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### Report on the Exterior Painting and Staining Procedures at the Riverview Project, Ottawa, 1964

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# TECHNICAL NOTE

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### SUBJECT

REPORT ON THE EXTERIOR PAINTING AND STAINING PROCEDURES  
AT THE RIVERVIEW PROJECT, OTTAWA, 1964.

### GENERAL

The Division of Building Research is very much interested in supplying technical information to the construction industry. Acting on the request for recommendations on exterior paint systems by the Central Mortgage and Housing Corporation, the Organic Materials Section proposed several promising experimental coatings to be applied at a local site. The performance of these coatings as well as the details of general painting procedures were to be observed.

The most desirable type of construction, from a paint performance point of view, would include large areas of wood siding on several blocks of individual housing units. This would provide enough surface area for a standard or conventional coating and for the experimental paint to be repeated several times. The repetition is necessary to increase the confidence level of the results.

A suitable project was scheduled for construction known as the River-view Federal and Provincial Low Rent Housing Project to be located in Southeast Ottawa and to be completed in 1964. A revision in the final design of the River-view Project, however, unfortunately limited the exterior surfaces requiring paint. The remaining areas did not provide sufficient surfaces for comparative paint study. The most satisfactory approach remaining was to observe the performance of the exterior finishes specified by the Corporation as well as painting and staining procedures. This paper covers the observations made during the application of the coating materials.

## ARCHITECTURAL DETAILS

The Riverview project consists of seven two-storey blocks of row housing as shown in Figure 1. The ends of each block are of brick veneer. The five central blocks are divided into ten housing units per block, five such housing units facing either side of each block and back to back. Each unit within the block has seven large windows and a combination window and door entrance. All the opening frames are of wood. The remaining area is faced with vertical Red Cedar siding reported to be from western Canada making rectangles approximately 4 by 12 ft between the openings. The door canopy has pine fascia with cedar underside and galvanized iron deck. Galvanized flashing is above all windows, the doors and the parapet.

Block 1 and Block 7 are slightly different in detail. These blocks have twelve units in a row and are mostly finished with brick. There are vertical wood siding panels set in over the doors, and above the rear access passageway. The two full-height sections at the front and rear at either end of the block are also finished with wood.

Cental Mortgage and Housing Corporation job specification, Ottawa 3/63 Section 15, included provisions to ensure good painting practice and workmanship. Paint and staining materials were defined by Canadian Government Specifications wherever possible. All exterior wood siding and fences were to receive two coats of an alkyd-type pigmented stain (Specification 1-GP-145). The only exception to this was the large vertical panels located on Blocks 1 and 7. These panels were to be coated with an acceptable exterior latex paint system and applied according to the manufacturer's instructions. The exterior door faces and jambs, window frames and other exterior trim were to be primed with 1-GP-55 exterior primer and to receive two finish coats of 1-GP-59 exterior alkyd enamel. All exposed ferrous metals required a thorough cleaning and metal conditioner before coating with 1-GP-40 primer and two coats of 1-GP-59 alkyd enamel.

## OBSERVATIONS

Painting commenced the week of the 10th of August. The siding materials had arrived at the construction site about two weeks previously. The bundles were securely wrapped with polyethylene sheeting to exclude the weather. A large work area was established adjacent to the stacks of siding. The first coats of sealer, stain or primer were applied here. The boards were laid out on trestles about 5 to 8 at a time and coated on face, then they were turned over and the backs coated. Usually two painters formed a work crew.

The stain was applied liberally with large brushes. The staining material had been transferred to a 5-gallon can from 1-gallon containers and stirred occasionally. Particular attention was given to the flat surfaces for uniformity of colour. The ends and sides were not specifically coated and received only the excess runoff. After treatment with stain, the siding was stacked in layers using spacers to facilitate drying. The fencing materials were coated by the same method.

The shorter lengths of lumber used for the refuse storage units were dipped. A galvanized iron dip tank approximately 6 in. longer and wider than the boards was filled with about 2 gallons of stain to a depth of 2 in. The boards were immersed one at a time and swished about by the painter. The total time of immersion averaged 12 to 15 sec. The boards were allowed to drain standing on end and were lightly brushed to even up the colour if necessary before stacking.

The prestained siding was fixed to the buildings, and the final coat of stain was then applied. Particular attention was given any uncoated edges of siding at this time, but the cut ends still were not stained.

The very first lot of siding, coated at the work area, received only a clear alkyd sealer before erection, the intention being to apply two coats of stain on the building. This procedure was stopped by the supervisor as the specifications required that stain be applied to the raw wood. The boards treated in this way were fixed to Block 6. There is some doubt whether these boards were removed and properly coated boards replaced or whether two coats of stain were applied to the exposed face in situ. In any event, some of these boards were removed to correct an architectural detail and replaced.

The primer coat was applied to the fascia boards at the work area and allowed to dry before erection, both faces being painted, the ends and edges receiving little attention. These boards were coated with a roller. When erected the mitered joints were excellent but the sawn ends were not painted.

The moisture content of the materials was followed over a period of about three weeks. Measurements were made using a Tag electrical moisture meter, of the electrical resistance type. All of the various

components requiring paint were included in the survey. The wood siding in the stock piles was measured as received as well as after erection. The door and window frames, door sills, fascia boards, etc. were measured also. The average moisture content was found to be 15.8 per cent; 94 per cent of all values were less than 20 per cent moisture content and 62 per cent were below 15 per cent moisture content.

The high values could be attributed to a very few samples and where values were taken near the ends of the boards. Canadian Government Specification 85-GP-1, for painting exterior surfaces, allows 20 per cent moisture content in wood at the time of coating.

The exterior trim painting of the window and doors began on 28 August. The work started on Block 5. The usual procedure was to commence the day's work on the south side of the building in the morning moving around to the north side in the afternoon. The stopping of cracks and nail holes with necessary sanding was carried out between the first and second coats. The prime coat, white, was applied by brush as well as the finish coats; only the flat door surfaces were finished with roller. The doors and a small panel adjacent were finished in bright trim colours. It was difficult to obtain a satisfactory finish on the doors with two coats of enamel over white primer. Later on, the primer was tinted close to the colour of the intended finish coat. It is suspected that by the time Blocks 1, 6 and 7 were painted, the top coat material was substituted for primer. The top and bottom edges of the doors were seldom coated.

The window and door frames received about the same amount of attention. Initially, the quality of the workmanship was quite good. As Blocks 4 and 5 were the first completed, they received the full paint system. It would appear that subsequent blocks were given the minimum in material and workmanship that would pass inspection. There were many instances where the shop coat on the frames when installed was assumed to suffice for a primer coat, the enamel top coats only being applied.

This depreciation in quality of the workmanship may be due in part to the lack of qualified personnel available although a foreman painter was at the site at all times. The more experienced painters no doubt were working inside where finishing is more exacting.



The areas designated for exterior latex paint were confined to Blocks 1 and 7 as shown in Figure 1. The siding had been treated with clear alkyd sealer before erection and had been in place one month prior to painting. The colour chosen was a light grey called Birch White. All the wood siding was given two coats of latex directly over the clear sealer. The sections over the entrance doors were painted by mistake and were further recoated with the stain used to finish the other blocks.

Late in October, the CMHC representatives decided to change the colour of some portions of the latex painted siding. One end unit of each of the blocks concerned was repainted. Initially, the front or northeast side of Block 7 was painted with two coats of yellow over two coats of the original grey. The rear face of this unit was painted blue with sufficient coverage being obtained in one coat. This same surface was further changed to yellow at a still later date, and required three additional coats to hide the blue. The total number of coats on this wall were six of latex and one of sealer. The south end unit of Block 1 received two coats of yellow over the grey on the front and rear. This departure from normal procedure will reduce the value of performance data.

There was some deviation from the specification requirement concerning the latex paint. Section 15, Page 3 of the job specifications, states that an acceptable latex paint system be applied and that the manufacturers' instructions be followed. The latex material used was not on CMHC's acceptable protective coating list of September 1st, 1964. The manufacturer's directives found on the containers specified a latex primer before the two top coats. It will be interesting to see if the clear sealer can be successfully substituted for a latex primer as the continuity of the sealer coat will control the durability of the system. There was some evidence of colour migration through the latex coating within two weeks after application. This was found only on the east side of Block 1.

The metal surfaces to be painted were mostly galvanized flashing materials and steel posts used for supports for the screens and the refuse storage boxes. The steel posts were shop coated with an iron oxide coating before delivery. This primer was in excellent condition having a good continuous film. A coat of grey alkyd exterior enamel was applied directly over this primer without any other preparation.

Some of the galvanized flashing, for use over the window openings, was primed with a galvanized primer before installation. These primed sections were used mostly on Blocks 5 and 6. The remaining window flashings and those installed on other units received priming on some locations but not on others. The roof decks of the door canopies and the parapet flashing on Blocks 1, 4 and 6 were coated in the same irregular fashion.

The galvanized primer that was applied was spread far beyond its intended capacity. In many instances, the manufacturer's stampings on the metal were easily legible through the dried coating. The paint foreman advanced the information that this primer as supplied was too slow drying and therefore required thinning to be workable. Slow drying, however, is normal for this type of oil base material and should be expected. cursory examination in the laboratory showed that both the thinned and the original material dried equally well in 18 hr. The two samples were laid down at equal wet film thickness. The amount of solvent that had been added was found to be negligible but a difference in pigment content was noted probably due to inadequate mixing.

The weather during the months of painting was generally cool and damp (Table I). At best, conditions could only be described as fair. The daily mean temperature was below normal for the most part and, although the total rainfall was less than usual for this period, short rain showers persisted almost daily. The month of October was the most favourable with both the hours of sunshine and the average daily temperature being above normal. Nevertheless, only 12 working days in the month recorded temperatures above 50° and on 4 of these days, rain occurred.

The effect of weather conditions at the time of painting on the ultimate life of the coating has not been firmly established. The manufacturers of paint products usually caution consumers concerning painting during adverse conditions of low temperatures, high humidity, and damp surfaces. As an example, the recoating of the yellow on the rear of Number 7 Block showed more brush marks and the colour was not uniform across the surface. The latex had been applied on a cool day with temperature ranging from 9 to 15° below the recommended level. On one other similar day the workmen commented on the paint being excessively thick and heavy. It was also noted that exterior painting proceeded in the afternoon following a morning rain shower. The surface in question was wiped casually with a cloth before applying the paint. These observations do not condemn the exterior painting wholly as unsatisfactory. There

remains, however, a wide area of divergence from good painting practice.

### SUMMARY

The observations reported here include only the work completed at the end of November 1964. While all the exterior painting was finished at that time, there remained the final inspection by the CMHC officer. Any necessary repairs would be completed in the spring of 1965.

It is planned to examine those exterior surfaces with different paint systems and record their performance. These observations will be made at half-yearly intervals. An attempt will be made to relate any unusual performance details with the painting techniques or the coating system.

TABLE I

### WEATHER CONDITIONS DURING MONTHS OF PAINTING

	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>
Hours of Sunshine,	215.2	155.0	153.3	98.8
Normal	251.0	176.0	136.4	78.4
No. of days with precipitation	18	17	15	23
No. of rainy days (work)	4	3	8	12
Total rainfall (in.)	1.37	1.37	1.22	3.23
Average daily temperature				
Maximum	72.9	66.6	55.1	40.9
Normal	78.1	68.9	56.1	40.0
Minimum	52.0	46.1	34.3	25.5
Normal	56.0	48.2	36.8	25.4
Humidity (7 p. m.)	59	60	62	75
Normal	66	72	74	78



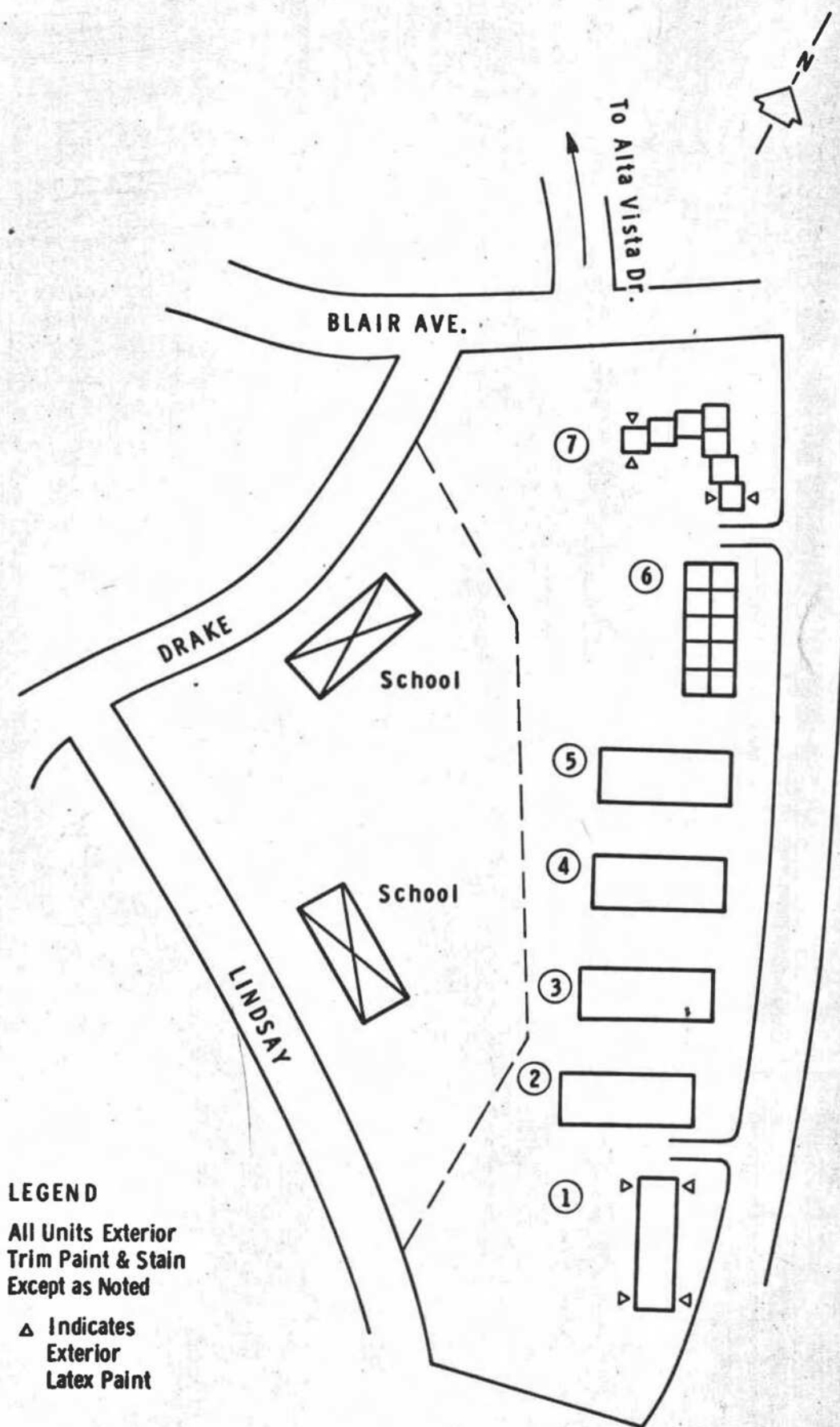


FIGURE 1

CMHC PAINT STUDY PLOT PLAN OF AREA