



**STATE OF NEW JERSEY**  
**Board of Public Utilities**  
44 South Clinton Avenue, 9<sup>th</sup> Floor  
Post Office Box 350  
Trenton, New Jersey 08625-0350  
[www.nj.gov/bpu/](http://www.nj.gov/bpu/)

WATER

IN THE MATTER OF THE JOINT APPLICATION OF )  
OAKWOOD VILLAGE SEWERAGE ASSOCIATES, )  
L.L.C. AND AION OAKWOOD SEWER, L.L.C. FOR )  
APPROVAL OF A TRANSFER OF CONTROL OF A )  
PUBLIC UTILITY ) DOCKET NO. WM15091006

**Parties of Record:**

**Tricia M. Caliguire, Esq., McCarter & English, LLP**, on behalf of AION Oakwood Sewer, L.L.C., Joint Petitioner  
**Edward K. DeHope, Esq., Riker Danzig Scherer Hyland & Perretti, LLP**, on behalf of Oakwood Sewerage Associates and East Coast Oakwood Apartments, L.L.C., Joint Petitioners  
**Stefanie A. Brand, Esq., Director**, New Jersey Division of Rate Counsel

BY THE BOARD:<sup>1</sup>

On September 4, 2015, Oakwood Village Sewerage Associates, L.L.C. (“Oakwood,” “Oakwood Village,” “OVSA,” or “the Company”) and AION Oakwood Sewer, L.L.C. (collectively, “the Joint Petitioners”) filed a verified petition with the New Jersey Board of Public Utilities (“Board”) seeking approval of the transfer of ownership and control of Oakwood pursuant to N.J.S.A. 48:2-51.1, N.J.S.A. 48:3-10, N.J.A.C. 14:1-5.14, and N.J.A.C. 14:1-5.10.

Oakwood is a public utility, subject to the jurisdiction of the Board, providing wastewater service to 35 customers, comprising 34 single-family homes and a multi-unit garden apartment complex consisting of approximately 1,224 apartments, in the Township of Mount Olive (“Township”), Morris County, New Jersey. The Acquisition of Oakwood by AION Oakwood Sewer, L.L.C. (“AION”) is part of a much larger transaction involving thirteen (13) residential rental properties owned by East Coast Oakwood Village, L.L.C. and affiliated entities. The majority of these rental properties are located in New Jersey.

The Joint Petitioners also requested the Board’s approval of a mortgage agreement that will be executed at the closing of the proposed transaction pursuant to N.J.S.A. 48:3-7.

<sup>1</sup> Commissioner Upendra J. Chivukula recused himself due to a potential conflict of interest and as such took no part in the discussion or deliberation of this matter. Commissioner Joseph L. Fiordaliso was not present at the December 16, 2015 agenda meeting.

Oakwood's tariff has remained unchanged since it was first approved by the Board in I/M/O the Application of Oakwood Village Sewerage Associates, L.L.C., for Approval of (A) Service Area, (B) Issuance of Equity Interests, and (C) Initial Tariff, Docket No. WE00120986, Order dated December 19, 2002 ("December 19, 2002 Order"). The Joint Petitioners request approval of a revised tariff, to be effective as of the date of the Board's approval, modified to reflect minor changes, including addresses, names and citations with no changes in Oakwood's existing rates.

By this Order, the Board considers the Stipulation of Settlement ("Stipulation") executed by representatives of the the Joint Petitioners, the Division of Rate Counsel ("Rate Counsel") and Board Staff ("Staff") (collectively, the "Parties"), agreeing to the proposed transfer of ownership and control of Oakwood.

## **BACKGROUND**

The Board retained jurisdiction in this matter. Discovery was conducted and Joint Petitioners provided responses to four sets of discovery requests. After proper notice, a public comment hearing was held in the Mount Olive Public Library, located close to the apartment complex and housing development served by Oakwood, on the evening of October 26, 2015. No members of the public appeared to provide comments at the public hearing and no written comments were submitted to the Board Secretary by members of the public during the open comment period.

Oakwood is a limited liability company of the State of New Jersey. East Coast Oakwood Apartments Sewerage, L.L.C. ("East Coast") is a limited liability company of the State of Delaware. East Cost is the owner of Oakwood. The Board approved East Coast's acquisition of Oakwood from Oakwood Apartments, L.L.C. in I/M/O the Application of East Coast Oakwood Apartments Sewerage L.L.C. for Approval of a Transfer of Control of Oakwood Village Sewerage Associates, L.L.C., Docket No. WM07070535, Order dated September 12, 2007. AION is a limited liability company of the State of Delaware.

The sewerage treatment plant ("treatment plant") was constructed in 1972 to provide sewerage treatment service to Oakwood Village Apartments ("Apartments"). In approximately 2000, the Mount Olive Township Planning Board ("Planning Board") approved an application to build Dara Estates ("Development"), a 34-unit single family housing development adjacent to the Apartments.<sup>2</sup> The Planning Board set a condition that the Development be served by a central sanitary sewerage collection and treatment system. The Planning Board also required the construction of gravity wastewater collection and transmission mains, a force main, and a wastewater pump station. At that time, the only sewerage treatment plant available to serve the Development was the plant serving the apartments. The Township supplies water service to the Apartments and the Development.

The Township issued a Municipal Consent (Mount Olive Township, NJ Ordinance 41-2000; November 21, 2000) to Oakwood Village "to acquire, construct, operate, maintain and manage a sewage collection, treatment and disposal plant and system ... to the Apartments and the Development and to use "the roads, streets, avenues and ways .. within and adjacent to the Service Area". The Board approved the Municipal Consent in the December 19, 2002 Order.

On July 1, 2003, Oakwood Apartments, L.L.C. and Dara Estates Homeowners Association, Inc. ("HOA") entered into an Operating Agreement for Oakwood Village outlining their mutual obligations to Oakwood Village. Oakwood Apartments, L.L.C. would own one hundred percent

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<sup>2</sup> The Development is now known as Millbrook Estates at Flanders.

(100%) of Oakwood Village and the HOA would be a non-equity member of Oakwood Village with a zero percent (0%) interest in Oakwood Village. Further, Oakwood Apartments, L.L.C. would make all capital contributions to Oakwood Village; contributions for operating expenses would be made to Oakwood Village by both contracting parties. Oakwood has a ninety-nine (99) year lease, dated July 1, 2003, with Millbrook Estates at Flanders Homeowners Association, Inc. (as successor to Dara Estates Homeowners Association) authorizing Oakwood Village to operate pump station, force main and related facilities for delivery of sewage from the Development to the treatment plant. (See Exhibit F to the Petition.)

### **CURRENT OPERATIONS**

The treatment plant is located on Route 206 in Flanders on a 40 acre property. It is a Tertiary Wastewater Treatment Plant with spray irrigation overland flow. Oakwood serves only the Apartments and the Development. Oakwood has no plans or any intention to expand the sewer systems, or to request an expansion of the service territory or the persons eligible for service.

Oakwood has a ninety-nine (99) year lease dated July 1, 2003 between Oakwood as tenant and East Coast Village Oakwood, L.L.C. (as assignee of Oakwood Garden Associates, L.L.C.). The lease demises to Oakwood the treatment plant, including the building and plant equipment, the septic fields, appurtenant parking and access, and the right to flow sewerage to the plant through the existing sewerage mains at Oakwood Village Apartment Complex 6. (See Exhibit E to the Petition.)

Oakwood has a ninety-nine (99) year lease, dates July 1, 2003, with the HOA authorizing Oakwood to operate a pump station, force main and related facilities for delivery of sewerage from the Development to the treatment plant. (See Exhibit F to the Petition.)

Applied Water Management (“Applied” or “AWM”), a subsidiary of Natural Systems Utilities, L.L.C., has for many years operated the treatment plant. On February 1, 2013, Applied and East Coast entered into an Operations and Maintenance Agreement (“O&M Agreement”) for the operation and maintenance of the treatment plant. (See Exhibit G to the Petition.) AION has begun discussions with Applied to extend the O&M Agreement following closing.

### **THE PROPOSED TRANSFER**

East Coast Oakwood Village, L.L.C. and other entities have entered into a Purchase and Sale Agreement dated September 2, 2015 (“PSA”) to sell to AION Real Estate II, L.L.C. land on Route 206 South, in Mount Olive Township, improvements thereon; all tangible personal property thereon; all leases, licenses, and occupancy agreements covering the land and improvements; all related third-party operating agreements; the lease for the treatment plant; and Oakwood’s interest in the lease with the HOA.

At closing:

- AION:
  - Will take title to the Apartments, the sewerage treatment plant; and the property on which the treatment plant is located, and would become the assignee of the landlord’s interest in Oakwood’s lease.
  - Would acquire 100% ownership interest in Oakwood, a public utility regulated by the Board.

- Would assume East Coast's obligations under the O&M Agreement.
- Applied would continue to operate and maintain the system.
- Oakwood will remain a public utility subject to the Board's jurisdiction, operating in accordance with its revised tariff, to be effective as of the date of closing.
- AION is contemplating placement of a fixed-rate loan from a local regional bank to purchase all of the assets described in the PSA. It is expected that treatment plant and the property on which it is located, which will be owned by AION, will be subject to this mortgage.

### **THE STIPULATION**<sup>3</sup>

Some of the key provisions of the Stipulation, which has been executed by all Parties to this matter, are as follows:

1. Updated rate base will not be calculated at this time as the Joint Petitioners make no request for an increase in the rates paid by the Oakwood customers nor in the rate of return and revenue requirement to be recovered by Oakwood. Should Oakwood petition the Board at some future time for an increase in rates, the Parties agree that nothing in this Stipulation reflects a calculation of rate base, rate of return, income requirement or revenue requirement as would be necessary to support a Board decision on rates.

### **APPROVAL OF CHANGE IN CONTROL**

2. The acquisition of control of Oakwood by AION as proposed in the transaction is consistent with the criteria of N.J.S.A. 48:2-51.1 and N.J.A.C. 14:1-5.14 and should be approved. It will have no impact on competition. Oakwood will remain a stand-alone sewer utility with a new owner. AION does not own and has no intention to purchase any other sewage treatment plants. The proposed acquisition of control of Oakwood by AION will have no impact on rates charged to Oakwood customers as Oakwood will continue to operate and charge its current Board-approved tariff rates and its financial condition will not be subject to material change. The proposed acquisition of control of Oakwood by AION will have no impact on the employees of Oakwood as Oakwood has no employees. Applied will continue to operate and maintain the treatment plant and collection system in accordance with an Operations and Maintenance Contract entered February 1, 2013. AION will take over management responsibility of Oakwood from East Coast Oakwood Apartments Sewage LLC, and Millbrook Estates at Flanders Homeowners Association will continue as a non-equity member of Oakwood with a zero percent (0%) ownership interest in Oakwood. The proposed acquisition of control of Oakwood by AION will have no impact on the provision of safe and adequate utility service at just and reasonable rates. Applied has more than thirty (30) years' experience in the water and wastewater industry. The company is well qualified to continue operating the Oakwood plant and to carry out the utility's obligation to render safe, adequate and proper service to Oakwood's customers.
3. Oakwood customers and the State of New Jersey will benefit from the acquisition of Oakwood by AION, which shall continue operation and maintenance of the sewer

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<sup>3</sup> Although described in this Order at some length, should there be any conflict between this summary and the Stipulation, the terms of the Stipulation control, subject to the findings and conclusions in this Order.

treatment plant and collection system pursuant to the Operations and Maintenance Contract and the requirements of the Board. AION is fully capable of funding any repairs or improvements necessary for Oakwood to provide safe, adequate and proper service to its customers. Oakwood customers will benefit from AION's commitment to fiscally prudent stewardship of Oakwood.

4. The Parties recognize that AION, through its due diligence and the evaluation completed at their request by the engineering firm of Hatch Mott MacDonald, has identified a number of improvements required to maintain operations and achieve reliable compliance with New Jersey Department of Environmental Protection permit requirements. These improvements are characterized as "Immediate Recommendations" in the Hatch Mott MacDonald report titled "Oakwood Village Wastewater Treatment Plant, Final WWTP Condition Assessment" and dated November 2015 (the "Hatch Mott MacDonald Report"), a copy of which was provided in response to RCR-2 and SE-24 and is attached to and made part of the Stipulation. In addition, the operator of the plant, Applied Water Management, recommended certain repairs, a summary of which was provided in response to SE-1 and is attached to and made part of the Stipulation, and one of which (Roto Screen Drum) is underway as of the date of this Stipulation.
5. Following closing, AION will provide the Board Staff and Rate Counsel with quarterly reports detailing the activities undertaken and completed to implement the Applied recommended repairs and the "Immediate Recommendations" recommended by Hatch Mott MacDonald, some of which are duplicative. The Parties recognize that, as such repairs and /or improvements are undertaken, certain recommended repairs and/or improvements may be deemed unnecessary and/or suitable for implementation at a later date. AION agrees to complete the Applied recommendations and, unless duplicative, the "Immediate Recommendations" within two years of the date of closing. If for any reason AION does not complete such recommendations within the specified timeframe, the Parties must agree to forego or delay implementation no later than two years of the date of Closing. Should the Parties not agree to a proposed delay or to forego the recommendation entirely, AION shall be required to seek Board approval to forego or delay implementation no later than two years of the date of Closing.
6. In addition to the "Immediate Recommendations" identified in the Hatch Mott MacDonald Report, numerous "Future Recommendations" were also identified. AION will submit within twelve months of closing a plan of action to the Board and to Rate Counsel detailing a schedule that will be followed to implement all "Future Recommendations" deemed necessary to maintain operations, improve site security and operator safety, and achieve reliable compliance with New Jersey Department of Environmental Protection permit requirements.

#### **TRANSFER OF OVSA MEMBERSHIP INTERESTS TO AION**

7. The proposed acquisition by AION of all the equity membership interests in Oakwood is consistent with N.J.A.C. 14:1-5.1 and 5.14. After closing Oakwood will be managed by AION and the sewer system will continue to be operated by Applied. AION is not proposing any changes in Oakwood's policies with respect to customer service, operations, financing, accounting, capitalization, rates, depreciation, maintenance, except for agreeing to implement the system repairs recommended by AWM and/or detailed in the Hatch Mott MacDonald Report as noted in Paragraphs 4 through 6 above, or any other matters affecting the public interest or utility customers. AION will not

capitalize any franchise cost as a result of the transaction. Accordingly, the Parties recommend Board approval of the transfer on OVSA's books of all issued and outstanding equity membership interests in the company to AION.

### **MORTGAGE OF SEWER SYSTEM PROPERTY**

8. As part of the property transaction described in the Joint Petition, the real property comprising the Oakwood Village Apartments complex, including the land under which sewer system collection mains and upon which the sewerage treatment plant are located, will be subject to mortgage. In addition, the collection mains and treatment plant will be subject to mortgage.

9. N.J.S.A. 48:3-7, provides, in pertinent part:

"No public utility shall, without the approval of the board, sell, lease, mortgage or otherwise dispose of or encumber its property, franchises, privileges or rights, or any part thereof . . . . Where, by the proposed sale, lease or other disposition of all or a substantial portion of its property, any franchise or franchises, privileges or rights or any part thereof . . . it appears that the public utility . . . may be unable to fulfill its obligation to any employees thereof . . . the board shall not grant its approval unless the public utility seeking the board's approval for such sale, lease or other disposition assumes such responsibility as will be sufficient to provide that all such obligations . . . will be satisfied[.]"

10. Oakwood will not be encumbering its property, because it owns neither the sewer plant nor the land upon which the plant is located. The ownership of the sewer plant and the land on which it is located will transfer from East Coast Oakwood Village LLC to Oakwood Village Real Estate, LLC, which will also assume all obligations of East Coast Oakwood Village, LLC under its lease with Oakwood. The mortgage will not adversely impact Oakwood. The mortgage is incidental to the much larger real estate transaction. The mortgage will have no impact on employees of Oakwood because Oakwood has no employees.

### **TARIFF REVISIONS**

11. The initial Oakwood tariff was approved by the Board on December 19, 2002 in BPU Docket No. WE00120986. Since then, the Board offices have been moved from Newark to Trenton, ownership of Oakwood has changed (with Board approval), and the regulations governing operations of water and sewer treatment plants have been revised. Working with Board staff, AION has modified the Oakwood tariff to reflect these changes. The Parties agree that the revised tariff which was filed with the Joint Petition should be adopted by the Board in its entirety, to be effective as of the date of Closing.

### **DISCUSSION AND FINDINGS**

As a result of the proposed transaction, AION will at closing acquire one hundred percent (100%) ownership interest in Oakwood, a public utility regulated by the Board. N.J.S.A. 48:2-51.1 in part provides:

Except as otherwise provided . . .no person shall acquire or seek to acquire control of a public utility directly or indirectly through the medium of an affiliated or parent corporation or organization, or through the purchase of shares, the election of a board of directors, the acquisition of proxies to vote for the election of directors, or through any other manner, without requesting and receiving the written approval of the Board of Public Utilities. Any agreement reached, or any other action taken, in violation of this act shall be void. In considering a request for approval of an acquisition of control, the board shall evaluate the impact of the acquisition on competition, on the rates of ratepayers affected by the acquisition of control, on the employees of the affected public utility or utilities, and on the provision of safe and adequate utility service at just and reasonable rates. The board shall accompany its decision on a request for approval of an acquisition of control with a written report detailing the basis for its decision, including findings of fact and conclusions of law.

Based on the entire record in this matter, the Board **HEREBY FINDS** that:

1. the proposed acquisition of control of Oakwood by AION will have no impact on competition. Oakwood will remain a stand-alone sewer utility with a new entity, AION, holding a controlling interest.
2. The proposed acquisition of control of Oakwood by AION will have no impact on the rates charged to Oakwood's customers as the Stipulation provides that Oakwood will continue to operate under its current Board-approved tariff.
3. The proposed acquisition of control of Oakwood AION will have no impact on Oakwood's employees since Oakwood has no employees. The Joint Petitioners have stated and the Parties have agreed that Applied will continue to operate the sewerage treatment plant and collection system in accordance with the Operating Agreement.
4. The proposed acquisition of control of Oakwood by AION will have no adverse impact on the provision of safe, adequate and proper service. Applied will continue to operate the sewer system in accordance with the O&M Agreement.

In addition to the statutory requirements, N.J.A.C. 14:1-5.14(c) provides:

The Board shall not approve a merger, consolidation, acquisition and/or change in control unless it is satisfied that positive benefits will flow to customers and the State of New Jersey and, at a minimum, that there are no adverse impacts on any of the criteria delineated in N.J.S.A. 48:2-51.1.

The Board **HEREBY FINDS** that AION engaged the engineering firm of Hatch Mott MacDonald to inspect and evaluate the condition of the treatment plant. The Board **FURTHER FINDS** that Hatch Mott MacDonald inspection and evaluation of the treatment plant resulted in Hatch Mott MacDonald producing a report titled "Oakwood Village Wastewater Treatment Plant, Final WWTP Condition Assessment" (the "Hatch Mott MacDonald Report") that identified a number of improvements required to maintain operations and achieve reliable compliance with New Jersey Department of Environmental Protection permit requirements. These improvements were

characterized as "Immediate Recommendations." In addition, the operator of the plant, Applied Water Management, has also recommended certain repairs, one of which (Roto Screen Drum) is underway as of the date of this Stipulation. The Board **NOTES** that AION has agreed to complete the Applied recommendations and, unless duplicative, the "Immediate Recommendations" within two years of the date of closing. The Board **FURTHER NOTES** that if for any reason AION does not complete such recommendations within the specified timeframe, the Parties must agree to forego or delay implementation of the Applied recommendations and, unless duplicative, the "Immediate Recommendations" no later than two years of the date of Closing. Should the Parties not agree to a proposed delay or to forego the recommendation entirely, the Board **HEREBY ORDERS** AION seek Board approval to forego or delay implementation of the Applied recommendations and, unless duplicative, the "Immediate Recommendations" no later than two years of the date of Closing.

The Petitioners also request that the Board approve the 2005 Mortgage and the 2005 Pledge as well as its assumption of each pursuant to N.J.S.A. 48:3-7, should the Board deem such approval necessary. N.J.S.A. 48:3-7 in part provides:

Except as otherwise provided . . . no public utility shall, without the approval of the board, sell, lease, mortgage, or otherwise dispose of or encumber its property, franchises, privileges, or rights, or any part thereof; or merge or consolidate its property, franchises, privileges, or rights, or any part thereof, with that of any other public utility. . . .

The Board **NOTES** that Oakwood will not be encumbering its property, because it neither owns the sewer plant nor the land upon which the plant is located. The ownership of the sewer plant and the land on which it is located will transfer from East Coast Oakwood Village LLC to Oakwood Village Real Estate, LLC, which will also assume all obligations of East Coast Oakwood Village, LLC under its lease with Oakwood. The mortgage will not adversely impact Oakwood. The mortgage is incidental to the much larger real estate transaction. The mortgage will have no impact on employees of Oakwood because Oakwood has no employees.

The Board **DIRECTS** Oakwood to seek prior approval from the Board for any and all future financings which encumber its property, franchises, privileges or rights, or any part thereof pursuant to N.J.S.A. 48:3-7; and to seek approval from the Board prior to issuing any indebtedness payable more than twelve months after the date of the original instrument pursuant to N.J.S.A. 48:3-9. No action may be taken by any other secured party, to enforce any lien or mortgage on Oakwood until all necessary Board approvals have been obtained. Any documentation of the pledge of property, franchises, privileges or rights of Oakwood shall note this requirement.

Pursuant to N.J.S.A. 48:2-51.1, N.J.A.C. 14:1-5.14, and other standards, the Board has determined that positive benefits will flow from the proposed transactions and that they are in accordance with law and therefore **HEREBY APPROVES** the transfer of ownership and control of Oakwood Village Sewerage Associates, L.L.C. to AION Oakwood Sewer, L.L.C.

This Order is subject to the following conditions:

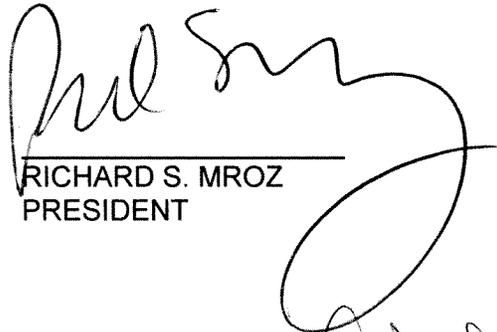
1. This Order shall not be construed as directly or indirectly fixing for any purposes, whatsoever, the value of any tangible or intangible assets now owned or hereafter to be owned by the Company.

2. This Order shall not affect or in any way limit the exercise of the authority of this Board or of this State, in any future Petition or in any future proceeding, with respect to rates, franchise, services, financing, accounting, capitalization, depreciation or in any other matters affecting the Company.
3. Joint Petitioners shall notify the Board in writing of the closing date within thirty (30) days of closing.
4. Oakwood shall file with the Board its 2015 Annual Report pursuant to N.J.A.C. 14:3-6.3.
5. Oakwood shall file with the Board, within thirty (30) days of closing, its Statement of Gross Intrastate Operating Revenues for the Year Ended December 31, 2015 (Form AR-3-1).
6. Pursuant to the applicable statutes, Oakwood shall be responsible for the Board of Public Utilities' and the Division of Rate Counsel's assessment liability based upon Oakwood's 2015 Gross Operating Revenues.
7. Oakwood shall submit tariff pages, reflecting the revised tariff which was filed with the Joint Petition, to be effective as of the date of Closing.

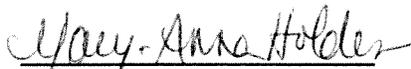
This Order shall be effective on December 26, 2015.

DATED: 12/16/15

BOARD OF PUBLIC UTILITIES  
BY:



RICHARD S. MROZ  
PRESIDENT

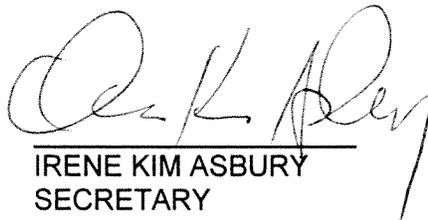


MARY-ANNA HOLDEN  
COMMISSIONER



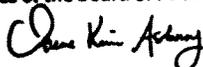
DIANNE SOLOMON  
COMMISSIONER

ATTEST:



IRENE KIM ASBURY  
SECRETARY

I HEREBY CERTIFY that the within document is a true copy of the original in the files of the Board of Public Utilities



**IN THE MATTER OF THE JOINT APPLICATION OF OAKWOOD VILLAGE SEWERAGE  
ASSOCIATES, L.L.C. AND AION OAKWOOD SEWER, L.L.C. FOR APPROVAL OF A  
TRANSFER OF CONTROL OF A PUBLIC UTILITY  
DOCKET NO. WM15091006**

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November 30, 2015

**BY FEDERAL EXPRESS**

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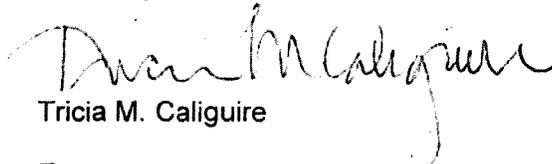
Re: Oakwood Village Sewerage Associates/BPU Docket No. WM15091006  
Final Stipulation of Settlement

Dear Chris:

Enclosed is the fully-executed Stipulation of Settlement agreed to by the parties in this matter on November 27, 2015. As requested, hard copies will be sent to the parties shown below and electronic copies to the service list.

Thank you for your assistance. Please call if you have any questions.

Best Regards,



Tricia M. Caliguire

Enc.

cc: Mike Kammer (w/ two hard copies)  
Irene Kim Asbury (w/ hard copy)  
Darlene Duque-Garcia (w/ hard copy)  
Edward K. DeHope, Esq. (w/ hard copy)  
Service List (electronic copies)

BOSTON

HARTFORD

STAMFORD

NEW YORK

NEWARK

EAST BRUNSWICK

PHILADELPHIA

WILMINGTON

WASHINGTON, DC

## LIST for E-MAIL SERVICE

In the Matter of the Joint Application of Oakwood Village Sewerage Associates, L.L.C.  
and AION Oakwood Sewer, L.L.C. for Approval of a Transfer of Control of a Public Utility  
BPU Docket No. WM 15091006

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### **BPU**

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**STATE OF NEW JERSEY**  
**BOARD OF PUBLIC UTILITIES**

<b>IN THE MATTER OF THE JOINT</b>	<b>:</b>	<b>BPU DOCKET NO. WM15091006</b>
<b>APPLICATION OF OAKWOOD</b>	<b>:</b>	
<b>VILLAGE SEWERAGE</b>	<b>:</b>	
<b>ASSOCIATES, L.L.C. AND AION</b>	<b>:</b>	<b>STIPULATION OF SETTLEMENT</b>
<b>OAKWOOD SEWER, L.L.C. FOR</b>	<b>:</b>	
<b>APPROVAL OF A TRANSFER OF</b>	<b>:</b>	
<b>CONTROL OF A PUBLIC</b>	<b>:</b>	
<b>UTILITY</b>	<b>:</b>	
	<b>:</b>	

**APPEARANCES**

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Christopher Psihoules, Deputy Attorney General, on behalf of the Staff of the New Jersey Board of Public Utilities (John Jay Hoffman, Acting Attorney General of New Jersey)

Susan E. McClure, Esq., Assistant Deputy Rate Counsel, and Debra Robinson, Esq., Deputy Rate Counsel, on behalf of the Division of Rate Counsel (Stefanie A. Brand, Esq., Director)

**TO THE HONORABLE COMMISSIONERS OF THE BOARD OF PUBLIC UTILITIES:**

This STIPULATION OF SETTLEMENT (“Stipulation”) is made as of November 27, 2015 by and among the Parties in this proceeding: Oakwood Village Sewerage Associates, L.L.C. (“OVSA”) and AION Oakwood Sewer, L.L.C. (“AION”) (together, “Joint Petitioners”), the Division of Rate Counsel (“Rate Counsel”), and the Staff of the Board of Public Utilities (“Staff”) (collectively, the “Parties”).

On September 3, 2015, Joint Petitioners filed a Verified Petition (“Petition”) requesting the Board’s approval of the transfer of ownership and control of OVSA, a public utility regulated by the Board and operating in accordance with a tariff approved by the Board’s Order

issued on December 19, 2002 in BPU Docket No. WE00120986, along with any related required approvals, pursuant to N.J.S.A. 48:2-51.1, N.J.A.C. 14:1-5.14, N.J.S.A. 48:3-10 and N.J.A.C. 14:1-5.10.

Joint Petitioners also requested the Board's approval of a mortgage agreement that will be executed as of closing of the proposed transaction pursuant to N.J.S.A. 48:3-7, to the extent the Board deems such approval necessary, and approval of revisions to the OVSA tariff, to be effective as of the date of the Board's approval, reflecting minor changes, including addresses, names and citations, with no changes in the sewer service rates charged by OVSA to its customers.

The Board retained jurisdiction in this matter. The Parties met on July 30, 2015 at the Board's offices. Discovery was conducted and Joint Petitioners provided responses to four sets of discovery requests. After proper notice, a public comment hearing was held in the Mount Olive Public Library, located close to the apartment complex and housing development served by OVSA, on the evening of October 26, 2015. No members of the public appeared to provide comments at the public hearing; no written comments were submitted to the Board Secretary by members of the public during the open comment period.

AION is not seeking any changes in OVSA's rates or terms of service to customers and will retain the current operator of the sewage collection system and treatment plant, Applied Water Management ("AWM"), and intends to negotiate an extension of the current operating agreement with AWM which expires January 31, 2016.

The Parties have reviewed the Petition, responses to discovery and have conducted settlement discussions in an effort to reach a proposed settlement of all the issues in this proceeding. The Parties have agreed to reasonably, fully and finally resolve all factual and legal issues in this matter by way of this Stipulation. In consideration of the recitals and mutual promises and covenants set forth herein, the Parties **DO HEREBY STIPULATE AND AGREE:**

1. Updated rate base will not be calculated at this time as the Joint Petitioners make no request for an increase in the rates paid by the OVSA customers nor in the rate of return and revenue requirement to be recovered by OVSA. Should OVSA petition the Board at some future

time for an increase in rates, the Parties agree that nothing in this Stipulation reflects a calculation of rate base, rate of return, income requirement or revenue requirement as would be necessary to support a Board decision on rates.

### **APPROVAL OF CHANGE IN CONTROL**

2. The acquisition of control of OVSA by AION as proposed in the transaction is consistent with the criteria of N.J.S.A. 48:2-51.1 and N.J.A.C. 14:1-5.14 and should be approved. It will have no impact on competition. OVSA will remain a stand-alone sewer utility with a new owner. AION does not own and has no intention to purchase any other sewage treatment plants. The proposed acquisition of control of OVSA by AION will have no impact on rates charged to OVSA customers as OVSA will continue to operate and charge its current Board-approved tariff rates and its financial condition will not be subject to material change. The proposed acquisition of control of OVSA by AION will have no impact on the employees of OVSA as OVSA has no employees. AWM will continue to operate and maintain the treatment plant and collection system in accordance with an Operations and Maintenance Contract entered February 1, 2013. AION will take over management responsibility of OVSA from East Coast Oakwood Apartments Sewage LLC, and Millbrook Estates at Flanders Homeowners Association will continue as a non-equity member of OVSA with a zero percent (0%) ownership interest in OVSA. The proposed acquisition of control of OVSA by AION will have no impact on the provision of safe and adequate utility service at just and reasonable rates. AWM has more than thirty (30) years' experience in the water and wastewater industry. The company is well qualified to continue operating the OVSA plant and to carry out the utility's obligation to render safe, adequate and proper service to the OVSA customers. There will be no discernible change in the operation, maintenance, and management of the OVSA treatment plant and sewer collection service.

3. OVSA customers and the State of New Jersey will benefit from the acquisition of OVSA by AION, which shall continue operation and maintenance of the sewer treatment plant and collection system pursuant to the Operations and Maintenance Contract and the requirements of the Board. AION is fully capable of funding any repairs or improvements necessary for OVSA to provide safe, adequate and proper service to its customers. OVSA customers will

benefit from AION's commitment to fiscally prudent stewardship of OVSA.

4. The Parties recognize that AION, through its due diligence and the evaluation completed at their request by the engineering firm of Hatch Mott MacDonald, has identified a number of improvements required to maintain operations and achieve reliable compliance with New Jersey Department of Environmental Protection permit requirements. These improvements are characterized as "Immediate Recommendations" in the Hatch Mott MacDonald report titled "Oakwood Village Wastewater Treatment Plant, Final WWTP Condition Assessment" and dated November 2015 (the "Hatch Mott MacDonald Report"), a copy of which was provided in response to RCR-2 and SE-24 and is attached to and made part of this Stipulation. In addition, the operator of the plant, Applied Water Management ("AWM") recommended certain repairs, a summary of which was provided in response to SE-1 and is attached to and made part of this Stipulation, and one of which (Roto Screen Drum) is underway as of the date of this Stipulation.

5. Following closing, AION will provide the Board Staff and Rate Counsel with quarterly reports detailing the activities undertaken and completed to implement the AWM recommended repairs and the "Immediate Recommendations" recommended by Hatch Mott MacDonald, some of which are duplicative. The Parties recognize that, as such repairs and /or improvements are undertaken, certain recommended repairs and/or improvements may be deemed unnecessary and/or suitable for implementation at a later date. AION agrees to complete the AWM recommendations and, unless duplicative, the "Immediate Recommendations" within two years of the date of closing. If for any reason AION does not complete such recommendations within the specified timeframe, the Parties must agree to forego or delay implementation no later than two years of the date of Closing. Should the Parties not agree to a proposed delay or to forego the recommendation entirely, AION shall be required to seek Board approval to forego or delay implementation no later than two years of the date of Closing.

6. In addition to the "Immediate Recommendations" identified in the Hatch Mott MacDonald Report, numerous "Future Recommendations" were also identified. AION will submit within twelve months of closing a plan of action to the Board and to Rate Counsel detailing a schedule that will be followed to implement all "Future Recommendations" deemed necessary to maintain operations, improve site security and operator safety, and achieve reliable

compliance with New Jersey Department of Environmental Protection permit requirements.

### **TRANSFER OF OVSA MEMBERSHIP INTERESTS TO AION**

7. The proposed acquisition by AION of all the equity membership interests in OVSA is consistent with N.J.A.C. 14:1-5.1 and 5.14. After closing OVSA will be managed by AION and the sewer system will continue to be operated by AWM. AION is not proposing any changes in OVSA's policies with respect to customer service, operations, financing, accounting, capitalization, rates, depreciation, maintenance, except for agreeing to implement the system repairs recommended by AWM and/or detailed in the Hatch Mott MacDonald Report as noted in Paragraphs 4 through 6 above, or any other matters affecting the public interest or utility customers. AION will not capitalize any franchise cost as a result of the transaction. Accordingly, the Parties recommend Board approval of the transfer on OVSA's books of all issued and outstanding equity membership interests in the company to AION.

### **MORTGAGE OF SEWER SYSTEM PROPERTY**

8. As part of the property transaction described in the Joint Petition, the real property comprising the Oakwood Village Apartments complex, including the land under which sewer system collection mains and upon which the sewerage treatment plant are located, will be subject to mortgage. In addition, the collection mains and treatment plant will be subject to mortgage.

9. N.J.S.A. 48:3-7, provides, in pertinent part:

“No public utility shall, without the approval of the board, sell, lease, mortgage or otherwise dispose of or encumber its property, franchises, privileges or rights, or any part thereof . . . . Where, by the proposed sale, lease or other disposition of all or a substantial portion of its property, any franchise or franchises, privileges or rights or any part thereof . . . it appears that the public utility . . . may be unable to fulfill its obligation to any employees thereof . . . the board shall not grant its approval unless the public utility seeking the board's approval for such sale, lease or other disposition assumes such responsibility as will be sufficient to provide that all such obligations . . . will be satisfied[.]”

10. The public utility, OVSA, will not be encumbering its property, as it owns neither the sewer plant nor the land upon which the plant is located. The ownership of the sewer plant

and the land on which it is located will transfer from East Coast Oakwood Village LLC to Oakwood Village Real Estate, LLC, which will also assume all obligations of East Coast Oakwood Village, LLC under its lease with OVSA. The mortgage will not adversely impact OVSA. The mortgage is incidental to the much larger real estate transaction. The mortgage will have no impact on employees of the public utility, as OVSA has no employees. Therefore, the Parties recommend that the Board approve the proposed mortgage to the extent the Board finds such approval necessary.

### **TARIFF REVISIONS**

11. The initial OVSA tariff was approved by the Board on December 19, 2002 in BPU Docket No. WE00120986. Since then, the Board offices have been moved from Newark to Trenton, ownership of OVSA has changed (with Board approval), and the regulations governing operations of water and sewer treatment plants have been revised. Working with Board staff, AION has modified the OVSA tariff to reflect these changes. The Parties agree that the revised tariff which was filed with the Joint Petition should be adopted by the Board in its entirety, to be effective as of the date of Closing.

### **OTHER AGREEMENTS**

12. The Parties recommend that the Board consider the above stipulated terms and all agreed upon issues embodied in this Stipulation at its next regularly scheduled agenda meeting.

13. This Stipulation is the product of negotiations by the Parties and it is an express condition of the settlement embodied by this Stipulation that it be presented to the Board in its entirety without modification or condition. It is also the intent of the Parties to this Stipulation that this settlement, once accepted and approved by the Board, shall govern all issues specified and agreed to therein. The Parties to this Stipulation specifically agree that if adopted in its entirety by the Board, no appeal shall be taken by them from the Order adopting the same as to those issues upon which the Parties have stipulated herein. The Parties agree that the within Stipulation reflects mutual balancing of issues and positions and is intended to be accepted and approved in its entirety. Each term is vital to this Stipulation as a whole, since the Parties hereto expressly state that they would not have signed this Stipulation had any terms been modified in

any way. In the event any particular aspect of this Stipulation is not accepted or approved by the Board, then any Party materially affected thereby shall not be bound to proceed under this Stipulation.

14. The Parties further recommend to the Board that an Order issued as a result of this Stipulation shall not be construed as directly or indirectly fixing for any purposes whatsoever any value of any tangible or intangible wastewater utility assets now owned or hereafter to be owned by AION.

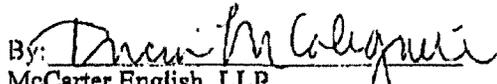
15. The Parties recommend to the Board that an Order issued as a result of this Stipulation shall not affect nor in any way limit the exercise of the authority of this Board or of this State, in any future Petition or in any proceedings with respect to rates, franchises, service, financing, accounting, capitalization, depreciation, or in any other matter affecting AION.

16. Except as expressly provided herein, the Joint Petitioners, Staff or Rate Counsel shall not be deemed to have approved, agreed to, or consented to any principle underlying or supposed to underlie any agreement provided herein. This Stipulation, in total or by specific item, is in no way binding upon them in any other proceeding, except to enforce the terms of this Stipulation.

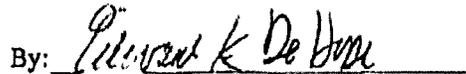
17. This Stipulation may be executed in as many counterparts as there are Parties to this Stipulation, each of which counterparts shall be an original, but all of which shall constitute one and the same instrument.

**NEXT PAGE IS SIGNATURE PAGE**

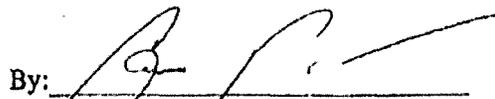
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SE-1 On this filing by Oakwood Village Sewerage Associates, L.L.C. and AION Oakwood Sewer, L.L.C. ("Petitioners") for Board approval to acquire and control Oakwood Village Sewerage Associates, L.L.C. ("OVSA"), a public utility, under N.J.A.C.14:1-5.14:

- (a) Please identify any repairs or improvements necessary to the OVSA sewage treatment plant ("plant") at this time and identify the costs of any planned repairs or capital improvements to the plant and a schedule of when these repairs and improvements will be made; and

Person Responsible for Response: John L. Mallinson, Vice President, Oakwood Village Sewerage Associates, L.L.C.

Answer: Applied Water Management ("AWM"), the operator of the plant, has proposed the following repairs and/or improvements which are necessary. The costs shown below are estimates provided by AWM.

New UV Cabinet	\$ 21,703.00
Berm Reconstruction	320,000.00
Aeration Diffusers	32,294.35
Roto Screen Drum	26,391.27



Hatch Mott  
MacDonald

**Oakwood Village Wastewater Treatment Plant**  
**Final WWTP Condition Assessment**

*Prepared for  
AION Partners*

**November 2015**

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Appendix A Risk Assessment Evaluation
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## 1. INTRODUCTION

### 1.1 Background

Oakwood Village, an apartment complex located in Mount Olive Township, Morris County, New Jersey, consists of approximately 1,224 one and two bedroom apartments. The wastewater generated from the apartments, as well as approximately 34 single family homes in the vicinity of Oakwood Village, is treated at an on-site wastewater treatment plant (WWTP). It is estimated that the WWTP was originally designed and constructed in the 1970's and later upgraded in 1999. The upgraded WWTP has a design treatment capacity of 175,000 gallons per day (GPD). Originally, the WWTP was designed as an activated sludge treatment system, consisting of the following: comminution, contact stabilization, clarification, filtration and chlorine disinfection. In the late 1990's the WWTP was upgraded and modified to treat wastewater using the following: comminution, membrane bioreactors (MBRs) consisting of anoxic/aerobic treatment, screening, membrane filtration and ultraviolet light (UV) disinfection. The WWTP effluent is pumped to spray fields through a spray pump dosing tank and distributed to the spray fields via a valve pit manifold. The spray fields were modified in the early 1990's to reduce the amount of wastewater flowing off site and improve the spray distribution of treated effluent.

In July 2007, East Coast Oakwood Apartment and Sewage, LLC acquired Oakwood Village Sewerage Association LLC. The successor company, like its predecessor, is regulated by the New Jersey State Board of Public Utilities (NJBPU) and the New Jersey Department of Environmental Protection (NJDEP). WWTP effluent is currently discharged year round via spray irrigation and/or overland flow under NJPDES permit number NJ0090051.

### 1.2 Purpose of the Assessment

AION Partners is undertaking an assessment of the Oakwood Village infrastructure as part of their due diligence associated with the consideration of purchasing and managing Oakwood Village. As a component of their assessment, AION Partners desires to develop a better understanding of the condition of the WWTP and its ability to treat the wastewater generated by the rental complex and adjacent single family homes.

HMM has been retained by AION Partners to develop an assessment report of the Oakwood Village WWTP. HMM conducted a field inspection of the WWTP facilities on September 18, 2015. In addition to the site visit, the following information was made available to HMM for the purposes of the condition assessment:



1. Partial set of plant drawings from 1997 plant upgrade
2. 2011 through April 2015 Discharge Monitoring Reports
3. 2013 and 2014 NJDEP Compliance Inspection Reports
4. 2014 Excise Tax Work Sheet
5. Certificate to Operate Standby Generator
6. July 2003 Operating Agreement for Oakwood Village Sewerage Associates, LLC
7. Operations and Maintenance Contract
8. NJDEP NJPDES Permit Discharge to Ground Water
9. NJDEP Sludge quality permit S2G.
10. Treatment Plant O&M Invoices
11. January 21, 2013 Proposal for Treatment Plant Engineering Evaluation
12. March 7, 2014 Site Visit Report for Oakwood Village
13. 15 Various Estimates for Repairs Prepared by Natural Systems Utilities.

## 2. FACILITIES EVALUATION

HMM visited the project site and performed a visual inspection of exposed piping and equipment. The checklist in Appendix A provides the field notes from the inspection. Below is a summary of the existing equipment, its current condition and recommendations for upgrade or replacement.

Recommendations for upgrade are distinguished based on need. Maintenance/upgrade items which need to be addressed immediately are listed as “Immediate Recommendations” while items which merit further evaluation by the utility are listed under “Future Recommendations.” Section 3 of this Report describes the methodology behind assigning risk levels to various treatment system assets. Only “Immediate Recommendations” are included in the Section 4 Construction Cost Estimate as these are items that are seen to be necessary for the treatment plant to continue to maintain operational performance and meet NJDEP requirements.

### 2.1 Collection System

Wastewater generated at Oakwood Village apartment complex and the Millbrook housing development (Dara Estates). Wastewater from the apartment complex is conveyed to the wastewater treatment plant (WWTP) using a gravity sewer system. Wastewater from the Millbrook housing development flows to a pump station. The pump station discharges to the Oakwood Village sewer system for conveyance to the WWTP. Evaluation of the site sewers was not included in the scope of contract; however, the operator and site manager reported that there were no odor or inflow/infiltration (I/I) issues with the collection system. HMM compared monthly average WWTP flow and monthly average rainfall and found that there was no correlation between high rain months and high wastewater flows. While this is an indication of low I/I issues, only observation of daily wastewater flows during rain events can accurately determine I/I flows.

## 2.2 General WWTP Site

### Current Condition:

1. In general, the treatment plant site is in need of maintenance and landscaping. The site is currently overgrown with vegetation and brush.
2. The extents of the WWTP are surrounded by a chain link fence. The barbed wire on the fence is in need of repairs.
3. A wooden stairway provides access to the lower portion of the treatment plant. The wood stairway is reaching the end of its useful life and represents a potential safety hazard.

### Immediate Recommendations:

The wooden stairway should be replaced with an aluminum stair and support structure.

### Future Recommendations:

The following work items are recommended; however, it is not necessary that they be dealt with immediately:

1. Site should be cleared of overgrowth and general access improved.
2. Chain link fence barbed wire should be repaired.

## 2.3 Headworks/Influent Grinder

Influent raw wastewater from the Oakwood Village properties is conveyed to the WWTP via a 10" diameter gravity sewer. The wastewater flows to the influent channel located on top of the anoxic/aerobic tank. The influent channel contains a mechanical grinder and a manual bar screen. During normal operation, the wastewater flows through the grinder, which reduces the size of any solids such as rags, plastic parts, diapers, and other material. Wastewater with the ground solids flows into the treatment tank anoxic zone. The ground solids are eventually removed by the screening equipment upstream of the membrane filter process. In the event of a failure of the grinder, wastewater can be diverted to the manual bar screen which traps any solids in the wastewater. Solids collected on the screen need to be periodically removed by the operator for disposal.

**Current Condition:** The grinder was installed as part of the 1998 upgrades. The grinder failed approximately 2 months ago and was remanufactured. It is unknown if this is the first time the grinder has been repaired. New controls for the grinder were installed at that time. During the time the grinder was

out of operation, the manual bar screen was used for treatment. The operator reported that the manual bar screen is undersized. The manual screen would often become blocked with solids and, as a result, wastewater would overflow the influent channel into the treatment tank aeration zone. Evidence of these overflows was visible during our site visit as there was a significant accumulation of solids on the treatment tank walkway grating and tank netting cover. The failure of the grinder had a significant impact on the membrane filters. The unground solids quickly fouled the membranes and frequent cleaning was required by the operator. Cleaning requires removal of the membranes, reducing the plant capacity and effluent quality. The contact of unground solids with the membranes can also lead to premature failure of the membranes.

The influent channel was installed as part of the 1998 upgrades. The channel is constructed of carbon steel. At the time of the site visit, the channel contained an accumulation of solids and plant growth from lack of maintenance, see photo below.



Figure 1 Influent Channel

**Immediate Recommendations:**

1. The influent channel should be drained, cleaned and painted.

2. A second grinder should be installed due to the significant impact of manually screened wastewater on the membrane filters. Alternatively, an adequately sized manual bar screen design should be installed along with a means to clean and handle solids.

#### 2.4 Anoxic/Aerobic Treatment Tank

After passing through the influent grinder, the raw sewage enters into a 36,468 gallon Anoxic zone of the Treatment Tank which is followed by a 156,042 gallon Aerobic Zone of the Treatment Tank. The anoxic and aerobic zones are used to reduce the biodegradable portion of the wastewater using microbes. The treatment tank is an above ground circular tank with internal partition walls that separate the anoxic and aerobic zones. The anoxic zone is not aerated but does contain an air system used for periodic mixing. The aerobic zone is aerated to provide oxygen for the treatment process. Wastewater from the anoxic zone overflows into the aeration zone based on the rate of raw wastewater flow. Air is supplied by blowers and fed through a number of aerators to promote the dissolving of oxygen into the wastewater. Wastewater from the aerobic zone is pumped to the membrane filters. The filters separate the microbes as well as other solids from the wastewater. The separated microbes (activated sludge) and other solids are returned to the anoxic zone (return activated sludge or RAS) and are circulated in the treatment process. Periodically, a portion of the activated sludge is removed from the aerobic zone and disposed of offsite.

**Current Condition:** As noted above, the treatment tank is an above ground tank with the following features;

- Painted and galvanized steel construction
- Access stairs and platforms
- Influent channel
- Aeration piping and aerators
- Pumps and piping to convey wastewater to the membrane filters, Recirculation Pumps
- Pump and piping for sludge wasting, Sludge Pump
- Electrical conduits and control panels for the pumps and grinder

The tank was constructed in 1975 with the original apartment complex. The influent channel, aeration piping, aerators, pumps, piping, electrical and controls were installed as part of the 1998 upgrades. Current condition of this equipment is summarized below.

1. The treatment tank exterior paint is in fair condition with some rust spots.

2. The interior condition of the tank is unknown. The operator reports that the tank likely has an accumulation of settled solids based on the condition of the removed sludge pump.
3. The access stairs, upper walkways, grating, handrails and walkway support steel is a combination of painted and galvanized steel. The painted steel shows significant rusting (see Figure 2). Some galvanized steel is showing signs of rusting.



Figure 2 Treatment Tank

4. Piping is a combination of PVC, steel, ductile iron and hoses. The painting on the steel and iron pipes is failing and the pipes are rusting. Some pipes are insulated and the insulation is in adequate condition; however, some minor repairs are needed. It is unknown if the insulated piping is also heat traced.
5. The Recirculation Pumps were installed as part of the 1998 upgrades. The operator did not know if the pumps were original. The operator was not aware of any current issues with the pumps. The Sludge Pump was currently out of service. As a result, the normal method of sludge removal had been modified. Sludge was being wasted to the screening tank which are accessed by small tank trucks for removal. Electrical equipment on the Treatment Tank access platform is in fair condition. Most panels are corrosion resistant. Steel panels are showing signs of rusting. Some

cables for pumps are exposed to the weather. Galvanized conduits and flexible conduits look adequate.

6. The walkways and bird screening covering the tank were covered with solids from the overflow of the influent channel and need to be cleaned.
7. The anoxic and aerobic treatment process is experiencing biomass foaming issues.



**Figure 3 Sludge Bulking**

During the site visit a thick layer of brown foam was observed covering the whole surface of the anoxic basin (central part of the round, above-ground, steel Treatment Tank). Similar foam was also covering part of the aerobic zone. While a definite determination of the nature of that foam would require specialized microscopic evaluation, our visual observations leave little doubt that the foam is of the type known as Nocardia. Nocardia is a nuisance foam of biological nature caused by proliferation of particular type of filamentous activated sludge bacteria known collectively as Nocardia or nocardioforms. Moderate amounts of this type of foam are commonly present in activated sludge treatment plants. Excessive amounts of foam could, however, lead to operational problems. In the summer, the thick layer of foam could become septic and cause odors. In the winter, foam accumulated on the surface could freeze, potentially damaging any appurtenances or equipment located at the tank surface.

The operator reports that the foam in the anoxic tank is mixed using air on a weekly basis.

8. The operator reports that the aerobic zone aerators have likely failed. The failure is due to age, an accumulation of settled solids, broken aerators or a combination of these.

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**Immediate Recommendations for Treatment Tank:**

1. The access stairs, platform, handrails and structural steel should be cleaned and painted to extend their useful lives.
2. The Treatment Tank should be drained, cleaned and inspected. The interior of the tank will likely require painting.
3. The exterior painting should be spot repaired. However, if during inspection of the tank interior it is found the tank needs painting, the exterior should be painted at the same time.
4. The sludge pump should be replaced and put back in service.
5. When the tank is drained and cleaned, aeration piping should also be inspected and painted or replaced as needed.
6. Aerators and should be replaced when the tank is drained and cleaned.
7. All metallic piping shall be cleaned and painted. Insulated piping should have the insulation removed and the condition of the pipe and pipe coating be inspected and repaired if needed.

**Future Recommendations:**

1. The presence of nuisance foam can be eliminated or reduced are as follows:
  - a. Preventive: It is understood that the excess sludge routinely generated by the treatment facility is wasted from the mixed liquor stream as it is recirculated to the membrane tanks. As the mixed liquor is pumped there by submersible pumps from the aeration basin, this stream wastes only "good" activated sludge bacteria. Very little nocardioform bacteria, residing predominately in the foam layer, is wasted from the system. This artificially enriches the nuisance nocardioforms. If practical, the primary source of any sludge wasted from the system, and hauled away for disposal, should be the foam layer from the anoxic or aerobic part of the tankage.
2. Troubleshooting: If at some point the foam is becoming a real problem, and hauling it away is not practical, a reliable and quick method of destroying the nuisance bacteria is by a chlorine spray. This can be either a dedicated potable water surface spray system (if available) with hypochlorite solution injected into it or a batch spray using a back-pack type spray canister similar to those used for pesticide application. In any case, the total amount and concentration of the chlorine spray must be carefully controlled to assure effectiveness and prevent excessive

chlorine application. The system of netting to keep birds and tree leaves out of the Treatment Tank should be replaced.

3. Pipe supports for Filter Building supply and return piping should be cleaned and painted.

## 2.5 Service Building

The service building houses aerobic treatment blowers, intake and discharge air piping, standby emergency generator, various electrical panels, and is used for storage of spare parts.

### Current Condition

1. The Service Building is wood construction with vinyl siding, asphalt shingle roofing, wood trim, and metal doors.
  - a. The siding needs some areas repaired.
  - b. The roofing looked adequate with no reports of leaks
  - c. The entry door locks do not work. The metal doors show some rust.
  - d. The outdoor lighting appeared to have a sensor; however, the lights were on in the daytime.
  - e. The aeration blower intake filters are located at or above the roof line with no ladder or platform for access.
  - f. The building floor is concrete and in good condition.
  - g. The floor was covered with leaves and had evidence of flooding.
  - h. The heater for the building was not operable.
  - i. The single bathroom was not in operation.
  - j. The condition of the building ventilation is unknown.
  - k. The floor drain cover was missing and is a tripping hazard. It is unknown if the floor drain is operable.
  - l. The operator reported that copperhead snakes have been found in the Service Building.
2. There are three aeration blowers, two positive displacement type and one centrifugal type.
  - a. The two positive displacement blowers were installed as part of the 1997 upgrades
  - b. Drive belts were recently replaced on one blower. The new belts caused a different spacing of the drive pulleys and the belt guard no longer fits.
  - c. The operator reports the relief valves on the blowers need to be replaced.

- d. The operator reports that blower maintenance is performed regularly including oil and intake filter changes.
  - e. The operator was not aware of any other issues with the blowers.
  - f. A single blower has adequate capacity for treatment.
  - g. Painting on the outdoor air piping and accessories is failing.
3. Standby Generator
- a. The operator reports that the generator is operable and has adequate power to run the plant.
  - b. Generator maintenance is provided by an outside company.
  - c. The fuel tank is integral to the generator. The design drawings show an outside tank but no tank was visible.
  - d. The generator is permitted under permit #GEN080001.
4. Electrical Equipment
- a. The electrical equipment at the Service Building includes the main utility transformer and disconnect, the automatic transfer switch, three phase distribution panel, various motor starters, blower and pump control panels, 120 volt power panels, and miscellaneous electrical devices.
  - b. It appeared that the blower motor starter for AB 1 had been repurposed for the new sludge pump. It is not clear if this removed the blower from service.
  - c. The operator was not aware of any failures of the electrical equipment.

**Immediate Recommendations:**

1. The building doors' locks should be repaired to secure the Service Building from unauthorized access.
2. Wood trim on the building should be replaced and painted.
3. The two large flat metal doors should be painted.
4. Damaged siding should be repaired.
5. The bathroom should be repaired and returned to service.
6. The building heating and ventilation should be repaired to prevent over heating of equipment in the summer and freezing conditions in the winter.

7. Any unused openings into the building should be repaired to reduce the risk of snakes entering the building. Snake Warning signs should be placed at each entrance to the building.
8. An access platform should be constructed to provide safe operator conditions for blower intake air filter changes.
9. The modified blower starter should be restored to its original service.
10. The blower relief valves should be repaired or replaced.
11. The age of the blowers should be confirmed

## 2.6 Filter Building

Effluent from the Anoxic/Aerobic Treatment Tank is pumped to the utility building where it undergoes screening and membrane filtration. Wastewater is first screened in a rotary drum screen to remove large solids that may become entangled in the membrane or damage the membrane. The screen discharges to the membrane tank. The membranes separate the treated wastewater from the biomass by allowing water to pass through the membrane while retaining the solids and biomass. The solids and biomass, or return activated sludge (RAS), are returned to the Anoxic Zone of the Treatment Tank. The filtered wastewater is pumped to ultra violet (UV) disinfection.

The Membrane tank is an above ground tank enclosed within the Filter Building. The tank includes a section for membrane cleaning. Membrane cleaning and replacement is a necessary and routine plant maintenance item. The Filter Building includes a monorail craned for removing and installing membranes. The building also includes access stairs and platforms, lighting, heating and ventilation.

### **Current Condition:**

1. The Filter Building is a wooden frame and metal skin construction. The building skin panels are show in Figure 4.



**Figure 4 - Filter Building Exterior and Interior Walls**

- a. The outside and inside skin of the building appear to be in good condition. The building wooden frame was not visible and its condition is unknown. Buildings of this type of construction typically have a life of 20 years under normal conditions. With the high moisture atmosphere and reduced ventilation building deterioration may be accelerated. As the building supports were hidden by both the interior and exterior panels the condition of the wooden structure is unknown.
- b. It was reported that carpenter ants have been found throughout the building and membrane tanks in the past. If the building is not treated for the carpenter ants building deterioration may be accelerated. Confirmation of insect damage can only be made by removal of the building interior and/or exterior panels.
- c. The building has a two doors: a 3 foot wide steel door and a roll up door. The steel door is in need of painting. The roll up door was not operated.
- d. The lighting in the building only partially works.
- e. Two of three exhaust fans were operable. Improper heating and ventilation could lead to premature corrosion due to moisture and sewage gases.
- f. Intake louvres need to be cleaned.
- g. Two propane unit heaters are not operable. Two radiant heaters were installed on the lower level of the building for heat. These were reported by the operator to be working.

## 2. Filter Tank Inlet Screen

- a. The inlet screen is a rotary drum fine screen capable of removing solids of 1 to 2 mm in size and greater.

- b. The screen is mounted on top of the Treatment tank at one end of the tank
- c. The screen drum recently cracked and was partially repaired. The screen is working at less than optimal efficiency and allows solids pass into the membrane tank. This results in the need for frequent removal of membranes for cleaning.
- d. The screen has reached the end of its useful life. This model screen is no longer available.



**Figure 5 Filter Tank Inlet Screen**

- 3. Filter Tank and access stairs and platforms
  - a. The Filter Tank is constructed of painted steel. The tank structure includes;
    - i. An access "ship ladder" stair to the top of the tank.
    - ii. An outer platform at the tank top level with grating and handrail
    - iii. Removable grating over the top of the tank
  - b. The outer tank walls show evidence of rust
  - c. The tank structural steel members show evidence of heavy rust



**Figure 6 Membrane Tank Structural Steel Rusting**

- d. The tank access stair shows evidence of heavy rust.
- e. The upper grating needs to be cleaned.
- f. All hand rails showed evidence of severe rust.
- g. The interior wall appeared to be covered with solids from cleaning of membranes.
- h. The tank monorail and support structure is rusting.
- i. The monorail crane is reaching the end of its useful life. The operator reports the crane has become noisy over the last several months. The monorail is essential for the membrane cleaning operation.

#### 4. Membranes

- a. The operator reported that the tank contained 5 racks of membranes with each rack containing 8 membrane cassettes.
- b. 4 of the 5 membrane racks were replaced 1.5 years ago. The 5<sup>th</sup> rack is in need of replacement. This older membrane rack is failing, leading to poor effluent quality.
- c. The tank contains five sections, each containing one membrane rack. Only four of the sections are in operation while the fifth section is used for membrane storage. The membrane type used are tubular. These are small diameter tubes that filter the water from the outside in (See Figure 7 below).
- d. Recent problems with the influent grinder and membrane tank influent screen have caused significant membrane fouling with solids. The operator reports that membranes are cleaned almost daily. Excessive solids can lead to membrane failure and poor water quality.



**Figure 7 - Membrane Removed from Service Due to Solids Fouling**

- e. The membrane product used at the site is now obsolete with only limited availability.
- f. Based on information from the membrane manufacturer, GE, there is a new membrane rack and cassette assembly that can be used in the existing tanks, both for short term and long term conditions.

**Immediate Recommendations:**

- 1. Filter Tank Inlet Screen
  - a. The inlet screen should be replaced as this equipment has reached the end of its useful life. Proper screening is essential to protect the membranes from premature failure.
- 2. Filter Tank
  - a. The tank should be drained cleaned and inspected. If needed, the tank interior should be painted.
  - b. The tank exterior should be cleaned and painted
  - c. The structural steel for platforms and handrails should be cleaned and painted.
  - d. Some structural steel will need to be replaced.
  - e. The monorail should be replaced or refurbished.

### 3. Membranes

- a. The normal life of a membrane is approximately 5-7 years under normal operating conditions. The newer membranes have been exposed to poorly screened wastewater and have required frequent cleaning. This will likely shorten the life of these membranes and these membranes should be replaced.

#### **Future Recommendations:**

##### 1. Filter Building

- a. Building lighting should be replaced
- b. Building heating should be replaced
- c. The broken building exhaust fan should be replaced

## **2.7 UV/Filter Control Building**

Following membrane filtration, treated water undergoes UV disinfection. UV disinfection equipment is located inside of the Filter/UV Control Building, adjacent to the Filter Building which houses the membrane filtration system. The Control Building also contains the Filter Tank aeration blowers, filter effluent pumps, filter backwash storage tank, filter backwash pumps, filter control valves, filter control panel, UV control panel, and other control and electrical and control devices.

#### **Current Condition:**

1. UV/Filter Control Building is a wood frame structure with vinyl siding and sheetrock interior walls. No major issues were reported for the building lights and heating. However, it has been reported that the UV building is too hot in the summer is in need of additional ventilation. The building systems are in need of a general cleanup.
2. UV Disinfection System: The UV disinfection system has 2 UV treatment units. Each unit contains 5 racks of UV bulbs. The operator reported that parts for the control panel that runs the UV system are becoming hard to get. As a result, not all of the UV bulbs operate, thereby reducing the disinfection capacity. The UV channels are constructed of stainless steel. Microbial growth was visible in both channels. The channels should be periodically cleaned. Flow in one channel was cloudy as a result of membrane failure.
3. Filter Blowers: The operator reported no problems with the filter blowers. One blower provides 100% capacity.



4. Filter Effluent Pumps: The operator reported no problems with the filter effluent pumps. The automatic valves used to control filter flow have been experienced problems.
5. Filter Backwash Tank and Pump: The operator reported no significant problems with the back wash system. The backwash pump was recently replaced. The backwash system has a single pump so a pump failure would eliminate the ability to backwash the membranes and reduce filtering capacity.
6. Filter Controls: The operator reported no problems with the Filter control panel.

**Immediate Recommendations:**

1. The filter building should be cleaned and obsolete equipment removed and discarded.
2. The UV disinfection electrical panels have reached the end of their useful life and are near failure. The UV system electrical cabinets should be replaced.
3. Automatic valves used for controlling filter flow should be replaced.
4. A second backwash pump should be installed to serve as an online backup.
5. Additional ventilation should be installed to improve temperature control in the summer months.

**Future Recommendations:**

1. The UV disinfection system is nearing the end of its useful life. It is recommended that the entire UV system be replaced in the near future.

## **2.8 Spray Field Dosing Tank/Pumps**

Effluent from UV disinfection flows into the spray field dosing tank which is located just outside of the UV/Filter Control building. The dosing tank was part of the original plant constructed in 1976 and is painted steel construction. The tank is covered with grating and corrugated roof panels with handrails on two sides. Access to the tank top is from a sloped area that is even with the tank top on one side. Two vertical turbine pumps are used to convey wastewater to the spray field distribution system. The tank is partially above ground and partially buried. The treatment plant flow meter is located in the dosing tank.



**Figure 8 - Dosing Tank Pumps**

**Current Condition:**

1. The dosing tank shows rusting. A portion of the tank is buried and the condition of the buried portion is unknown. The condition of the tank interior is also unknown. This tank is part of the original plant constructed in 1976.
2. One dosing pump was replaced in the last year. The shaft seals on the other pump are failing. The operator reports that the pump is in need of replacement or repair.
3. The hand rail is installed on only two sides of the tank. One side has no hand rail is a fall hazard.
4. A portion of the grating on the tank is steel and is rusting.
5. The flow measurement device is a bubbler type v-notch weir. The operator reported the poor meter accuracy.

**Immediate Recommendations:**

1. The second dosing pump should be replaced.
2. The tank should be drained, cleaned, inspected. Depending on the results of the interior tank inspection, the tank may need to be repaired or replaced.
3. In the event that the inspection finds tank is structurally satisfactory, the tank interior and exterior should be painted.
4. New grating should be installed on the tank.
5. The flow meter should be updated to provide accurate effluent readings. A magnetic flow meter would provide accurate readings and reduce maintenance.

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**Future Recommendations:**

1. New handrails should be installed on three sides of the tank.
2. Pump discharge piping should be painted.

**2.9 Valve chambers**

Two valve chambers exist for the spray field. The first valve chamber, downstream of the dosing pumps, is used to individually isolate the three spray fields (Valve Chamber No. 1 VVC1)). The valve chamber downstream of the first valve chamber is used to balance the flow to each spray field and measure wastewater flow to each field (Valve Chamber No. 2 (VC2)). The Valve Chamber No. 2 was added during the spray field upgrades in the 1990's.

**Current Condition:**

1. Valve Chamber No. 1 was constructed with the original treatment plant in 1976. The operator reported that this valve chamber is rarely used. The valves and piping in the chamber are rusting.
2. The access door to VC1 is rusting.
3. Valve Chamber No. 2 was not inspected as it was not in use at the time of inspection.

**Future Recommendations:**

1. The door to VC1 should be replaced or repaired and painted
2. The piping and valves in VC1 should be painted.
3. VC2 should be opened and inspected to determine its condition.

**2.10 Spray Irrigation Fields / Overland Flow**

Treated wastewater is discharged using a spray field. The spray field has three sections. Section 1 has 5 spray heads but one head can only use ½ of its spray pattern. The ½ spray pattern was needed to satisfy the 100 foot buffer requirements to the property line. Sections 2 and 3 each have 4 spray heads each. Spray field disposal normally was to occur to two sections at a time with the third field removed from service for a rest period. The rest period is meant to allow sprayed wastewater to infiltrate and for ground water levels in that field to subside. The Valve Chamber No. 2, described above, was designed to provide the ability to equalize flow to the three spray field. The valves in VC1 would be used to isolate flow to the

field to be rested. To equalize flow within each section, each spray head has a manual valve to equalize the flow.

With a spray field, wastewater uptake to the environment is achieved by evaporation, plant adsorption (evapotranspiration) and ground infiltration. Ground infiltration is accomplished in the radius of the spray field and as the water flows off the spray field to the surrounding area (overland flow). By NJDEP regulation overland flow should not leave the property. In the early 1990's a system of trenches and berms were constructed downstream of the spray field to capture and infiltrate overland flow. As part of the 1990's upgrade, storm water flow from the access road was diverted around the field. In addition, rivulets that formed in the spray field were filled with stone to reduce the runoff velocity and spread the flow from the rivulet.

**Current Condition:**

1. The vegetation in the spray field was over grown. It was reported that the field is cut twice per year.
2. The condition of the storm water diversion could not be confirmed due to overgrowth.
3. Spray head flow radius was not equalized.
4. Some spray heads appeared to not be working; however, close inspection was not possible on the operating fields. Lack of flow from non-working spray heads will lead to increased overland flow and rivulet formation.
5. All three spray fields were in operation at the time of the inspection. The operator was not aware of any spray field rotation and resting procedures. Note that with all fields in operation, flow to each spray head is reduced which in turn reduces the spray radius/area. This can lead to overloading spray to a smaller area and increased overland flow.
6. The trench and berm system were located and visually inspected. Flow from the spray field was observed flowing into the trench. However, flow was observed flowing from under the berms just downslope of the trench. Flow continued for a few hundred feet into the woods and we were unable to locate the end of the flow.



**Figure 9 Stone Filled Trench and Growth over Trench**

7. Some trench areas had growth indicating possible silt filling the trench.
8. A water level was not visible in the trench. It was difficult to tell the reason for water bypassing the berm. Test pits in the area of the trenches and berms may be required to determine a remedy.



**Figure 10 Flow into Trench and Ponding**

9. The stone rivulets were visible but it appeared that new rivulets may have formed. The area was overgrown making it difficult to accurately inspect rivulets. There was some ponding of flow upslope of the trench/berm system.

**Immediate Recommendations:**

1. All spray heads should be replaced, flow balanced and field section flows balanced.
2. The frequency of spray field cutting should be evaluated to confirm NJDEP conditions for optimal nutrient uptake are satisfied.
3. The trench and berm system need to be further inspected to determine the cause of flow through the berm. This may require digging test pits in the trenches and berms to evaluate soil conditions.
4. The berms and trenches will need to be improved to reduce the amount of flow past the berms.
5. Spray field rivulets will need to be remapped and filled with stone to reduce spray field run off intensity.
6. The access road storm water runoff diversion system should be rehabilitated to reduce stormwater flow across the spray field.

**2.11 Millbrook Pump Station**

The Millbrook Pump Station serves a small single family home development adjacent to the Oakwood Village apartment complex. Wastewater collected from the housing development is pumped to the Oakwood Village sewer system for disposal in the Oakwood Village Wastewater treatment plant. The pump station includes the following equipment:

1. Precast concrete wetwell.
2. Influent basket strainer
3. Pump crane
4. Two 100% capacity submersible sewage pumps.
5. Valve chamber.
6. Control Panel.
7. Standby diesel generator.

**Current Condition:**

The Oakwood Village Apartment Complex is responsible for operating the pump station and the wastewater treatment plant operator provides daily inspection and operator functions. The operator reports that the pump station has no significant operating problems. The control panel alarm auto dialer periodically sends out false alarm notifications. The generator maintenance is provided by an outside service.

**Future Recommendations:**

1. The alarm auto dialer should be replaced.
2. A flow meter should be installed at the pump station to assess flow contribution from the housing development.

**2.12 Discharge Permit Compliance**

Treated wastewater discharged from the Oakwood Village Plant is regulated under a New Jersey Pollution Discharge Elimination System (NJPDES) permit issued by the New Jersey Department of Environmental Protection (NJDEP). Compliance with the NJDPES permit is monitored with monthly testing of treated wastewater and submitting of Discharge Monitoring Reports (DMRs) to the NJDEP. HMM was provided with DMRs from January 2011 through April of 2015. The DMR data is summarized in tables appendix.

A review of this data shows general compliance with the following permit limit exceedances;

**Average Flow**

January 2011, November 2014, January 2015, April 2015

**Max Flow**

January 2011, October 2012, April 2015

**Fecal Coliforms**

August 2011, July 2013, December 2013, March 2015,

In addition, the NJDEP compliance evaluation inspection reports were reviewed and the following non-compliances were noted.

1. 2013
  - a. Minor flow violations in October and November 2012
  - b. Failure to notify the Department of non-compliance with Permit, to report a tank overflow in January 2013
  - c. Failure to maintain existing ground water monitoring wells as required by permit. All wells must be locked
  - d. The discharge to the spray fields is not contained within the determined boundaries which result in effluent continuing down the hill
2. 2014
  - a. Minor effluent violations for fecal coliform during July and December 2013
  - b. The discharge to the spray fields is not contained within the determined boundaries which result in effluent continuing down the hill

The major noncompliance concern above is the flow of effluent from the spray fields. This item needs to be addressed by modifications to the spray field and berm system and brought into compliance. This same issue led to NJDEP enforcement action back in the 1990's that resulted in upgrades to the spray fields.

The fecal coliform non compliances may be the result of the UV system bulb failures or from fouling of the UV bulbs. The incidents of high fecal coliforms can be addressed by installation of new UV system and routine bulb cleaning maintenance.

Flow exceedances could have several causes. As noted above in the site sewer assessment, there appears to be no correlation between monthly average rain and monthly average wastewater flows. High monthly average and peak day flows could be the result of apartment complex leaking plumbing fixtures.

## **2.13 Site Assessment Summary**

The Oakwood Village Wastewater Treatment Plant process is designed to provide a high quality effluent for spray field irrigation and overland flow disposal. Based on the plant operating data the plant has maintained NJDEP permit compliance. This plant is constructed to "private or developer quality" standards which do not provide a long plant useful life when compared to a public or municipal wastewater facilities. Since the plant was constructed in the 1970's and upgraded in the 1990's it has suffered from normal wear and tear, equipment failures and from deferred maintenance. As a result some



significant repairs are now required to extend the useful life of the plant and maintain NJDEP permit compliance.

To further evaluate and rank the above recommendations HMM performed a risk based assessment. The assessment process is summarized in Appendix A. The results from this assessment are provided in Section 3 below and the cost table provided in the appendix. Using this assessment HMM developed a cost estimate to address the high risk items. This cost estimate is summarized in table XX and is summarized in Section 4 below.

### 3. WWTP ASSET ASSESSMENT MATRIX

A asset assessment matrix was prepared for the major WWTP process facilities. Appendix A discusses the methodology applied in assessing risk levels for the major assets. The probability and consequence of failure scores were assigned based on asset age, condition, function and criticality. The Asset Assessment Matrix is located in Appendix A and summarizes the process components and their associated risk exposure scores , which assists in identifying system needs.

Risk levels have been assigned to each asset at the WWTP. The assessment and ranking or risk levels are based on the product multiplication of the ranking of the Probability of Failure (POF) and Consequence of Failure (COF) as shown in the Asset Risk Signature table shown below. See Appendix A for a more detailed description of the Risk-based Asset Management approach.

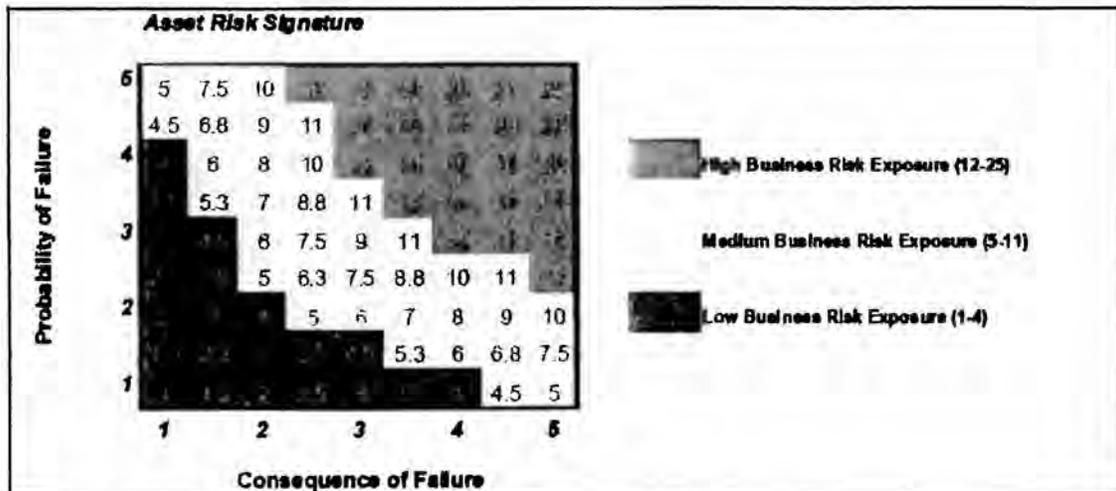


Figure 11 - Asset Risk Signature

In order to bring the plant up to operating condition, it is recommended that assets which are assigned high and medium business risk exposure ratings be repaired or replaced. The following Table 3-1 summarizes the WWTP assets with the highest business risk exposure rankings. The items with the highest risk rankings are priority for repair and/or replacement; however, it is recommended that all items which are assigned a business risk exposure ranking of 10 or more be addressed.

**Table 4 - WWTP Asset Risk Signature Summary**

<b>Asset</b>	<b>Ranking</b>
Membrane Rack 5	20
Membrane Rotoscreen	20
Flow Diversion Berm	20
Flow Control Rivulets	20
Anoxic/Aerobic Treatment Tank	16
Membrane Racks 1-4	16
Aeration Diffusers	15
Membrane Tank Metal Stairs	15
UV Disinfection Units	15
Wooden Staircase	15
Influent Grinder	12
Anoxic/Aerobic Access Bridge/Platform	12
Spray Pump Dosing Metal Tank	12
Dosing Effluent Flow Meter	12
Membrane Bioreactor Metal Tank	12

#### 4. CONSTRUCTION COST ESTIMATE

Table 3 attached presents a construction cost estimate for bringing the WWTP up to proper operating condition. As discussed in Section 3, items which are included in the estimate were assigned business risk exposure rankings of 10 or greater. Note that work on the Treatment Tank and on the Membrane Filter Tank will require the use of temporary treatment. The cost estimate includes 35 days of temporary treatment cost using temporary tanks, pumps, piping and controls. The total estimated construction cost for all recommended upgrades of the Oakwood Village WWTP is approximately \$1,973,000. This estimate includes a 10% contingency to address uncertainties and the likely need for additional work once certain equipment is exposed. The estimate also uses 10% contractor overhead and 10% contractor profit. This estimate is based on manufacturer and contractor quotes, HMM experience on similar projects and engineering judgement. It should be noted that the construction cost estimate does not include costs associated with engineering, legal or permitting fees.

## **TABLES**

**MOUNT OLIVE TOWNSHIP**  
**TABLE 1: OAKWOOD VILLAGE WTP WASTEWATER DATA (NJ0090051)**

PARAMETER	January 2014	February 2014	March 2014	April 2014	May 2014	June 2014	July 2014	August 2014	September 2014	October 2014	November 2014	December 2014	AVERAGE 2014	PERMIT LIMITS
FLOW, (EFF.) AVG. (GDP)	133,888	149,347	145,392	85,779	164,095	142,178	154,656	143,266	162,123	185,317	191,628	157,302	151,248	175,000
FLOW, (EFF.) MAX. (MGD)	168,499	169,044	175,310	199,100	195,260	168,570	178,840	169,980	187,420	229,320	234,928	178,138	234,928	244,000
pH (Eff.) MIN., SU														
pH (Eff.) MAX., SU	7.50	7.60	7.70	7.36	7.23	7.28	7.30	6.95	7.25	7.05	6.50	7.15	7.70	Report
NITROGEN-NITRATE (Eff.), AVG.	2.77	6.08	6.05	2.49	4.36	1.53	3.52	3.51	7.23	6.33	4.40	3.75	4.34	Report
NITROGEN-NITRATE (Eff.), MAX.	2.77	6.08	6.05	2.49	4.36	1.53	3.52	3.51	7.23	6.33	4.40	3.75	7.23	10.00
FECAL COLIFORM, AVG.	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	2.00	< 2.00	< 2.00	1.08	Report
FECAL COLIFORM, MAX.	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	2.00	< 2.00	< 2.00	2.00	4/100 ml
VOC (Eff.), AVG.														
VOC (Eff.), MAX.	0.00419	CODE=N	CODE=N	CODE=N	CODE=N	CODE=N	CODE=N	CODE=N	CODE=N	CODE=N	CODE=N	CODE=N	0.00419	Report
Monthly Rain	3.83	3.85	2.76	3.17	4.58	4.26	7.27	2.24	1.8100	3.95	2.51	3.23	43.46	

NOTE: All units in mg/l, unless otherwise specified.

**MOUNT OLIVE TOWNSHIP**  
**TABLE 2: OAKWOOD VILLAGE WTP SOAR DATA (NJ0090051)**

PARAMETER	January 2011	February 2011	March 2011	April 2011	May 2011	June 2011	July 2011	August 2011	September 2011	October 2011	November 2011	December 2011	AVG / TOTAL 2011
Sludge generated (Wet Gallons/month)													
Sludge Removed: % Solids	1.00	1.20	1.10	1.20	0.90	0.90	0.80	0.80	0.80	0.80	1.10	1.40	1.00
Sludge Removed (Dry Metric Tons)	1.80	1.50	2.30	3.90	1.90	1.60	1.70	1.20	0.70	0.70	1.60	3.70	22.60
Sludge disposed (Dry Metric Tons)	1.80	1.50	2.30	3.90	1.90	1.60	1.70	1.20	0.70	0.70	1.60	3.70	22.60
Monthly Incinerated (dry Met. Tons)													
Sludge to PVSC (Wet Gallons/month)	48,000	34,000	56,000	86,000	56,000	48,000	56,000	38,000	24,000	24,000	38,000	69,000	577,000
Sludge to Parsippany-Troy (Wet Gallons/month)													
Sludge to SRVSA (Wet Gallons/month)													
Antimony													
Arsenic						4.13					5.21		4.67
Beryllium						0.05					< 0.03		0.04
Cadmium						0.29					0.36		0.33
Chromium						9.74					9.44		9.59
Copper						948.00					1,090.00		1,019.00
Lead						14.60					19.10		16.85
Mercury						0.43					0.19		0.31
Molybdenum						5.26					5.29		5.28
Nickel						10.70					11.30		11.00
Selenium						6.05					5.62		5.84
Silver													
Thallium													
Zinc						538.00					550.00		544.00
Total Nitrogen (TKN)						108,000.0					77,700.0		92,850.0
Ammonia-Nitrogen						7,530.0					< 1,870.0		4,700.0
Nitrate-Nitrogen						549.0					< 467.0		508.0
Oil & Grease						19,900.0							
Phosphorus											13,100.0		13,100.0
Calcium						22,000.0					23,500.0		22,750.0
Magnesium													
Potassium						94,000.0					6,910.0		50,455.0
Cyanide													
Total Solids (%)						0.91					1.07		1.0
Volatile Organics													
Acid/Base/Neutrals													
Pesticides + PCB's													

- NOTE: (1) All units in mg/kg, unless otherwise specified.  
(2) Dry sludge is calculated as Dry-Metric-Tons (DMT) unit.  
(3) When calculating averages with some concentrations are less than the detection limit, the detection limit is used.  
(4) When calculating averages with all concentrations are less than the detection limits, the highest detection limit is used.

**MOUNT OLIVE TOWNSHIP**  
**TABLE 2: OAKWOOD VILLAGE WTP SQAR DATA (NJ0090051)**

PARAMETER	January 2012	February 2012	March 2012	April 2012	May 2012	June 2012	July 2012	August 2012	September 2012	October 2012	November 2012	December 2012	AVG / TOTAL 2012
Sludge generated (Wet Gallons/month)													
Sludge Removed: % Solids	1.00	1.10	1.10	1.10	1.10	1.00	0.80	1.00	0.90	0.70	1.00	1.10	0.99
Sludge generated (Dry Metric Tons)	1.70	2.70	2.70	2.46	2.90	2.10	2.10	2.00	1.40	0.60	1.60	1.50	23.8
Sludge disposed (Dry Metric Tons)	1.70	2.70	2.70	2.46	2.90	2.10	2.10	2.00	1.40	0.60			20.66
Monthly Incinerated (dry Met. Tons)											1.60	1.50	3.10
Sludge to PVSC (Wet Gallons/month)	45,000	64,000	64,000	59,000	69,000	55,000	68,000	54,000	40,000	24,000			542,000
Sludge to Parsippany-Troy (Wet Gallons/month)													
Sludge to SRVSA (Wet Gallons/month)											42,200	37,000	79,200
Antimony													
Arsenic						3.84						2.90	3.37
Beryllium						0.59						0.06	0.33
Cadmium						0.29						0.27	0.28
Chromium						9.88						9.36	9.62
Copper						936.00						882.00	909.00
Lead						17.00						11.50	14.23
Mercury						0.29						0.17	0.23
Molybdenum						4.28						4.72	4.50
Nickel						9.83						0.26	5.05
Selenium						7.68						3.90	5.79
Silver													
Thallium													
Zinc						484.00						450.00	467.00
Total Nitrogen (TKN)						111,000.0						70,100.0	90,550.0
Ammonia-Nitrogen						< 2,020.0						2,260.0	2,140.0
Nitrate-Nitrogen						< 505.00						< 459.0	< 505.0
Oil & Grease													
Phosphorus						15,800.0						14,200.0	15,000.0
Calcium						21,900.0						21,200.0	21,550.0
Magnesium													
Potassium						7,480.0						7,760.0	7,620.0
Cyanide													
Total Solids (%)						0.99						1.10	1.05
Volatile Organics													
Acid/Base/Neutrals													
Pesticides + PCB's													

- NOTE: (1) All units in mg/kg, unless otherwise specified.  
(2) Dry sludge is calculated as Dry-Metric-Tons (DMT) unit.  
(3) When calculating averages with some concentrations are less than the detection limit, the detection limit is used.  
(4) When calculating averages with all concentrations are less than the detection limits, the highest detection limit is used.

**MOUNT OLIVE TOWNSHIP**  
**TABLE 2: OAKWOOD VILLAGE WTP SOAR DATA (NJ0090051)**

PARAMETER	January 2013	February 2013	March 2013	April 2013	May 2013	June 2013	July 2013	August 2013	September 2013	October 2013	November 2013	December 2013	AVG / TOTAL 2013
Sludge generated (Wet Gallons/month)													
Sludge Removed: % Solids	1.00	1.00	0.70	0.90	0.80	0.90	0.90	0.80	0.80	0.70	0.60	0.70	0.82
Sludge Removed (Gallons)													321,800
Sludge Removed (Dry Metric Tons)	1.70	0.90	0.70	0.90	0.80	0.80	0.90	0.60	0.80	0.80	0.50	0.90	10.3
Sludge disposed (Dry Metric Tons)						0.50	0.90	0.60					2.0
Monthly incinerated (dry Met. Tons)	1.70	0.90	0.70	0.90	0.80	0.30			0.80	0.80	0.50	0.90	8.3
Sludge to PVSC (Wet Gallons/month)			25,000	25,000	25,000	9,200	25,000	20,000	25,000	30,000	20,000	35,000	239,200
Sludge to Parsippany-Troy (Wet Gallons/month)						5,000							5,000
Sludge to SRVSA (Wet Gallons/month)	44,200	25,000				10,000							79,200
Antimony						1.10						0.66	
Arsenic						0.64						0.84	0.74
Beryllium						< 0.34						< 0.42	< 0.42
Cadmium						1.20						1.10	1.15
Chromium						10.90						11.40	11.15
Copper						715.00						742.00	728.50
Lead						< 34.40						9.50	21.95
Mercury						< 1.40						0.17	0.79
Molybdenum						4.00						3.90	3.95
Nickel						8.50						9.80	9.15
Selenium						< 34.40						< 21.20	< 34.40
Silver						< 34.40						< 42.40	< 42.40
Thallium						< 0.34						< 0.42	< 0.42
Zinc						411.00						411.00	411.00
Total Nitrogen (TKN)						84,000.0						15,100.0	49,550.0
Ammonia-Nitrogen						2,900.0						4,710.0	3,805.0
Nitrate-Nitrogen						2,300.00						970.00	1,635.00
Oil & Grease													
Phosphorus						481,000.0						39,100.0	260,050.0
Calcium						19,400.0						19,700.0	19,550.0
Magnesium													
Potassium						7,730.0						7,070.0	7,400.0
Cyanide													
Total Solids (%)						0.90						0.70	0.80
Volatile Organics													
Acid/Base/Neutrals													
Pesticides + PCB's													

- NOTE: (1) All units in mg/kg, unless otherwise specified.  
(2) Dry sludge is calculated as Dry-Metric-Tons (DMT) unit.  
(3) When calculating averages with some concentrations are less than the detection limit, the detection limit is used.  
(4) When calculating averages with all concentrations are less than the detection limits, the highest detection limit is used.

**MOUNT OLIVE TOWNSHIP**  
**TABLE 2: OAKWOOD VILLAGE WTP SOAR DATA (NJ0090051)**

PARAMETER	January 2014	February 2014	March 2014	April 2014	May 2014	June 2014	July 2014	August 2014	September 2014	October 2014	November 2014	December 2014	AVG / TOTAL 2014
Sludge generated (Wet Gallons/month)													
Sludge Removed: % Solids													0.86
Sludge Removed (Gallons)													432,000
Sludge Removed (Dry Metric Tons)													14.07
Monthly Incinerated (dry Met. Tons)													
Sludge to PVSC (Wet Gallons/month)	80,000	58,000	45,000	15,000	20,000	20,000		54,000		25,000	20,000	25,000	362,000
Sludge to Parsippany-Troy (Wet Gallons/month)			20,000										20,000
Sludge to SRVSA (Wet Gallons/month)													
Antimony						11.90						0.23	6.07
Arsenic						18.20						0.52	9.36
Beryllium						5.80						< 0.10	2.95
Cadmium						23.50						0.75	12.13
Chromium						219.00						6.30	112.65
Copper						14,200.00						513.00	7,356.50
Lead						185.00						6.80	95.90
Mercury						0.37						0.20	0.29
Molybdenum						92.50						2.00	47.25
Nickel						177.00						5.40	91.20
Selenium						121.00						< 4.90	62.95
Silver						584.00						< 29.20	306.60
Thallium						5.80						< 0.29	3.05
Zinc						8,990.00						371.00	4,680.50
Total Nitrogen (TKN)						66,100.0						67,000.0	66,550.0
Ammonia-Nitrogen						2,900.0						2,300.0	2,600.0
Nitrate-Nitrogen						260.00						< 290.00	275.00
Oil & Grease													
Phosphorus						136,000.0						470,000.0	303,000.0
Calcium						338,000.0						13,900.0	175,950.0
Magnesium													
Potassium						156,000.0						6,490.0	81,245.0
Cyanide													
Total Solids (%)						1.05						0.86	0.96
Volatile Organics													
Acid/Base/Neutrals													
Pesticides + PCB's													

- NOTE: (1) All units in mg/kg, unless otherwise specified.  
(2) Dry sludge is calculated as Dry-Metric-Tons (DMT) unit.  
(3) When calculating averages with some concentrations are less than the detection limit, the detection limit is used.  
(4) When calculating averages with all concentrations are less than the detection limits, the highest detection limit is used.

**MOUNT OLIVE TOWNSHIP**  
**TABLE 2: OAKWOOD VILLAGE WTP SOAR DATA (NJ0090051)**

PARAMETER	January 2015	February 2015	March 2015	April 2015	May 2015	June 2015	July 2015	August 2015	September 2015	October 2015	November 2015	December 2015	AVG / TOTAL 2015
Sludge generated (Wet Gallons/month)													
Sludge Removed: % Solids													
Sludge Removed (Gallons)													
Sludge Removed (Dry Metric Tons)													
Monthly Incinerated (dry Met. Tons)													
Sludge to PVSC (Wet Gallons/month)	35,000		44,000	42,000									121,000
Sludge to Parsippany-Troy (Wet Gallons/month)													
Sludge to SRVSA (Wet Gallons/month)													
Antimony													
Arsenic													
Beryllium													
Cadmium													
Chromium													
Copper													
Lead													
Mercury													
Molybdenum													
Nickel													
Selenium													
Silver													
Thallium													
Zinc													
Total Nitrogen (TKN)													
Ammonia-Nitrogen													
Nitrate-Nitrogen													
Oil & Grease													
Phosphorus													
Calcium													
Magnesium													
Potassium													
Cyanide													
Total Solids (%)													
Volatile Organics													
Acid/Base/Neutrals													
Pesticides + PCB's													

- NOTE: (1) All units in mg/kg, unless otherwise specified.  
 (2) Dry sludge is calculated as Dry-Metric-Tons (DMT) unit.  
 (3) When calculating averages with some concentrations are less than the detection limit, the detection limit is used.  
 (4) When calculating averages with all concentrations are less than the detection limits, the highest detection limit is used.



PROJECT TITLE/LOCATION AION WWTP CONDITION ASSESSMENT

PROJECT MANAGER JSS CLIENT AION PARTNERS

PREPARED BY MIB CHECKED BY JSS

DATE OF ESTIMATE Oct-15

**TABLE 3.1 - CONSTRUCTION COST ESTIMATE SUMMARY PAGE**

PAGE 1 OF 8

PHASES (CHECK CURRENT PHASE):

CLASS 5 (CONCEPTUAL)  CLASS 4 (FEASIBILITY)  CLASS 3 (BUDGET)  CLASS 2 (DETAILED)  CLASS 1 (FINAL)

CSI DIV.	DESCRIPTION	TOTAL DOLLARS
1	SITework	\$ 17,400.00
2	HEADWORKS	\$ 49,500.00
3	ANOXIC/AEROBIC TREATMENT	\$ 347,400.00
4	SERVICE BUILDING	\$ 49,000.00
5	MEMBRANE BIOREACTOR TREATMENT	\$ 645,500.00
6	UV DISINFECTION	\$ 22,000.00
7	DOSING TANK & SPRAY FIELDS	\$ 348,900.00
		\$ -
		\$ -
	SUBTOTAL	\$ 1,479,700.00
	CONTRACTOR'S OVERHEAD 10%	\$ 147,970.00
	SUBTOTAL	\$ 1,627,670.00
	CONTRACTOR'S PROFIT 10%	\$ 162,767.00
	SUBTOTAL	\$ 1,790,437.00
	PROJECT CONTINGENCY 10%	\$ 179,043.70
	SUMMARY TOTAL	\$ 1,969,480.70
	SUMMARY TOTAL - ROUNDED	\$ 1,970,000.00















## **APPENDIX A**

## Appendix A Oakwood Village WWTP Asset Assessment

A Risk-Based Asset Management Approach was utilized to assess and prioritize the Oakwood Village Wastewater Treatment Plant (WWTP) facility assets. The paragraphs below provide the details of the Risk-Based Asset Management Approach.

Risk levels were assigned to each WWTP facility asset. The assessment and ranking of risk levels are based on the product multiplication of the ranking of the Probability of Failure (POF) and Consequence of Failure (COF) as shown in the Asset Risk Signature table (see Figure 1).

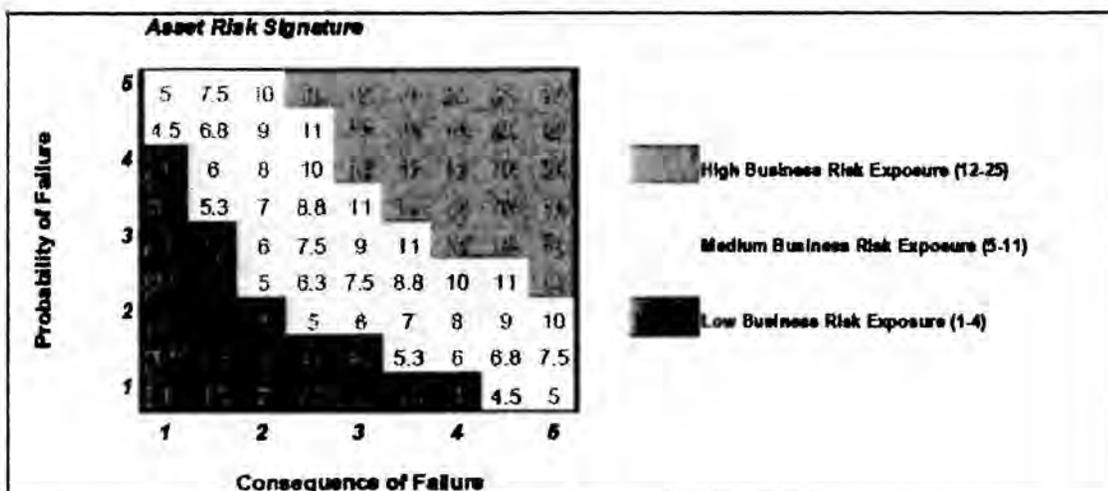


Figure 2: Asset Risk Signature

The first step of the process is the development of assessment criteria to support the Risk Ranking of the assets located within the WWTP system. The Assessment Criteria utilized are described below.

### Probability of Failure

The Probability of Failure (POF) criteria used to evaluate the WWTP assets are summarized in Table 1. For each asset, the Probability of Failure was evaluated based on the following five (5) categories as defined in the table and further defined below:

1. Physical Condition – The current physical state of the asset resulting from an interaction of usage, age, maintenance, design and manufacturing quality, initial construction management, and operating environment. If the asset exceeds its current requirements it will be rated a 1 or a 2. If the asset is becoming ineffective and/or failing it will be rated a 4 or a 5.
2. Operational Performance – The current ability of the asset to meet operational requirements now and in the foreseeable future. This criterion is influenced by the required levels of service/asset performance, technical obsolescence, operations and maintenance policies and history, and design effectiveness/process efficiency. An asset that exceeds its current requirements and requires negligible attention will be rated a 1 or a 2. An asset that has difficulty sustaining its performance and/or is failing will be rated with a 4 or a 5.
3. Useful Life – Equipment with more than half of its estimated useful life remaining and only requiring scheduled preventative maintenance will be rated a 1. If 25% of the equipment’s expected useful life remains or if more than scheduled routine maintenance is required, then the equipment will be rated a 3. If less than 5% of the equipment’s expected useful life remains or if the equipment is not usable, then the equipment will be rated a 5.
4. Capacity – Equipment whose capacity matches the capacity required to perform its function will be rated a 3. If the equipment has excess capacity, it will be rated a 1 or 2 and the equipment will be rated a 4 or 5, if it is under the required capacity.
5. Reliability – The ability of an asset to perform its required function(s) for a specified period of time. “How frequently does the asset fail?” If breakdown is infrequent and/or occasional the asset will be rated a 1 or a 2. If breakdown is continuous or if the asset is inoperable the asset will be rated at a 4 or a 5.
6. Maintainability – Probability that a failed asset can be restored to its normal operable state within a given timeframe using prescribed practices and procedures. Its two main criteria are serviceability (ease of conducting scheduled inspections and servicing) and reparability (ease of restoring service after a failure). An asset that is easily maintained and/or repairable will be rated a 1 or a 2. An asset that needs frequent maintenance or needs constant monitoring will be rated at a 4 or a 5.
7. Financial Efficiency – Equipment will be rated a 2, if there are few (if any) better ways to perform the function. Equipment will be rated a 4, if there are better ways to perform the function such as a newer technology. A rating of 3 will be given, if the equipment is a proper fit for its function.

**Table 1: Probability of Failure Criteria**

<b>Probability of Failure Criteria</b>	<b>Description</b>				
<b>SCORE</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Physical Condition	Substantially exceeds current requirements	Exceeds current requirements	Meets current requirements	Inefficient; becoming ineffective; cost/benefit questions; becoming obsolete	Failing; not capable of sustaining required performance
Operational Performance	Negligible attention required	Exceeds current requirements	Meets current requirements	Difficult to sustain performance; cost/benefit questions	Failing; not capable of sustaining required performance
Useful Life	Almost new; up to 10% physical life consumed	Up to 25% physical life consumed	Up to 50% physical life consumed	Up to 75% physical life consumed	up to 90% useful life consumed - End of it's useful life
Capacity	Substantially exceeds current capacity requirements	Exceeds current capacity requirements	Meets capacity required to perform its function	Under the current capacity requirements	Failing; not capable of sustaining capacity requirements
Reliability	As specified by manufacturer	Infrequent/occasional breakdown	Occasional/Periodic Breakdown	Continuous recurrent breakdown	Virtually inoperable
Maintainability	Easily maintained; OEM maintenance is straightforward	Largely preventative maintenance with some corrective maintenance beginning to show up	Increasing minor maintenance required; periodic/frequent corrective maintenance	Scheduled maintenance becoming frequent; more experienced trades people required for maintenance; work order frequency increasing	Work orders well above average for type of asset; recurrent minor repairs; constant monitoring required to sustain performance
Financial Efficiency	There are no more efficient ways to perform the function	There are few more efficient ways to perform the function (newer technology)		There are many more efficient ways to perform the function (newer technology)	There are significantly more efficient ways to perform the function
<b>CONDITION SCORE</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Prob of Failure</b>	<b>0.01</b>	<b>0.25</b>	<b>0.5</b>	<b>0.75</b>	<b>0.99</b>

## Consequence of Failure

The assets at the WWTP were evaluated using the Consequence of Failure (COF) criteria described in Table 2 and per the following guidelines:

1. **Loss of Service** – Equipment was evaluated on its criticality to the system. If a particular asset is out of commission, how long could the system continue to operate without it. If the asset can be down for over a week without a disruption to the service, then it will be rated at a 1 or a 2. If the asset cannot be down for more than a day, then it will be rated at a 4 or a 5.
2. **Health and Safety** – Equipment was evaluated on the potential for human harm in the event of failure with the equipment. The more serious the human harm, the higher the rating. Equipment was only evaluated on its specific function within the plant. Although failure with one piece of equipment could have consequences with associated equipment and have impacts throughout the plant, the rating provided is only for the specific piece of equipment being evaluated.
3. **Social Impact**– Equipment was evaluated on potential to cause violations of the treatment plant’s ability to be a “good neighbor”. If an equipment failure directly jeopardizes the plant’s standing in the neighborhood, then that equipment would be given a high score. Failures or problems with equipment that could lead significant odor releases, as an example, would be rated a 4 or 5. Although failure with one piece of equipment could have consequences with associated equipment and have impacts throughout the plant, the rating provided was only for the specific piece of equipment being evaluated.
4. **Difficulty of Repair** – A piece of equipment would be rated a 2 based upon guidelines such as if spare parts are readily available, service could be performed by local technicians, the service work is not labor intensive, the equipment is easy to access, or no shutdowns or temporary operations are required. As any of these guidelines became less favorable, the rating of the equipment will be higher.
5. **Redundancy** – The percent redundancy was determined by considering the number of pieces of equipment required to operate on an average day’s plant flow with the number of pieces of spare equipment available. For example, if there are four pieces of equipment and three pieces are required leaving one spare available, the redundancy is 33%. Individual pieces of equipment that are associated with an overall piece of equipment, such as a belt drive on a belt filter press, was evaluated for redundancy as a part of the overall piece of equipment. In this example, since there would not be 2 drives for one belt, the redundancy rating would be for the entire belt filter press.
6. **Economic/Financial Impact** – An asset would be rated a 1 or a 2 if its failure and/or replacement represents a moderate cost, less than \$500,000. An asset will be rated a 4 or a 5 should its failure and/or replacement represent a value of more than \$2,000,000.

**Table 2: Consequence of Failure Criteria**

<b>Consequence of Failure Criteria</b>	<b>Description</b>				
<b>SCORE</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Loss of Service	Can be out of service indefinitely	Cannot be down a month	Cannot be down a week	Cannot be down a day	Cannot be down one hour
Health & Safety	No impact	Minor inconvenience	minor/moderate injury	Major injury, sickness	Death widespread injury and sickness
Social Impact	No impact	Minor inconvenience	minor/moderate social impact	Major social impact	Directly impacts the plant's standing in the neighborhood
Difficulty to Repair		Spare parts are readily available; local technicians; not labor intensive ; easy to access; no shutdowns required			
Redundancy	up to 100% redundancy in place	Up to 75% redundancy in place	Up to 50% redundancy in place	10% or less redundancy in place	Asset served primary function with no back-up
Economic/Financial Impact	Insignificant; Low Cost	Moderate cost; up to \$500K	High cost; diverts \$; up to \$2 million	Up to \$10 million; change of priorities	> \$10 million; staff changes
<b>CONDITION SCORE</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Consequence of Failure</b>					

## Business Risk Exposure

Business Risk Exposure scores were calculated for each asset based on the combined effect of the Probability of Failure (POF) and Consequence of Failure (COF) ratings. The Project Team developed the overall business risk exposure according to the following methodology upon the completion of the assessment of each asset.

### Step 1 – Develop Overall Probability of Failure (POF) Rating

The overall POF rating (score) for a given asset estimates the likelihood of the asset failing to meet any one of the five (5) criteria identified above. The overall POF score was assigned for the asset based on the highest score out of all of the above criteria. For example, a particular asset may have low scores for all items, but have a rating of 5 for inadequate capacity, in which case an overall POF rating of 5 would be assigned for the asset.

### Step 2 – Develop Overall Consequence of Failure (COF) Rating

The consequences of the failure of a given asset are cumulative; therefore, the COF ratings developed for each of the above criteria were added together to obtain a combined rating. The combined rating was then be divided by the number of criteria ratings analyzed for a given asset to obtain a normalized overall COF rating on a scale of 1 to 5 to be utilized in the Asset Risk Signature table.

### Step 3 – Develop Overall Business Risk Exposure Ratings

For each asset evaluated, the overall POF rating and overall COF rating were multiplied to calculate the overall “Business Risk Exposure Rating”. If an asset had an overall Business Risk Exposure Rating of 12 to 25, the asset was considered to have a “High Risk Exposure” and is shown in red in the Asset Risk Signature table (see Figure 1). An asset with a score of 5 to 11 was considered to have a “Medium Business Risk Exposure” and is shown in yellow. Assets with a “Low Business Risk Exposure” are shown in green on the Asset Risk Signature table.

### **Asset Assessment / Equipment Hierarchy List**

A detailed list of the assets evaluated at the WWTP is provided below. The Risk-Based Assessment Management approach was applied to each asset on the list. This Equipment/Asset Hierarchy for the WWTP is organized by Process System and the various components associated with the Process System (such as tanks, equipment and buildings). This spreadsheet shows the date that the equipment/asset was installed, estimated useful life, Probability of Failure Rating, Consequence of Failure Rating and Business Risk Exposure Rating. High Risk Assets have a rating of 12 to 25 and are shown in Red on the Asset Assessment spreadsheet. The risk rating

system allows one to compare the assets at the WWTP in a systematic way to make informed decisions as to which assets are most critical to be replaced.

AION Partners  
Oakwood Village WWTP Condition Assessment  
Appendix A - Asset Assessment Matrix (October 2015)

Item No	System/Structure	Component	Date Installed	Estimated Useful Life	Estimated End of Useful Life	Failure Timing as % of Expected Life	Probability of Failure Criteria (POF) (1-8)					Overall POF Rating	Consequences of Failure Criteria (COF) (1-8)					Overall COF Rating	Business Risk Exposure Rating		
							Physical Condition	Operational Perf.	Useful Life	Capacity	Reliability		Maintainability	Financial Efficiency	Health & Safety	Social Impact	Difficulty to Repair			Redundancy	Economic Financial Impact
1	Headworks	Influent Greaser (2)	1998	20	2018	15%	3	4	3	3	4	2	2	5	1	2	4	3	4		
2	Headworks	Manual Bar Screen (1)	1998	40	2038	5%	3	4	3	3	3	3	1	2	2	2	2	2	2	10	
3	Headworks	Influent Grinder Channel	1988	40	2028	5%	5	1	1	1	1	2	1	5	2	2	2	2	2	10	
4	Headworks	Influent Pump	1998	40	2038	5%	3	3	3	3	3	1	3	3	2	2	4	2	4		
5	Aerobic/Aeration	Aerobic/Aeration Treatment Tank	1975	50	2025	20%	3	4	3	3	3	2	2	3	4	4	3	4	2	4	
6	Aerobic/Aeration	Diffusers	1996	20	2016	15%	5	3	5	3	5	3	1	3	2	2	4	1	2	4	
7	Aerobic/Aeration	Air Pump	1998	20	2018	15%	3	3	3	3	3	3	1	3	2	2	4	1	2	4	
8	Aerobic/Aeration	Access Bridge	1975	50	2025	20%	4	3	3	3	3	2	1	4	3	5	3	2	3	3	
9	Aerobic/Aeration Tank	Access Platform	1975	50	2025	20%	4	3	3	3	3	2	1	4	3	5	3	2	3	3	
10	Aerobic/Aeration	Sludge Pump (1)	1996	20	2016	15%	5	5	5	3	5	3	1	3	1	2	2	2	2	3	
11	Aerobic/Aeration	Recirculation Pumps (2)	1996	20	2016	15%	3	3	4	3	3	3	1	3	2	2	2	2	2	3	
12	Service Building	Positive Displacement Aeration Blowers (2)	1998	30	2028	43%	3	3	3	3	3	3	1	3	2	2	4	1	2	4	
13	Service Building	Centrifugal Aeration Blower (1)	1998	30	2028	43%	3	3	3	3	3	3	1	3	2	2	3	1	2	4	
14	Service Building	Blower Air Relief Valves	1998	20	2018	15%	5	3	3	3	3	3	1	5	2	2	2	2	2	3	
15	Service Building	Blower/Air Piping	1998	20	2018	15%	4	3	3	3	3	3	1	4	4	2	2	3	2	3	
16	Service Building	Standby Generator	1998	40	2038	5%	3	3	3	3	3	1	3	3	4	2	2	2	2	3	
17	Service Building	Electrical Equipment	1998	30	2028	43%	2	3	3	3	3	3	1	3	5	2	2	2	2	3	
18	Service Building	Building	1976	75	2051	48%	1	1	2	3	3	3	2	5	2	2	1	2	2	10	
19	Membrane Bioreactor Building	Membrane Bioreactor Building	1998	40	2038	5%	3	3	2	3	3	3	2	3	3	2	2	3	3	1	9
20	Membrane Bioreactor Building	Lights	1998	20	2018	15%	4	4	4	4	4	1	1	4	2	2	2	2	2	2	8
21	Membrane Bioreactor Building	Struct. Tank	1998	40	2038	5%	4	3	2	2	2	2	1	4	5	3	2	2	2	2	8
22	Membrane Bioreactor Building	ROSO Screen	1998	20	2018	15%	5	5	5	2	5	2	1	5	3	3	2	4	5	2	4

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Scenario A - Asset Assessment Needs (October 2015)

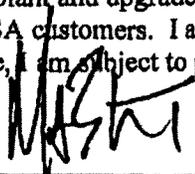
Item No.	Substation/Function	Component	Date Installed	Estimated Useful Life (Yr)	Estimated % of Expected Life	Failure Timing				Probability of Failure Criteria (POF) (1-4)				Corresponds to Failure Criteria (POF) (1-4)				Overall POF Rating	Overall COF Rating	Overall Risk Exposure Rating
						Physical Condition	Operational Perf.	Useful Life	Capacity	Reliability	Maintainability	Financial Viability	Loss of Revenue	Health & Safety	Social Impact	Difficulty to Repair	Revolvement			
23	Mechanical Room Building	Mechanical Room 1-4	2004	5	2009	80%	2	1	4	2	2	4	3	4	3	5	4	4		
24	Mechanical Room Building	Mechanical Room 5	1998	7	2005	~40%	5	1	5	3	3	4	1	4	3	4	3	4		
25	Mechanical Room Building	Mechanical Room	1998	20	2004	15%	4	4	5	2	2	3	3	2	2	3	3	3		
26	UV Distribution Building	Mechanical Room (2)	1998	30	2009	43%	1	1	1	8	2	1	1	2	2	2	2	2		
27	UV Distribution Building	UV Electrical Cabinet	1998	20	2011	15%	5	4	4	1	4	4	2	2	2	2	2	2		
28	UV Distribution Building	UV Distribution Units (2)	1998	20	2011	13%	4	1	4	3	4	4	2	4	2	2	4	2		
29	UV Distribution Building	UV Feed Pumps	1998	30	2008	40%	2	2	2	2	2	2	2	2	2	2	2	2		
30	UV Distribution Building	Backwash Tank	1998	40	2008	20%	2	1	2	2	2	3	3	2	2	2	2	2		
31	UV Distribution Building	Backwash Pumps	1998	30	2009	43%	2	2	2	2	2	2	1	2	2	2	2	2		
32	Spray Pump Cooling Tank	Metal Tank	1976	40	2016	39%	3	3	4	2	2	2	3	2	2	2	4	2		
33	Spray Pump Cooling Tank	Backwash Tank	1976	40	2016	39%	3	3	4	2	2	2	3	2	2	2	4	2		
34	Spray Pump Cooling Tank	Spray Pump #1	2004	40	2004	90%	1	1	1	3	2	1	1	1	1	1	1	1		
35	Spray Pump Cooling Tank	Spray Pump #2	1976	40	2016	26%	4	4	5	1	2	1	1	1	1	1	1	1		
36	Spray Pump Cooling Tank	Water Motor	1976	20	1996	~60%	1	1	4	3	4	3	1	4	2	2	4	2		
37	Mechanical Room	Pump #1	UNK	30	UNK	UNK	2	2	2	2	2	2	1	2	1	2	4	2		
38	Mechanical Room	Control	UNK	30	UNK	UNK	2	2	2	2	2	2	1	2	1	2	4	2		
39	Mechanical Room	Generator	UNK	40	UNK	UNK	2	2	2	2	1	2	1	2	1	2	4	2		
40	General Site	Mechanical Room	1976	40	2016	39%	1	1	5	3	3	2	1	1	1	1	1	1		
41	General Site	Chain Link Fence	UNK	30	UNK	UNK	4	3	3	2	1	2	1	2	1	2	4	2		
42	Spray Field	Spray Nozzle	1976	40	2016	39%	4	3	5	3	1	2	1	2	1	2	4	2		
43	Spray Field	irrigation system	1990	20	2010	~20%	5	5	5	4	1	1	2	2	2	2	4	2		
44	Spray Field	Control Building	1990	20	2010	~20%	1	1	3	4	4	1	2	2	2	2	4	2		
45	Spray Field	Spray Observation Room	1990	20	2010	~20%	1	1	5	4	4	1	2	2	2	2	4	2		

CERTIFICATION

I hereby certify that the foregoing responses to discovery requests numbered SE-22 and SE-24 are true to the best of my knowledge and belief and that all documents and reports annexed hereto are exact copies of the entire original document or report. In making this certification, I have relied upon Applied Water Management for information as to the operational and compliance history of the Oakwood sewer system and I have relied upon Hatch Mott and MacDonald for information as to the current condition of the plant and upgrades and/or repairs needed to ensure safe, adequate and proper service to the OVSA customers. I am aware that if any of the foregoing statements made by me are willfully false, I am subject to punishment.

Date:

By:



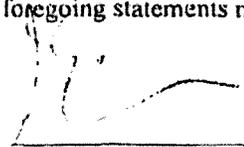
\_\_\_\_\_  
Michael Betancourt  
Vice President  
AION Oakwood Sewer L.L.C.

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Date: 11/13/15

By:

  
\_\_\_\_\_  
John L. Mallinson  
Vice President  
Oakwood Village Sewerage Associates, L.L.C.