PROTECTED INSTREAM FLOW STUDY

I. Identification and Draft List of IPUOCR Entities

The consultant will research and identify IPUOCR entities for the Designated Reach as required in Env-Ws 1905.02(a) – (c). The Department has defined the Instream Protected Uses, Outstanding Characteristics, and Resources (IPUOCR) that must be evaluated for the Designated Reach in a discussion paper titled, Defined for PISF Study – Instream Public Uses, Outstanding Characteristics, and Resources (Appendix A). The Department has also compiled a preliminary list of IPUOCR entities for the Souhegan River DR (Appendix B). The consultant will research applicable files, records and studies, and may need to conduct structured interviews with local watershed authorities to develop information about the specific IPUOCR entities, their river location, and their dependence on river flow conditions. The consultant will document this information completely in a draft IPUOCR report required later under Part IV. To complete this Part I, the consultant will present an annotated list of the IPUOCR entities to both advisory committees for their review and comment. The list will identify and briefly describe the IPUOCR entities, and if known, their location within the DR.

II. Assessment of Well Withdrawal Impacts on Surface Water

The consultant will develop a method for assessing AWU groundwater withdrawal impacts on surface water flow in the Designated Reach. The Department, in consultation with stakeholders during rulemaking deliberations, developed the position that groundwater withdrawals, sufficiently separated from a stream by hydrologic barriers or distance, or both, may have reduced impacts on critical flows because of the timing or volume of the withdrawal. In previous rule drafts, the Department proposed methods of evaluating hydraulic connection between well withdrawals and surface water (See Instream Flow Rules – November 14, 2000, Working Draft Env-Ws 1903.04 Procedure for Determining No Hydraulic Connection - or http://www.des.state.nh.us/rivers/instream/Archive/11142kifr.pdf). This document may be used by the consultant as a starting point or the consultant may propose alternative methods.

The consultant will present the methods considered, and a recommended method in a report to the TRC for their review and comment. The recommended method will be capable of estimating effective surface water withdrawal due to wells by using available information, or information easily obtained by the Department. The consultant will then revise the report in consultation with the Department, and apply the selected method to the AWUs' well withdrawals.

The Department has identified seven AWUs withdrawing from fourteen groundwater wells sources (12 source IDs—two wells each for two sources). Well information is provided in Attachment IV - Reference Materials. The method developed from this task will be used in the estimating water use by individual AWUs versus the proposed PISF under Part V and versus the established PISF under Part VIII.

III. On-stream Survey for IPUOCR Entities

The consultant will conduct an on-stream survey of the DR as required in Env-Ws 1905.02(e) to locate and verify the specific entities identified in the IPUOCR listing as revised by the TRC and WMPAAC. Prior to conducting the on-stream survey, the consultant will

prepare a Standard Operating Procedure for conducting the survey and present it to the Department. The consultant will use the Department's Photo Documentation Procedure (Appendix D) to document IPUOCR entities and river conditions for future reference. The consultant will conduct the on-stream survey with DES staff oversight, and possibly with the presence of advisory committee representatives, during the summer season. The survey is not intended to be an exhaustive identification and cataloging of these entities, but rather a targeted verification of their existence and occurrence.

IV. Report Describing IPUOCR Entities and Proposed PISF Methods

The consultant will produce a draft report describing the results of the IPUOCR entities research and on-stream survey, and proposing PISF methods to be used to assess their flow needs. The report will include maps showing the presence of the IPUOCR entities and a short, referenced narrative for each. Locations of threatened or rare species should be generalized or omitted for their protection. The consultant will identify and catalogue all source documents and reports describing IPUOCR entities, as per Env-Ws 1905.02(d), as part of the report. The report will propose protection goals consistent with RSA 483, Env-Ws 1900 and surface water quality standards.

The consultant will collect and document relevant information in describing the IPUOCR entities and PISF methods. The items listed in Env-Ws 1905.03(b) are considered relevant information. Some of these items concern IPUOCR entities, but some refer to watershed characteristics or other information. Where this information supports the identification and description of IPUOCR entities or the selection of PISF methods, it will be included in the draft report. Otherwise, this information will be included in the draft Proposed PISF report under Part V below.

The consultant will describe PISF methods that are appropriate for identifying protected flows to conserve and protect the IPUOCR entities as required by Env-Ws 1905.02(f). At a minimum, the methods chosen must assess the hydrologic regime and the flow needs of the biologic ecosystem. The Department has discussed considerations for method selection in a paper called, Discussion of PISF Assessment Methods (Appendix E).

The draft report will describe in detail the proposed PISF methods with supporting rationale for why and how they will be applied, including where they are to be used, and how the results will be rendered into PISFs. The consultant will explain how the proposed methods apply to the IPUOCR entities. The consultant will identify which method if any will be applied for the individual IPUOCR entities. The consultant must identify and provide justification for not applying methods to assess any IPUOCR.

The draft report will be submitted to the committees for review and comment. The draft report will then be revised in consultation with the Department into the final report on IPUOCR entities and PISF methods. This document will define the work to be conducted to make the PISF assessments.

V. PISF assessments and Proposed PISF report

The consultant will apply the selected PISF methods to determine scientifically-based, quantitative PISF values to meet the protection goals described earlier for the IPUOCR entities and applicable water quality standards [Env-Ws 1905.01(a)(1)]. The Department will request the assistance of the Public Utilities Commission (PUC) in assessing the effect of the proposed PISF developed under this Part upon each hydroelectric power facilities in the WMPA as required in Env-Ws 1905.04(b)(4) and Env-Ws 1906.03(b)(3).

The consultant will compile the PISF assessment results in a draft Proposed PISF report. The report will identify the IPUOCR entities, their locations, and the protection goals for these entities. The report will describe the PISF methods that were chosen for evaluating the flows needed to meet these goals, and the results using these methods. The consultant's report will describe the Proposed PISF values and their scientific basis [See Env-Ws 1905.01(a)(1) and Env-Ws 1905.04(b)(2)].

The report will include a discussion describing how the Proposed PISF values meet the criteria in RSA 483:1 and 483:2 supporting the Department's decision making process under Env-Ws 1905.04(a). It will also include supporting documentation describing how the proposed PISF values meet applicable water quality standards [Env-Ws1905.04(b)(3)] and describing the results of the assessment required by Env-Ws 1905.04(b)(4), which cites RSA 483:9-c, III. The consultant will incorporate descriptions of the factors for reviewing the PISF found under Env-Ws 1905.03(b) and the results of PUC's assessment.

The report will include a preliminary determination of DR reaches not meeting the draft proposed PISF. The consultant will determine aggregate water use versus stream flow on a daily basis using the draft Proposed PISF and following the model of the aggregate water use versus stream flow assessment under Env-Ws 1903.02. The consultant will base the determination on an assessment of daily conditions for the previous five years using appropriately selected or synthesized hydrologic data, and will incorporate the values determined earlier in Part II for the ground water well withdrawal impacts on surface water. The report will describe the location, timing and net upstream withdrawal rates where the draft proposed PISF was not met. The methods in the Department's January 2002 Instream Flow Analysis Within the Contoocook River Basin (draft) should be used as a basis for developing this process.

The consultant will present the draft proposed PISF values before the advisory committees for review and comment. The draft Proposed PISF report will be revised in consultation with the Department to create the Proposed PISF report for submittal to the legislature as required by Laws of 2002, Chapter 278:3, III(a).

VI. PISF Public Hearing

The Department will hold a public hearing jointly with the NH Senate's Environment Committee and the House's Resources, Recreation & Development Committee within 60 days of submitting the Proposed PISF to the legislature as required by Laws of 2002, Chapter 278:3, III(a). The public hearing will be held to receive comments on the Proposed PISF as required by Laws of 2002, Chapter 278:3, III(a) and as described in Env-Ws 1905.03. The public hearing

will be held in a community through or past which the DR flows in accordance with Env-Ws 1905.03(e).

The consultant will make the Proposed PISF with all documentation available to the public for at least 30 days prior to the hearing date. The consultant will ensure that the Proposed PISF is available in at least one major library in a community through or past which the DR flows at least 30 days prior to the hearing date. The consultant will participate in the public hearing by giving a presentation describing the Proposed PISF and its development, and by answering questions.

The Department will post the Proposed PISF on its website, and provide written notices for and publicize the hearing in accordance with Env-Ws 1905.03(d) and (e). The Department will provide and prepare facilities for the hearing, and conduct the hearing. The comment period will remain open for a minimum of 30 days following the hearing. The Department will receive and record comments, and prepare records of the hearing.

VII. PISF Report for the Souhegan River

Following the comment period, the consultant will revise the Proposed PISF report, in consultation with the Department, based on the comments received. The consultant will prepare the PISF Report from the Proposed PISF report with the addition of a section describing how the comments affected the final PISF values [Env-Ws 1905.04 (b)(5-6)]. The consultant will submit the PISF Report within 40 days of the close of the comment period to allow time for the Department to issue a decision on the PISF within 60 days of the close of the comment period as required in Env-Ws 1905.04(a). The PISF study portion of the contract will be complete upon written notice from the Department of its acceptance of the PISF Report. It will be the Department's responsibility to establish the PISF.

SOUHEGAN WATER MANAGEMENT PLAN

VIII. Assessment of water use with the established PISF

The consultant will estimate aggregate water use versus stream flow to identify times and stream reaches that do not meet the PISF and therefore require management under the WMP. The assessment will be reported on a daily basis over three one-year periods using the established PISFs and appropriately selected or synthesized hydrologic data. The three annual datasets selected will represent actual or simulated dry year, wet year, and mean streamflow conditions. The consultant will document the DR reaches not meeting the established PISF and use this information in guiding the development of the WMP. The process will be equivalent to the process described in Part V except for the hydrologic data set used and the use of the established PISF instead of the draft proposed PISF.

IX. Development of WMP sub-plans

The consultant will develop three sub-plans – Conservation, Water Use, and Dam Management – as required under Env-Ws 1906.02 through 1906.04 for the WMP. Each of these sub-plans shall provide a range of alternatives for each AWU or ADO. The sub-plans will describe the potential for water conservation and water use changes by each AWU or for dam management by each ADO. The Department will make the notifications to each AWU and each

ADO by certified mail as required by Env-Was1906.01(c)(1) through (3), such as that a WMP is being prepared and that the WMP is enforceable. The consultant will meet with each AWU and ADO and discuss the established PISF as required in Env-Ws 1906.01(c)(4) and in the rules describing each sub-plan. The consultant will interview each AWU and ADO to collect information about water use and management and discuss alternatives. From this information, the consultant will develop recommended alternatives for each AWU and ADO in the applicable sub-plans. The consultant shall prepare structured interview formats to collect necessary and useful information from the AWUs and ADOs for preparing these plans. The Department has identified known AWUs and ADOs from the Department's water use and dam registrations. The consultant shall notify the Department if they encounter or are informed of any unregistered water users that meet the requirements for registration under the Department's Water Use Registration and Reporting Rules. Previously unknown AWUs shall be incorporated into the sub-plans. Each sub-plan will be developed as described in the sections below.

Conservation Plan

The consultant will prepare a Conservation Plan as described in Env-Ws 1906.02. The Department has identified known AWUs from the Water Use database and has compiled water use and contact information and other data. See Attachment IV - Reference Materials. Other AWUs that may be discovered during the course of the project shall be incorporated into the plan. The consultant will identify generic conservation measures and best management practices for each AWU type (such as public water supplier, agricultural user, etc.) as required by Env-Ws 1906.02(b)(2).

The consultant will meet with each AWU to collect information on their water use patterns, needs, potential for conservation and past and present water conservation efforts as required by Env-Ws 1906.02(b)(3). The consultant will describe to each AWU during these meetings the established PISF and general instream flow requirements under the WMP as required by Env-Ws 1906.02(c)(4). The consultant will collect water use and operational information from the affected water users to the extent that they are willing to provide it. Information not provided by an AWU will be estimated by the consultant using reported historical water use, industry standards, or both. The consultant will document any changes in water use anticipated within the next five years. The consultant will document these findings separately for each AWU in the Conservation Plan.

The consultant will identify a range of specific conservation measures applicable to each AWU, including a description of the water conservation best management practices and effective water-saving technologies applicable to the types of water-using processes of the AWU. The consultant will prepare an economic assessment of the estimated costs to implement the water conservation alternatives for each AWU as required by Env-Ws 1906.02(f). For AWUs, other than agricultural and public water suppliers, the estimated costs will be based on implementation within five years. For agricultural or public water supply AWUs, the consultant will determine the period for the cost of implementation to be paid back, if it is greater than five years, out to twenty years. The consultant will assess

the feasibility of water conservation methods for each AWU using the water use and needs information collected from the AWU or using estimates of daily use.

The consultant will document in the Conservation Plan report, a detailed list of the recommended water conservation measures that each AWU might implement including a quantitative estimate of the volume and timing of water savings associated with these measures. The consultant will estimate the cost for each AWU to implement the recommended conservation measures and compare the cost to water savings and to payback time. The consultant will prepare an implementation schedule for each AWU in order to meet Env-Ws 1906.02(c) through (f). The consultant will describe a process to monitor and evaluate the results of, and compliance with, the Water Conservation Plan, in order to meet Env-Ws 1906.02(b)(4)c.

Water Use Plan

The consultant will prepare a Water Use Plan as described in Env-Ws 1906.03. The consultant will identify and document generic water management alternatives for the AWU types in the WMPA. The consultant will meet with each affected water user to collect information for the water use plan. Where information specific to the AWU is not available the consultant will use industry standards or generic water management alternatives for estimating methods, equipment, or costs. The consultant will identify and discuss with each water user the water management options specific to the AWU's operation that will meet the established PISFs as required by Env-Ws 1906.03(c)(1).

The consultant will document in a Water Use Plan report each AWU's potential for water use modification or sharing as required by Env-Ws 1906.03(b)(2). The consultant will identify and document a recommended alternative available to each AWU for changing water use which, in combination with conservation measures and water use or release changes by other AWUs and ADOs, will meet the PISF as required by Env-Ws 1906.03(b)(4) and describe each alternative's effectiveness in meeting the PISF. Appropriate changes in water use include, but are not limited to: changes in rate or timing of withdrawal; increases in volume of available storage; changes in location or type of withdrawal; and shared water uses. The Department will request the assessment by PUC of the effect of the PISF upon each hydroelectric power facility in the WMPA as required in Env-Ws 1906.03(b)(3)., for incorporation by the consultant into the plan.

For each AWU, the consultant will prepare an economic assessment of the estimated costs to implement the water use change alternatives within five years. The consultant will prepare an implementation schedule for each AWU in order to meet Env-Ws 1906.03(b)(5).

Dam Management Plan

The consultant will prepare a Dam Management Plan as described in Env-Ws 1906.04. The consultant will meet with each ADO to collect information on dam

construction, and the operations and uses of their dams as required by Env-Ws 1906.04(b)(1). (Some data on dam construction, impoundment conditions and other particulars have been compiled and are available from the Department. See Attachment IV - Reference Materials. The consultant will describe to each ADO during these meetings the established PISF requirements as required by Env-Ws 1906.04(c)(1).

The consultant will determine and report the potential flow available from dam operation for instream flow management as described in Env-Ws 1906.04(b)(2)a. The consultant will identify and document, for each ADO impoundment as required by Env-Ws 1906.04(b)(2), ecological and other impacts to the impoundment and downstream river reaches resulting from storage or releases which might restrict the release of water for meeting the PISFs. The consultant will document the alternatives for offsetting water use by AWUs by dam management in order to meet the PISF. Dam management alternatives for providing instream flow will be described and ranked by effectiveness in meeting PISFs, and by positive and negative effects. The consultant will report the potential for dam management to meet PISF requirements as required by Env-Ws 1906.04(b)(2)c. For each ADO the consultant will prepare an economic assessment of the estimated costs to implement the dam management alternatives within five years. An implementation schedule for each ADO will be required in order to meet Env-Ws 1906.04(b)(4). The implementation schedule will be defined later after dam management measures are selected for the draft Proposed WMP from the range of alternatives. For agricultural or public water supply ADOs, the consultant will allow implementation over twenty years in order to spread the payback period where necessary.

The consultant will present the results of the water use assessment conducted in Part VIII and the recommended alternatives compiled in the three sub-plans to the committees. The advisory committees will review and comment on the recommended alternatives in the sub-plans. The Department will document comments concerning the sub-plans from the committees. The consultant will use the comments, in consultation with the Department, to direct the development of the draft Proposed WMP.

X. Proposed WMP

The Consultant will combine the Conservation, Water Use and Dam Management sub-plans into a draft Proposed WMP, as described in Env-Ws 1906.05. The consultant will include the assessment in Part VIII of water use versus streamflow under the established PISF.

The draft Proposed WMP will contain a Conservation Plan and a Water Use Plan for each AWU in the WMPA as required by Env-Ws 1906.02(4) and Env-Ws 1906.03(b)(4). The draft Proposed WMP will contain a Dam Management Plan for each ADO in the WMPA as required by Env-Ws 1906.04(b)(3). The draft Proposed WMP will identify the recommended alternatives from each sub-plan developed under Part IX, which collectively will meet the protected instream flow requirements.

The consultant will discuss implementation schedules for selected water conservation alternatives with AWUs per Env-Ws 1906.02(c). Conservation alternatives will be given highest priority.

The consultant will negotiate with the ADOs and AWUs as per Env-Ws 1906.03(c)(1) and Env-Ws 1906.04(c)(2) to select from the alternatives identified in the Water Use and Dam Management sub-plans in Part IX. Alternatives will be chosen that most effectively improve flow conditions required under the established PISF. The consultant will negotiate a schedule for implementation for each of the alternatives selected from the Water Use and Dam Management sub-plans. The consultant will document in the draft proposed WMP any available sources of public funding identified by the Department, including grants, donations, and loans for AWUs engaged in agriculture or public water supply so as to meet the requirements of Env-Ws 1906.05(c). The implementation plans negotiated will comply with Env-Ws 1906.05(d) for agricultural and public water supply AWUs. The draft Proposed WMP will contain a section describing how the Proposed WMP meets the adoption criteria in 1906.07(b).

The consultant will present the draft Proposed WMP before the advisory committees for review and comment. The consultant will revise the draft Proposed WMP, after consultation with the Department, in response to comments from the committees into a Proposed WMP. The Proposed WMP will be for submitted to the legislature as required by Laws of 2002, Chapter 278:3, III(a)..

XI. WMP Public Hearing

The Department will hold a public hearing jointly with the NH Senate's Environment Committee and the House's Resources, Recreation & Development Committee within 60 days of submitting the Proposed WMP to the legislature as required by Laws of 2002, Chapter 278:3, III(a). The public hearing will be held to receive comments on the Proposed WMP as required by Laws of 2002, Chapter 278:3, III(a) and as described in Env-Ws 1906.06. The public hearing will be held in a community through or past which the DR flows in accordance with Env-Ws 1906.06(c).

The consultant will make the Proposed WMP with all documentation available to the public for at least 30 days prior to the hearing date. The consultant will ensure that the Proposed WMP is available in at least one major library in a community through or past which the DR flows at least 30 days prior to the hearing date. The consultant will participate in the public hearing by giving a presentation describing the Proposed WMP and its development, and by answering questions.

The Department will post the Proposed WMP on its website, and provide written notices for and publicize the hearing in accordance with Env-Ws 1906.06(d). The Department will provide and prepare facilities for the hearing, and conduct the hearing. The comment period will remain open for a minimum of 30 days following the hearing. The Department will receive and record comments, and prepare records of the hearing.

XII. Water Management Plan for Souhegan River

Following the comment period, the consultant will revise the Proposed WMP report based on the comments, in consultation with the Department,. The consultant will prepare the WMP Report from the Proposed WMP report with the addition of a section describing how the comments affected the final WMP. The consultant will submit the WMP Report to the Department within 40 days of the close of the comment period to allow time for the Department to issue a decision on the WMP within 60 days of the close of the comment period as required in Env-Ws 1906.07(a).

The contract for the WMP will be complete upon written notice of acceptance of the WMP ready for adoption by the Department. The Department will deem the WMP complete and ready for adoption if the report has been revised as directed by the Department following review and comment at the public hearing.