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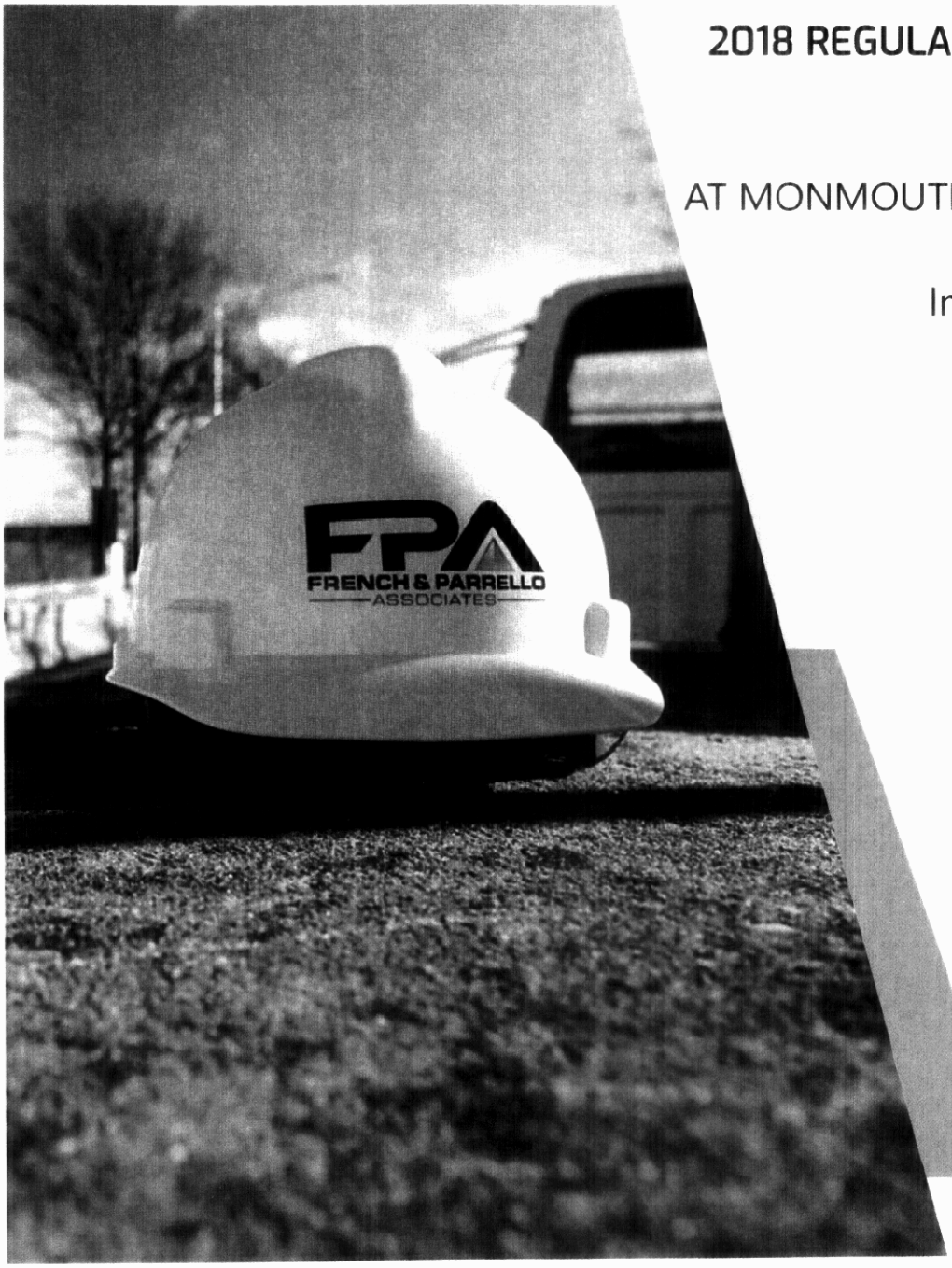

2018 REGULAR INSPECTION REPORT

RED VALLEY DAM
NJ DAM FILE NO. 28-025
AT MONMOUTH COUNTY BRIDGE U-1

Inspection Performed on
November 28, 2018

Submitted to:

MONMOUTH COUNTY
DIVISION OF ENGINEERING
& TRAFFIC SAFETY
Hall of Records Annex
1 East Main Street
Freehold, NJ 07728

January 10, 2019
FPA No. 2284.005

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Camden, NJ
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New York, NY

January 10, 2019

Mr. Joseph M. Ettore, PE, PP, County Engineer
MONMOUTH COUNTY
DIVISION OF ENGINEERING & TRAFFIC SAFETY
Hall of Records Annex
1 East Main Street
Freehold, New Jersey 07728

Re: 2018 Regular Inspection of
Red Valley Dam
NJ Dam File No. 28-025
At Monmouth County Bridge U-1
Upper Freehold Township, Monmouth County, New Jersey
FPA No. 2284.005

Dear Mr. Ettore:

Pursuant to our proposal dated October 16, 2018, French & Parrello Associates (FPA) performed a Regular Inspection of Red Valley Dam, located in the Upper Freehold Township, Monmouth County, New Jersey. A Regional Location Plan of the dam is presented on Drawing No. 1. The purpose for our current services was to perform a Regular Inspection of the dam in accordance with the NJ Dam Safety Standards [N.J.A.C. 7:20]. Our work included the visual inspection of the dam, completion of the Dam Safety Visual Inspection Checklist and the preparation of this report. Also, as part of this Regular Inspection Report, we have reviewed the previous inspection reports, the Emergency Action Plan and the Operation & Maintenance Manual for Red Valley Dam.

Red Valley Dam is classified as a Class II, Significant Hazard Dam and is designated as NJ File No. 28-025. It is our understanding that the dam is owned by Monmouth County and Fin Fur & Feather Club. The dam was constructed circa 1939. The dam is an earthfill embankment dam with a concrete drop box spillway structure. The dam is approximately 330 feet long with a maximum height of ±15 feet. The dam impounds the waters of Doctors Creek and its tributaries to create Red Valley Lake.

VISUAL INSPECTION OF THE DAM

A visual inspection of the dam was made by Christopher W. Marx, PE and Carlo Romano, EIT on November 28, 2018. Debby DeJong was present during the inspection to represent Monmouth County. The observations are detailed in the Visual Inspection Checklist presented in Appendix A and photographs taken during our site reconnaissance are presented in Appendix B.
In general, the physical condition of the Red Valley Dam may be described as fair, with maintenance and repairs required. However, since a dam safety deficiency is recognized based on the NJDEP Division of Dam Safety and Flood Control criteria, the dam is considered to be in **POOR** condition. The recommendations based on our visual inspection are presented on page A-10 of the Visual Inspection Checklist.

CLOSING & LIMITATIONS

Our work was limited to a visual dam inspection and did not include any stability or hydraulic analyses or any design services. No assessment was made of the structural condition of the bridges or culverts associated with the dam. Services performed by FPA during the referenced inspection have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, expressed or implied, and no warranty or guarantee is included or intended in the services provided.

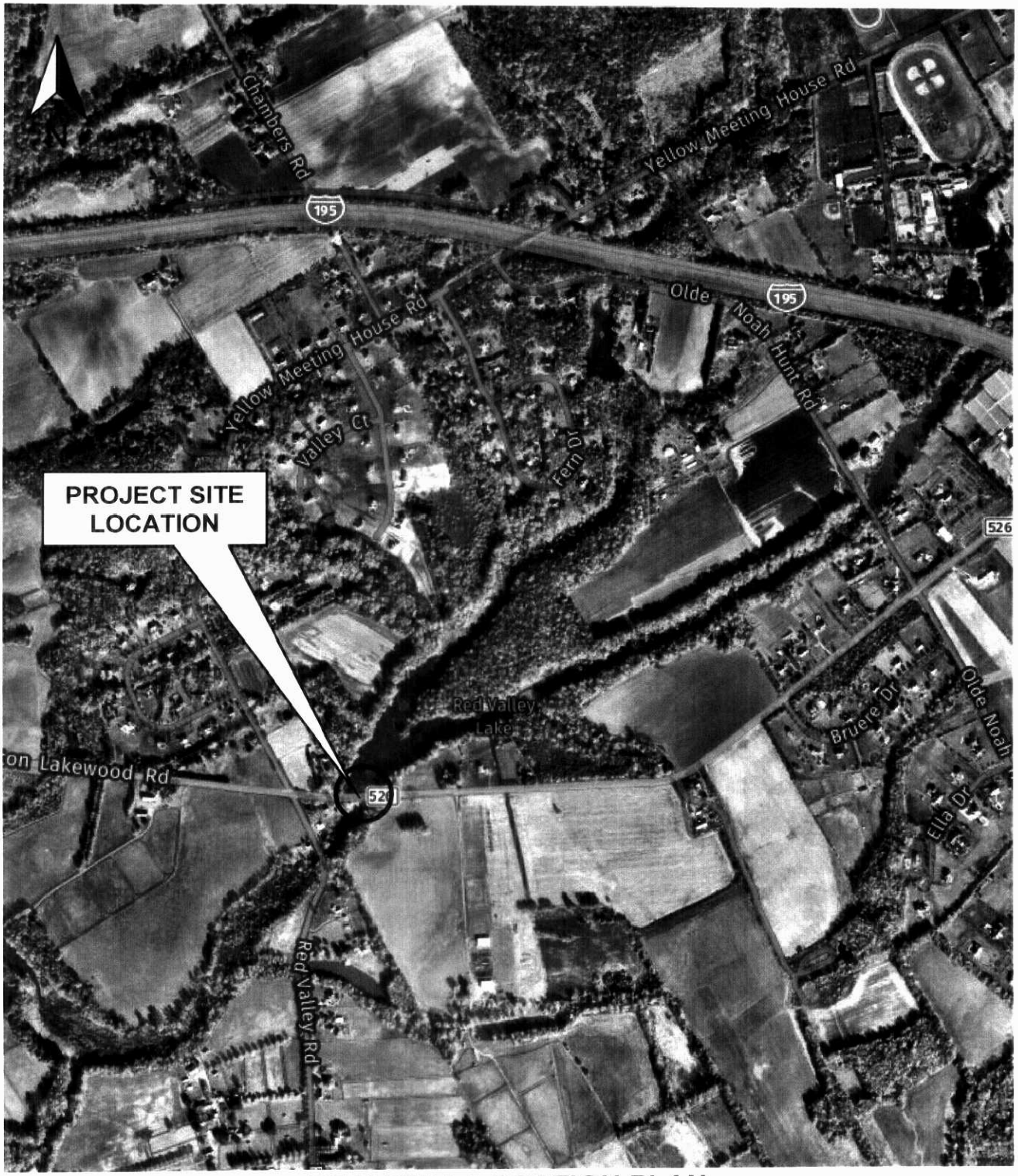
Should you have any questions or comments or if we can be of service to you in the future, please feel free to contact us.

Sincerely,

FRENCH & PARRELLO ASSOCIATES

Christopher W. Marx, PE
Project Manager

FPA



REGIONAL LOCATION PLAN

RED VALLEY DAM (NJDEP FILE No.28-025)
UPPER FREEHOLD TOWNSHIP, MONMOUTH COUNTY, NEW JERSEY

SCALE:	DATE:	JOB NO.:	DRAWING NO.
NTS	JANUARY 2019	2284.005	1

APPENDIX A

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

This general checklist should be used as an aid when examining all dams. This checklist may not, however, include all features or conditions found at a specific dam that are relevant to the safety of that dam. All features integral to the safety of the dam being examined should be inspected and their condition reported.

NJ INSPECTION YEAR: *2018*

TYPE OF INSPECTION: (formal, regular, informal): *REGULAR*

DAM NAME: ***Red Valley Dam***

DAM FILE NO.: ***28-025***

LOCATION: ***Upper Freehold Township, Monmouth County***

CO-OWNERS:** ***County of Monmouth
Fin Fur & Feather Club

CO-OPERATORS:** ***County of Monmouth

*** Monmouth County performed the necessary inspection without prejudice and jurisdictional/ownership responsibility determination.***

DATE OF INSPECTION: ***November 28, 2018***

RESERVOIR INFORMATION

Normal Reservoir Elevation (ft):	***± 130.3 (NAVD 88)***
Reservoir Elevation at time of inspection (ft):	***± 130.5***

WEATHER CONDITIONS (including recent rainfall): ***Partly Sunny, 40° F***
0.66 inches – 11/26/2018
1.28 inches – 11/25/2018
1.07 inches – 11/24/2018

INSPECTION PERSONNEL

New Jersey Licensed Professional Engineer(s):

Name	Affiliation	Area of Expertise
Christopher W. Marx, PE	***French & Parrello Associates***	***Dam Engineering***

Non-Licensed technical expert(s) and advisor(s):

Name	Affiliation	Area of Expertise
Carlo Romano, EIT	***French & Parrello Associates***	***Civil Engineering***

State Representative(s):

Name	Affiliation
None.	

Dam Co-Owner Representative(s):

Name	Affiliation
Debby DeJong	***Monmouth County, Division of Engineering and Traffic Safety***

Others:

Name	Affiliation
None.	

GENERAL INFORMATION

Name of Dam:	***Red Valley Dam***		
Fed. I.D. No.	***NJ 0454***	N.J. Dam No.:	***28-025***
River Basin:	***Lower Delaware***		
Town:	***Upper Freehold Township***	County:	***Monmouth***
Block:	***18***	Lot:	***24.02***
Nearest Downstream City-Town:	***Upper Freehold Township***		
Stream Name:	***Doctors Creek***	Tributary of:	***Crosswicks Creek***
Latitude (N):	***40 ° 09.7'***	Longitude (W):	***74 ° 28.1'***
Type of Dam:	***Earthen Embankment***		
Purpose of Dam:	***Recreation / Roadway Embankment***		
Hazard Category:	***Class II, Significant Hazard***		
Drainage Area (sqr mls):	***± 3.8***		
Height (ft):	***± 15***	Length (ft):	***± 328***
Normal Surface (ac):	***± 15***	Normal Capacity (af):	***± 34***
Maximum Capacity (af):	***± 116***	Spillway Capacity (cfs):	***± 739***

HISTORY

Date Constructed:	***1939***	Dates(s) Reconstructed:	***Unknown***
Designer:	***Unknown***	Constructed By:	***Ailey and Ferraro Company***

Owner & Address: ***County of Monmouth, Hall of Records Annex, 1 East Main Street, Freehold, NJ 07728***
Fin Fur & Feather Club, 337 Route 526, Cream Ridge, NJ 08514

Owner/Operator present during inspection (yes or no): ***Yes.***

PREVIOUS INSPECTIONS (date of)

Last Inspection:	***May 11, 2016***	Last Regular Inspection:	***July 25, 2014***
Phase I Inspection:	***Unknown***	Last Formal Inspection:	***May 11, 2016***

EMERGENCY ACTION PLAN (Required for all Class I and Class II dams)

Date of Approved Plan: ***July 15, 2005***

Date of Plan Revision: ***March 2018. Monmouth County Division of Engineering and Traffic Safety has retained French and Parrello Associates to prepare an updated Emergency Action Plan for Red Valley Dam. The EAP will be submitted under separate cover.***

Is the notification flowchart complete and current? ***Revisions are required once ownership responsibilities have been resolved.***

Is inundation mapping or a description included? ***Yes.***

Are emergency materials and equipment identified? ***Yes.***

When was the plan last tested? ***Unknown.***

DOWNSTREAM HAZARD CLASSIFICATIONS

Present Hazard Classification: ***Class II, Significant.***

Changes in Downstream Land Use and Habitation: ***None observed.***

Is present classification appropriate? ***Yes.***

OPERATION AND MAINTENANCE

Date of Operation and Maintenance Plan: ***August 2004.***

Are instructions adequate? ***Will be revised once jurisdictional/ownership issues/responsibilities are resolved.***

Do operating personnel follow instructions? ***Will be revised once ownership responsibilities are resolved.***

What are operating personnel capabilities? ***Operating capabilities will be revised once jurisdictional/ownership issues/responsibilities are resolved.***

EXAMINATION OF EMBANKMENT DAMS AND DIKES

DESCRIPTION OF STRUCTURE

Embankment Material:	***Earthfill Embankment.***
Cutoff Type:	***Unknown.***
Impervious Core:	***Unknown.***
Internal Drainage System:	***Unknown.***
Movement (Horizontal and Vertical Alignment):	***None observed.***
Junctions with Abutments or Embankments:	***No problems noted.***
Miscellaneous:	***Paved roadway along crest.***

CREST

Vertical Alignment:	***Slight vertical curve in road alignment, with low area in crest.***
Horizontal Alignment:	***No problems noted.***
Surface Cracks:	***Minor cracks observed in roadway pavement.***
Settlement:	***None observed.***
Unusual Conditions:	***None observed.***

UPSTREAM SLOPE

Slope (Estimate) (H:V):	***Vertical steel sheet pile along most of the upstream face. Earthen slope is approximately 5H: 1V beyond the limits of the sheeting.***
Trees, Undesirable Growth or Debris, Animal Burrows:	***There are small caliper trees, brush and vegetation located on the upstream slope along the steel sheeting.***
Sloughing, Subsidence or Depressions:	***Minor subsidence observed adjacent to the vertical steel sheeting observed during previous inspection, obscured by vegetation during this inspection.***
Slope Protection:	***Vertical steel sheeting. Some tree growth at the steel sheeting.***
Surface Cracks or Movement at Toe:	***None observed.***
Unusual Conditions:	***Erosion of the upstream slope near the right abutment observed during previous inspection, obscured by vegetation during this inspection.***

DOWNSTREAM SLOPE

Slope (Estimate) (H:V):	***Varies – 1 H:1V near vertical timber sheeting, left of spillway structure 3H:1V near spillway structure to 12H:1V, right of spillway structure***
Trees, Undesirable Growth or Debris, Animal Burrows:	***Some trees along slope.***

Sloughing, Subsidence or Depressions:	***Asphalt observed at these locations as an attempt to prevent future erosion due to roadway runoff. A timber retaining wall and riprap stone has been installed to stabilize the area.***
Surface Cracks or Movement at Toe:	***None observed.***
Seepage:	***Seepage observed at the toe of the stone masonry wall observed during previous inspection; obscured by vegetation during this inspection.***
External Drainage System (Ditches, Trenches, Blanket):	***None observed.***
Condition Around Outlet Structure:	***Some erosion noted.***
Unusual Conditions:	***Concrete rubble appears to have been dumped along the downstream slope near the left abutment.***

ABUTMENTS AND TOE AREA

Erosion at Contact:	***None observed.***
Seepage or Wet Area Along Contact:	***A small amount of flow was observed ± 50 feet to the left of the primary spillway structure at the toe of the stone masonry wall during previous inspection. The seepage was obscured by vegetation during this inspection.***
Signs of Movement:	***None observed.***
Depressions, Sinkholes:	***None observed.***
Unusual Conditions:	***During the last inspection, the ground at the toe of the downstream slope near the stone retaining wall was wet with standing water. Conditions at the toe were obscured by vegetation during this inspection.***

SEEPAGE AND TOE DRAIN / RELIEF WELL FLOW SUMMATION

Location	Measurement No.	Estimated Flow	Color (Turbidity)
None.			

(Attach additional sheets for facilities with more than one embankment dam or dike)

EXAMINATION OF SPILLWAYS AND OUTLET WORKS

TYPE(S) AND DESCRIPTION OF SPILLWAY(S)

Primary: ***Concrete box drop inlet.***

Secondary (auxiliary): ***None.***

Emergency: ***None.***

Other: ***None.***

ENTRANCE CHANNEL

Description: ***Not Applicable – flow enters spillway directly from the lake.***

SPILLWAY CREST

Description: ***Concrete broad crested weir.***

Condition of Material: ***Fair with some deterioration of the concrete.***

Signs of Movement: ***None observed.***

Joints: ***No problems noted.***

Unusual Conditions: ***No problems noted.***

DROP BOX

Description: ***Reinforced concrete, vertical walls upstream of bridge.***

Condition of Material: ***Good with the exception of the concrete at the low level outlet support. The concrete is spalled and deteriorated at the bottom.***

Signs of Movement: ***None observed.***

Joints: ***None observed.***

Floor: ***Obscured by tailwater.***

Unusual Conditions: ***None observed.***

SPILLWAY WING WALLS

Description: ***Concrete spillway wing walls are connected to the bridge abutments.***

Condition of Material: ***The concrete wing walls are cracked vertically at the interface with the abutments.***

Signs of Movement: ***The wing walls exhibit signs of movement at the concrete abutments.***

Joints: ***No problems noted.***

Drains: ***None observed.***

Unusual Conditions: ***None observed.***

DOWNSTREAM APRON

Description:	***The downstream apron was obscured by tailwater and debris.***
Condition of Material:	***Not observed.***
Signs of Movement:	***Not observed.***
Unusual Conditions:	***Not observed.***

CULVERTS

Description:	***Flow travels downstream between the concrete bridge abutments into the exit channel.***
Condition of Material:	***Fair.***
Signs of Movement:	***None observed.***
Joints:	***No problems noted.***
Seepage:	***None observed.***
Unusual Conditions:	***The steel bridge beams appear to be rusted and deteriorated.***

TRASH RACKS

Description:	***None observed – No Trash Racks.***

CHUTES

Description:	***None observed – No Chutes.***

STILLING BASIN

Description:	***None observed – No Stilling Basin.***

EXIT CHANNEL

Vegetation (Trees, Bushes):	***Channel is clear of vegetation.***
Debris:	***None observed.***
Channel Side-Slope Stability:	***Side slopes are stable.***
Erosion:	***Minor bank erosion observed.***
Unusual Conditions:	***None observed.***

LOW LEVEL OUTLET

Description:	***A 24 inch diameter steel pipe with gate through lower portion of the spillway headwall.***
Condition:	***The gate was submerged by tailwater at the time of inspection. The gate stem is rusted and deteriorated.***
Trash Rack:	***None observed.***
Leakage:	***None observed – pipe outlet submerged by tailwater at the time of inspection.***

CONCLUSION

DAM INSPECTION PROGRAM GUIDELINES

The following new guidelines have been established by the NJDEP Bureau of Dam Safety & Flood Control to help meet the requirements of the National Inventory of Dams condition assessment of existing dam structures. Please follow the guidelines/definitions below and select the appropriate checkbox.

SATISFACTORY
No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) in accordance with the applicable regulatory criteria. Minor maintenance items may be required.

FAIR
Acceptable performance is expected under all required loading conditions (static, hydrologic, seismic) in accordance with the applicable dam safety regulatory criteria. Minor deficiencies may exist that require remedial action and/or secondary studies or investigations.

POOR
A dam safety deficiency is recognized for any required loading condition (static, hydrologic, seismic) in accordance with the applicable dam safety regulatory criteria. Remedial action is necessary. POOR also applies when further critical studies or investigations are needed to identify any potential dam safety deficiencies.

UNSATISFACTORY
Considered unsafe. A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution. Reservoir restrictions may be necessary.

I certify that the dam structure referenced herein was personally inspected by me and was found to be in the following condition **(select one only):**

☐ SATISFACTORY

☐ FAIR

☒ POOR

☐ UNSATISFACTORY

Location
None observed.

Estimated Flow

Unusual Conditions: ***None observed.***

Was the low level outlet operated during the inspection? ***No.***

Were there difficulties operating the low level outlet? ***Not Applicable.***

When was the low level outlet last operated and did this conform with the Operation and Maintenance procedures? ***Unknown.***

Miscellaneous: ***None observed.***

STILLING BASIN FOR LOW LEVEL OUTLET

Description: ***Same as primary spillway structure.***

EXIT CHANNEL FOR LOW LEVEL OUTLET

Description (Trees, Bushes): ***Same as primary spillway structure.***

EXAMINATION OF OTHER FEATURES

INSTRUMENTATION
(Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) location, condition: ***None observed.***

RESERVOIR

Slopes: ***Surrounding topography is gently sloping.***

Sedimentation: ***None observed. Previous inspection report indicates that there may be significant sediment volume in the lake. Removal of sediment near the steel sheeting may affect the stability of the sheeting.***

Unusual Conditions Which Affect Dam: ***None observed.***

Unusual Conditions: ***None observed.***

APPURTENANT STRUCTURES (Power House, Gatehouse, Penstocks, Water Supply, Other)

Description and Condition of each: ***None observed.***

CONCLUSION (continued)

I recommend the following repairs be made immediately:

- ***Small trees and brush should be removed from the crest of the dam embankment.***
- ***Concrete repairs of spillway wing wall and bridge abutment cracks, as well as spalls in low level outlet support.***
- ***Debris should be removed from spillway crest.***

The following long term improvements should also be undertaken:

- ***The recommendations in the Phase II Report dated February 2006 should be reviewed and implemented.***
- ***Prior to the next inspection, the lake should be lowered so that no water is flowing over the spillway crest. This will allow the inspector to freely observe the spillway structure.***
- ***The Operation & Maintenance Manual should be revised.***

The following studies are recommended:	☐ Hydrologic and Hydraulic analysis ☐ Verification of Hazard Class ☐ Spillway Design Strom Determination ☒ None

Have the recommendations above included those from the Phase I Inspection Report or previous Regular or Formal Inspection Reports? If not, indicate why.

Yes. The recommendations from previous Inspection Reports have been included.

EMERGENCY ACTION PLAN (This section must be completed for all Class I & II dams)

Date of Approved Plan: ***July 15, 2005***

Date of Last Plan Revision: ***March 2018***

Is the notification flowchart complete and current? ***Revisions are required once jurisdictional/ownership issues/responsibilities have been resolved.***

Is inundation mapping or a description included? ***Yes.***

NJ Dam Safety Compliance Schedule Form (attached). This form must be completed or the Inspection Report will be deemed incomplete.

Name of Professional Engineering Company/Consultant Representing the Owner:

Company/Consultant Address: ***French & Parrello Associates***
1800 Route 34, Suite 101
Wall, New Jersey 07719

Company/Consultant Telephone Number: ***(732) 312-9800***

New Jersey Licensed Professional Engineer representing the dam owner in responsible charge of the inspection:

Sign _____ Date 02/15/2019

Christopher W. Marx, PE

New Jersey Professional Engineer License Number 47776

New Jersey Dam Safety Compliance Schedule Form

Dam Name: Red Valley Dam **File No:** 28-025	**Co-Owner:** County of Monmouth **Address:** Hall of Records Annex 1 East Main Street Freehold, NJ 07728 **Phone:** (732) 431-7760 **Co-Owner:** Fin Fur & Feather Club **Address:** 337 Route 526 Cream Ridge, NJ **Phone:** (609) 259-7309 -	**Owners Engineering Firm:** French & Parrello Associates **Address:** 1800 Route 34, Suite 101 Wall, New Jersey 07719 **Phone:** (732) 312-9800

The purpose of this form is to allow the dam owner, through consultation with their engineer, to establish a time line for addressing the deficiencies identified in the inspection report for the dam and bringing the dam into compliance with the New Jersey Dam Safety Standards, N.J.A.C. 7:20-1.1 et seq.

Proposed time frame for submission of required information and implementation of recommended repairs:
(Engineer should check required sections and propose appropriate time frames. However, the Dam Safety Section reserves the right to require additional dates and/or information as needed.)

☒ **Performance of maintenance and repairs not requiring approval from the Dam Safety Section** (Such work includes grass mowing, brush removal, debris removal, filling of animal burrows, minor concrete repairs, minor gate repairs, filling of areas of minor surface erosion, etc. The Dam Safety Section must be notified upon completion of these activities.)

Work to be completed no later than: ***TBD once ownership responsibilities are resolved.***

☒ **Engineering Report / Studies** (This work includes any required hydrologic and hydraulic analysis, structural analysis, alternative analysis, geotechnical investigations or dam breach analysis that may be recommended by your engineer and/or required by the Dam Safety Section.)

Phase II Investigation submitted to Dam Safety dated: ***TBD once ownership responsibilities are resolved.***

☒ **Permit Application:** (A permit application must be submitted for any construction activity at the dam. The permit application must address all deficiencies as identified in the inspection report and the subsequent engineering report / studies.)

Permit application to be submitted no later than ***TBD once ownership responsibilities are resolved*** **months after the date of the Dam Safety Section's approval of any required studies. (Please provide date if no studies are required.)**

☒ **Construction to start no later than** ***TBD once ownership responsibilities are resolved*** **months after the date of issuance of the permit by the Dam Safety Section.**

☒ **Operation and Maintenance Plan (O&M):** (An O&M is required for all dams. O&M's should be submitted with the permit application or sooner if possible. Existing O&M's may need to be updated if a dam is being rehabilitated. Please indicate if an O&M has already been submitted and approved.)

Revised O&M to be submitted no later than: ***TBD once ownership responsibilities are resolved.***

☒ **Emergency Action Plan (EAP):** (EAPs are required for all high and significant hazard dams and should be submitted as soon as possible. Existing EAPs should be reviewed on a yearly basis and revised as necessary. Please indicate if an EAP has already been submitted and approved.)

Revised EAP to be submitted no later than: ***TBD once ownership responsibilities are resolved.***

The dates provided above will be reviewed by the Dam Safety Section to determine if the schedule is acceptable to achieve compliance with the Dam Safety Standards. Requests for extensions to the accepted time frames outlined above must be submitted to this office in writing along with appropriate justification and will be considered on its merits on a case by case basis.

Signed: Dam Co-Owner	**Date**	**Signed: Owner's Engineer**	**Date** 02/15/2019
Signed: Dam Co-Owner	**Date**		

Additional information including Dam Safety Section forms, standards and inspection guidelines as well and EAP guidelines and a sample O&M is available at http://www.state.nj.us/dep/damsafety or contact this office via e-mail at Damsafety@dep.state.nj.us or telephone at (609)984-0859. Please submit the completed form to: NJDEP, Dam Safety Section, P.O. Box 419, Trenton, NJ 08625

APPENDIX B

PHOTOGRAPHS

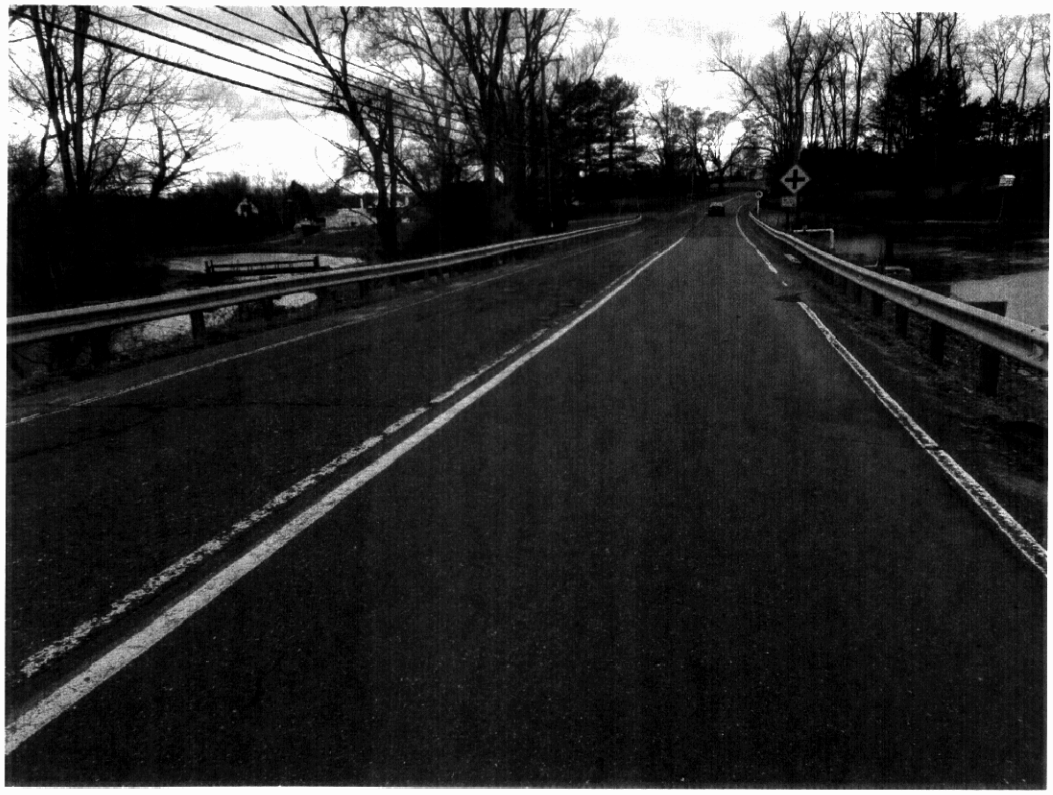


Photo 1: Dam embankment crest.
Note: Allentown Lakewood Road, CR 526 traverses the dam crest.

Photo 2: Deteriorated, cracked asphalt pavement.
Note: Allentown Lakewood Road, CR 526 traverses the dam crest.

Photo 3: Upstream slope / steel sheet pile bulkhead.
Note: Trees, brush, and woody vegetation located along the steel sheeting.

Photo 4: Upstream slope to the right of the spillway structure.
Note: Minor erosion of the upstream slope was noted near the right abutment.

Photo 5: Steel sheeting on upstream slope to the right of the spillway structure. Note: Depressions observed along upstream steel sheeting.

Photo 6: Steel sheeting on upstream slope to the right of the spillway structure.

Photo 7: Steel sheeting on upstream slope to the right of the spillway structure. Note: Trees established through the sheeting.

Photo 8: Downstream slope to the left of the spillway structure. Note: Trees, brush, and woody vegetation located near the left abutment.

Photo 9: Downstream slope at spillway structure

Photo 10: Timber sheeting along the downstream slope to the left of the primary spillway structure. Note: The sheeting is heavily deteriorated.

Photo 11: Timber sheeting located on the downstream slope.
Note: Recently installed timber retaining wall and riprap observed to the left of the exit channel.

Photo 12: Overview of primary spillway structure.

Photo 13: Primary concrete drop box spillway structure.

Photo 14: Right side of primary concrete drop box spillway structure and right bridge abutment

Photo 15: Downstream slope to the left of the spillway structure.
Note: Recently installed timber retaining wall and riprap observed to the left of the exit channel.

Photo 16: Concrete wing walls downstream of bridge abutments.
Note: Vertical cracks in the concrete wing walls at bridge abutments.

Photo 17: Crack located in the left downstream wing wall at the downstream face.
Note: Vertical cracks extend from the top down the face of the wall, typical both sides.

Photo 18: Upstream fascia steel bridge beam.
Note: The steel bridge beam exhibits some signs of rust and deterioration.

Photo 19: Downstream fascia of bridge.

Photo 20: Exit channel.

Photo 21: Low level outlet gate operator.

Photo 22: Low level outlet gate.
Note: The floor of the drop box spillway structure obscured by tailwater and debris.

Photo 23: Overview of Red Valley Lake.