Analysis							
103	Reasonable Alternative(s) Identification							
104	Alternatives Analysis & Report Preparation							
	SUBTOTAL							

SECTION 150
ENVIRONMENTAL

		PIC	PM	SE	Eng	AE	ET	TOTAL
151	Early Coordination							
152	Hist./Arch. Impacts (Section 106 and Chapter 254)		4		4			8
153	MESA Determination							
154	Hazardous Materials Research/Review							
155	Project Development Meetings and Hearings							
156	NEPA/MEPA Determination							
157	NEPA - Categorical Exclusion (CE)		2		2			4
158	NEPA - Environmental Assessment (EA)							
159	NEPA - Draft Environmental Impact Statement (EIS)							
160	NEPA - Final Environmental Impact Statement (EIS)							
161	NEPA - Supplemental Environmental Impact Statement (EIS)							
162	NEPA - Reevaluation							
163	MEPA - Environmental Notification Form (ENF)	2	8	40	64	24	24	162
164	MEPA - Draft Environmental Impact Report (DEIR)							
165	MEPA - Final Environmental Impact Report (FEIR)							
166	MEPA - Notice of Project Change (NOPC)							
167	MEPA - Supplemental Environmental Impact Report (SEIR)							
168	MESA/NOI Streamlined Review							
169	MESA - Conservation and Management Permit							
170	USACE Section 404 Programmatic General Permit (PGP)							
171	USACE Individual Section 404 Permit							
172	U.S. Coast Guard Bridge Permit							
173	Programmatic Section 4(f) Evaluation							
174	Draft Individual Section 4(f) Evaluation							
175	Final Individual Section 4(f) Evaluation							
176	Wetland Resource Area Delineation							
177	Wetlands Protection Act (WPA) ANRAD							
178	WPA - Request for Determination of Applicability							
179	WPA - Notice of Intent (NOI)	6	16	60	180	94	56	412
180	WPA - Variance							
181	Chapter 91 License/Permit Application		2	4	12	12	16	46
182	Water Quality Certification (401)							
183	Coastal Zone Management Consistency Certificate							
184	Wildlife/Rare Species Assessment							
185	Essential Fish Habitat Assessment							
186	Coordination and Liaison	4	12	24	8			48
	SUBTOTAL	12	44	128	270	130	96	680

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SECTION 200

FUNCTIONAL DESIGN REPORT (FDR)

		PIC	PM	SE	Eng	AE	ET	TOTAL
201	Evaluate Existing Conditions							
202	Traffic Count Analysis							
203	Safety Analysis							
204	MUTCD Signal Warrants							
205	Intersection Analysis							
206	Proposed Geometrics							
207	Report Preparation							
	SUBTOTAL							

SECTION 220

DESIGN EXCEPTION REPORT

		PIC	PM	SE	Eng	AE	ET	TOTAL
221	Evaluate 13 Controlling Criteria (PDDG Ch. 2)		2	4	8	4		18
222	Perform Incremental Evaluation		4	8	16	8		36
223	Prepare Narrative/Report	2	4	4	16	4	4	34
	SUBTOTAL	2	10	16	40	16	4	88

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SECTION 300

25% HIGHWAY DESIGN SUBMISSION

		PIC	PM	SE	Eng	AE	ET	TOTAL
301	Project Initiation and Data Compilation							
302	Utility Coordination							
303	Survey Coordination and Controls							
304	Base Plans, Profiles and Typical Sections							
305	Field Reconnaissance							
306	Plot Existing Layout Lines							
307	Meetings and Liaison							
308	Determine Roadway Cross Section							
309	Preliminary Horizontal Geometry							
310	Preliminary Vertical Geometry							
311	Cross Section Studies							
312	Prepare Cross Sections							
313	Plot Proposed Layout and Easements							
314	Pavement Design							
315	Typical Sections							
316	Construction Details							
317	Hydrological Studies and Hydraulics Report							
318	Preliminary Drainage and Utility Studies							
319	Lane Configuration							
320	Traffic Signals							
321	Signs and Pavement Markings							
322	Traffic Management							
323	Early Environmental Coordination							
324	Constructability Review							
325	Quality Control (QC) Review							
326	Preliminary Construction Estimate							
327	Submission Check List							
328	Modifications and Revisions							
329	Value Engineering (VE)							
	SUBTOTAL							

SECTION 350

DESIGN PUBLIC HEARING

		PIC	PM	SE	Eng	AE	ET	TOTAL
352	Hearing Preparation		8		16		48	72
353	Design Public Hearing	4	8	16				28
	SUBTOTAL	4	16	16	16		48	100

COMMONWEALTH OF MASSACHUSETTS
HIGHWAY DEPARTMENT

SCOPING WORKBOOK Form 1.3 Work Hour Estimate

City/Town	**Acton/Westford/Carlisle/Concord**	Contract No.:	
Location:	**BFRT Phase 2A and Phase 2C Final Design**	Assignment No.:	
Bridge No.:		ProjInfo No.:	**604532/605189**

SECTION 400

75% HIGHWAY DESIGN SUBMISSION

		PIC	PM	SE	Eng	AE	ET	TOTAL
401	Response to 25% Comments	6	24	32	32	28	18	140
402	Field Reconnaissance		20		72	72		164
403	Meetings, Liaison and Coordination (6 meetings)	24	32	56				112
404	Utility Coordination	2	16	24	24	20		86
405	Final Horizontal Design Geometrics	6	20	32	28	84	52	222
406	Final Vertical Design Geometrics	4	16	36	28	80	48	212
407	Pavement Design		4	2	4			10
408	Typical Cross Sections			6	12	16	2	36
409	Plot Cross Section	4	12	20	104	172	140	452
410	Plot Proposed Layout and Easements		12	8	16			36
411	Construction Plans	6	12	18	36	102	60	234
412	Grading & Tie Plans		6	20	16	16		58
413	Drainage and Water Supply Details	2	16	32	48	36	46	180
414	Preliminary Traffic Signs			16	16			32
415	Guide Sign Design & Overhead Directional Elevations							
416	Traffic Signals and Plan Preparation	4	6	16	40	64	58	188
417	Pavement Markings and Plan Preparation		8	28	28	28		92
418	Traffic Management and Suggested Sequence of Construction		4	8	10	6		28
419	Highway Lighting Plans and Details							
420	Landscaping and Plan Preparation		16	28	20	8	76	148
421	Erosion Control Plans		8	20	16	20		64
422	Miscellaneous Contract Plans		4	8	8	20	16	56
423	Quantity & Cost Estimate	2	8	16	66	160	96	348
424	Special Provisions		40	28				68
425	Constructability and Quality Control (QC) Review	10	40	32				82
426	Submission Check List	2	6	10				18
	SUBTOTAL	72	330	496	624	932	612	3066

SECTION 450

100% HIGHWAY DESIGN SUBMISSION

		PIC	PM	SE	Eng	AE	ET	TOTAL
451	Respond to 75% Comments		16	28	28			72
452	Finalize Plans	4	36	62	64	228	174	568
453	Finalize Special Provisions		14	8				22
454	Finalize Estimate	2	16	16	48	52	34	168
455	Quality Control (QC) Review	4	24	24				52
456	Submission Check List	6	6	8				20
	SUBTOTAL	16	112	146	140	280	208	902

COMMONWEALTH OF MASSACHUSETTS
HIGHWAY DEPARTMENT

SCOPING WORKBOOK Form 1.3 Work Hour Estimate

City/Town	**Acton/Westford/Carlisle/Concord**	Contract No.:	
Location:	**BFRT Phase 2A and Phase 2C Final Design**	Assignment No.:	
Bridge No.:		ProjInfo No.:	**604532/605189**

SECTION 500
RIGHT OF WAY

		PIC	PM	SE	Eng	AE	ET	TOTAL
501	Preliminary Right of Way Plans							
502	Layout and Order of Taking Plans		16	20	36	52	44	168
503	Written Instrument		16	44	16	54	52	182
504	Final Right of Way Plans	8	8	8	16	58	24	122
505	Title Search		16		8	8	16	48
	SUBTOTAL	8	56	72	76	172	136	520

SECTION 600
GEOTECHNICAL REPORT

		PIC	PM	SE	Eng	AE	ET	TOTAL
601	Research Available Subsurface Data							
602	Field Reconnaissance							
603	Subsurface Investigation Plan							
604	Subsurface Investigation Inspection							
605	Office Studies, Analysis and Testing							
606	Geotechnical Report		4	8	4	16	12	44
607	Meetings, Reviews and Liaison	4	4	4	4		8	24
608	Final Plans, Specifications and Estimate							
	SUBTOTAL	4	8	12	8	16	20	68

SECTION 700
PROJECT DEVELOPMENT (STRUCTURAL)

		PIC	PM	SE	Eng	AE	ET	TOTAL
701	Field Investigation		8	10				18
702	Determine Bridge Configuration		6	22	12	2		42
703	Preliminary Structural Analysis							
704	Comparative Design and Cost Analysis	2	26	36	50	172	154	440
705	Preliminary Structures Report Preparation							
706	Bridge Type Selection Worksheet Preparation	2	20	16	34	16	8	96
707	Meetings and Liaison	4	10	12	2			28
	SUBTOTAL	8	70	96	98	190	162	624

SECTION 710
SKETCH PLANS

		PIC	PM	SE	Eng	AE	ET	TOTAL
711	Establish Boring Locations		2	6	6			14
712	Hydraulics Study and Report (Bridges over Water)							
713	Sketch Plan Development	4	58	102	140	368	308	980
714	Meetings, Coordination and Liaison	6	28	24	12			70
715	Constructability Review		32	24	18			74
716	Submission Check List	8	8	8				24
	SUBTOTAL	18	128	164	176	368	308	1162

COMMONWEALTH OF MASSACHUSETTS
HIGHWAY DEPARTMENT

SCOPING WORKBOOK Form 1.3 Work Hour Estimate

City/Town	**Acton/Westford/Carlisle/Concord**	Contract No.:	
Location:	**BFRT Phase 2A and Phase 2C Final Design**	Assignment No.:	
Bridge No.:		ProjInfo No.:	**604532/605189**

SECTION 750

FINAL BRIDGE DESIGN

		PIC	PM	SE	Eng	AE	ET	TOTAL
751	Structural Design - Superstructure	2	80	72	96	178	80	508
752	Structural Design - Substructure	2	60	68	72	140	68	410
753	Bridge Layout Geometrics	2	12	56	46	86	46	248
754	Contract Drawings	6	84	128	268	698	672	1856
755	First Review Submission	2	28	40	24	56	46	196
756	Quantity Cost Estimates	6	12	24	42	68	36	188
757	Special Provisions		12	46	8	24	12	102
758	Second Review Submission		58	38	14	48	46	204
759	FHWA Reviews							
760	Meetings and Liaison	40	64	52	8			164
761	Constructability and Quality Control (QC) Review	8	56	48				112
762	Submission Check List	6	8	6				20
	SUBTOTAL	74	474	578	578	1298	1006	4008

SECTION 800

PS&E SUBMISSION

		PIC	PM	SE	Eng	AE	ET	TOTAL
801	Respond to 100% Comments	2	8	16	8			34
802	Finalize Plans, Specifications and Estimate	4	24	36	54	108	162	388
803	Prepare Detail Sheets		8	10	20	36		74
804	Combine Highway and Bridge	4	6	14	18	42		84
805	Quality Control (QC) Review	4	30	16				50
806	Consultant Peer Review		6	14	48	8		76
	SUBTOTAL	14	82	106	148	194	162	706

SECTION 900

CONSTRUCTION ENGINEERING

		PIC	PM	SE	Eng	AE	ET	TOTAL
901	Pre-Bid Services		14	15	48			77
902	Pre-Construction Conference		10	8				18
903	Highway Shop Drawings and Signal Permit	4	10	10	20			44
904	Bridge and Wall Shop Drawings	4	20	22	44	62	48	200
905	Bridge Construction Procedures	4	20	22	20	62	52	180
906	Furnishing Advice and Field Visits	6	44	96	100	124	96	466
907	Geotechnical Construction Evaluation							
908	Bridge Rating and Photographs	4	12	18	22	70	40	166
909	Traffic Signal Inspection and Fine Tuning		2	16	12			30
	SUBTOTAL	22	132	207	266	318	236	1181

COMMONWEALTH OF MASSACHUSETTS
HIGHWAY DEPARTMENT

SCOPING WORKBOOK Form 1.4 Summary Table

City/Town	Acton/Westford/Carlisle/Concord				Contract No.:				0
Location:	BFRT Phase 2A and Phase 2C Final Design				Assignment No.:				0
Bridge No.:	0				ProjInfo No.:	604532/605189			

HOURLY RATE SUMMARY

	PIC	PM	SE	Eng	AE	ET
DIRECT HOURLY RATE ($) (Design)	$51.00	$51.00	$49.95	$38.49	$28.31	$24.32
DIRECT HOURLY RATE ($) (Construction)	$51.00	$51.00	$51.00	$42.01	$30.90	$26.54
HOURLY RATE ($) (Design)	$144.36	$144.36	$141.38	$108.95	$80.14	$68.83
HOURLY RATE ($) (Construction)	$144.36	$144.36	$144.36	$118.90	$87.45	$75.11

WORK HOUR AND FEE SUMMARY

	TASK DESCRIPTION	PIC	PM	SE	Eng	AE	ET	Task Hours	Task Fee
100	PROJECT DEVELOPMENT ENGINEERING	0	0	0	0	0	0	0	$ -
150	ENVIRONMENTAL	12	44	128	270	130	96	680	$ 72,623.50
200	FUNCTIONAL DESIGN REPORT	0	0	0	0	0	0	0	$ -
220	DESIGN EXCEPTION REPORT	2	10	16	40	16	4	88	$ 9,910.04
300	25% HIGHWAY SUBMISSION	0	0	0	0	0	0	0	$ -
350	DESIGN PUBLIC HEARING	4	16	16	16	0	48	100	$ 10,196.14
400	75% HIGHWAY SUBMITTAL	72	330	496	624	932	612	3066	$ 312,952.53
450	100% HIGHWAY SUBMITTAL	16	112	146	140	280	208	902	$ 91,126.88
500	RIGHT OF WAY	8	56	72	76	172	136	520	$ 50,842.58
600	GEOTECHNICAL REPORT	4	8	12	8	16	20	68	$ 6,959.19
700	PROJECT DEVELOPMENT/STRUCTURAL	8	70	96	98	190	162	624	$ 61,885.65
710	SKETCH PLANS	18	128	164	176	368	308	1162	$ 114,127.12
750	FINAL BRIDGE DESIGN	74	474	578	578	1298	1006	4008	$ 397,057.23
800	PS&E SUBMITTAL	14	82	106	148	194	162	706	$ 71,666.13
900	CONSTRUCTION ENGINEERING	22	132	207	266	318	236	1181	$ 129,275.95
	TOTAL WORK-HOURS	254	1462	2037	2440	3914	2998	13105	
								TOTAL FEE	$ 1,328,622.93
	ACTUAL PERCENTAGES	2	11	16	19	30	23		
	(TYPICAL PERCENTAGES)	1-3%	10-15%	15-25%	25-35%	10-15%	10-15%		

		DESIGN	CONSTRUCTION	TOTALS
(a) Salary Costs		$ 423,722.66	$ 45,672.48	$ 469,395.14
(b) Indirect Costs (%)	155.00%	$ 656,770.12	$ 70,792.34	$ 727,562.46
(c) Net Fee (%)	11.00%	$ 118,854.21	$ 12,811.13	$ 131,665.34
TOTAL LIMITING FEE		$ 1,199,346.99	$ 129,275.95	$ 1,328,622.93
(d) Direct Expenses		$ 54,000.00	$ -	$ 54,000.00
MAXIMUM PAYMENT AMOUNT		$ 1,253,346.99	$ 129,275.95	$ 1,382,622.93
MAXIMUM OBLIGATION				$ 1,382,622.93
			SAY	$ 1,382,600.00

COMMONWEALTH OF MASSACHUSETTS
HIGHWAY DEPARTMENT

SCOPE OF WORK

Acton/Westford/Carlisle/Concord	Contract No.:	**0**
BFRT Phase 2A Final Design	BFRT Phase 2A I Assignment No.:	**0**
0	ProjInfo No.:	**604532/605189**
	7700000	

Direct Costs

Expenses	Design	Construction	Total
Printing & Copying	$3,000.00		$3,000.00
Mileage & Travel	$500.00		$500.00
Misc.	$500.00		$500.00
Geotechnical Sub	$50,000.00		$50,000.00
Sub-Total Direct Costs	$54,000.00	$0.00	$54,000.00