

**AOP Design Recommendations**  
**VT116 Culvert AOP Assessment Study**  
**Hinesburg, Vermont**  
**May 4, 2012**

LocalID	VTrans Milepost (miles)	Drainage Area (square miles)	Existing Structure Type	Channel Bankfull Width (ft)*	VTrans Plan of Action Due to Condition**	Upgrade for Flow Capacity	Upgrade for AOP Improvement	Upgrade for Full AOP and Geomorphic Compatibility	Design Recommendation	AOP Priority #
Action Items During VTrans Paving Project (Listed by Priority.)										
3	6.2	0.9	42" CMP	10	Field Visit	66" CMP	72" CMP	10.7' x 6.9' Pipe Arch	Lower inlet 1.25' to reduce slope and lower outlet 1.5' to eliminate drop. Increase slope by 0.5% to 1.5%. Modify farm ford downstream to increase elevation by 0.5' to increase backwater. Embed 20%	2
14	2.7	0.7	48" RCP	<i>11</i>	Field Visit	66" CMP	72" CMP	11.4' x 7.3' Pipe Arch	Increase pipe size from 66" to 72". Embed 1'. Lower inlet elevation by 0.6', lower outlet by 1', increase slope by 0.6% to 3.6% to eliminate drop and decrease length of depth barrier. Downstream culvert needs to be addressed also.	3
19	0.2	0.8	42" RCP	13	Field Visit	72" CMP	72" CMP	13' x 7' Box	Install as existing.	5
10	3.7	0.3	36" RCP	7	Field Visit	54" CMP	54" CMP	7.3' x 5.3' Pipe Arch	Embed pipe 1 foot. Lower elevation by 1.0'. Decrease slope by 0.8% to 1.5%.	8
4	5.5	0.3	4' x 2.5' Box	10	Field Visit	54" CMP	54" CMP	10.7' x 6.9' Pipe Arch	Install as existing.	10
Future AOP Recommendations (Listed by Priority.)										
16	1.3	0.5	35" CMP	<i>10</i>	No Change	60" CMP	60" CMP	10.3' x 6.8' Pipe Arch	Lower inlet by 3.71' and outlet by 2' to eliminate drop. Modify downstream riffle to increase backwater by 1.0'. Decrease slope by 1.8% to 1.5%. Embed 20%. (To be investigated by US F&W. Possibly move to Action List.)	1
6	5.1	7.4	7' x 4' Box	10	No Change	14' x 7' Box	14' x 7' Box	14' x 8' Box	Lower inlet by 1.5' to reduce slope. Lower outlet by 1.0' to increase backwater depth. Decrease slope by 0.9% to 2%. Embed 20%.	4
1b	6.7	0.2	4.3' x 3.2' Box	<i>1</i>	No Change	No	48" CMP	7.3' x 5.3' Pipe Arch	Replace with 48" CMP. Embed 0.5'. Lower elevation 4 feet to eliminate drop.	7
13	3.2	3.2	Two 10' x 6.5' Pipe Arches	22	No Change	No	<i>Beyond Scope of Project.</i>	<i>N/A</i>	Replace with single span structure at least 100% bankfull width. Likely a bridge structure. (Beecher Hill Brook).	6
12	3.3	0.3	60" CMP	10	No Change	No	No	10.7' x 6.9' Pipe Arch	Embed 1 foot. Lower elevation by 0.5'.	9
AOP Not Applicable. Limited Habitat Potential.										
1	6.9	0.0	24" RCP	3	Clean	36" CPP	<i>AOP not applicable. Limited habitat potential.</i>		Clean sediment out of ends.	19
1c	6.5	0.1	24" CMP	5	Field Visit	36" CPP	<i>AOP not applicable. Limited habitat potential.</i>		<i>N/A</i>	14
2	6.4	0.0	30" CMP	3	Clean	No	<i>AOP not applicable. Limited habitat potential.</i>		Remove sediment from pipe to restore capacity.	17
5	5.4	0.0	18" RCP	3	Field Visit	30" CPP	<i>AOP not applicable. Limited habitat potential.</i>		<i>N/A</i>	18
8	4.7	0.1	36" CMP	5	No Change	60" CMP	<i>AOP not applicable. Limited habitat potential.</i>		Increase pipe size from 60" to 66". Embed 1'. Lower inlet 2.3', lower outlet 2.6', and increase slope by 0.3% to 1.5% to decrease velocity and increase depth. Increased tailwater elevation 1.5'.	12
9	3.9	0.1	36" RCP	5	Field Visit	6.4' x 4.3' Pipe Arch	<i>AOP not applicable. Limited habitat potential.</i>		Limited fill depth, required pipe arch. 72" pipe satisfied conveyance criteria.	13
10b	3.7	0.0	18" RCP	<i>1</i>	No Change	No	<i>AOP not applicable. Limited habitat potential.</i>		<i>N/A</i>	20
11	3.5	0.1	18" RCP	4	No Change	30" CPP	<i>AOP not applicable. Limited habitat potential.</i>		<i>N/A</i>	16
15	1.5	0.2	36" RCP	6	No Change	42" CMP	<i>AOP not applicable. Limited habitat potential.</i>		Increase pipe size by 1' to 54". Lowered inlet by 2.6' and outlet by 2.4'. Decrease slope from 7% to 5.8%. Increase slope of channel upstream by 2%. Increase tailwater downstream by 1'.	11
17	1.1	0.1	18" RCP	4	Repair	36" CMP	<i>AOP not applicable. Limited habitat potential.</i>		Fix Headwall.	15
Bridges. No AOP problems.										
7	4.8	7.2	Bridge	21	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	22
18	0.7	7.5	Bridge	34	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	21

NOTES:  
RCP = radial concrete pipe. CMP = corrugated metal pipe. CPP = corrugated plastic pipe.  
Bold box indicates recommended structure type and size. See design recommendations for embeddedness, slope, inlet/outlet, and alignment.  
\* Italicized channel bankfull width indicates value taken from VT hydraulic geometry equation.  
\*\* Plan of Action based on VTrans initial assessment of MMI field data and recommendations.