

**REPORT ON  
TOWER CRANE COLLAPSE  
BRENTON SUITES CONSTRUCTION SITE  
HALIFAX, NS**

*Prepared for:*

**Department of Labour and Advanced Education**  
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## INTRODUCTION

At the request of Mr. Ron Buchanan, Occupational Health & Safety Officer with the Nova Scotia Department of Labour and Advanced Education, the undersigned carried out a review of the collapse of the tower crane in use at the construction of Brenton Suites on Brenton Place, Halifax, NS.

The tower crane collapsed at approximately 4:30 PM ADT on September 7, 2019 during Post-Tropical Storm Dorian. The crane was owned and operated by Lead Structural Formwork Ltd. The undersigned visited the site on September 10, 2019 and again on September 12, 2019 and visually reviewed portions of the crane structure after the collapse. The undersigned only had close-up access to the portion of the crane mast located within Brenton Suites. The remainder of the mast and the entire top-kit of the crane was viewed from distance as access was limited by the instability of the crane.

BMR Structural Engineering was involved with the design of modifications to this crane in May/June 2019. The turntable of the crane originally erected at the site malfunctioned in May 2019. At that time, the top kit of the original crane was removed and a new top kit from a different crane was installed. BMR designed a transition section near the top of the mast to allow the alternate top kit to be installed on the mast of the original crane, which remained on site. BMR was only responsible for the design of the transition section. APA Inc. reviewed the overall stability, load carrying capacity, etc. of the “hybrid” crane.

The undersigned took photographs, made observations and carried out calculations in order to determine why the crane collapsed on September 7, 2019.

## DEFINITIONS

*Counter-jib:* The horizontal section at the top of the crane directly opposite from the jib. The counter-jib supports counterweight ballast blocks which counteract the load the crane is lifting while it is in use. Refer to Diagram 1 in Appendix A.

*Jib:* The long horizontal section at the top of the crane used to support the load lifted by the crane. The trolley moves back and forth along the jib when the crane is in use. Refer to Diagram 1 in Appendix A.

*Mast:* The vertical tower portion of the crane extending from the base to the tower head. Refer to Diagram 1 in Appendix A.

*Slew Brakes:* Brakes on the turntable which when released allow the tower head to rotate freely around the mast

*Top – Kit:* the portion of the tower crane above the mast which includes the tower head, turntable, cab, jib, counter-jib, counter-jib ballast, trolley, cable, hook, etc.

*Tower Head:* The section of crane where the jib and counter-jib are connected to the mast. The turntable is located within the tower head. Refer to Diagram 1 in Appendix A.

*Turntable:* That part of a tower crane located in the tower head which allows the cab, jib and counter-jib, etc. to rotate around the mast when the crane is both in-service and out-of-service.

*Weather-vane:* Free to rotate in the wind. In the case of tower cranes, if the turntable at the top of the crane is unlocked, the entire top kit should rotate such that the jib and counter-jib are parallel to the wind direction. The counter-jib should face into the wind, while the jib should point in the direction the wind is blowing if the crane is weather-vaning properly.

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#### **HISTORY OF THE CRANE ON THE SITE**

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**CERIFICATION AND INSPECTIONS**

**WEATHER-VANING THE CRANE WHEN OUT-OF-SERVICE**

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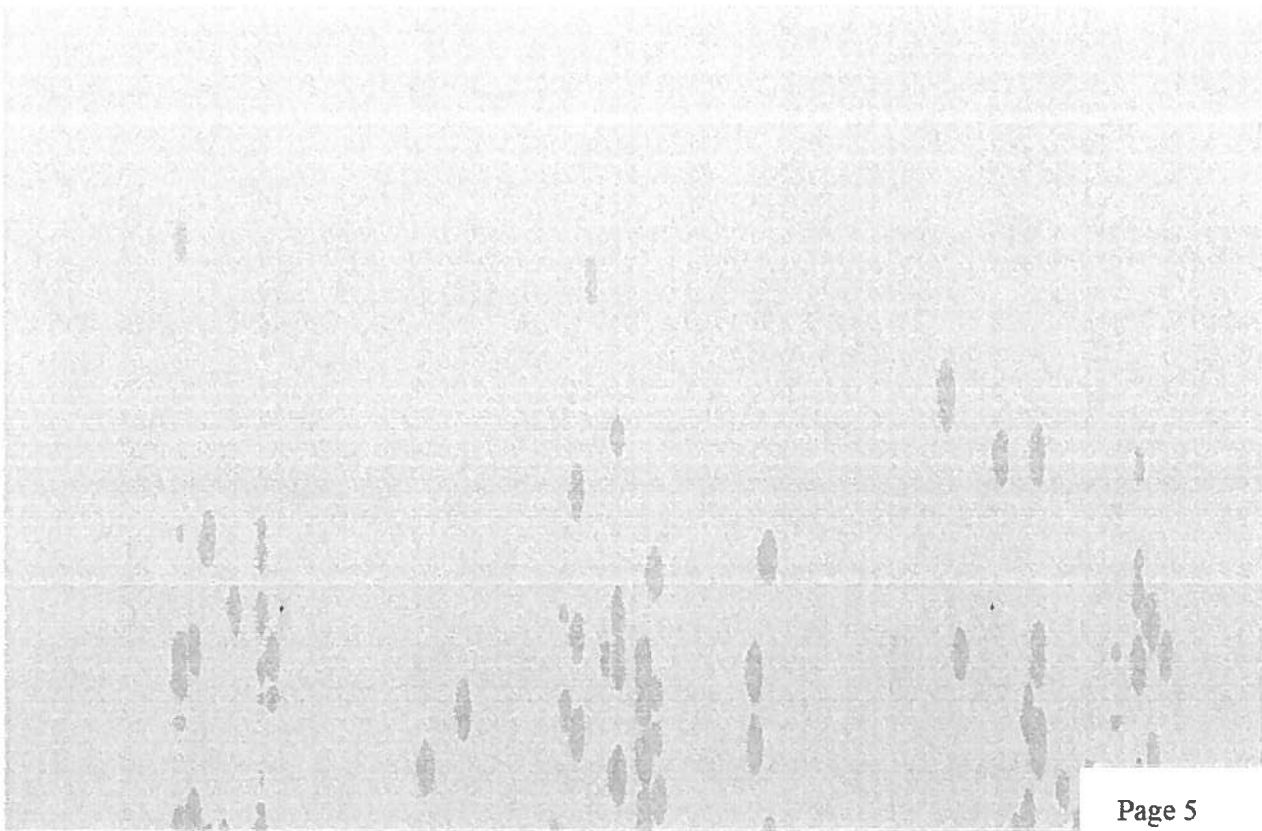
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**OBSERVATIONS**

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**WIND SPEEDS**



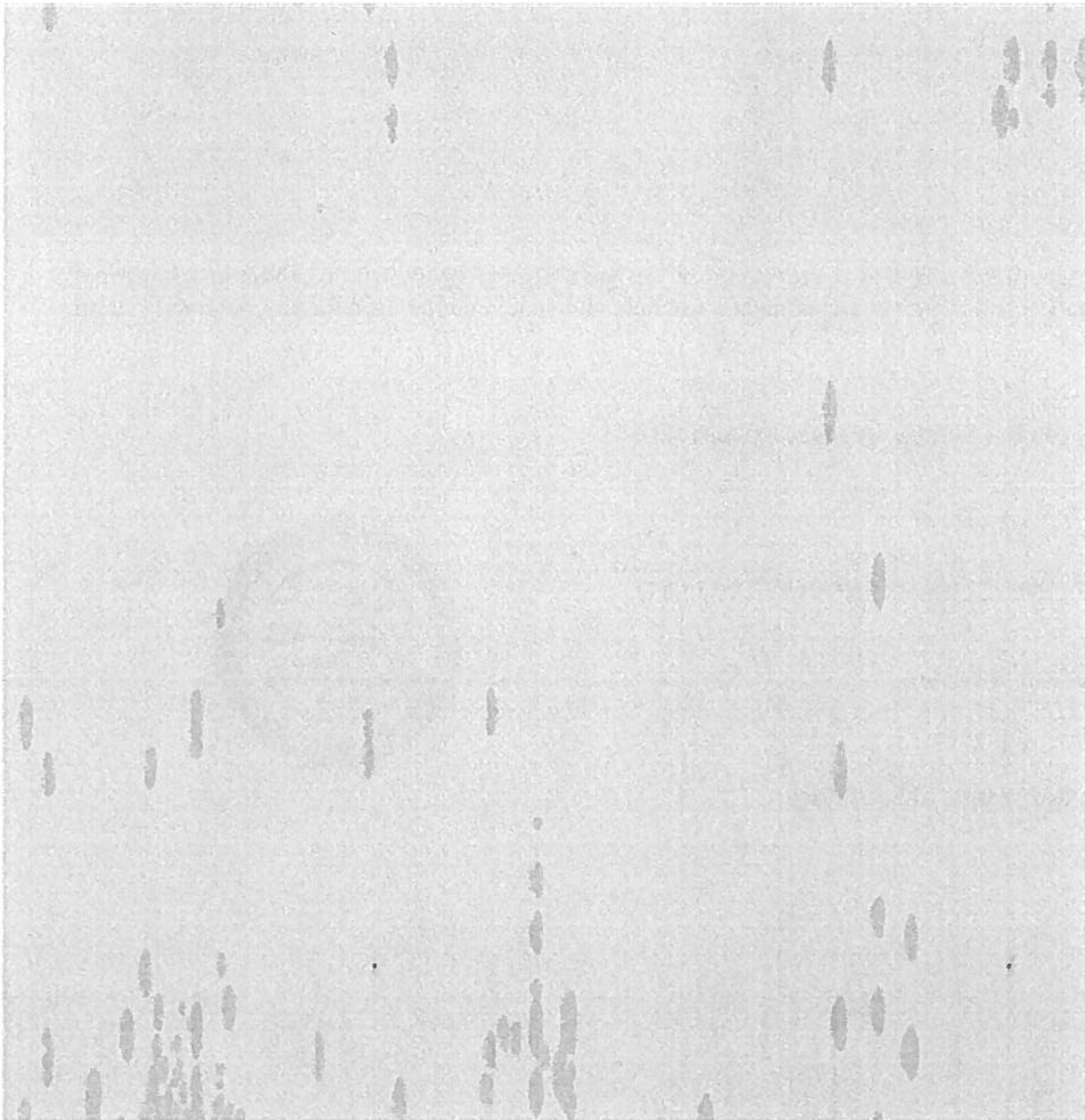
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**REASONS FOR COLLAPSE**



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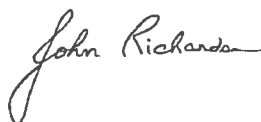
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This report was prepared at the request of the Nova Scotia Department of Labour and Advanced Education and is for the Department's use only and should not be used for any purpose by third parties.

If we can be of further assistance, please advise.

Yours very truly,

BMR STRUCTURAL ENGINEERING LTD.



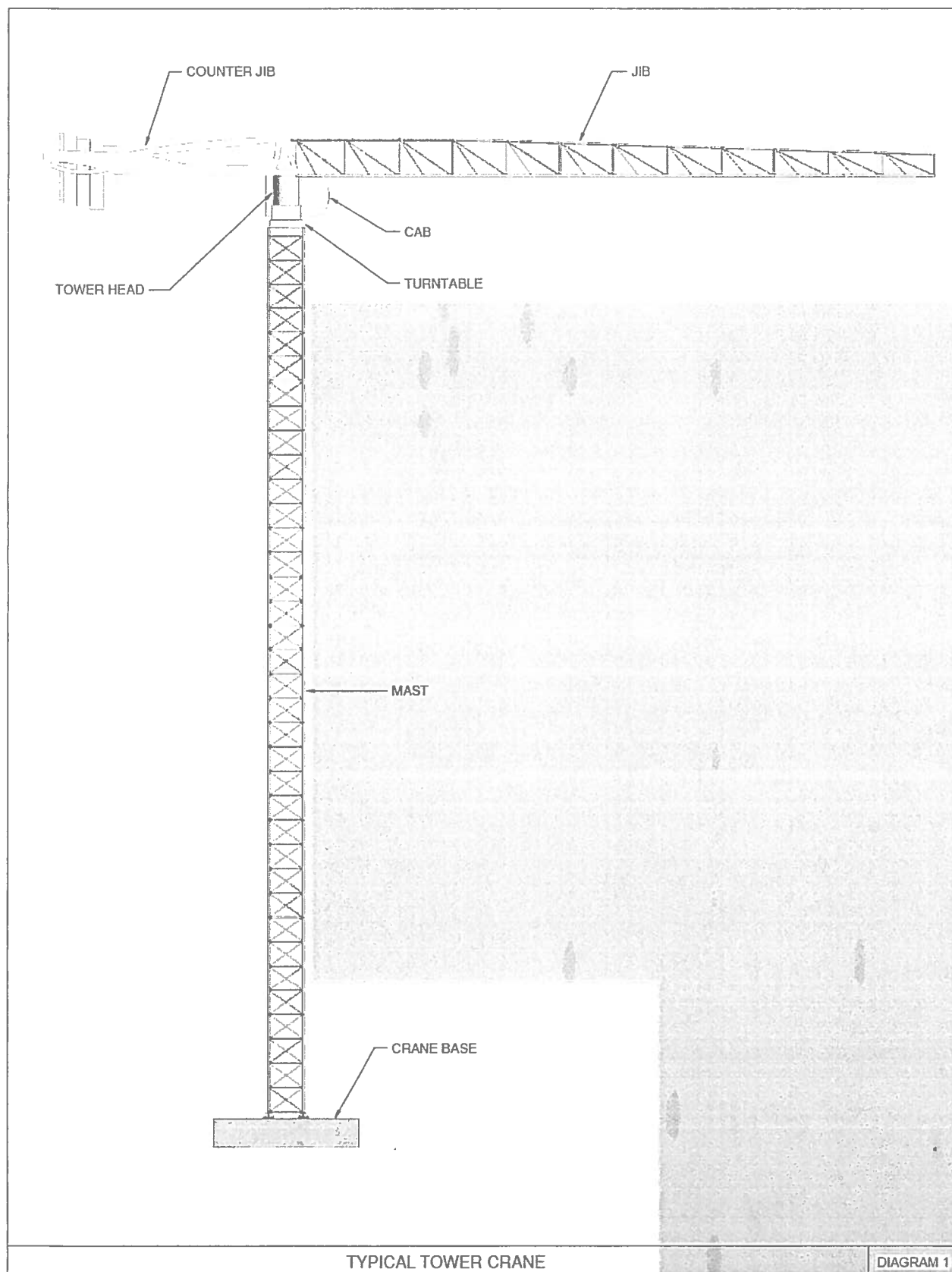
John Richardson, M.Sc., P.Eng.

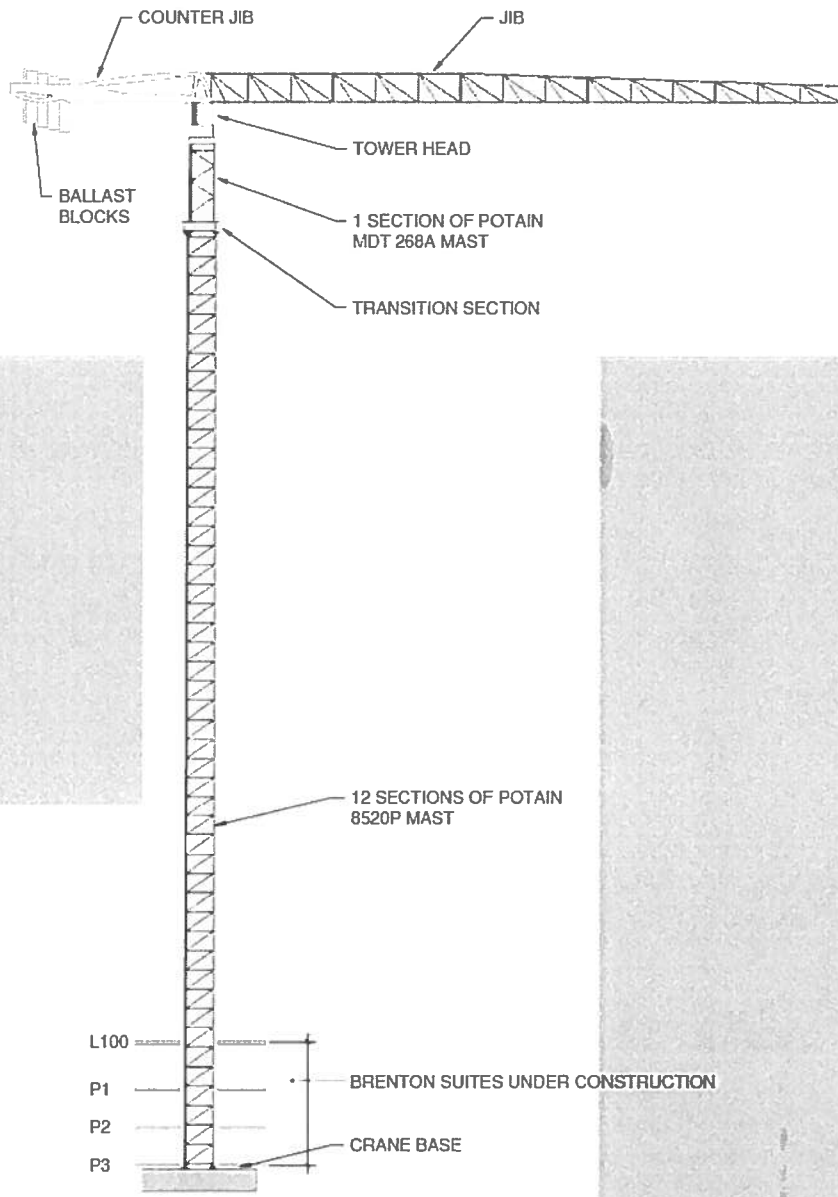




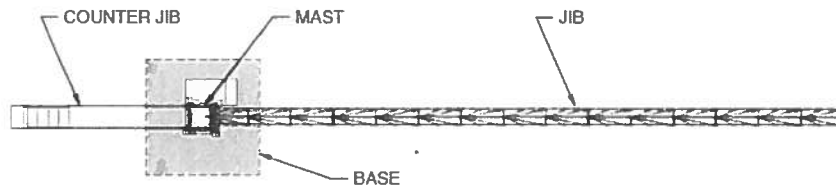
APPENDIX A  
DIAGRAMS

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SIDE VIEW



TOP VIEW

TOWER CRANE AS INSTALLED AT BRENTON SUITES

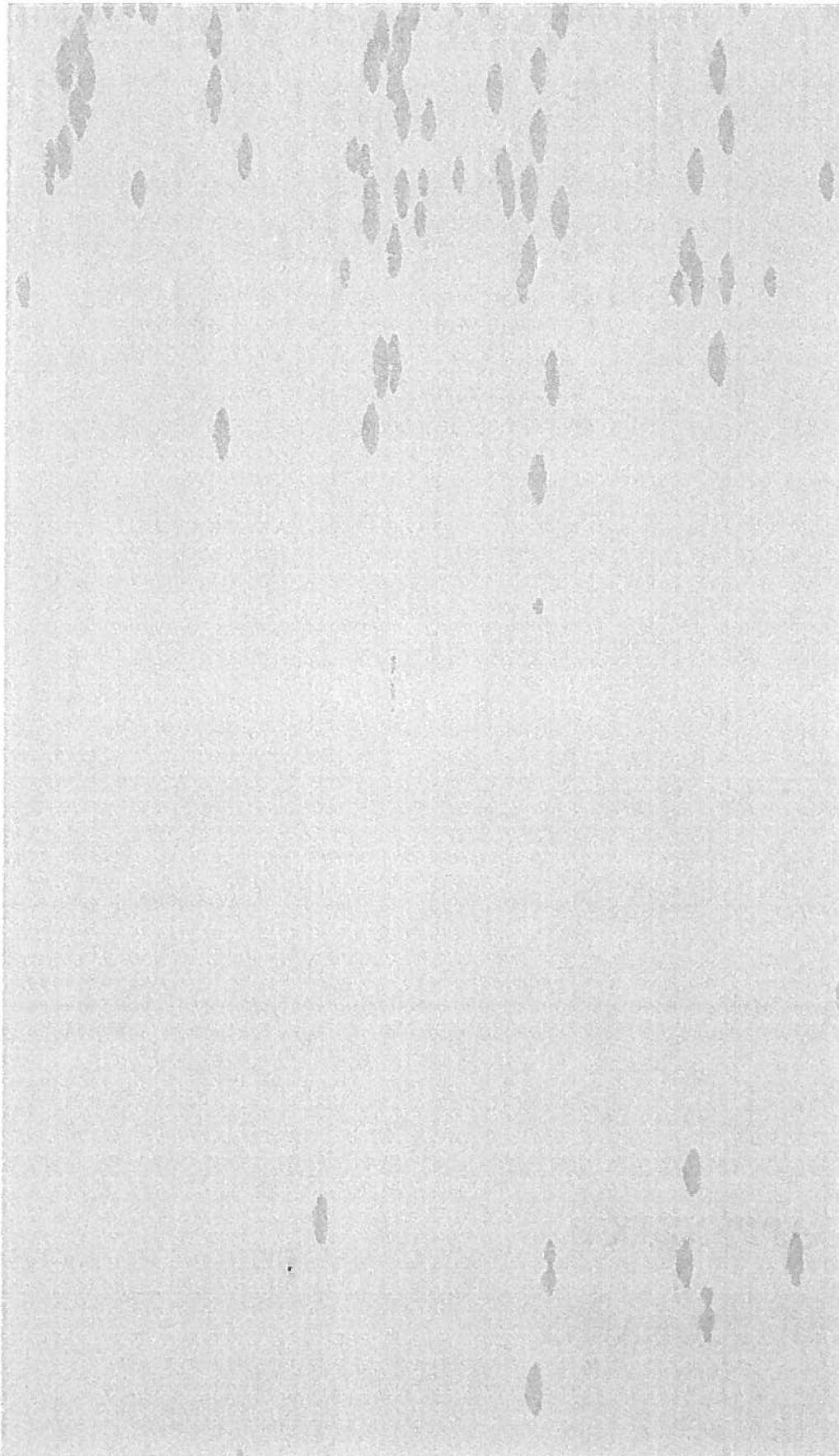
DIAGRAM 2

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DIAGRAM 3



14(1)

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**APPENDIX B**  
**PHOTOGRAPHS**

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**15(1)(a)**

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**14(1)**

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