DRAFT

**Recommendations for All Projects**

Achieve an upstream performance standard of at least 96% within 48 hours for adult Atlantic salmon and downstream performance standard of at least 97% within 24 hours for Atlantic salmon smolts at each project and conduct three years of effectiveness testing to document that standards have been met (3 total testing events). Provide a provision to be able to update and increase future performance standard based on a river specific dam impact model that could be developed to assess performance for achievement of ESA Recovery Based on the Recovery Plan criteria.

Achieve an upstream passage performance standard of 85% within 48 hours for American shad and downstream performance standard of at least 95% within 24 hours for American shad at each project and conduct three years of effectiveness testing to document that standards have been met (3 total testing events).

Achieve an upstream passage performance standard of 96% within 48 hours for alewives and downstream performance standard of at least 95% within 24 hours for alewives at each project and conduct three years of effectiveness testing to document that standards have been met (3 total testing events).

Achieve an upstream passage performance standard of 90% within 72 hours for blueback herring and downstream performance standard of at least 95% within 24 hours for blueback herring and conduct three years of effectiveness testing to document that standards have been met (3 total testing events).

Achieve an upstream passage performance standard of 80% for sea lamprey and conduct three years of effectiveness testing to document that standard has been met (3 total testing events).

Develop study plans for upstream and downstream fishway effectiveness testing in consultation with the resource agencies.

Conduct three additional years of fishway effectiveness testing for each of the applicable life stages of the six diadromous species following implementation of any modifications to the upstream or downstream fish passage facilities.

Develop study plans and test effectiveness of new or untested eelways for two study seasons. Season one should include monitoring of new eelways to determine the number and size distribution of eels using the eelways. Season two should include tag-recapture methods or PIT telemetry to determine passage effectiveness of the eelway.

Brookfield will construct, operate, and maintain a ¾ inch or less, full depth, angled or inclined rack structure in the forebay within three years of license amendment approval at each project. The structure should be designed such that normal velocities do not exceed two feet per second as measured at an upstream location where velocities are not influenced by the local acceleration around guidance structures

**Lockwood Recommendations**

Brookfield shall implement the following measures, including the development of a comprehensive adaptive management plan with DEP approval that outlines clear steps and timelines for implementation and testing of passage measures at the Lockwood Project. Should the Lockwood Project facilities fail to achieve any of MDMR’s performance standards, the plan will include a timeline for the implementation of additional measures. For the Lockwood project this will include the following measures and milestones:

1. Brookfield will construct, operate, and maintain a volitional fishway in the bypass within 3 years of license amendment approval;
2. Brookfield will construct, operate, and maintain attraction flow channel(s) in the vicinity of the volitional fishway capable of conveying spill flows required under the BiOp or 20% of station capacity within 3 years of license amendment approval,
3. Brookfield will construct a flume to connect the existing fish lift to the headpond within 3 years of license amendment approval;
4. Brookfield will construct, operate, and maintain a ¾ inch or less, full depth, angled or inclined rack structure in the forebay within three years of license amendment approval. The structure should be designed such that normal velocities do not exceed two feet per second as measured at an upstream location where velocities are not influenced by the local acceleration around guidance structures;
5. Effectiveness testing to assess survival, injury, and delay in upstream and downstream passage shall be implemented by Brookfield in the first downstream fish passage season and the second upstream fish passage season following installation of measures a, b, c, and d. Brookfield will prepare study plans for effectiveness testing for shad, alewife, blueback herring, American eel, and sea lamprey and distribute draft plans to MDMR and DEP for review and for approval by DEP no later one year prior to the start of the passage season in which the study will be conducted. The study plans will include appropriate measures for testing to determine if the project meets the applicable performance standards.
6. These initial studies may be limited to specific species and life stages, with approval from DEP, to prevent delay of potential modifications. However, the facilities will need to be tested for all species and life stages during the license term.
7. No later than 8 months after the initiation of effectiveness testing, Brookfield shall distribute a draft study results report to MDMR and DEP. If performance standards have not been achieved, Brookfield will consult with MDMR and DEP within 30 days of distribution of the effectiveness testing report to review study results and identify areas of deficiency.
8. If performance standards have not been achieved, but the results are close (within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield can implement minor operational or structural modifications to address the deficiency as approved by DEP.
9. If upstream performance standards have not been achieved, and the results are not close (not within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield shall construct the following measures no later than 3 years after the distribution of the effectiveness testing report:
10. modifications to the spillway,
11. modifications to fishway entrance(s) including entrance gate or other infrastructure.
12. If downstream performance standards have not been achieved, and the results are not close (not within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield shall construct the following measures no later than 3 years after the distribution of the effectiveness testing report:
13. construction of a new downstream fish bypass facility,
14. construction of additional crest gates or other spillway gates,
15. modifications to the downstream existing bypass facility.
16. Brookfield may propose alternative adaptive measures from the list below or as identified by Brookfield. If DEP determines that any alternative proposed measure from Brookfield is likely to achieve the performance standard and approves the timeline of implementation of the measure, Brookfield can implement that proposed measure.
17. Additional Adaptive Upstream Measures could include:
18. construction of additional fishway entrance(s),
19. construction of additional crest or other spillway gates,
20. modification to fishway entrance location(s).
21. Additional Interim Adaptive Downstream Measures include:
22. construction of a new downstream fish bypass facility,
23. construction of additional crest gates or other spillway gates,
24. other modifications to the spillway
25. modifications to the downstream existing bypass facility.
26. Once Brookfield has implemented DEP’s required measures, Brookfield will repeat steps E-I of this adaptive management plan until deficiencies have been addressed.  This includes the design and development of replacement fishways that could achieve these standards.

**Hydro-Kennebec Recommendations**

Brookfield shall implement the following measures, including the development of a comprehensive adaptive management plan with DEP approval that outlines clear steps and timelines for implementation and testing of passage measures at the Hydro-Kennebec Project. Should the Hydro-Kennebec Project facilities fail to achieve any of MDMR’s performance standards, the plan will include a timeline for the implementation of additional measures. For the Hydro-Kennebec dam this will include the following measures and milestones:

1. Brookfield will construct, operate, and maintain a ¾ inch or less, full depth, angled or inclined rack structure in the forebay within two years of license issuance. The structure should be designed such that normal velocities do not exceed two feet per second as measured at an upstream location where velocities are not influenced by the local acceleration around guidance structures;
2. Effectiveness testing to assess survival, injury, and delay in upstream and downstream passage shall be implemented by Brookfield in the first downstream fish passage season and the second upstream fish passage season following installation of measures a and b. Brookfield will prepare study plans for effectiveness testing for shad, alewife, blueback herring, American eel, and sea lamprey and distribute draft plans to MDMR and DEP for review and for approval by DEP no later one year prior to the start of the passage season in which the study will be conducted. The study plans will include appropriate measures for testing to determine if the project meets the applicable performance standards.
3. These initial studies may be limited to specific species and lifestages, with approval from DEP, to prevent delay of potential modifications. However, the facilities will need to be tested for all species and life stages during the license term.
4. No later than 8 months after the initiation of effectiveness testing, Brookfield shall distribute a draft study results report to MDMR and DEP. If performance standards have not been achieved, Brookfield will consult with MDMR and DEP within 30 days of distribution of the effectiveness testing report to review study results and identify areas of deficiency.
5. If performance standards have not been achieved, but the results are close (within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield can implement minor operational or structural modifications to address the deficiency as approved by DEP.
6. If upstream performance standards have not been achieved, and the results are not close (within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield shall construct the following measures no later than 3 years after the distribution of the effectiveness testing report:
7. construction of a second fishway
8. modifications to the spillway,
9. modifications to fishway entrance(s) including entrance gate or other infrastructure.
10. If downstream performance standards have not been achieved, and the results are not close (within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield shall construct the following measures no later than 3 years after the distribution of the effectiveness testing report:
11. construction of a new downstream fish bypass facility,
12. construction of additional crest gates or other spillway gates,
13. modifications to the downstream existing bypass facility.
14. Brookfield may propose alternative adaptive measures from the list below or as identified by Brookfield. If DEP determines that any alternative proposed measure from Brookfield is likely to achieve the performance standard and approves the timeline of implementation of the measure, Brookfield can implement that proposed measure.
15. Additional Adaptive Upstream Measures could include:
16. construction of additional fishway entrance(s),
17. construction of additional crest or other spillway gates,
18. modification to fishway entrance location(s).
19. Additional Interim Adaptive Downstream Measures include:
20. construction of a new downstream fish bypass facility,
21. construction of additional crest gates or other spillway gates,
22. other modifications to the spillway
23. modifications to the downstream existing bypass facility.
24. Once Brookfield has implemented DEP’s required measures, Brookfield will repeat steps E-I of this adaptive management plan until deficiencies have been addressed. This includes the design and development of replacement fishways that could achieve these standards.

**Shawmut Recommendations**

Brookfield shall implement the following measures, including the development of a comprehensive adaptive management plan with DEP approval that outlines clear steps and timelines for implementation and testing of passage measures at the Shawmut Project. Should the Shawmut Project facilities fail to achieve any of MDMR’s performance standards, the plan will include a timeline for the implementation of additional measures. For the Shawmut dam this will include the following measures and milestones:

a. Brookfield will construct, operate, and maintain a fish lift adjacent to the 1912 Powerhouse along with an associated flume to provide passage to the project’s headpond within three~~hree~~ years of license issuance

b. After construction of the fish lift and flume, Brookfield will reevaluate the location of eelways and conduct an initial “one-year shakedown” operation period, conduct one year of sit~~t~~ing studies to verify that eels continue to congregate near the location of the existing upstream eelways;

c. Brookfield will construct, operate, and maintain a ¾ inch or less, full depth, angled or inclined rack structure in the forebay within three~~ree~~ years of license issuance. The structure should be designed such that normal velocities do not exceed two feet per second as measured at an upstream location where velocities are not influenced by the local acceleration around guidance structures;

1. In the interim while Brookfield works to install full depth inclined or angled trash racks, Brookfield will pass a minimum of 5% of the station flows through the surface sluice from July 1 through September 15.
2. Effectiveness testing to assess survival, injury, and delay in upstream and downstream passage shall be implemented by Brookfield in the first downstream fish passage season and the second upstream fish passage season following installation of the fish lift and flume. Brookfield will prepare study plans for effectiveness testing for shad, alewife, blueback herring, American eel, and sea lamprey and distribute draft plans to MDMR and DEP for review and for approval by DEP no later one year prior to the start of the passage season in which the study will be conducted. The study plans will include appropriate measures for testing to determine if the project meets the applicable performance standards.
3. These initial studies may be limited to specific species and life stages, with approval from DEP, to prevent delay of potential modifications. However, the facilities will need to be tested for all species and life stages during the license term.
4. No later than 8 months after the initiation of effectiveness testing, Brookfield shall distribute a draft study report to MDMR and DEP and schedule a meeting to review study results within 30 days of report distribution.
5. If performance standards have not been achieved, but the results are close ((within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield can implement minor operational or structural modifications to address the deficiency as approved by DEP.
6. If upstream performance standards have not been achieved, and the results are not close (within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield shall construct the following measures no later than 3 years after the distribution of the effectiveness testing report:
7. Construct a second fish lift adjacent to the 1982 powerhouse,
8. modifications to the spillway,
9. modifications to fishway entrance(s) including entrance gate or other infrastructure,
10. If downstream performance standards have not been achieved, and the results are not close (within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield shall construct the following measures no later than 3 years after the distribution of the effectiveness testing report:
11. construction of a new downstream fish bypass facility,
12. construction of additional crest gates or other spillway gates,
13. modifications to the downstream existing bypass facility.
14. Brookfield may propose alternative adaptive measures from the list below or as identified by Brookfield. If DEP determines that any alternative proposed measure from Brookfield is likely to achieve the performance standard and approves the timeline of implementation of the measure, Brookfield can implement that proposed measure.
15. Additional Adaptive Upstream Measures could include:
16. construction of additional fishway entrance(s),
17. construction of additional crest or other spillway gates,
18. modification to fishway entrance location(s).
19. Additional Interim Adaptive Downstream Measures include:
20. construction of a new downstream fish bypass facility,
21. construction of additional crest gates or other spillway gates,
22. other modifications to the spillway
23. modifications to the downstream existing bypass facility.

1. Once Brookfield has implemented DEP’s required measures, Brookfield will repeat steps D-H of this adaptive management plan until deficiencies have been addressed. This includes the design and development of replacement fishways that could achieve these standards.

**Weston Recommendations**

Brookfield shall implement the following measures, including the development of a comprehensive adaptive management plan with DEP approval that outlines clear steps and timelines for implementation and testing of passage measures at the Weston Project. Should the Weston Project facilities fail to achieve any of MDMR’s performance standards, the plan will include a timeline for the implementation of additional measures. For the Weston dam this will include the following measures and milestone:

1. Brookfield will construct, operate, and maintain a new upstream anadromous fish lift between the South Channel Dam log sluice and the powerhouse within three years after license modification.
2. Brookfield will construct, operate, and maintain a ¾ inch or less, full depth, angled or inclined rack structure in the forebay within three years of license modification. The structure should be designed such that normal velocities do not exceed two feet per second as measured at an upstream location where velocities are not influenced by the local acceleration around guidance structures;
3. Effectiveness testing to assess survival, injury, and delay in upstream and downstream passage shall be implemented by Brookfield in the first downstream fish passage season and the second upstream fish passage season following installation of measures a and b. Brookfield will prepare study plans for effectiveness testing for shad, alewife, blueback herring, American eel, and sea lamprey and distribute draft plans to MDMR and DEP for review and for approval by DEP no later one year prior to the start of the passage season in which the study will be conducted. The study plans will include appropriate measures for testing to determine if the project meets the applicable performance standards.
4. These initial studies may be limited to specific species and lifestages, with approval from DEP, to prevent delay of potential modifications. However, the facilities will need to be tested for all species and life stages during the license term.
5. No later than 8 months after the initiation of effectiveness testing, Brookfield shall distribute a draft study results report to MDMR and DEP. If performance standards have not been achieved, Brookfield will consult with MDMR and DEP within 30 days of distribution of the effectiveness testing report to review study results and identify areas of deficiency.
6. If performance standards have not been achieved, but the results are close (within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield can implement minor operational or structural modifications to address the deficiency as approved by DEP.
7. If upstream performance standards have not been achieved, and the results are not close (within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield shall construct the following measures no later than 3 years after the distribution of the effectiveness testing report:
8. construction of a second fishway in the north channel
9. construct, operate, and maintain attraction flow channel(s) in the vicinity of the fish lift capable of conveying spill flows required under the BiOp or 20% of station capacity,
10. modifications to the spillway,
11. modifications to fishway entrance(s) including entrance gate or other infrastructure.
12. If downstream performance standards have not been achieved, and the results are not close (within 10% of performance standard criteria for passage efficiency or timing for the tested species), Brookfield shall construct the following measures no later than 3 years after the distribution of the effectiveness testing report:
13. construction of a new downstream fish bypass facility,
14. construction of additional crest gates or other spillway gates,
15. modifications to the downstream existing bypass facility.
16. Brookfield may propose alternative adaptive measures from the list below or as identified by Brookfield. If DEP determines that any alternative proposed measure from Brookfield is likely to achieve the performance standard and approves the timeline of implementation of the measure, Brookfield can implement that proposed measure.
17. Additional Adaptive Upstream Measures could include:
18. construction of additional fishway entrance(s),
19. construction of additional crest or other spillway gates,
20. modification to fishway entrance location(s).
21. Additional Interim Adaptive Downstream Measures include:
22. construction of a new downstream fish bypass facility,
23. construction of additional crest gates or other spillway gates,
24. other modifications to the spillway
25. modifications to the downstream existing bypass facility.
26. Once Brookfield has implemented DEP’s required measures, Brookfield will repeat steps C-G of this adaptive management plan until deficiencies have been addressed. This includes the design and development of replacement fishways that could achieve these standards.