52.1 SNOW REMOVAL AND ICE CONTROL (TRUCK)

52.1.1 GENERAL

The Work consists of loading trucks, snowplowing and the application of sand, salt or a sand and salt mixture to roadway surfaces.

52.1.2 MATERIALS

The sand and salt mixture shall be obtained from a premixed stockpile, the salt material from a storage shed and the sand from a separate stockpile. The conditions for the supply of these materials is detailed elsewhere in the Contract Specifications or in the Special Provisions.

52.1.3 EQUIPMENT

52.1.3.1 General

The Contractor shall supply all equipment necessary to complete the Work.

52.1.3.2 Loader

The loader shall have a minimum 1.3 cubic metre bucket size.

52.1.3.3 Truck

The number and size of trucks will be specified in the Special Provisions. Tandem axle trucks shall have a minimum 270 horsepower engine or a minimum 325 horsepower engine when equipped with a wing. Single axle trucks shall have a minimum 210 horsepower engine. Gross engine horsepower will be the rating as shown in the manufacturers' specifications. In addition, any trucks which were approved for work with Alberta Transportation and Utilities during the 1994/95 season will also be deemed acceptable. All plow trucks shall have a properly operating engine hour meter.

Each truck shall have a valid Alberta Vehicle registration or equivalent permit and a current Commercial Vehicle Inspection Certificate Decal. The decal shall be displayed on the vehicle at all times. The Contractor shall maintain each truck to the minimum standard established by the commercial vehicle inspection. If, in the opinion of the Engineer, the truck is not in a satisfactory mechanical or safe condition, then it shall be removed from the work site until the necessary repairs have been made.

Each truck engaged in the Work shall be assigned a unique number, that is prominently displayed on the truck, for the duration of the Contract. The doors of each truck shall prominently display the Contractor's company name or logo and phone number.

Standard lighting on the truck shall conform to Drawing A4 94 08 A and Drawing A4 94 08 B and be adjusted in accordance with Drawing A1 93 10.

Trucks shall have a 75 mm wide, orange coloured reflector tape applied near the top and along the full width of the truck hopper at the rear of the vehicle and a similar 75 mm wide tape applied to the full width of the tail plate.

When snowplowing on recently applied seal coats or asphalt stabilized base course surfaces, as determined by the Engineer, trucks shall be equipped with power floats, castor wheels or rubber blades to reduce damage done to these surfaces. The use of other "protective equipment" will be subject to the approval of the Engineer. Any damage to these surfaces resulting from the snowplowing operation shall be repaired by the Contractor at his expense.

52.1.3.4 Sanding Unit

The sanding unit shall be either a frame mounted or slide-in-box type with a minimum capacity of 6.1 cubic metres or 8.5 cubic metres for tandem axle units and 3.8 cubic metres for single axle units. The sanding unit shall be equipped with height adjustable material deflectors and spinners capable of both clockwise and counter clockwise movements and in-cab controls for regulating the discharge of a sand, salt or a sand and salt mixture, as required by the prevailing road conditions. The Contractor shall ensure the trucks are licensed to carry the minimum capacity.

52.1.3.5 Snowplow

The snowplow blade shall be front mounted one-way for right side plowing only or two-way for both left and right side plowing, as indicated in the Special Provisions. The snowplow shall be equipped with a minimum 3.66 metre wide blade, in-cab controls for lifting and adjusting the plow blade and 330 mm x 410 mm red flags mounted on the top outside edges of the blade.

52.1.3.6 Snowplow Wing

The number of trucks to be equipped with snowplow wings will be specified in the Special Provisions.

The wing attachment shall be mounted to the passenger side of tandem axle trucks.

The snowplow truck shall be equipped with in-cab controls for lifting and adjusting the wing.
The wing functions must be quick acting and positively controlled. The wing control system shall have a "panic button" to provide for fast raising of the wing in emergency situations.

The wing adjustment mechanism shall be of a hydraulic telescopic type to allow for variations in the plow width. The minimum length of the wing blade shall be 2.30 metres.

The wing shall have a rear facing clearance light mounted as close to the end of the wing as practical. The light shall be similar in size, shape and capacity as a Dominion Auto Part #706068 Red Clearance Light. The wing shall also be equipped with a 330 mm x 410 mm red flag mounted on its top outside edge.

52.1.3.7 Snowplow Blades

The Contractor shall supply snowplow blades and wing blades.

52.1.3.8 Spread Control Device

All snowplow units, with the exception of the approved units used by Alberta Transportation and Utilities during the 1994/95 season, shall be equipped with a microprocessor based spread control system capable of controlling the application rate of a sand, a sand and salt mixture or salt only. The approved 1994/95 trucks will not be accepted for work if their original spread control devices are removed and not replaced by an equivalent or superior system. Only field proven products in service for at least one year will be considered unless otherwise approved by the Engineer.

The spread control system for new units must be capable of performing the following functions:

52.1.3.8.1 Sand/Salt Application Rate Control

- Controlling an operator determined application rate to an accuracy of ± 5% for at least three different materials of varying densities. The system must also allow the operator to chose the type of load (material).

- Each material setting shall have at least ten distinct application rate settings which can be controlled by an operator. The knob or switch used to control the application rate shall provide one increase (or decrease) with one activation of the switch.

Application Rates (Kilograms per 2-lane kilometre)		
	Low	**High**
Salt	50 kg	400 kg
Sand	370 kg	1000 kg

Note: The application rate should be expressed as kilograms per kilometre and should not be affected by spread width.

- Displaying the actual application rate back to the operator when desired.

- A "blast" setting which when activated will provide a maximum application rate.

- A "passing" function which will allow the operator to stop the spinner and the main conveyor for short periods. There can be no delay in continuation of the spreading function after shutting off the passing function.

- An error indicator which will notify the operator when the desired output of the main conveyor is less than expected due to an insufficient flow or high truck speed plus indicate other system related malfunctions.

52.1.3.8.2 Spread Width Control

- The spread width (spinner speed) must be controlled by the operator.

- The spread width control must have a minimum of ten individual settings. The user should be able to specify each setting in the programming mode.

- The spinner rotation direction must be reversible. The spinner must turn at the same speed when switched from one direction to the other while still on the same speed setting.

52.1.3.8.3 Material Calibration

- Material calibration will be required under the following conditions:

  - prior to commencement of winter operations, when there is a change of materials or a change in hydraulic components and when requested to do so by the Engineer.

- All calibration calculations and measurements must be performed by the microprocessor. The

operators should only be required to input the weight of the unit before and after the calibration.

- The calibration procedure must not require the capture and weighing of any material spread by the sander. Procedures requiring buckets, tarps, boxes or other such devices to catch and weigh materials are unacceptable.

- Calibration procedures must use as large a material sample as possible to ensure adequate precision of the equipment (i.e., 30% of full load).

52.1.3.8.4 Main Control Enclosure

- All circuitry for the Spread Control Device and all necessary controls for their function shall be contained in a "main" control enclosure.

52.1.3.9 Optional Functions For Spread Control Device

The Contractor has the option of providing the following enhancements to the Spread Control Device.

52.1.3.9.1 Data Logging

- A control system with the ability to perform data logging. If provided, the data logging should record periodic totals as well as running (yearly) totals of truck kilometres travelled, average truck speed, kilometres sanded by type of material, the amount (weight) of each material used and dating of the information.

- The periodic totals referred to above should be totals for a period determined by the Engineer. The period may vary from a day to a portion of a day to a multiple of a day. The periodic totals should last from one data extraction process to the next.

- Provisions should be made so that yearly totals can be erased in the programming mode only.

- The system should also possess some means of retrieving this data from the controller, either by personal computer or printer link. The Contractor should provide complete details on the method of data retrieval and technical data for the information retrieval devices.

52.1.3.10 Global Positioning System

The Contractor is advised the Engineer proposes to use GPS (Global Positioning System) devices to record location and times of snow removal and ice control Work. The Engineer will provide GPS units at no cost to the Contractor. The Contractor shall cooperate with the Engineer by making the designated snow removal and ice control equipment available, and ensuring data is downloaded and provided to the Engineer at least once per day or as otherwise determined by the Engineer. The Contractor shall take all reasonable precautions to ensure GPS equipment is not damaged and is in working condition. The Engineer plans to begin trial installation during the winter of 1995/96 with full implementation to occur subsequently.

52.1.4 PROCEDURE

52.1.4.1 Snowplowing and Sanding

In general, truck speeds shall range between 60 and 70 kilometres per hour. Individual truck speed shall be adjusted to meet snow, wind, highway and traffic conditions and the application requirements of the sand, salt or a sand and salt mixture applied.

The angle of the snowplow blade shall be adjusted to remove snow and ice from the roadway in an efficient manner and to the satisfaction of the Engineer.

Plow trucks shall pull over at reasonable intervals to allow traffic to pass. Generally, this interval shall be between 5 and 8 kilometres. However, when traffic is heavy or rear visibility is obscured, this interval shall be shortened.

When plow trucks are operating as multiple unit groupings, they shall be spaced so that traffic can safely pass. Generally the distance between units, on the open highway, shall not be less than 800 metres, but is dependent on snow, weather, and traffic conditions.

When plowing the inside lanes into the median, truck speed shall be adjusted to ensure snow is not deposited on the adjacent roadway.

When approaching railway crossings, plow trucks shall have the plow raised sufficiently to clear the tracks. Snow or ice shall not be deposited on the crossing. Damage to the crossing shall be reported to the local railway authority and to the Engineer immediately. Windrows of snow shall not reduce the lateral sight distance of motorists nor obscure the motorists' vision of railway traffic.

When plowing overpass structures, the operator shall ensure snow is not plowed off the overpass while there are vehicles on the roadway below.

The Contractor shall supply the number of hours and kilometres worked in each "winter segment" per each truck to the Engineer on a daily basis.

The Contractor shall ensure all truck lights are clear of snow, ice and other materials which may reduce the illumination ability of the lights.

52.1.4.2 Application of Sand, Salt or Sand and Salt Materials

Material application rates will be specified by the Engineer.

The Contractor shall maintain a sand/salt usage inventory system, which shall include:

- daily quantities of sand and salt usage from each material stockpile or salt shed for the particular winter segment worked;
- the time and date of loading for each truck unit.

The Contractor shall provide this information to the Engineer on a daily basis. The Engineer will provide a data form for the reporting of this information.

In general, material applications shall be carried out at speeds up to 60 kilometres per hour. However, the individual truck speed shall be adjusted to account for weather, traffic, highway conditions and the type of material being applied.

Unless directed otherwise by the Engineer, the Contractor shall adjust the spinner speed to ensure the spread of ice control materials in the following manner:

- **On a Straight-a-Way** - The Contractor shall concentrate the placement of ice control materials on the crown area of the road. The crown is designed so that positive surface drainage occurs on both sides of it. If ice control materials are placed on the crown area, then the brine formed by salt and the subsequent melting of snow and ice will drain off the road in two directions.

- **On a Curve -** The Contractor shall place ice control materials on the high side of the curve so that any melting which may occur will run down the face of the curve and off the roadway surface.

- **On Multiple-Lane-Highways** - The crown is usually in the middle of the roadway. The Contractor shall place ice control materials on one lane or two lanes at a time but starting with the lane or lanes closest to the roadway crown.

The deflector on the spinner must be regularly checked to ensure proper placement of the material on the roadway. Centre mount spinners shall be equipped with deflectors on both sides.

If an optional spread control device is used, then the Contractor shall download information and provide it to the Engineer on a monthly basis or at any other time requested by the Engineer.

52.1.5 COMMENCEMENT OF WORK

The Contractor shall ensure that equipment and operators are available for work 24 hours a day, 7 days a week and that the loader and a minimum 2/3 of the trucks are ready to commence work within 1 hour of the issuance of the Work Order. The remaining trucks shall be ready to commence work within 2 hours of the issuance of the Work Order. Work will commence at the stockpile site, equipment shop or any other location so designated by the Engineer.

The Contractor shall provide a maximum of three telephone numbers of contact persons authorized to receive a Work Order for snow and ice control work. The Engineer shall be notified at once and in written form, of any changes to these telephone numbers. A fax transmission is considered a written form.

52.1.6 AVAILABILITY RATE

An availability rate is a daily payment made to the Contractor for having snow removal and ice control trucks available to commence work during the date period specified in the Special Provisions. The rate applies individually to trucks and will be paid whether the truck is performing the Work or simply available to perform the Work as described herein.

If the Engineer requests a winter road inspection in accordance with Specification 53.39, Highway Maintenance Work, the Contractor has the option of using regular snow removal equipment operators to perform the inspection. Any such use of equipment operators, will not compromise the Contractor's availability rate and the employee and equipment will be considered to be available to commence work as defined.

In the event of heavy snowstorms or other unseasonable weather which occurs outside of the time period specified for availability, the Contractor shall make sufficient equipment and personnel available at the earliest possible time, regardless of the time period specified for Availability. In these cases, the availability rate will be paid for the additional days worked.

52.1.7 MEASUREMENT AND PAYMENT

52.1.7.1 General

Measurement for snow removal and ice control (by truck) will be in hours for the actual number of hours a snowplow truck is engaged in this activity.

Measurement for the availability rate will be in days for the time both the snowplow truck and loader are available to engage in the Work during the date period specified in the Special Provisions.

Payment for snow removal and ice control will be made at the hourly rate bid per truck for "Snow Removal and Ice Control (Truck)" for the type of truck and auxiliary equipment specified. This payment will be full compensation for supplying the truck and loader (complete with all auxiliary equipment), loading the trucks, snowplowing, hauling materials from the stockpile site to the roadway, applying a sand, salt or a sand and salt mixture as required, and all labour, equipment, tools and incidentals necessary to complete the Work.

The Contractor will not be paid for the time spent travelling from his home base to the designated worksite at the start of the workday nor from the designated site at the end of his work day to his home base. In addition, the Contractor will not be paid for the time spent changing blades, calibrating his equipment, refuelling, repairs or other servicing, or meal breaks.

Payment for availability will be made at the daily rate established in the Unit Price Schedule for "Snow Removal and Ice Control (Truck) - Availability Rate". This payment will be full compensation for ensuring both the snowplow truck and loader are available to commence the Work on any day during the date period specified in the Special Provisions.

Payment for the supply of a spread control device equipped with the "optional functions" will be made at the rate of $750 per vehicle per year under the bid item "Premiums for Trucks with optional Spread Control Device".

52.1.7.2 Penalties

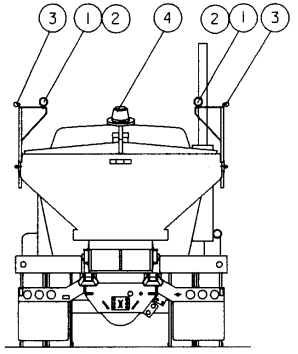
A penalty of $100 per hour up to a maximum of $500 per day will be assessed for each truck unavailable to commence work within the specified time.

A penalty of $100 per hour up to a maximum of $500 per day will be assessed for each hour the loader is unavailable to commence work within the one hour response time. In addition, if the Contractor is unable to provide the loader within the specified time on any given day, then the "Availability Rate" will not be paid for any of the trucks at the designated site that day.

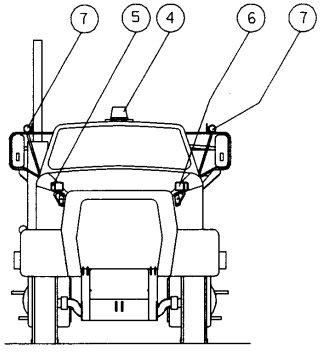
52.1.8 WARRANTY

There is no warranty period for this Work.

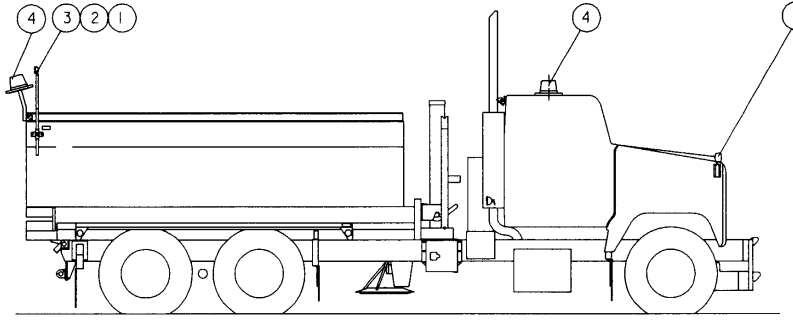
A4 94 08 A



REAR VIEW



FRONT VIEW



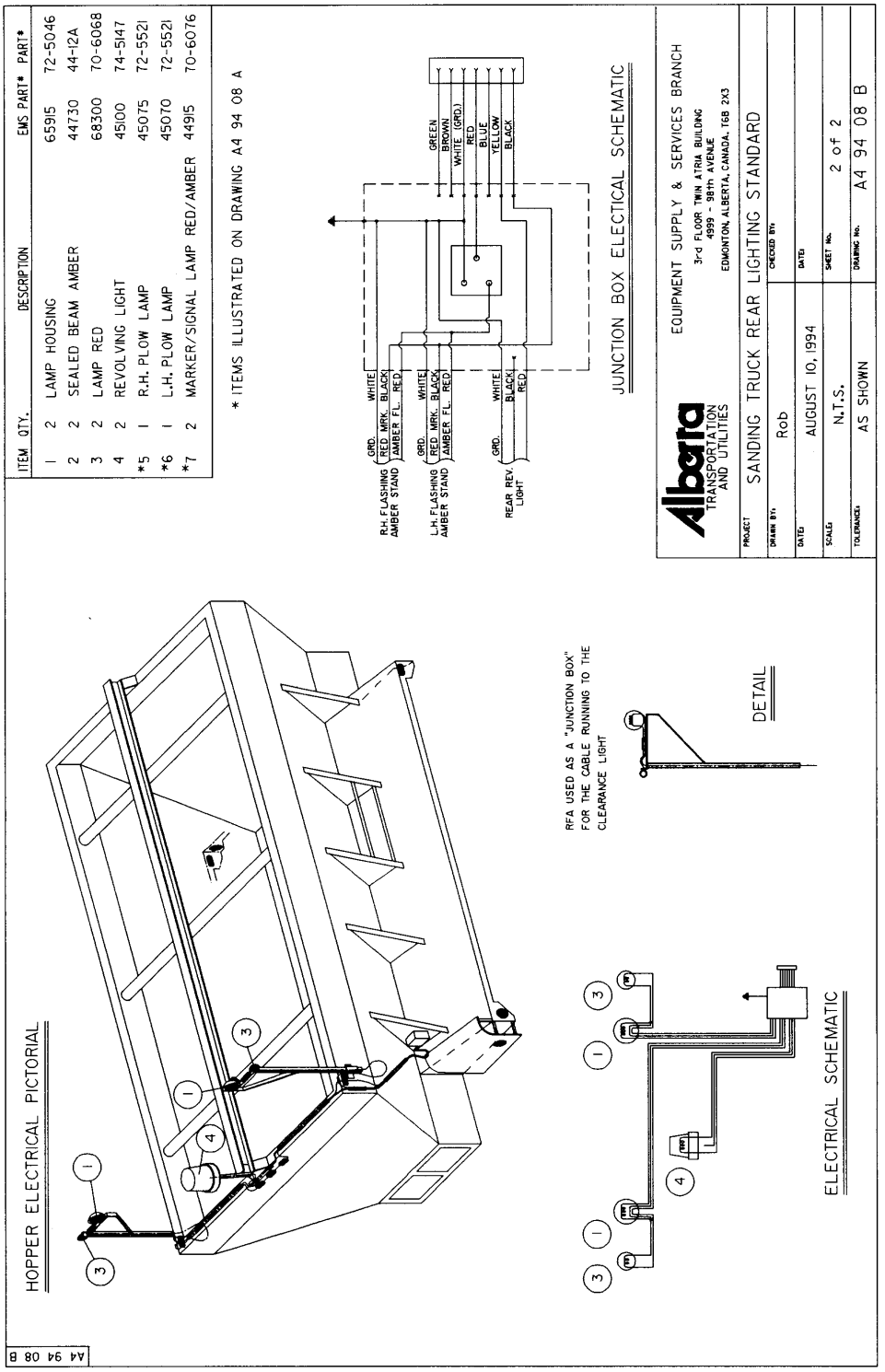
RIGHT SIDE

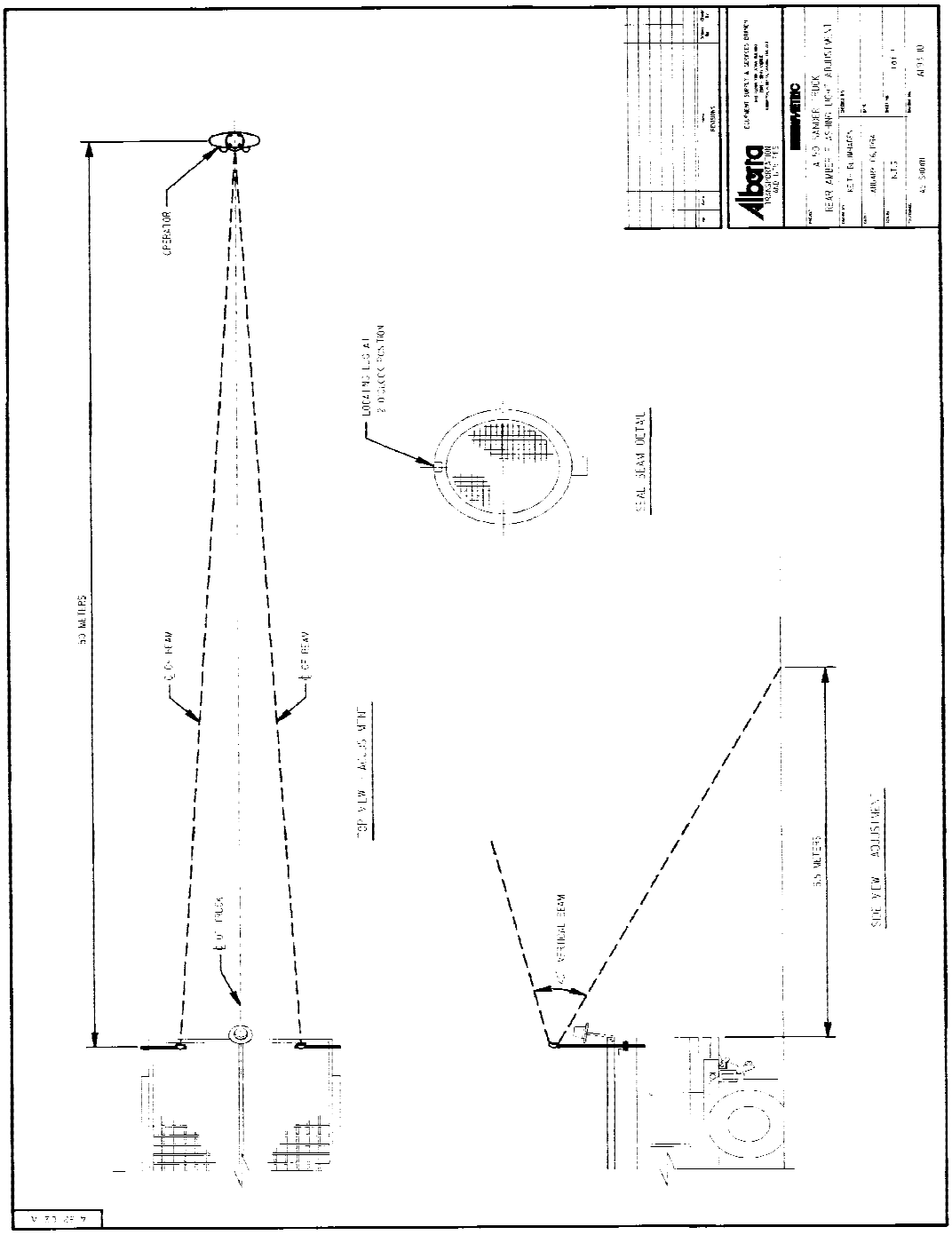
ITEM	QTY.	DESCRIPTION	EMS PART#	PART#
1	2	LAMP HOUSING	65915	72-5046
2	2	SEALED BEAM AMBER	44730	44-12A
3	2	LAMP RED	68300	70-6068
4	2	REVOLVING LIGHT	45100	74-5147
5	1	R.H. PLOW LAMP	45075	72-5521
6	1	L.H. PLOW LAMP	45070	72-5521
7	2	MARKER/SIGNAL LAMP RED/AMBER	44915	70-6076

Alberta
TRANSPORTATION AND UTILITIES

EQUIPMENT SUPPLY & SERVICES BRANCH
3rd FLOOR TWIN ATRIA BUILDING
4999 - 98th AVENUE
EDMONTON, ALBERTA, CANADA. T6B 2X3

PROJECT	SANDING TRUCK REAR LIGHTING STANDARD		
DRAWN BY:	VALERIA PITULESCU	CHECKED BY:	
DATE:	AUGUST 2,1994	DATE:	
SCALE:	1/2"=1'-0"	SHEET No.	1 of 2
TOLERANCE:	AS SHOWN	DRAWING No.	A4 94 08 A


HOPPER ELECTRICAL PICTORIAL
ELECTRICAL SCHEMATIC
DETAIL
RFA USED AS A "JUNCTION BOX" FOR THE CABLE RUNNING TO THE CLEARANCE LIGHT
JUNCTION BOX ELECTICAL SCHEMATIC
R.H. FLASHING AMBER STAND
L.H. FLASHING AMBER STAND
REAR REV. LIGHT
GRD.
RED MRK.
AMBER FL.
WHITE
BLACK
RED
GREEN
BROWN
WHITE (GRD.)
BLUE
YELLOW
* ITEMS ILLUSTRATED ON DRAWING A4 94 08 A
ITEM QTY. DESCRIPTION EMS PART* PART*
1 2 LAMP HOUSING 65915 72-5046
2 2 SEALED BEAM AMBER 44730 44-12A
3 2 LAMP RED 68300 70-6068
4 2 REVOLVING LIGHT 45100 74-5147
*5 1 R.H. PLOW LAMP 45075 72-5521
*6 1 L.H. PLOW LAMP 45070 72-5521
*7 2 MARKER/SIGNAL LAMP RED/AMBER 44915 70-6076
Alberta TRANSPORTATION AND UTILITIES
EQUIPMENT SUPPLY & SERVICES BRANCH
3rd FLOOR TWIN ATRIA BUILDING
4999 - 98th AVENUE
EDMONTON, ALBERTA, CANADA. T6B 2X3
PROJECT SANDING TRUCK REAR LIGHTING STANDARD
DRAWN BY: Rob
CHECKED BY:
DATE: AUGUST 10, 1994
DATE:
SCALE: N.T.S.
SHEET No. 2 of 2
TOLERANCES: AS SHOWN
DRAWING No. A4 94 08 B
A4 94 08 B


OPERATOR
LOCATE LOAD AT
2/3 BACK POSITION
SEAL BEAM DETAIL
SIDE VIEW - MAXIMUM HEIGHT
SIDE VIEW - ADJUSTMENT
Alberta
Metric