

**Attachment 3A**  
**MEETING SUMMARY**  
**H2O – Help to Others – Program Board of Directors**  
**September 7, 2011**  
**Newport News**

The Board of Directors agreed that the September 7, 2011 meeting will serve as the annual meeting for 2011 and, therefore, no Board meeting will be held in November 2011.

**1. Salvation Army Partnership Update**

HRPDC staff updated the Board of Directors on partnership efforts with the Salvation Army. The organization is eager to partner with the H2O program, and HRPDC staff has met with representatives from the regional Salvation Army offices in Norfolk (serves Norfolk, Virginia Beach, Chesapeake), Portsmouth (serves Portsmouth and part of Chesapeake), Suffolk (serves Suffolk, Surry and Isle of Wight County), Franklin (serves Franklin, South Hampton and part of Isle of Wight), and Williamsburg (serves Williamsburg, James City County and upper York County). A meeting is pending with the Hampton office (serves Hampton, lower York County, Gloucester County, Newport News, and Poquoson).

The Salvation Army will screen program applicants and determine eligibility. A program budget will be allocated by HRSD to each Salvation Army office based on the number of utility accounts in the localities served by the office. The Salvation Army and HRSD will coordinate on accounts to be paid through the program. All funds will remain with HRSD, and HRSD will remit payment for utility bills. The Salvation Army would like to have an identified program contact at each utility billing department

The Salvation Army currently partners with Dominion Power to administer the utility's assistance program, which applies similar eligibility criteria. Salvation Army staff is therefore comfortable with screening clients using various resources to accurately assess need.

The H2O Board of Directors agreed to partner with the Salvation Army. The following next steps were discussed by the Board:

- Partnership Memorandum of Agreement (MOA): HRPDC staff will draft the MOA between the H2O Board of Directors, HRSD, HRPDC, and the participating Salvation Army offices for review. Final approval of the MOA will require approval from the Salvation Army office in Washington DC.
- Envelope Printing: Proposals were due August 29, 2011. The best proposal came in at \$29,750. The Board may wish to consider adjusting the \$20,000 envelope printing budget in the future. As changes are occurring with HRSD's billing service, the price quote included the \$500 cost to split the shipment of envelopes

between Virginia and New Jersey billing offices. The first shipment of 250,000 envelopes will be sent to HRSD for inclusion with the November 2011 bills. In the future, as options for online donations and e-billing emerge, Staff will assess anticipated impacts to envelope printing.

- H2O Website Development: HRPDC has received 2 of three quotes solicited for website development. Costs are anticipated in the \$3500 range. Staff will pursue the most promising quote.
- Utility Contacts: HRPDC will collect direct contact numbers from each utility billing office to provide to Salvation Army.
- Applicant Screening: HRPDC will work with Salvation Army staff to compile screening questions.
- Training: HRPDC staff will compile a program administration package and set-up training days for Salvation Army staff in December 2011.
- Program Kick-off: HRPDC staff will set up the H2O Program kick-off meeting with Salvation Army and Utility Billing Department representatives in January 2012.

**ACTION:** 1. The Board of Directors voted to enter into a formal partnership with the Salvation Army.  
 2. HRPDC staff was directed to pursue next steps for partnership and program implementation as listed above.

## 2. Program Eligibility Criteria Document

HRSD, HRPDC, and the Salvation Army reviewed the H2O program eligibility criteria and identified the questions listed below for discussion by the Board of Directors. The answers, as agreed to by the Board, are shown in **bold**:

### Criteria # 3

- Is the \$250 amount adequate to cover the water and wastewater fees, trash fee, and stormwater fee?

**Yes, \$250 is adequate. Program funds may be used to pay combined utility bills if non-payment results in water service shut-off.**

- Will assistance cover late fees, set-up fee or connection fee, outstanding balance from previous residence?

**Assistance should not cover set-up fees or new service fees. Assistance may cover late fees, service re-establishment or reconnection fees, and outstanding balances from previous residence.**

- How will customers who have diverted water or tampered with the water meter be handled?

**No assistance will be provided in such situations. These customers are not eligible.**

Criteria #4

- Is it necessary to include water conservation education? Should this be an optional requirement necessary only if water mismanagement is apparent?

**Criteria 4 shall remain as written. HRPDC staff will talk with Salvation Army staff to highlight the signs of water waste and ask them to notify utilities of suspected waste.**

Criteria #5

- Can language be added that if a utility bill is over \$250, Salvation Army must require client to show they have paid down the difference to \$250?

**The Salvation Army, through discussion with the utility billing department, will determine if \$250 is enough to reestablish service. If \$250 is not enough to reestablish service, a payment plan should be set up by the utility billing department.**

The Board agreed to amend the program eligibility criteria per the discussion reflected above. HRPDC staff will make the appropriate revisions.

**ACTION:** Amend the H2O Program eligibility criteria.

**Attachment 2A  
MEETING SUMMARY  
DIRECTORS OF UTILITIES COMMITTEE  
September 7, 2011  
Newport News**

**1. UASI Water Supply Assessment and Emergency Response Training Project**

The Committee agreed that a closed session discussion was not necessary for the September project update.

HRPDC staff provided the following project updates:

- The project team will provide a briefing on expectations for the final deliverable at the October 5, 2011 Directors of Utilities Committee meeting.
- HRPDC staff has confirmed the utility interview schedule for September and is working on the October schedule.
- Three sub-regional workshops with locality emergency managers originally scheduled for mid-September 2011 were cancelled due to Hurricane Irene recovery efforts. The workshops will be rescheduled for October.

**ACTION:** No action.

**2. Summary of August 3, 2011 Meeting of the Directors of Utilities Committee**

There were no comments on or revisions to the summary of the August 3, 2011 Committee meeting.

**ACTION:** The Summary of the August 3, 2011 meeting of the Directors of Utilities Committee was approved.

**3. Special Order of Consent: Proposed Amendment to the Regional Technical Standards and Development of a Memorandum of Agreement (MOA) for Private Property Infiltration/Inflow (I/I) Abatement**

At the August 3, 2011 Committee meeting, Mr. Richard Stahr provided an update on the Capacity Team's work with the Department of Environmental Quality (DEQ) to memorialize practices for Rehabilitation Planning and for the regional private property I/I abatement program.

Mr. Stahr reviewed the proposed amendments to Section 7 of the Regional Technical Standards (RTS). A copy of the document mark-up is attached. Comments from DEQ are

pending. Upon receipt, comments will be circulated to the Committee. Mr. Stahr also reviewed the proposed amendments to RTS Sections 1, 2, and 8 (see attached mark-up). These changes are proposed for consistency with the revisions to Section 7.

Mr. Stahr reviewed the latest version of the MOA principles. A copy of the document mark-up is attached. The Committee offered comments to clarify the sequence of work, exceptions, and growth. It was noted that the sequence of work relating to locality rehabilitation work and private property rehabilitation work is described in the MOA principles and in the amended RTS Section 7.3 (I/I Reduction Approach, I/I Reduction Extent). For MOA principle number 4, it was clarified that locality physical testing to demonstrate that the public lateral is free of defects includes pressure testing and dye testing. CCTV work is not considered physical testing.

The Committee also discussed issues associated with selection of a level of service (LOS) including peak flow recurrence, implications for wastewater pump station design, and effectuating a more consistent LOS regionally. HRSD noted that they are working on a revised pressure policy and that groundwater adjustments need to be incorporated in the Regional Hydraulic Model.

In response to a question regarding the treatment of federal properties, HRSD indicated that such properties have been placed under administrative order for I/I abatement. Work has already been completed in several basins under the existing program.

At the conclusion of the discussion, the Committee agreed to move forward with the MOA and the amendments to the RTS. The Capacity Team will continue work on the documents and discussions with DEQ. The deadline for agenda items for the December meeting of the State Water Control Board is in October. It was noted that some localities expect that the amendment to the RTS would have to be approved by city/county councils. Given the anticipated council involvement and the pending DEQ comments, it is unlikely that the proposed amendments to the RTS would be ready by the October deadline. It was recommended that localities take the RTS amendments and the MOA to councils for consideration as a package. The Committee agreed that these documents relate to operational issues and do not think the MOA and RTS amendments need to be presented to the HRPDC.

The Capacity Team will begin examining the issue of affordability and impacts to rehabilitation plan schedules.

**ACTION:** No action.

#### 4. Staff Reports

- **Final Regional Water Supply Plan:** Local program adoption activities continue in individual localities. Localities were asked to submit the following to HRPDC staff:
  - Copy of approved minutes from local public hearing;
  - Copies of any written comments received and locality responses;
  - Copy of the locality resolution adopting the plan.
- **Water and Sewer Rates and Water Use Data Call:** HRPDC staff reviewed the draft format of the 2011 data call for information on water and sewer rates, taxes, and water use by category. There were no comments or revisions recommended by the Committee. Staff will finalize format, populate data, and distribute for Committee review.

**ACTION:** No action on Staff Reports.

#### 5. Other Business

- **Approval of Agenda Topics:** The Committee agreed that informational presentations by consultants or guests sponsored by the Committee are to be scheduled outside of the regular Committee meeting agenda. Such presentations may be arranged for an appropriate duration prior to the meeting and will conclude by 1:15 p.m. Committee members may contact HRPDC staff with any suggestions for speakers or topics of interest.

**ACTION:** No action.

Committee Meeting Sign-In Sheet  
September 7, 2011

Attachment 3B

| Locality/Agency           | Representative     | Representative   | Representative | Representative |
|---------------------------|--------------------|------------------|----------------|----------------|
| HRSD                      | Phil Hubbard       |                  |                |                |
| Chesapeake                | Jim Walski         |                  |                |                |
| Franklin                  |                    |                  |                |                |
| Gloucester                | Martin Schlesinger |                  |                |                |
| Hampton                   | Lynn E. Allsbrook  | Jason Mitchell   |                |                |
| Isle of Wight             | Frank Haltom       |                  |                |                |
| James City County         | Larry Foster       |                  |                |                |
| Newport News              | Reed Fowler        | Everett Skipper  |                |                |
| Newport News              | Brian Ramaley      | Eileen Leininger |                |                |
| Norfolk                   | Kristen Lentz      |                  |                |                |
| Poquoson                  | Ellen Roberts      |                  |                |                |
| Portsmouth                | Bryan Foster       |                  |                |                |
| Smithfield                | Bill Hopkins       |                  |                |                |
| Southampton               |                    |                  |                |                |
| Suffolk                   | Al Moor            | Craig Ziesemer   |                |                |
| Surry                     |                    |                  |                |                |
| Virginia Beach            | Tom Leahy          | Bob Montague     |                |                |
| Williamsburg              |                    |                  |                |                |
| Windsor                   |                    |                  |                |                |
| York                      | Brian Woodward     |                  |                |                |
| HRPDC                     | Julia Hillegass    | Katie Rider      | Lisa Hardy     |                |
| HRPDC                     | Whitney Katchmark  | Tiffany Smith    |                |                |
| New Kent                  |                    |                  |                |                |
| DEQ                       |                    |                  |                |                |
| EPA                       |                    |                  |                |                |
| USGS                      |                    |                  |                |                |
| VDH                       |                    |                  |                |                |
| VDH                       |                    |                  |                |                |
| VDH                       |                    |                  |                |                |
| AECOM                     |                    |                  |                |                |
| AquaLaw                   |                    |                  |                |                |
| Brown & Caldwell          | Richard Stahr      |                  |                |                |
| CH2M-Hill                 |                    |                  |                |                |
| Christian Barton          |                    |                  |                |                |
| CNA                       |                    |                  |                |                |
| Hurt & Proffitt, Inc.     |                    |                  |                |                |
| McGuire Woods             |                    |                  |                |                |
| REMSA                     | Joe Duffy          |                  |                |                |
| Troutman Sanders          |                    |                  |                |                |
| URS                       |                    |                  |                |                |
| Watermark Risk Management |                    |                  |                |                |
| Woolpert                  |                    |                  |                |                |

## **SECTION 1 INTRODUCTION AND PURPOSE**

### **1.1 INTRODUCTION**

This document is Attachment 1 – Regional Technical Standards (Standards) to the Special Order by Consent (Consent Order) issued by the State Water Control Board (SWCB) to HRSD and the Hampton Roads Localities. These Regional Technical Standards provide detailed requirements for completion of the work embodied in the Consent Order, and were developed to ensure a consistent regional approach. These Standards include completion dates for various activities, which are described in terms of months from the effective date of the Consent Order.

### **1.2 PURPOSE**

The purpose of the Consent Order and these Regional Technical Standards is to reduce the occurrence of sanitary sewer overflows (SSOs) in the Regional Sanitary Sewer System. These standards cover the analysis of existing data, collection of additional system data, preparation of rehabilitation plans, correction of serious defects requiring prompt attention, development of a hydraulic model, and assessment of the hydraulic performance of the Regional Sanitary Sewer System. These Standards have been developed to be information-based so that resources are focused on the areas that require attention to mitigate SSOs. Where appropriate, these Standards include quality assurance/quality control procedures related to field data collection.

These Standards also address the relationship between the hydraulic performance of the Regional Sanitary Sewer System, Rehabilitation Plans that will be developed and implemented by HRSD and the Hampton Roads Localities, and the Regional Wet Weather Management Plan. The longer-term repairs of the sanitary sewer system will occur after the term of this Consent Order in accordance with plans developed, submitted and approved pursuant to this Consent Order.

### **1.3 RELATIONSHIP WITH THE MEMORANDUM OF AGREEMENT**

The Localities and HRSD are entering into a Memorandum of Agreement (MOA) which is a long term agreement related to regional collaboration. These Regional Technical Standards have been developed primarily to support the fulfillment of the Consent Order requirements, and are incorporated into the MOA by reference. Future work done outside the context of the Consent Order, and future regulatory actions, should generally be conducted in accordance with these standards when it is appropriate. For example, future flow monitoring performed outside the context of the Consent Order and future regulatory actions would generally be performed in accordance with these standards, but the duration and magnitude of qualifying events could be different from the standards in this document. Similarly, SSES and hydraulic modeling conducted for purposes unrelated to the Consent Order should follow these Standards, with appropriate modifications to reflect the specific application.

Two components of these Standards ~~will survive the fulfillment of the Consent Order and~~ are enforceable under the MOA. These are Exhibit A – Regional Design Guidelines and Exhibit B – Regional Sanitary Sewer System Operating Guidelines.

## 1.4 SUMMARY OF THE REGIONAL TECHNICAL STANDARDS

The following is a brief overview of each section of these Regional Technical Standards:

### **Section 1 – Introduction and Purpose**

This section establishes the context for the Regional Technical Standards.

### **Section 2 – Definition of Terms**

This section provides definitions for the major terms used in the Standards.

### **Section 3 – Data Collection and Flow Monitoring**

This section provides direction on SSO characterization, use of previously developed information, system inventory mapping and GIS data standards, flow monitoring procedures for both model calibration and SSES basin identification, rainfall monitoring, sewer flow evaluation and flow evaluation reporting. Taken together, this section provides the guidance for identification of SSES Basins, which require further investigation.

### **Section 4 – Condition Assessment of Sewers and Pump Stations**

This section provides the guidelines for conducting detailed condition assessment, assessment standards for SSES Basins, and assessment reporting requirements. The information developed through these efforts will be used to develop the SSES Plans in accordance with the requirements in Section 5.

### **Section 5 – SSES Planning**

This section establishes the SSES Basin criteria and the requirements for preparing a prioritized plan for conducting the SSES work. This plan must be submitted to DEQ within 15 months of the effective date of the Consent Order for their review and approval.

### **Section 6 – Hydraulic Performance Assessment**

This section provides the standards for development and application of a hydraulic model that will be used to evaluate system performance under a variety of hydrologic conditions. The model will be used to evaluate the capacity of the existing Regional Sanitary Sewer System, and to develop and review alternatives for providing adequate capacity. Procedures and standards for model development, calibration and verification are included. The model shall be developed within 38 months of the effective date of the Consent Order.

### **Section 7 – Rehabilitation Planning**

This section discusses using the results of the SSES work to develop specific plans for rehabilitation, including evaluation of the effectiveness of rehabilitation on inflow and infiltration reduction, cost estimates and schedules. The Rehabilitation Plans will be submitted to DEQ for review and approval within 62 months of the effective date of the Consent Order. Implementation of the plans is outside the scope of the current Consent Order. Localities will assess the feasibility and cost of achieving

specific peak flow reduction outcomes, which will inform the Regional Wet Weather Management Plan.

### **Section 8 – Regional Wet Weather Management Plan Development**

This section provides the guidelines for developing the Regional Wet Weather Management Plan (RWWMP) that will identify the Regional Sanitary Sewer System improvements necessary to provide capacity to meet an agreed upon level of service. This section includes direction on capacity assessment, level of service selection, development of capacity enhancement solutions, affordability and provides a preliminary outline for the content of the RWWMP. The Regional Wet Weather Management Plan will be submitted to DEQ for review and approval within 74 months of the effective date of the Consent Order.

### **Exhibit A – Regional Design Guidelines**

This section presents regional design guidelines that will be used for design of any new or enhanced major sewer infrastructure until the RWWMP is complete.

### **Exhibit B – Regional Sanitary Sewer System Operating Guidelines**

This section provides guidelines related to operating flow and pressure in the Regional Sanitary Sewer System prior to the approval of the RWWMP.

## **1.5 REVISIONS TO THE REGIONAL TECHNICAL STANDARDS**

The parties agree that minor changes may be made in the Standards without triggering a modification of the Order, provided that such changes are subject of unanimous agreement of the General Manager of HRSD and the Hampton Roads Localities Directors of Utilities and are approved by the Director of DEQ's Tidewater Regional Office.

## SECTION 2      DEFINITION OF TERMS

The following words and terms that have been used in Attachment 1 – Regional Technical Standards shall have the meanings assigned to them below unless the context clearly indicates otherwise. Other commonly used terms used in Attachment 1 are defined by reference to terms in the Sewage Collection and Treatment Regulations (SCATR) [9VAC 25-790] unless otherwise specifically defined in these Regional Technical Standards.

“**ADF**” means Average Daily Flow.

“**Adequate Capacity**” means that the Sanitary Sewer System has a demonstrated ability to manage peak flows at a specific peak flow recurrence interval without causing or contributing to overflows from any component of the Regional Sanitary Sewer System. The specific peak flow recurrence that will be used for the basis of identifying capacity enhancements shall be established within the Regional Wet Weather Management Plan.

Demonstration of adequate capacity for wastewater pumping stations requires each pump station to be capable of transmitting specific peak flows ~~with the largest pump out of service~~, without causing or contributing to overflows. Evaluation of adequate capacity shall consider the interrelationship between: i) each pump and the pump station immediately upstream from that pump station, ii) all pump stations through which flow from that pump station passes to the wastewater treatment plant receiving such flow, and iii) all pump stations discharging directly to the HRSD Sanitary Sewer System, which receive flow from that pump station.

For gravity systems, adequate capacity shall mean that the system can convey the peak flow without exceeding a surcharge level of 1.5 feet below the rim of a manhole.

“**ASCII**” means American Standard Code for Information Interchange.

“**CCTV**” means closed-circuit television.

“**CMMS**” means computerized maintenance and management system.

“**DEQ**” means the Department of Environmental Quality, an agency of the Commonwealth of Virginia as described in Code§ 10.1-1183.

“**Design Flow Rate**” means the flow rate specifically used as the basis of design for facilities within the regional sanitary sewer system.

“**Diurnal curve**” means a graphical or tabular representation of the variation of wastewater flow (excluding rainfall derived I/I contributions) over a typical, 24-hour cycle.

“**DWI**” means dry weather infiltration.

“**Dry Weather Overflow**” means any sanitary sewer overflow for which the underlying cause is not attributable to precipitation related flows.

**“Event of Interest”** means any wastewater flow event or specific rainfall event, which is used to evaluate the performance of the sanitary sewer system.

**“Excessive Pump Run Time”** means a threshold at which a pumping station meets the relevant SSES Basin planning criterion. Excessive Pump Run Time can be identified by evaluating the daily total run time of all pumps within a pump station under wet weather/peak flow conditions. Excessive Pump Run Time exists when the total run time for all pumps within a pump station exceeds an average of 24 hours per day per pump with one pump out of service. This threshold can be calculated using the following equation,:

$$\text{Excessive Pump Run Time} = [(\text{Number of Pumps}) - 1] \times 24 \text{ hours}$$

Excessive pump run time is a threshold that must be compared to actual pump run time under specific flow conditions to identify indications of potential capacity limitations. Excessive pump run time and actual pump runtime should be directly compared for pump stations that are comprised of constant speed pumps of equal size, or multi-speed pumps that are running at full speed.

**“GIS”** means Geographic Information System.

**“Gravity Sewer Line”** means a pipe that receives, contains and conveys wastewater not normally under pressure, but is intended to flow under the influence of gravity.

**“Ground Water”** means sub-surface water that is stored in the voids between soil particles.

**“Hampton Roads Localities”** means the cities of Chesapeake, Hampton, Newport News, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg; the counties of Gloucester, Isle of Wight, James City, and York; and the town of Smithfield.

**“Hampton Roads Locality” or “Locality”** means one of the Hampton Roads Localities.

**“HRPDC”** means Hampton Roads Planning District Commission, a political subdivision of the state. The purpose of planning district commissions, as set out in the Code of Virginia, Section 15.2-4207 is “...to encourage and facilitate local government cooperation and state-local cooperation in addressing on a regional basis problems of greater than local significance.”

**“HRSD”** means Hampton Roads Sanitation District, a political subdivision created by a 1940 Act of the General Assembly of Virginia and charged with the responsibility to provide sewage collection, conveyance, and treatment services for the communities in the Hampton Roads metropolitan area.

**“HRSD Master Meter”** means a permanent flow or pressure meter installed in a location mutually agreed upon between HRSD and the Hampton Roads Localities, owned and operated by HRSD, and specified within the HRSD Master Metering Program. HRSD Master Meters are used to evaluate Operating Flow.

**“Hydrograph”** means the graphical or tabular representation of flow volume over time, which could depict a specific hydrologic condition.

“**I/I**” means the infiltration and inflow, which is a component of sewer flow contributed as a result of groundwater and precipitation that enters the sanitary sewer system.

“**Illicit Connection**” means an unauthorized connection to the sanitary sewer system, including but not limited to area drains, foundation drains, roof drains and sump pumps. Illicit connections are connections that have been made to the sanitary sewer system without the knowledge and/or approval of the Locality or HRSD.

“**IIMS**” means information management system, which is a formalized system to manage data.

“**Infiltration**” means water other than wastewater that enters a sewer system (including sewer service connections) from the ground through such means as defective pipes, pipe joints, connections, or manhole walls. Infiltration does not include, and is distinguished from, inflow.

“**Inflow**” means water other than wastewater that enters a sewer system (including sewer service connections) from sources such as, but not limited to, roof leaders, cellar drains, yard drains, area drains, drains from springs and swampy areas, manhole covers, cleanouts, cross connections between storm sewers and sanitary sewers, catch basins, cooling towers, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include, and is distinguished from, infiltration.

“**Interceptor Sewer**” means a sewer, typically without individual sewer customer connections, that is used to collect and carry flows from main and trunk sewers to a central point for treatment and discharge.

“**LACP**” means Lateral Assessment Certification Program developed by National Association of Sewer Service Companies.

“**Level of Service**” means the peak sewer flow recurrence interval that the Regional Sanitary Sewer System can convey without resulting in a capacity-related SSO. Level of service can be expressed as a specific flow and associated pressure at a point in the Regional Sanitary Sewer System as defined by the Regional Hydraulic Model that corresponds with the sewer flow recurrence interval.

“**MACP**” means Manhole Assessment Certification Program developed by the National Association of Sewer Service Companies.

“**Management, Operations, and Maintenance or MOM**” means a flexible program of accepted industry practices to properly manage, operate and maintain a sanitary sewer system.

“**NASSCO**” means National Association of Sewer Service Companies.

“**ODBC**” means Open Database Connectivity.

“**Operating Flow**” means three times the actual average potable water consumption for domestic flow and smaller commercial flow within a specific sewer basin (or pump station service area). Major industrial and commercial wastewater flows (100,000 gpd and greater) are added to the Operating Flow based on their peak metered flow rates. When the peak hourly flow rate as measured at HRSD Master Metering sites exceeds the corresponding Operating Flow

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prior to the approval of the RWWMP, HRSD and the affected Localities will jointly evaluate the hydraulic capacity of the impacted facilities and determine the appropriate course of action.

“**PACP**” means Pipeline Assessment Certification Program developed by NASSCO.

“**Peak Flow**” means the maximum hourly wastewater flow that occurs at a specific location within the sanitary sewer system.

“**Peak Flow Recurrence**” means the statistical probability of achieving a certain peak sewer flow. Typically, these values are expressed in terms of return years, or return frequency. As an example, a 10-year peak flow recurrence represents the probable peak sewer flow that is expected to occur once every 10 years.

“**Peak Flow Threshold**” means the calculated flow of 775 gallons per day per existing residential unit plus 3 times commercial water consumption plus actual major commercial and industrial (100,000 gpd and greater) flows.

“**Preventable Overflow**” or “**Preventable SSO**” means overflows, which could have reasonably been prevented through due diligence, proper operations and maintenance, reduction in I/I, or increased capacity of the sanitary sewer system.

“**Private Service Connection/Lateral**” means that portion of the collection system used to convey wastewater from a building or buildings to that portion of the sanitary sewer system owned by the Locality.

“**Pumping Station**” means facilities comprised of pumps which lift wastewater to a point physically higher than the wastewater elevation in the wet well, including all related electrical, mechanical, and structural systems necessary to the operation of that pumping station.

“**RDII**” means rainfall-derived inflow and infiltration. RDII is a parameter that can be measured, estimated or synthetically generated through other means, such as flow monitoring data or hydraulic modeling.

“**Regional Design Guidelines**” means the standards adopted by HRSD, the Hampton Roads Localities and DEQ for the design of any new or enhanced major sewer infrastructure (i.e., regional pump stations, major interceptors, etc.) until the Regional Wet Weather Management Plan is complete. The adopted Regional Design Standards will be based on a peak hourly residential wastewater flow of 250 gallons per capita per day at an assumed 3.1 persons per household, or 775 gallons per residential unit per day; plus peak hourly commercial/industrial wastewater flow based on actual flow if available, or 3 times the average projected water consumption if not available. The relationship of peak water consumption to peak wastewater flow is assumed to be 3 times the water consumption is equal 2.5 times wastewater flow.

“**Regional Hydraulic Model**” means the hydraulic model of the following components of the regional sanitary sewer system:

- All HRSD pipes, HRSD pumping stations, and HRSD pressure reducing stations, in the regional sanitary sewer system

- Locality pumping stations that directly discharge into a HRSD interceptor sewer
- The gravity sewers extending one manhole upstream from each Locality pumping station that directly discharges to a HRSD interceptor sewer (Note that some pumping stations may receive discharge from multiple sewers; in these instances, the first upstream manhole on each line will be included).
- Locality gravity sewers extending one manhole upstream from the point of connection with an HRSD gravity interceptor.

**“Regional Sanitary Sewer System”** means the collective sanitary sewer systems owned and operated by the Localities, as well as the HRSD sanitary sewer system including gravity sewer lines, manholes, pump stations, lift stations, pressure reducing stations, force mains, wastewater treatment plants, and all associated appurtenances.

**“Regional Wet Weather Management Plan (RWWMP)”** means the document to be developed jointly by HRSD and the Hampton Roads Localities that defines prioritized capital and operating improvements in the Regional Sanitary Sewer System necessary to manage peak wet weather flows to achieve a mutually agreed upon level of service.

**“Rehabilitation Plan”** means documents to be developed individually by each Hampton Roads Locality and HRSD that define specific measures to reduce SSOs, address deficiencies identified in SSES Basins; identify system-wide improvements including control of I/I sources and improvements needed to ensure sustainability of the sanitary sewer infrastructure.

**“Replacement”** means obtaining and installing equipment, accessories, or appurtenances which are necessary at the end of the design or useful life, whichever is longer, of the sanitary sewer system to maintain the capacity and performance for which such works were designed and constructed.

**“Rainfall Recurrence Interval”** means the statistical probability of achieving a rainfall of specific intensity, volume and duration. Typically, these values are expressed in terms of return years. As an example, a rainfall with 2-year recurrence interval has a probability of occurring once every two years.

**“Sanitary Sewer Overflow (SSO)”** means the unauthorized intentional or unintentional spill, release, or discharge to waters of the State of untreated wastewater from any portion of a sanitary sewer system before the headworks of a Wastewater Treatment Facility.

**“Sanitary Sewer System”** means the wastewater collection and transmission system that is comprised of all portions of the individual Hampton Roads Locality or HRSD collection systems, including manholes, gravity sewers and force mains, lift stations, pump stations, and associated appurtenances. Building sewer laterals are not considered part of the Locality’s sanitary sewer system.

**“Sewer Basin”** means all portions of the sanitary sewer system tributary to an interceptor sewer or pump station (also referred to as a pump station service area). Generally, the sewers within a Sewer Basin are hydraulically linked.

**“Sewer Basin Criticality”** means an expression of the condition of a sewer basin as it relates to consequences of failures within the associated sanitary sewer system. Sewer Basin criticality may consider factors such as environmental risk, public health risk (including potential impacts to drinking water sources from SSOs), economic risk (including potential impacts on new service connections due to sanitary sewer system capacity limitations), and operational risk.

**“Sewer System Evaluation Survey (SSES)”** means a systematic examination of a sanitary sewer system or portion thereof to, at a minimum: i) identify the condition of sewers, manholes, pump stations and associated appurtenances; ii) identify I/I sources, locations, and associated extraneous flow rates; iii) characterize the wastewater flow; and iv) determine technically feasible, cost effective methods of rehabilitation.

**“Significant Rainfall Event”** means a rainfall event, which results in an associated measurable increase of wastewater flow in the sanitary sewer system above dry weather flows. Significant rainfall events are defined solely for the purposes of flow monitoring data analysis.

**“SSES Basin”** means a defined portion of the sanitary sewer system where historical data and/or flow monitoring data collected pursuant to this Attachment indicate high levels of RDII, unresolved SSOs, or other characteristics described in Section 5.1 that warrant investigation. SSES Basins will be subject to investigation to identify infrastructure deficiencies and define the potential for peak flow reduction.

**“Supervisory Control and Data Acquisition (SCADA)”** means a computer system for gathering and analyzing real time data.

**“Surcharge”** means the condition where gravity sewer flow depth exceeds the diameter of the sewer line that is conveying the flow.

**“TAZ”** means Traffic Analysis Zone. Demographic data for each TAZ is maintained by HRDPC in a GIS database, and includes population and workforce data used to predict growth and future flows for modeling purposes.

**“Unpermitted Discharge”** means the discharge of pollutants from a point source into waters of the State, which is not authorized by a VPDES Permit, including but not limited to any SSO, which reaches waters of the Commonwealth.

**“Unresolved SSO”** means any SSO for which the underlying cause has not been resolved so as to prevent future reoccurrences at that location from that cause.

**“Useful Life”** means the length of time, or period during which infrastructure assets operate. Useful life is not synonymous with “design life” which is the period over which infrastructure assets are planned to be used and designed to be operated.

**“Water Consumption”** means the volume of potable water consumed by residential, commercial, and industrial users as measured by potable water meters.

## AMENDED SECTION 7 REHABILITATION PLANNING

### 7.1 PURPOSE

A Rehabilitation Plan shall be developed to address deficiencies identified in the SSES Basins; system-wide improvements including control of I/I sources; and improvements needed to ensure sustainability of the regional sanitary sewer system and protect water quality, human health, and the environment. Rehabilitation shall be considered the repair or replacement of existing sewer assets to restore or improve the performance of the regional sanitary sewer system.

Factors to be considered in the development of the Rehabilitation Plan include:

- Location, cause and frequency of SSOs
- Structural condition of assets
- ~~Hydraulic capacity of existing assets versus capacity needs~~ Potential for future capacity enhancements (level of service requirement)
- I/I reduction potential
- Criticality of the pump station, sewer basin, or sewer
- Technical feasibility of rehabilitation
- Durability and useful life of various remedies
- Economic feasibility of rehabilitation
- Affordability of the Rehabilitation Plan in relation to the implementation schedule

The structural conditions of the assets shall be identified in the Condition Assessment documentation described in Section 4.8. The durability, useful life, and I/I mitigation effects of rehabilitation measures shall be considered when comparing asset repair versus asset replacement alternatives.

The criticality of individual assets shall be considered during the prioritization of projects in the Rehabilitation Plan. The prioritization shall consider the risk and consequence of failures that may be prevented or mitigated by each project. Projects that mitigate chronic SSOs and conditions leading to environmental, public health, or safety risks will be given the highest priority.

### 7.2 GOALS

The goals of the Rehabilitation Plan are to:

- Prevent SSOs by addressing localized significant defects and bottle necks in the sanitary sewer system
- Reduce I/I and thereby peak flows
- Ensure sustainability of the infrastructure assets by addressing identified deficiencies
- Identify means and methods to remedy the problems

- Establish prioritization of rehabilitation efforts for inclusion in the Locality's Capital Improvement Program

### 7.3 I/I REDUCTION APPROACH

Engineering judgment should be used to estimate the percent of I/I that can be removed within an SSES Basin based on observed defects, general pipe/manhole condition, material of construction, and estimated I/I contributions within the sanitary sewer system exclusive of contributions from private sanitary sewer connections. Consideration shall be given to the "fluid" nature of the I/I sources, particularly if rehabilitation is limited to specific components in the total system. A common error in estimating the effectiveness of rehabilitation is to assume net sewer service area effects will be equal to the sum of the I/I values initially allocated to specific rehabilitation components. Rehabilitation in one area can result in raising the groundwater level, increasing leakage in previously adequate sewers because of increased hydraulic head. Historically, peak flows represent a surcharge condition, in which rehabilitation efforts will not register any overall reduction until peak flows have been reduced below the capacity of the limiting conveyance segment of the surcharged section. Understanding the effectiveness of the sewer rehabilitation I/I control program is essential to making the right decisions regarding rehabilitation versus increasing conveyance capacity. Additional guidance information may be found in the WEF Manual of Practice FD-06 – "*Existing Sewer Evaluation and Rehabilitation*", and WERF Publication 99-WWF-8 – "*Reducing Peak Rainfall Derived Infiltration/Inflow Rates – Case Studies and Protocols*."

Various rehabilitation and replacement methods have differing levels of effectiveness, maintenance impacts and life spans. These variations should be considered when evaluating the costs and benefits of alternatives.

Localities and HRSD, for its gravity sewers, shall make a Peak Flow Commitment (PFC) for the post rehab peak hour flow. The PFC shall be defined as the post rehab flow rate at a 10 year recurrence interval based on confirmed by post rehab flow monitoring and hydrologic modeling for a specific basin. The pre-rehab 10 year peak hour flow shall be based on the hydrologic parameters contained in the Regional Hydraulic Model (RHM) as of July 31, 2011. Should subsequent information become available necessitating a change in a basin's 10 year peak flow, the Locality shall notify DEQ and HRSD in writing of the change including technical justification. This circumstance would be the exception as final pre-rehab flow parameters have been agreed upon.

#### 7.3.1 Locality Rehab Plans

All rehabilitation planning shall be at the sewer basin level as defined in the approved SSES Plans. Localities shall make a Peak Flow Commitment (PFC) for each SSES basin. In some selected cases, the Locality PFC from several basins may be aggregated into a single commitment where it is impractical to measure the PFC at the basin level and the Locality, HRSD and DEQ agree.

Each Locality shall make a PFC for each basin based on the rehab extent and I/I reduction extent below. The Locality's PFC shall be independent of HRSD's PFC for its gravity sewers except where a mutually agreed upon joint commitment has been developed.

### **Rehab Extent**

In SSES basins, the Locality Rehab Extent (%) =  $[0.185x(X-775)] + 5$ ; where X = Estimated 10 year peak hour flow, gpd/ERU, up to values of 1126. For estimated 10 year peak hour flow values exceeding 1126, the minimum rehab extent is 70%. Rehab extent for this case is comprehensive public side rehab including all taps, publicly owned laterals, cleanouts, mainline gravity sewers and manholes within the rehab area. ERU shall mean the equivalent residential units calculated as the number of single family dwellings, plus the number of multifamily units, plus 3 times commercial water consumption divided by 775 gpd.

If DEQ, the Locality and HRSD agree that definitive and adequate SSES data exists for an entire basin to support an alternative rehab extent, the extent of rehab may be based on the data and the I/I reduction extent shall be per the formula in this section. This case is expected to apply to a relatively small fraction of SSES basins.

In determining how much rehabilitation work a Locality shall perform, the governing factor shall be achievement of the PFC, as demonstrated through flow monitoring, irrespective of the percentage of system rehab performed.

### **I/I Reduction Extent**

Locality I/I reduction that forms the basis for the PFC shall conform to the following:

- If the SSES basin 10 year peak hour flow is less than or equal to 950 gpd/ERU, the minimum required I/I reduction is the reduction required to achieve the PFT.
- If the SSES basin estimated 10 year peak hour flow is greater than 950 and less than or equal to 1901 gpd/ERU, the minimum required I/I reduction (%) =  $[0.0105x(X-950)] + 20$ , where X is the estimated 10 year peak hour flow in gpd/ERU.
- If the SSES basin 10 year peak hour flow is greater than 1901 gpd/ERU, the minimum required I/I reduction is 30%.

For certain SSES basins, where DEQ, the Locality and HRSD agree, I/I reduction from rehabilitation of less than the values derived from the formulas indicated above will be allowable provided that data is available to support such a determination.

### **Example Calculations**

Estimated 10 year peak flow = 1100 gpd/ERU

Base Flow = 200 gpd/ERU

Estimated I/I = 900 gpd/ERU

Land Use is 80% single family residential, 180 connections.

Planned Locality rehab extent =  $0.185x(1100-775)+5=65$  % of mainlines, manholes & public laterals

Estimated I/I Reduction =  $0.0105 \times (1100 - 950) + 20 = 22\%$ ; Remaining I/I =  $(.78)(900) = 702$  gpd/ERU

Peak Flow Commitment =  $200 + 702 = 902$  gpd/ERU

When the Locality demonstrates that it has achieved its PFC through flow monitoring, hydrologic modeling and long term simulation, no further rehabilitation efforts are required. Use of representative or associated flow data shall not be used to demonstrate achievement of the PFC. Flow monitoring shall meet the RTS data accuracy specifications (RTS Section 3.3.4) and shall be conducted in each SSES basin until three individual rainfall events, each of which has a 24 hour rainfall accumulation of at least 1 inch and one of which has at least 1.5 inches of rainfall accumulation over 24 hours, are monitored.

Should the Locality find it has not achieved its PFC; the Locality shall perform additional rehabilitation efforts until the PFC is achieved. If a Locality completes all the rehab activities for a particular basin and the PFC is not met, the Locality shall notify DEQ and provide its intended course of action. Should the Locality and HRSD jointly determine that additional rehabilitation efforts are not cost effective or feasible, system storage or other alternative approaches agreed to by HRSD and the Locality may be utilized to meet the PFC, with DEQ concurrence. The Locality and HRSD shall collaborate to confirm the decision that additional rehabilitation work is not feasible.

The PFC may be adjusted to account for growth and/or changes in land use that affect sewer flows from the date of the flow monitoring that was used to establish the PFC to the date of demonstration of achievement of the PFC, provided that DEQ and HRSD agree that conclusive data has been provided to validate the amount and nature of growth and the system flows associated with such growth.

### 7.3.2 HRSD Gravity Sewers Rehab Plan

HRSD will prepare a Rehab Plan that includes all of its gravity sewers and manholes. All HRSD gravity sewers and manholes that have not been comprehensively rehabilitated or replaced since September 2007 and verified by CCTV inspection, shall be rehabbed or replaced as part of the Rehab Plan.

HRSD shall make a PFC based on the extent of HRSD gravity sewer rehab. This commitment will be based on removal of 30% of the I/I estimated to be associated with the HRSD gravity sewers based on an inch-diameter-mile (IDM) calculation including all Locality and private sewers tributary to the point(s) of measurement. The total estimated I/I shall be allocated to the HRSD gravity system in proportion to its IDM fraction of the total system including estimated private infrastructure.

#### Example Calculation

Estimated 10 year peak flow at point of measurement in HRSD gravity sewer = 2400 gpd/ERU

Estimated base flow = 200 gpd/ERU

Estimated 10 year I/I = 2200 gpd/ERU

Total Inch- Diameter-Mile (IDM) tributary to point of measurement as follows:

Locality gravity pipe – 400,000 lf of 8” diameter = 606 IDM

Locality public laterals – 4,000 each of 4” diameter at 25 lf/each=76 IDM

Private Sewers – 106,500 lf of 6” diameter = 121 IDM

HRSD Gravity Pipe – 2 miles of 48” diameter = 96 IDM

TOTAL IDM = 899 IDM

HRSD IDM Portion =  $96/899 = 10.7\%$

HRSD I/I Allocation =  $0.107 \times 2200=224$  gpd/ERU

HRSD I/I Reduction Commitment =  $224 \times 0.30=67$  gpd/ERU

#### 7.4 Rehabilitation Toolbox

The following suggested budgetary unit costs (2011\$) are provided as guidelines for preparing Rehabilitation Plan cost estimates and should be applied with appropriate engineering judgment. All Locality and HRSD Rehabilitation Plans shall use at least the minimum unit costs shown and may use a higher number if local conditions warrant.

|  |  |
|--|--|
| Mainline sewer lining – 8” diameter                                      | \$ 70 to \$90 /LF                                    |
| Mainline sewer lining – 10” diameter                                     | \$ 90 to \$100 /LF                                   |
| Mainline sewer lining – 12” diameter                                     | \$ 100 to \$120 /LF                                  |
| Mainline sewer lining (diameters greater than 12”)                       | \$90 + \$9/in-dia(>12”) to \$120 + \$12/in-dia(>12”) |
| Mainline Replacement (diameters to 12”, depths to 10’)                   | \$100 to 140/LF                                      |
| Mainline Replacement (diameters to 12”, depths 10’ to 20’)               | \$150 to \$250/LF                                    |
| Manhole Rehab (diameters to 5’, depth to 10’)                            | \$2500 to \$4000/EA                                  |
| Manhole Replacement (diameters to 5’, depths to 10’)                     | \$3500 to \$6000/EA                                  |
| Manhole Replacement (diameters to 5’, depths 10’ to 20’)                 | \$5000 to \$8000/EA                                  |
| Public Lateral Replacement (lengths to 35’, includes cleanout)           | \$2000 to \$6000/EA                                  |
| Public Lateral Replacement (lengths greater than 35’, includes cleanout) | \$2000 +\$60/LF to \$6000 +\$80/LF                   |
| Private Lateral Replacement (lengths to 50’)                             | \$2000 to \$4000/EA                                  |
| Private Lateral Replacement (lengths greater than 50’)                   | \$2000 +\$50/LF to \$4000 +\$60/LF                   |
| Clean Out Replacement/Addition   | \$1000 to \$2000/EA                                  |

|  |                         |
|--|-------------------------|
| Manhole Inserts  | \$110 to \$200/EA       |
| Point Repairs (up to one joint of pipe, depths to 10')     | \$5000 to \$10,000/EA   |
| Point Repairs (up to one joint of pipe, depths 10' to 20') | \$10,000 to \$20,000/EA |
| Clean Out Plugs  | \$40 to \$60/EA         |
| Contingency (on construction subtotal)                     | 15 %                    |
| Engineering (on construction subtotal)                     | 15%                     |

Costs are capital only and include all related costs such as traffic control, excavation, backfill, restoration, mobilization, etc.

HRSD and the Localities shall prepare cost estimates for Rehabilitation, generally conforming to the above guidelines, but informed to local specific conditions. Engineering judgment shall be applied as costs will vary substantially depending on many factors including but not limited to traffic control, soil conditions, excavation depths, restoration requirements, etc. Costs shall be presented in the Plan in 2012 dollars. Costs presented in the above table shall be adjusted in accordance with the index published in Engineering News Record (ENR CCI).

## 7.5 PRIORITIZATION OF PROBLEMS AND IDENTIFIED DEFECTS

The prioritization of significant defects is needed in order to develop a plan to systematically reduce I/I, and ultimately reduce SSOs, that occur in the system. ~~The prioritization shall consider areas with the majority of SSO occurrences and the most severe defects. In addition, there are several other factors that need to be considered when working through the prioritization.~~ Items to consider when prioritizing rehabilitation activities include:

- Number and severity of system defects
- Number of SSOs that could be avoided if the system were rehabilitated
- Operation and maintenance history and costs
- Quantity of I/I entering the system and potential for I/I reduction
- Probability and consequence of failure of the sanitary sewer system
- Available capacity
- Estimated cost of the proposed rehabilitation
- Technical complexity of the rehabilitation activities and potential secondary impacts

A ranking system shall be developed that accounts for factors that influence the prioritization of system improvements. Individual utilities may weight the criteria differently and/or may add additional criteria based on their need and desired priorities. In any case, the prioritization shall consider the above criteria as a minimum. Careful consideration shall be given to compiling logical work packages that aggregate rehab segments to facilitate construction.

Components that are scheduled for rehabilitation may be impacted by the outcome of the Regional Wet Weather Management Plan (RWWMP). In general, the need to rehabilitate a component may be superseded if the component is scheduled to be replaced in the RWWMP for capacity reasons. HRSD and Localities should revisit their Rehab Plans after the RWWMP is approved to address any scheduling issues.

## **7.6 REHABILITATION ALTERNATIVES EVALUATION**

Alternative approaches to rehabilitation shall be considered in the development of the Rehabilitation Plan. This may include rehabilitation, capacity upgrades, flow diversions, and/or replacement. Key factors in deciding a rehabilitation method for various facilities will include the: structural condition, mechanical condition, capacity requirements, type of material, accessibility, conflicting utilities and other facilities, extent of repair needed, remaining useful life and cost of rehabilitation or replacement.

### **7.6.1 Rehabilitation vs. Replacement**

It will be necessary to determine if failing portions of the system can be rehabilitated or if they will require replacement. Factors affecting this decision include:

- Available capacity
- Structural condition
- Remaining useful life
- Estimated rehabilitation effectiveness
- Future needs
- Change in system functionality or operation
- Pipe slope
- Restoration requirements
- Cost

### **7.6.2 Methods of Rehabilitation**

Several technologies are available for consideration in developing the Rehabilitation Plan, and new technologies are routinely emerging in the sanitary sewer industry. The Rehabilitation Plan shall consider the application of commonly used rehabilitation and replacement methods, advantages and limitations of the technique. The full range of available rehabilitation methods should be considered at the time the Locality develops the Rehabilitation Plan as described in Section 7.7.

## **7.7 REHABILITATION PLAN**

### **7.7.1 Rehabilitation Plan and Schedule**

Rehabilitation Plans shall be developed to define specific measures that will be taken to reduce SSOs, the cost associated with the proposed rehabilitation, and the planned timeframe for

rehabilitation activities. The Rehabilitation Plans shall include PFC, scope of rehab (quantities of rehab or replacement for mainlines, public laterals, manholes, cleanouts – this information does not need to be asset specific), location of rehab within the basin (this may change based on achievement of the PFC and/or new field information gathered after submittal of the Rehab Plans), schedule and cost in the dollar value of the year the plan is submitted. The schedules and sequencing of Localities and HRSD rehab work shall be coordinated. In developing schedules for implementation of the Rehabilitation Plan, the Localities and HRSD should all consider affordability. The Rehabilitation Plan shall be submitted to DEQ for review and approval within 62 months of the effective date of the Consent Order. In addition, each Locality shall submit their estimated post rehabilitation 10 year peak hour flows to the Regional Wet Weather Management Planning Group, which will rely upon these in the completion of the RWWMP.

### 7.7.2 Report on Work Completed

Progress on rehabilitation projects shall be described in the Annual Report to DEQ.

In addition, for each SSES basin, a Completion Report shall be submitted by the Localities to DEQ and HRSD that documents the following information:

- Extent and location of the rehab activities accomplished in map and GIS format
- Summary of rehab activities accomplished (i.e., linear feet of pipe lined, numbers of manholes rehabbed, numbers of public laterals replaced, etc)
- Summary of flow monitoring data collected to demonstrate the achievement of the PFC
- Estimated post rehab 10 year peak hour flow and log Pearson post rehab peak flow recurrence graph showing at least the 2, 5 and 10 year peak hour post rehab flows

HRSD shall submit Completion Reports for the rehabilitation of its gravity sewers to applicable Localities and DEQ. Such reports shall contain the following information:

- Extent and location of the rehab activities accomplished in map and GIS format
- Summary of rehab activities accomplished (i.e., linear feet of pipe lined, numbers of manholes rehabbed, numbers of public laterals replaced, etc)
- Summary of flow monitoring data collected to demonstrate the achievement of the PFC

In cases where there is a joint commitment between the Locality and HRSD, each party shall submit a completion report in accordance with the above requirements.

Completion Reports shall be submitted not later than 90 days from completion of demonstration of the PFC.

## SECTION 8 REGIONAL WET WEATHER MANAGEMENT PLAN DEVELOPMENT

### 8.1 BACKGROUND AND PURPOSE

HRSD and the Hampton Roads Localities are entering into a collaborative process to address sanitary sewer overflows (SSOs). One component of this challenge is the provision of adequate capacity to collect, convey and treat peak flows in the Regional Sanitary Sewer System during wet weather. HRSD owns, operates and maintains the backbone infrastructure generally consisting of pump stations, pressure reducing stations, interceptors and treatment works for the region. The Localities generally own, operate and maintain sanitary sewer facilities that collect and convey wastewater to HRSD. During some wet weather conditions, facilities owned by the Localities and HRSD are strained to convey peak flows without experiencing SSOs.

The purpose of the Regional Wet Weather Management Plan (RWWMP) is to define improvements in the Regional Sanitary Sewer System necessary to achieve a mutually agreed upon level of service. Procedures are identified in Section 6 for evaluating the hydraulic performance assessment of the Regional Sanitary Sewer System under a range of hydrologic conditions. The hydraulic performance assessment will identify hydraulic deficiencies for each condition analyzed. This output will be used as input to the RWWMP.

Three types of improvements shall be defined and analyzed:

- Large scale strategies to address major systemic hydraulic deficiencies
- Improvements to the pump stations, force mains, sewer mains and interceptors
- Improvements needed to ensure adequate capacity ~~in SSES Basins where the Locality's or HRSD's individual Rehabilitation Plans are not expected to reduce the peak flow at the agreed upon level of service to within the Peak Flow Threshold, by retaining the peak flows (i.e., storage, real time controls, etc.) until capacity is available.~~

Alternatives for addressing the hydraulic deficiencies will be developed and analyzed. Cost, feasibility, operations and maintenance issues, risk, performance, flexibility and local impacts will be considered in the analysis of alternatives. The preferred set of alternatives necessary to achieve the mutually agreed upon level of service will be identified along with their associated costs and implementation schedule.

During the process of actually providing and rehabilitating needed infrastructure, operational considerations shall be analyzed and coordinated between HRSD and the localities to help reduce the effects of high I/I and in turn reduce associated overflows, where possible.

### 8.2 CAPACITY ASSESSMENT

~~(SUPERCEDED BY MINOR REVISION NO. 1)~~

HRSD and the Localities shall develop and document capacity assessments that describe the conclusions regarding capacity deficiencies and hydraulic performance of the Regional Sanitary Sewer System. Conclusions shall include, but not be limited to, identification of areas that do not

have adequate capacity, as defined in Section 2, to manage peak flows under the following conditions:

- Baseline dry weather flows, current conditions and 2030 population
- 2-year peak flow recurrence, current conditions and 2030 population
- 5-year peak flow recurrence, current conditions and 2030 population
- 10-year peak flow recurrence, current conditions and 2030 population

Operational and structural conditions contributing to capacity deficiencies shall also be identified. If a sewer basin is deemed to have adequate capacity under the 10-year peak flow recurrence conditions, additional analysis at lower levels of service may not be required. Any conclusions shall be supported by the modeling output (e.g. graphs, surcharge, depths, peak flow), or other appropriate data.

### 8.3 LEVEL OF SERVICE SELECTION

A key concept in development of the RWWMP is establishing a level of service that will form the basis for planning capacity enhancements. Level of service in this context is defined as the peak sewer flow and associated pressure that the Regional Sanitary Sewer System can convey without resulting in a capacity-related SSO. Level of service in the RWWMP shall be quantified as a peak sewer flow recurrence interval.

Level of service equates to risk of system failure. For example, a sewer that performs at a 2-year level of service would have a probability of overflows being 50% in any given year; at a 10-year level of service, the probability of overflows would be 10% in any given year. The probability of overflow can be estimated based on monitoring and analysis of the flow rate and level of flow in a wastewater collection system, and through analysis of the SSO history. The cost of providing a 10-year level of service (or protection against overflows) is generally significantly greater than providing a 2-year level of service. The cost of service and risk of overflows are inversely proportional.

The costs, benefits and risks associated with achieving various levels of service for the defined capacity enhancements shall be defined in the RWWMP. These costs, benefits and risks shall be analyzed to reach a consensus on the selected level of service. The selected level of service will generally apply across the Regional Sanitary Sewer System although exceptions may be possible on a case by case basis provided that these can be adequately justified by their associated benefits and risks. The selected level of service may be expressed as a flow rate and associated pressure at a specific point in the regional system at a peak flow recurrence as defined by the Regional Hydraulic Model.

### 8.4 DEVELOPMENT OF CAPACITY ENHANCEMENT SOLUTIONS

After a level of service is selected, alternatives to achieve that level of service will be developed and analyzed in order to optimize the solutions needed to ensure adequate capacity. Alternatives shall be developed to address the capacity deficiencies identified per Section 8.2. These alternatives shall consider approaches such as removal of RDII, providing additional hydraulic capacity to convey and treat peak flows, storage options, operational schemes, and satellite treatment. These approaches can be used alone and/or in combination and should follow the Operating Guidelines set forth in Exhibit B. The life cycle costs, constructability, operations and maintenance impacts, water quality benefits, local impacts and risks associated with each alternative shall be described.

August 30, 2007 Amended September 108, 2011 v1

## **8.5 AFFORDABILITY**

An affordability analysis shall be conducted for the selected plan with the results to be used as input to the development of an implementation schedule. The affordability analysis shall use a multifaceted approach which describes affordability in terms of such factors as total annual wastewater costs as a function of median household income, Localities' financial capability, total annual wastewater costs as a function of household income for vulnerable populations, impacts to homeownership and renter housing cost burden and impacts to the local economy and business health. The purpose of the affordability analysis is to provide input to the development of an implementation schedule, which will result in an affordable program for the Hampton Roads region.

## **8.6 RWWMP CONTENT**

The following is a preliminary outline describing the anticipated content of the RWWMP. This outline is intended to provide general guidance for the preparation of the RWWMP. It is anticipated that some deviation from this outline will occur in the development of the RWWMP.

### **1. Introduction**

- 1.1 Background
- 1.2 Purpose and Format of Regional Wet Weather Management Plan

### **2. Consent Order Requirements**

### **3. Public Participation and Agency Coordination**

### **4. Characterization Report**

- 4.1 Sanitary Sewer System
  - 4.1.1 Localities Sanitary Sewer Systems
  - 4.1.2 HRSD Sanitary Sewer System
  - 4.1.3 Service Areas
  - 4.1.4 Historical Wastewater Flow Projections
- 4.2 HRSD Wastewater Treatment Works
  - 4.2.1 North Shore Facilities
  - 4.2.2 South Shore Facilities

### **5. Planning Process**

- 5.1 Methodology
  - 5.1.1 Large Scale Strategies
  - 5.1.2 SSES Basins
  - 5.1.3 Wastewater Treatment Plant Wet Weather Optimization
- 5.2 Sewer System Capacity Definitions

### **6. Population Forecasts**

- 6.1 Planning Horizon
- 6.2 Population and Employment Forecasts

### **7. System Evaluation**

- 7.1 Model Framework
  - 7.1.1 Dry Weather Flow

- 7.1.2 Wet Weather Flow and Peak Flow Commitments
- 7.1.3 Peak Flow Reductions Expected from Localities' Rehabilitation Plans
- 7.1.4 Capacity Deficiencies
  - 7.1.4.1 Deficiencies in the Regional Sanitary Sewer System
  - 7.1.4.2 Deficiencies at the WWTPs
- 7.1.5 Modeled Conditions
- 7.2 Evaluation of Pump Stations, Main Trunk Sewers and Interceptors
  - 7.2.1 Pump Stations, Main Trunk Sewers/Interceptors Studied
  - 7.2.2 Level of Service Evaluation
  - 7.2.3 Peak Flow Events
  - 7.2.4 Methodology
  - 7.2.5 Identification of Hydraulic Deficiencies
- 7.3 Wastewater Treatment Plants
  - 7.3.1 Historical Flow Data
  - 7.3.2 Evaluation for Extreme Events
    - 7.3.2.1 Selection of Historical Events
    - 7.3.2.2 Projecting to Future Conditions
    - 7.3.2.3 Recurrence Frequency Analysis
- ~~7.4 SSES Basins Not Meeting Peak Flow Threshold~~
  - ~~7.4.1 Methodology~~
  - ~~7.4.1 Evaluation~~

## **8. Development and Evaluation of Capacity Enhancement Solutions**

- 8.1 Large Scale Strategy Alternatives Evaluation and Selection
  - 8.1.1 North Shore
  - 8.1.2 South Shore
- 8.2 Pump Stations, Main Trunk Sewers/Interceptors
  - 8.2.1 Analysis of 2, 5 and 10 year LOS
  - 8.2.2 LOS Selection for Pump Stations, Trunk Sewer/Interceptors
- ~~8.3 SSES Basins Not meeting Peak Flow Threshold~~
  - ~~8.3.1 Mitigation Options~~
    - ~~8.3.1.1 RDII Abatement Options~~
    - ~~8.3.1.2 Operational Alternative~~
    - ~~8.3.1.3 Conveyance Options~~
    - ~~8.3.1.4 Storage Options~~
    - ~~8.3.1.5 Satellite Treatment~~

~~8.3.2 Alternatives Analysis and Plan Selection~~

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## **9. Wastewater Treatment Plant Alternatives**

- 9.1 Hydraulic Assessment
  - 9.1.1 North Shore
  - 9.1.2 South Shore
- 9.2 Process Assessment
  - 9.2.1 North Shore
  - 9.2.2 South Shore

## **10. Optimization of Wet Weather Improvements**

- 10.1 Description of Large Scale Strategy Alternatives
- 10.2 Sizing the Alternatives

Attachment 1 to the Special Order by Consent – Regional Technical Standards  
Section 8 – Regional Wet Weather Management Plan Development

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10.3 Scoring of Alternatives

- 10.3.1 Cost
- 10.3.2 Constructability
- 10.3.3 Operations and Maintenance
- 10.3.4 Water Quality
- 10.3.5 Local Impacts
- 10.3.6 Risks

10.4 Selection of the Preferred Alternatives

- [10.4.1 HRSD Improvements](#)
- [10.4.2 Locality Improvements](#)

**11. Summary of Wet Weather Management Plan Components**

- 11.1 Overview
- 11.2 Capital Improvement Plans
  - [11.2.1 HRSD CIP](#)
  - [11.2.2 Localities CIP](#)
- 11.3 Operating Plans
- 11.4 Program Summary

**12. Cost Analysis, Implementation Schedule and Risk/Benefit Analysis**

- 12.1 Program Overview
- 12.2 Risk/Benefit Analysis
- 12.3 Affordability Analysis
- 12.4 Prioritization of Improvements
- 12.5 Implementation Schedule
  - [12.5.1 HRSD Schedule](#)
  - [12.5.2 Localities Schedules](#)
- 12.6 Operating Plans

**Hampton Roads Regional  
Infiltration/Inflow (I/I) Abatement  
Memorandum of Agreement Principles**

**Private Property Infiltration/Inflow (I/I) Abatement**

1. HRSD will manage and execute a Regional Private Property I/I Abatement Program in collaboration with Localities. This program will have two principal components – single family residential and commercial (non single family). HRSD intends to fund the single family residential component and may use an enforcement approach for the commercial component that requires property owners to investigate and repair private sewers to reduce infiltration and inflow (I/I).
2. Localities shall use available data from flow monitoring and Sanitary Sewer Evaluation Survey (SSES) field investigations to identify areas (basins or areas within basins) where I/I from private sources is known or suspected to be significant. The data used to support this determination may include smoke testing, flow monitoring, closed circuit television (CCTV) and night flow isolation. Additional information such as pipe age, materials of construction, etc. may be used to support the determination. Localities shall provide the relevant data to HRSD along with their request that HRSD performs or causes to be performed private property I/I abatement activities. Priority shall be given to addressing private property I/I in SSES basins; especially SSES basins where the public side rehab is not expected to reduce the forecasted 10 year peak flow to the peak flow threshold. Known defective private single family laterals outside of SSES basins shall be addressed in the Regional Private Property I/I Program.
3. HRSD may make additional investigations to define the nature and extent of private property I/I contributions and will define the scope of the abatement activities. HRSD will make an initial estimate of the peak flow reduction that is expected to result from the planned private property I/I abatement activities. HRSD will collaborate with the affected Localities to preliminarily define the scope of the abatement activities and estimate the peak flow reduction not later than May 1, 2012. HRSD

and the Locality may each rely upon the estimate of peak flow reduction, as submitted in the Rehab Plan, resulting from the planned private property I/I abatement activities for planning of HRSD and Locality capacity improvements.

4. After the Locality has demonstrated the achievement of the Locality Peak Flow Commitment (PFC), HRSD shall perform or cause to be performed private property I/I abatement in those basins identified by Localities. The single family private property I/I abatement work managed or enforced by HRSD will be external from the building envelope to the Right of Way line where there is a clean out. If a clean out does not exist at the Right of Way, the Locality shall construct or caused to be constructed one for any property where private property I/I abatement work is planned. In addition, wherever Localities rehab the publicly owned laterals and a clean out does not exist, the Locality shall install one. HRSD efforts to test and repair/replace single family private laterals will coincide with the specific areas that Locality public side rehab has been conducted. In these areas, the Locality shall either replace the public laterals or demonstrate through physical testing that the public lateral is free of defects.

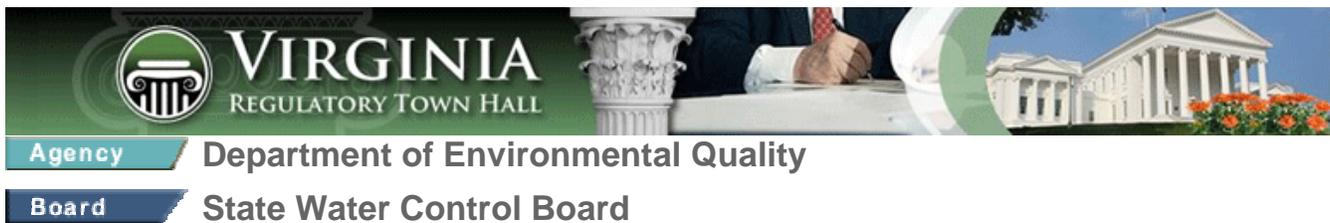
After HRSD managed private property I/I abatement work is performed, HRSD, in conjunction with the Locality, shall collect RTS compliant flow monitoring data at the basin level to estimate the remaining peak flow and demonstrate the PFC has been achieved.

5. For basins where the non single family residential private property I/I flow contribution is estimated to be greater than or equal to 80% (as estimated by percentages of commercial/industrial sewered area or flow data), HRSD managed work on the private side infrastructure will precede or be conducted in parallel with Locality led work on the publicly owned infrastructure.
6. In areas where HRSD managed private property I/I abatement work will be performed, public outreach and communication will be conducted by HRSD in consultation with the affected Localities.
7. HRSD and/or Localities may identify areas outside of SSES basins for private property I/I abatement work through MOM related activities or via other means. HRSD may elect to address such commercial/industrial

(i.e., non single family residential) I/I sources in areas outside of SSES basins.

### Locality I/I Abatement and PFC

8. The PFC for Localities in non SSES basins is the peak flow threshold at a 10 year peak flow recurrence. Hydrologic parameters will be developed to use as model inputs.
9. For SSES basins where rehabilitation is expected to achieve the PFT or below, for the capacity assessment and capacity enhancement planning the post rehab flows will be set at the PFT at a 10 year peak flow recurrence.
10. Growth will be included in the RHM in the capacity assessment and capacity enhancement planning at 775 gpd/ERU at a 10 year peak flow recurrence.
11. The PFCs shall be maintained in perpetuity by the responsible party (Locality or HRSD).
12. Any dispute resolution conducted under this MOA shall use the same process as in the SOC related MOA.



## General Notice

### Notice of Opportunity to Serve on a Stakeholder Group in Advance of Regulatory Action Regarding Groundwater Recharge with Reclaimed Water

Date Posted: 9/16/2011

Expiration Date: 10/7/2011

Submitted to Registrar for publication: YES

**PURPOSE OF NOTICE:** The Department of Environmental Quality is seeking persons interested to serve on a stakeholder group that will provide input to the Department on issues related to groundwater recharge with reclaimed water, and will assist the Department in determining the scope of one or more regulatory actions that may be needed to address these issues.

**DEADLINE FOR SUBMITTAL OF REQUESTS:** October 7, 2011

**BACKGROUND:** Concurrent with the process to develop amendments to the Water Reclamation and Reuse Regulation, the Department studied groundwater recharge with reclaimed water and presented its findings in a report to the regulatory advisory panel (RAP) assisting the Department with the regulation amendments. Based on discussions of the RAP and comments received from individual RAP members, there appeared to be general support for groundwater recharge with reclaimed water for subsequent reuse. While the input of the RAP was valuable, the Department determined that any amendments to the Water Reclamation and Reuse Regulation to address groundwater recharge with reclaimed water may need to be associated with or follow the establishment of a new or revised State Water Control Board policy on groundwater recharge, and a regulatory action to amend the Groundwater Standards (9VAC25-280).

**PURPOSE OF PANEL:** The Department is establishing this stakeholder group to: (i) review previous reports and findings of the Department, discussions of the Water Reclamation and Reuse Regulation RAP, and existing regulations and policies; (ii) discuss relevant issues, and (iii) make recommendations to the Department on the scope of regulatory actions to be considered for groundwater recharge with reclaimed water. The Department is specifically seeking additional input from stakeholders related to protection of groundwater quality. The Department will publish a Notice of Intended Regulatory Action (NOIRA) to begin a rulemaking process following completion of and based substantially upon recommendations of the stakeholder group. Individuals interested in participating in this stakeholder group are asked to send their name, contact information, and qualifications related to groundwater recharge to the contact person listed below.

### Contact Information

|                      |                   |
|----------------------|-------------------|
| <b>Name / Title:</b> | William K. Norris |
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|                       |  |
|-----------------------|--|
| <b>Address:</b>       | 629 East Main Street<br>P.O. Box 1105<br>Richmond, 23218 |
| <b>Email Address:</b> | william.norris@deq.virginia.gov                          |
| <b>Telephone:</b>     | (804)698-4022 FAX: ()- TDD: ()-                          |

| Locality                    | Public Hearing /<br>Approval Date | Approved<br>Meeting<br>Minutes | Written<br>Comments | Responses | Resolution<br>(date rec'd) |
|-----------------------------|-----------------------------------|--------------------------------|---------------------|-----------|----------------------------|
| <b>Peninsula</b>            |                                   |                                |                     |           |                            |
| 1. City of Hampton          | <b>8/10/2011</b>                  | draft                          | none                | none      | √ (8-31-11)                |
| 2. City of Newport News     | <b>8/9/2011</b>                   | draft                          | none                | none      | √ (8-10-11)                |
| 3. City of Poquoson         | <b>8/22/2011</b>                  |                                |                     |           |                            |
| 4. City of Williamsburg     | <b>9/8/2011</b>                   | draft                          | none                | none      | √ (9-26-11)                |
| 5. County of Gloucester     | <b>8/2/2011</b>                   | √ final                        | none                | none      | √ (8-15-11)                |
| 6. James City County        | <b>9/27/2011</b>                  |                                | none                | none      |                            |
| 7. York County              | <b>9/20/2011</b>                  |                                | none                | none      |                            |
| <b>Southside</b>            |                                   |                                |                     |           |                            |
| 8. City of Chesapeake       | 9/27/2011 (PH)                    |                                |                     |           |                            |
| 9. City of Norfolk          | 10/11/2011 (PH)                   |                                |                     |           |                            |
| 10. City of Portsmouth      | <b>8/23/2011</b>                  |                                | none                | none      | √ (8-29-11)                |
| 11. City of Suffolk         | <b>9/7/2011</b>                   | √ final                        | none                | none      | √ (9-27-11)                |
| 12. City of Virginia Beach  | 10/11/2011 (PH)                   |                                |                     |           |                            |
| <b>Western Tidewater</b>    |                                   |                                |                     |           |                            |
| 13. City of Franklin        | <b>9/12/2011</b>                  |                                | none                | none      | √ (9-27-11)                |
| 14. County of Isle of Wight | 10/6/2011 (PH)                    |                                |                     |           |                            |
| 15. Town of Smithfield      | <b>8/2/2011</b>                   | √ final                        | none                | none      | √ (9-12-11)                |
| 16. Town of Windsor         | <b>8/9/2011</b>                   |                                | none                | none      |                            |
| 17. County of Southampton   | <b>8/22/2011</b>                  |                                | none                | none      |                            |
| 18. Town of Capron          | <b>8/1/2011</b>                   |                                | none                | none      |                            |
| 19. Town of Courtland       | <b>8/9/2011</b>                   | √ final                        | none                | none      | √ (9-20-11)                |
| 20. Town of Ivor            | <b>9/12/2011</b>                  |                                |                     |           | pending                    |
| 21. Town of Boykins         | <b>8/9/2011</b>                   |                                | none                | none      |                            |
| 22. Town of Branchville     | August (done)                     |                                | none                | none      | pending                    |
| 23. Town of Newsoms         | <b>8/1/2011</b>                   |                                | none                | none      | √ (8-22-11)                |
| 24. County of Surry         | <b>9/1/2011</b>                   |                                | none                | none      | √ (9-8-11)                 |
| 25. Town of Claremont       | <b>9/1/2011</b>                   |                                | none                | none      | √ (9-21-11)                |
| 26. Town of Dendron         | <b>9/1/2011</b>                   |                                | none                | none      | √ (9-20-11)                |
| 27. Town of Surry           | <b>9/1/2011</b>                   |                                | none                | none      | √ (9-8-11)                 |