

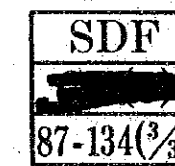
THE FEASIBILITY STUDY
ON
MODERNISATION OF ROLLING STOCK WORKSHOP
IN
INDIA
VOL. III
(DRAWINGS)

FINAL REPORT

DECEMBER 1987

JAPAN INTERNATIONAL COOPERATION AGENCY

(JICA)



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JAMALPUR WORKSHOP

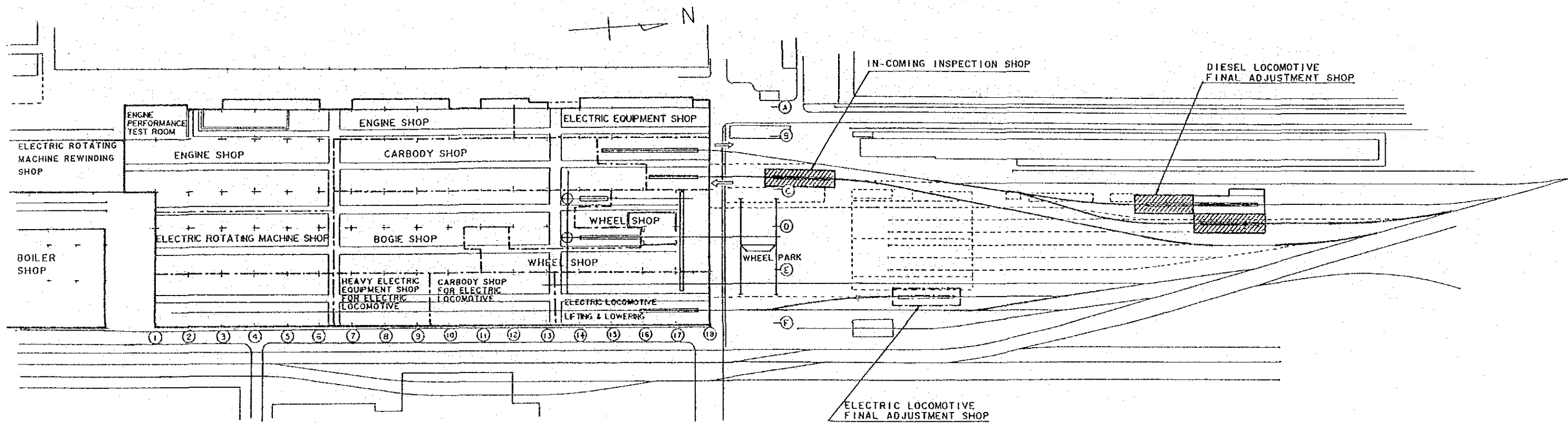


Fig. I-1

LAYOUT PLAN OF DIESEL POH FACILITY

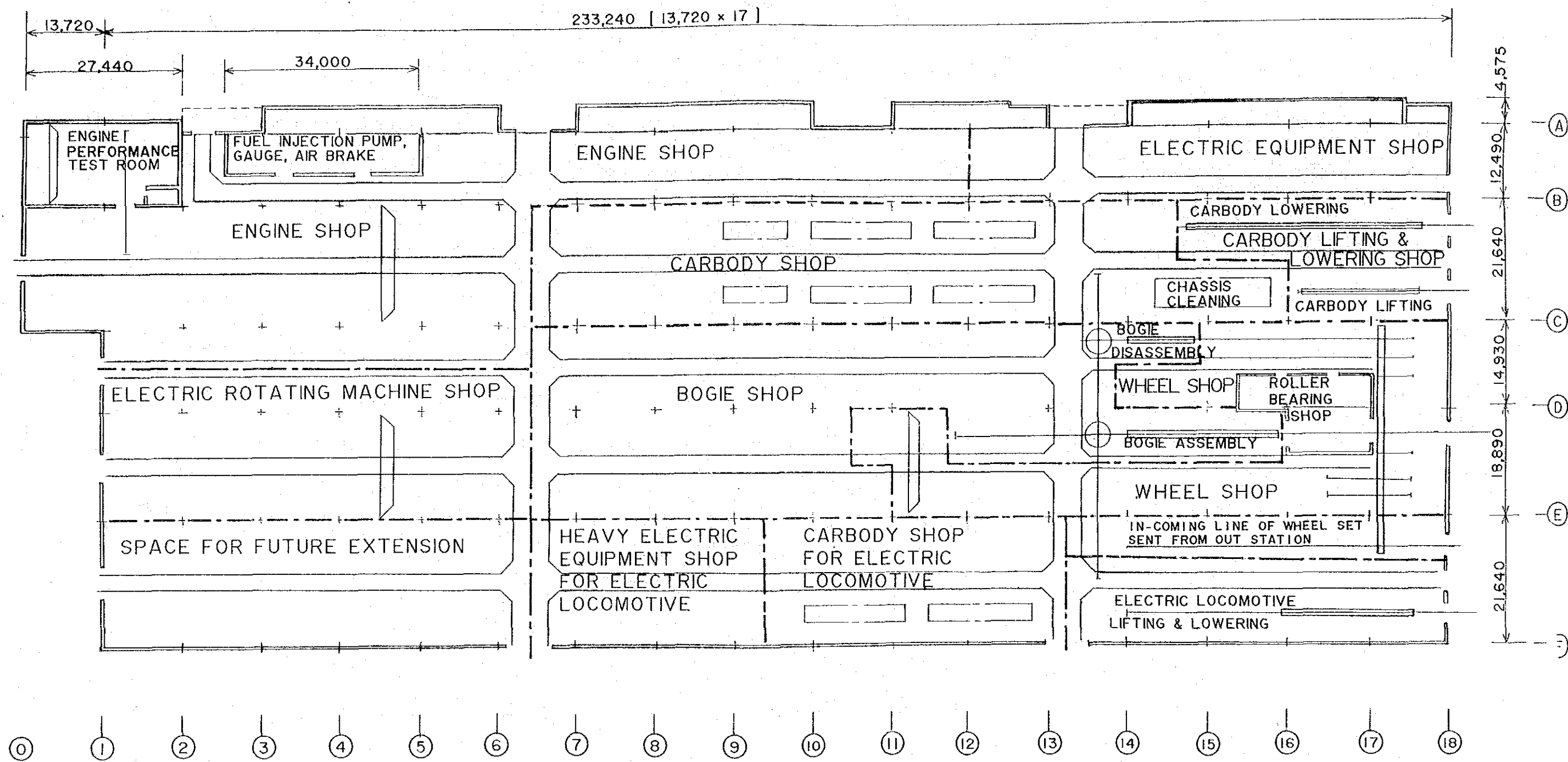


Fig. 1-2 WORKSHOP LAYOUT PLAN

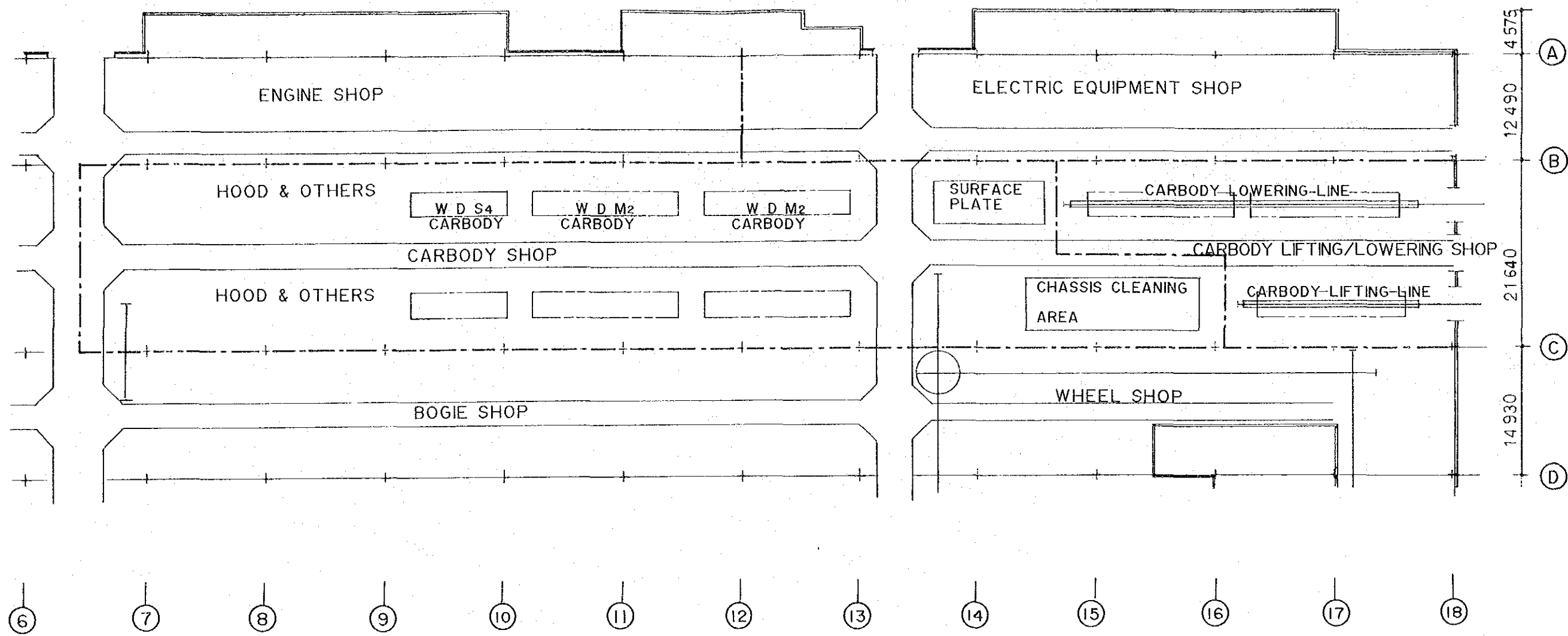


Fig. 1-3 PLAN OF CARBODY LIFTING/LOWERING SHOP & CARBODY SHOP

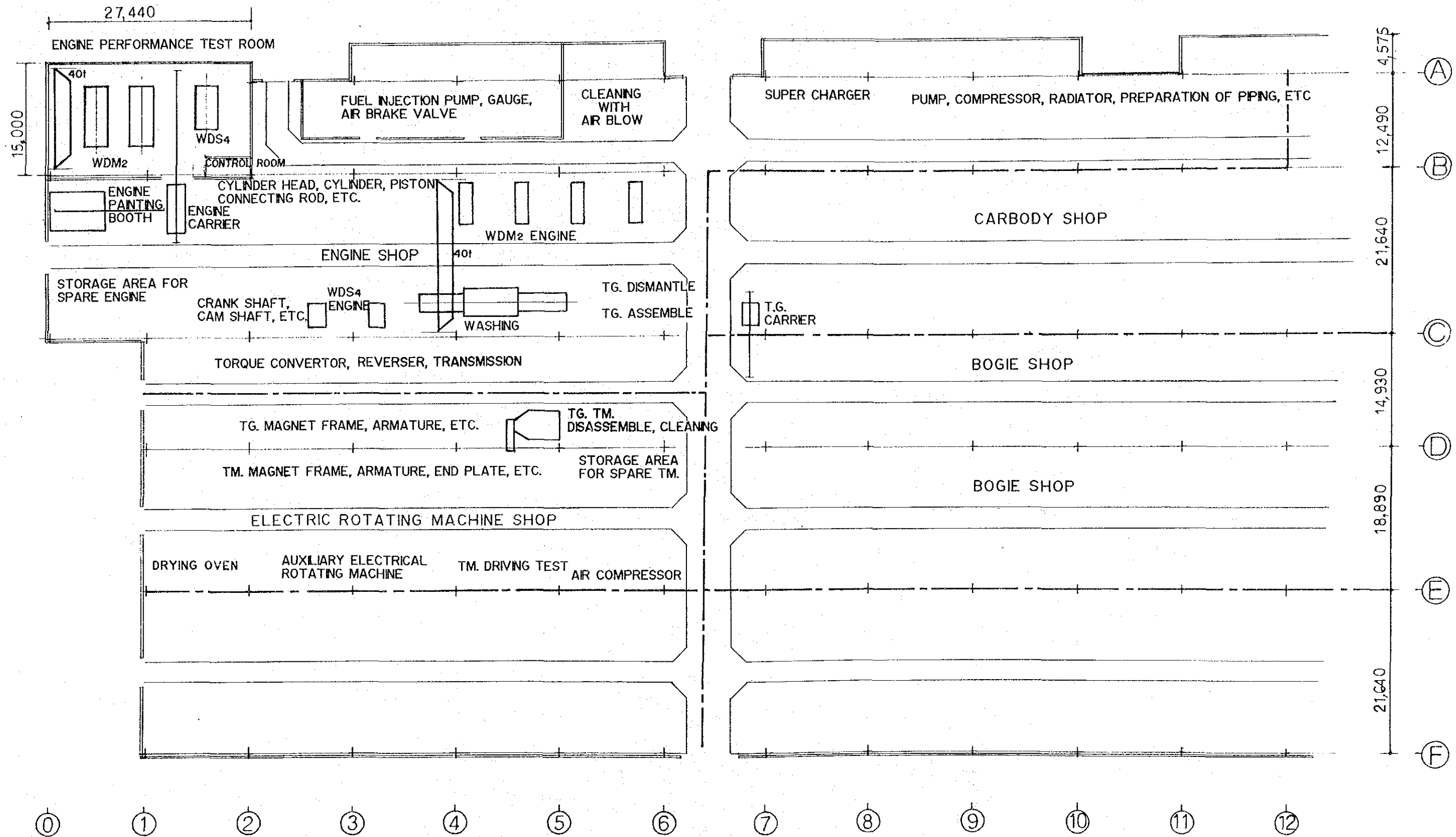


Fig. 1-4 PLAN OF ENGINE SHOP, ELECTRIC ROTATING MACHINE SHOP

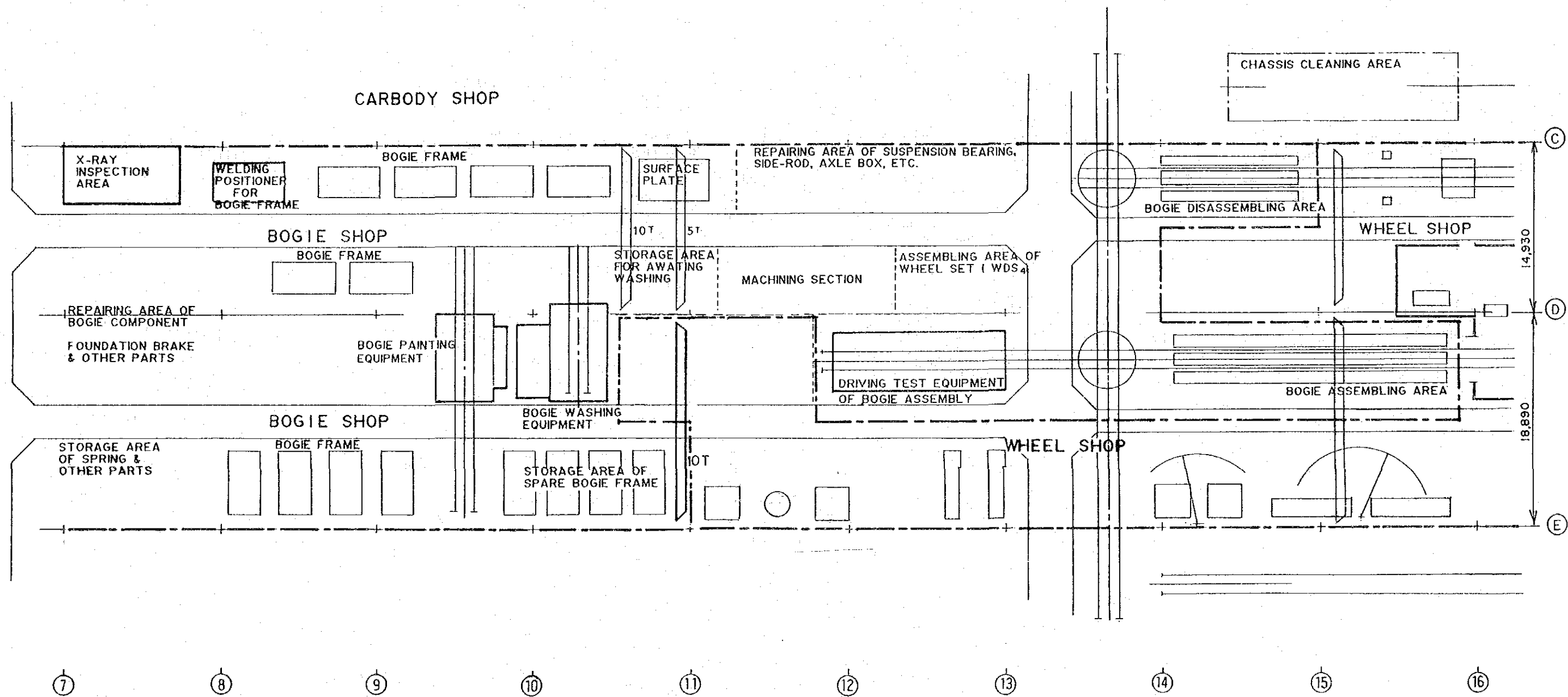
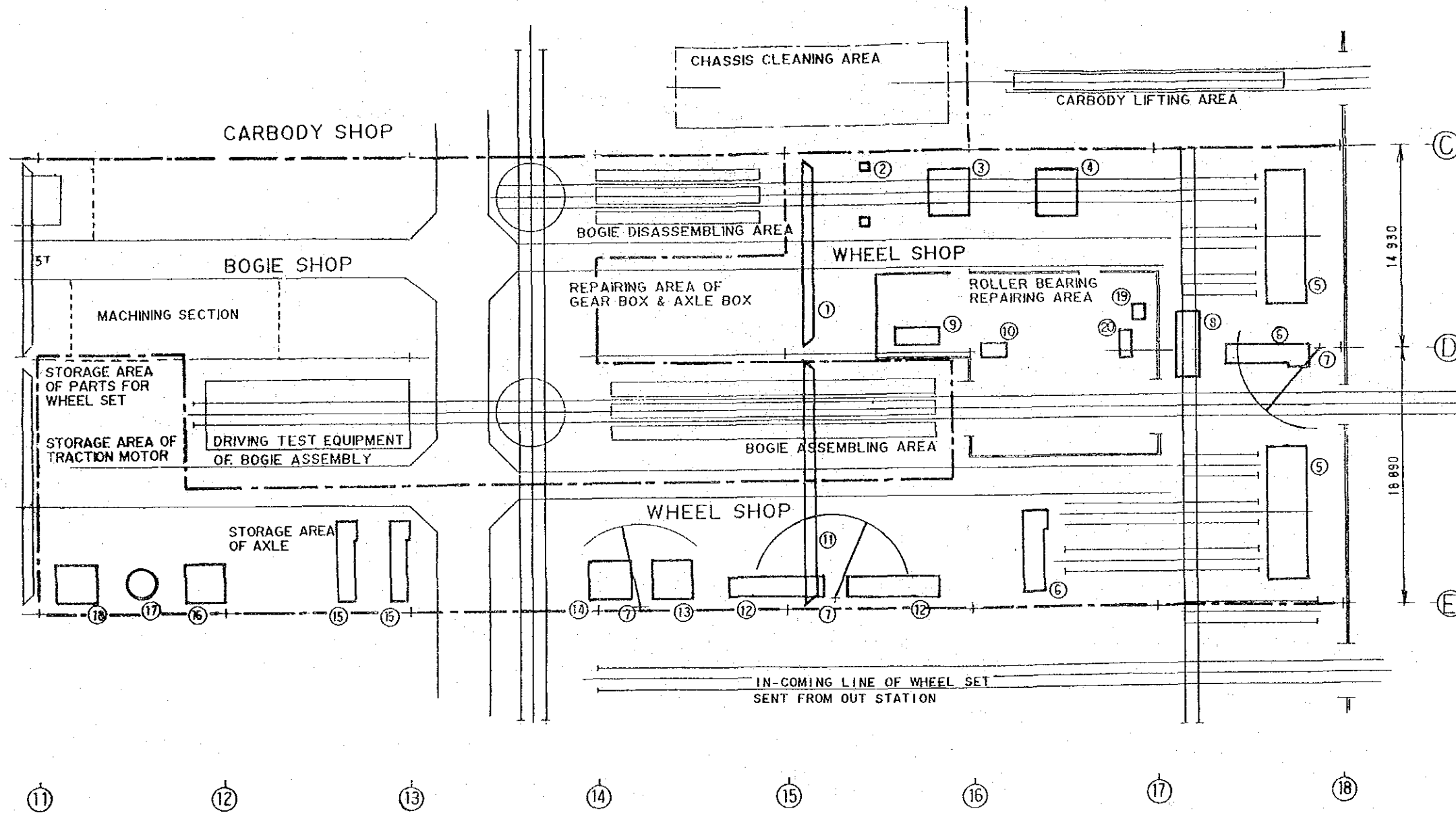


Fig. 1-5 LAYOUT PLAN OF BOGIE SHOP



NO	NAME OF MACHINE	Qty
WHEEL SHOP		
1	E.O.T. CRANE (31 x 14m)	1
2	INDUCTION HEATER FOR BEARING INNER RACE	1
3	ROLLER BEARING CLEANER (FOR WDS)	1
4	ULTRASONIC FLAW DETECTOR	1
5	WHEEL LATHE	2
6	AXLE JOURNAL TURNING AND BURNISHING LATHE	2
7	JIB CRANE (31)	3
8	WHEEL SET TRAVERSER	1
9	ROLLER BEARING WASHER	1
10	OIL BATH FOR HEATING BEARING INNER RACE	1
11	E.O.T. CRANE (31 x 18m)	1
12	WHEEL PRESS	2
13	VERTICAL LATHE (NC TYPE)	1
14	VERTICAL TURRET LATHE	1
15	AXLE TURNING LATHE	2
16	VERTICAL LATHE FOR TYRE	1
17	TYRE HEATING FURNACE	1
18	TYRE DRILLING MACHINE	1
19	AXLE BEARING GREASE FILLER	1
20	AXLE BOX ASSEMBLING MACHINE	1

Fig. 1-6 LAYOUT PLAN OF WHEEL SHOP

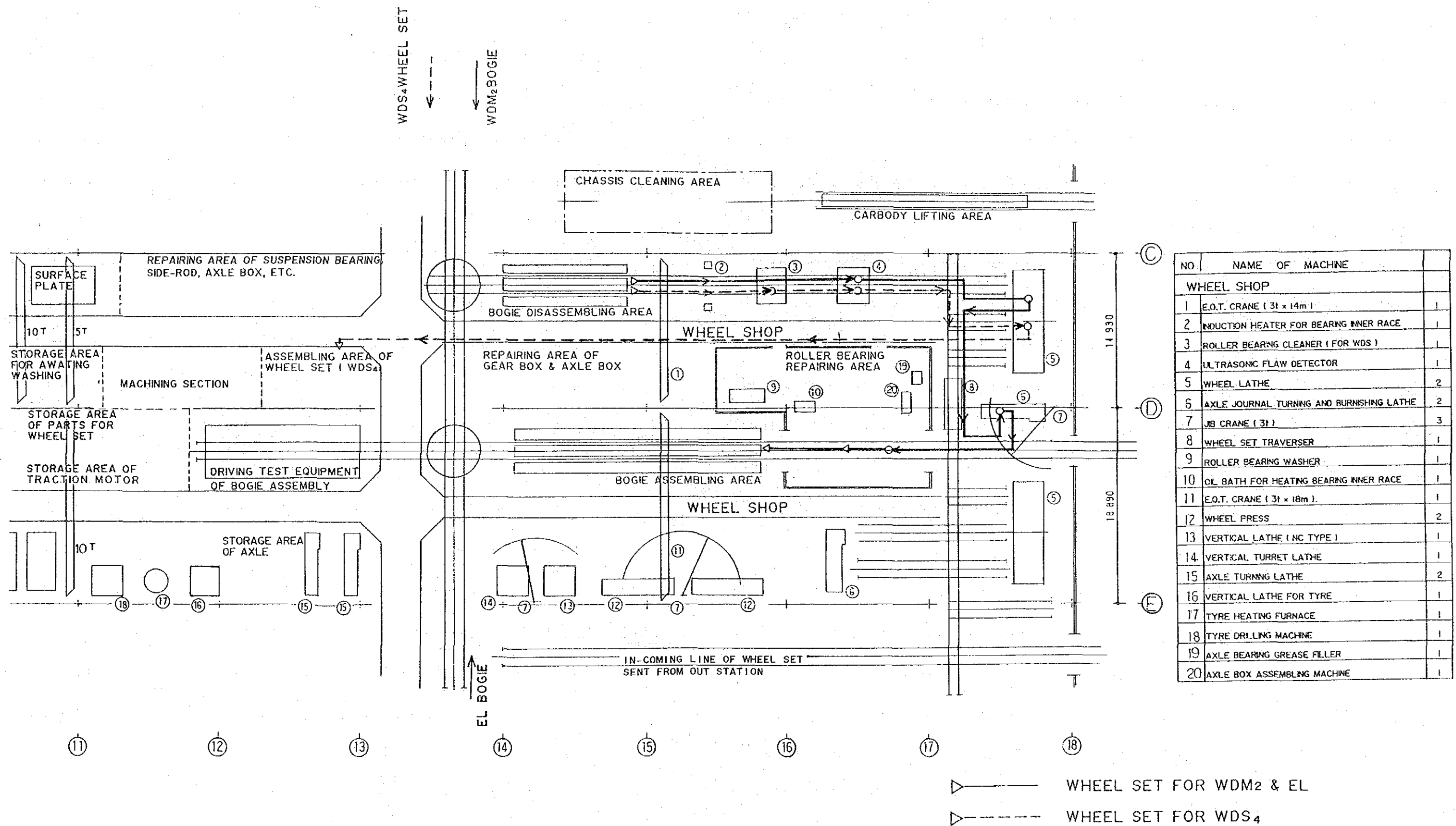


Fig. 1-7 FLOW OF WHEEL SET FOR LIGHT REPAIR IN POH

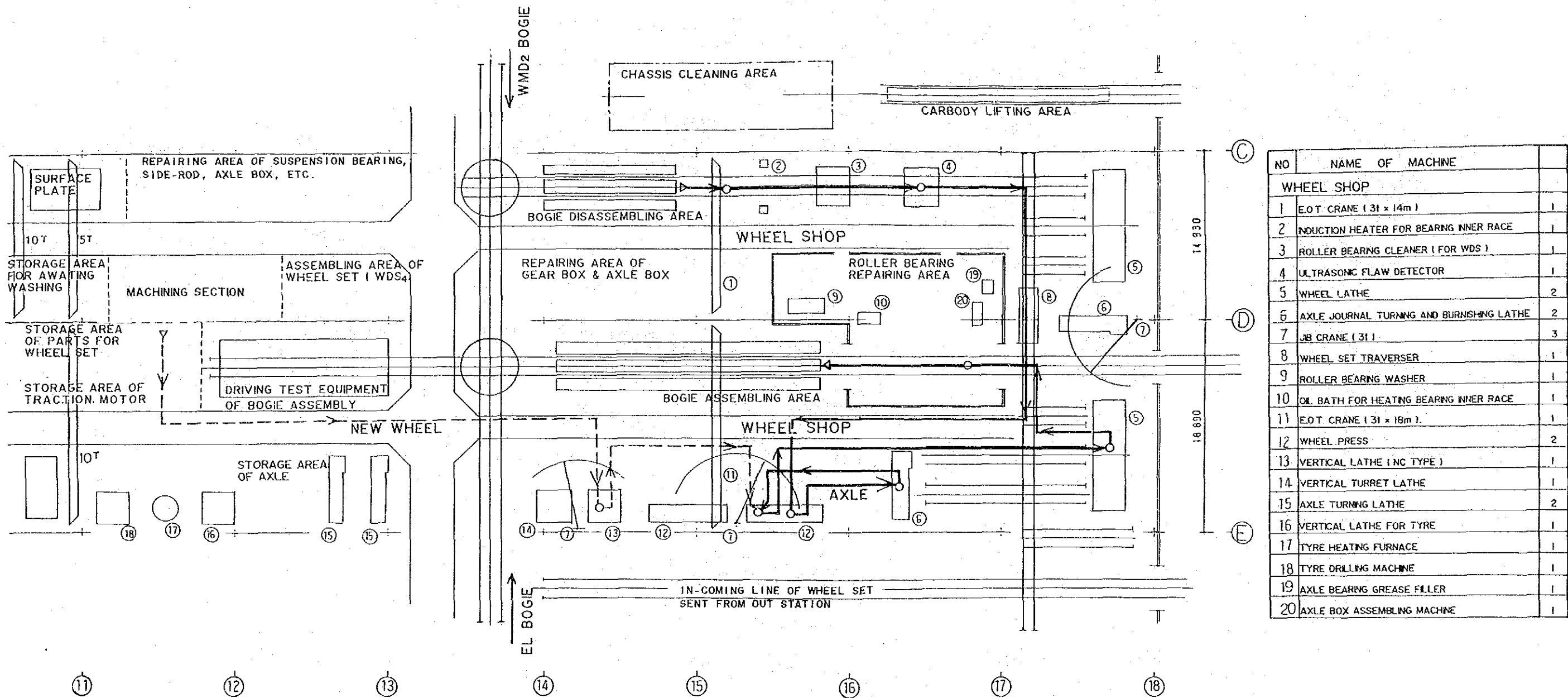
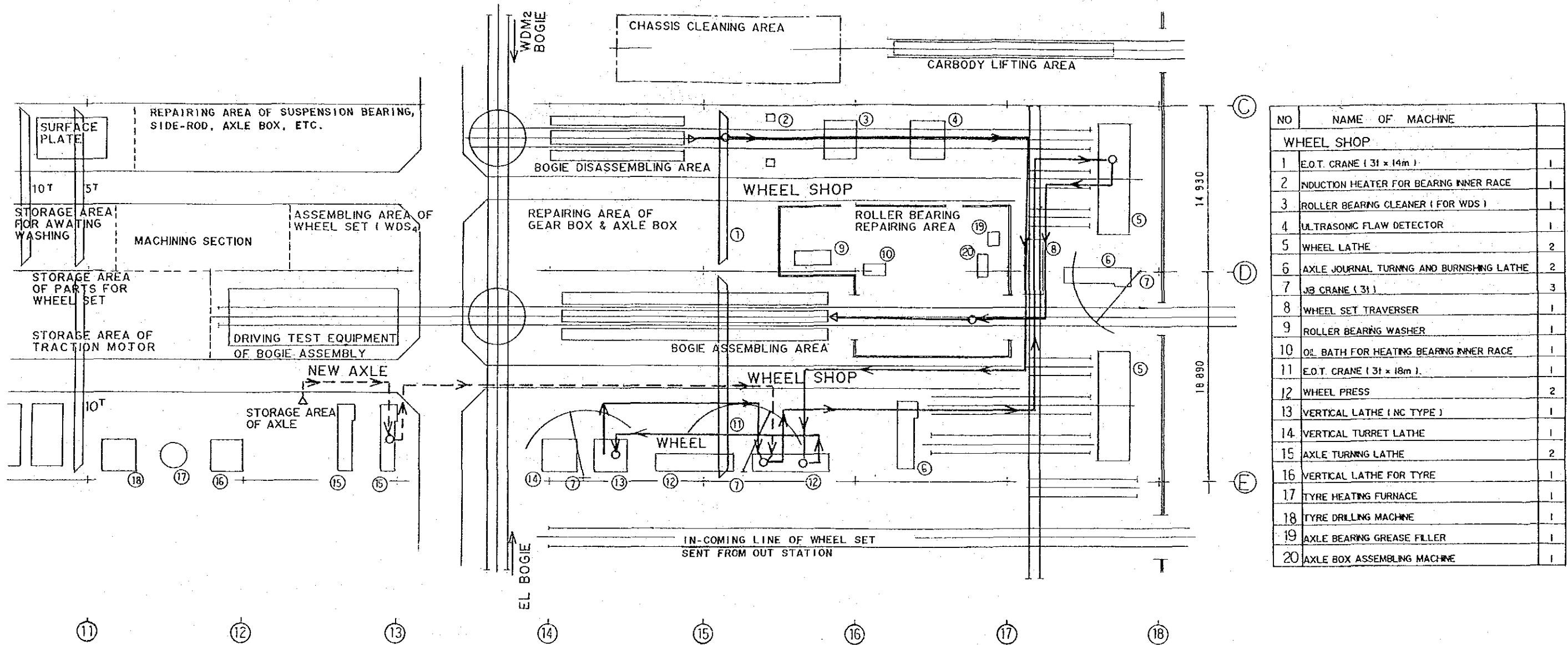


Fig. 1-8 FLOW OF WHEEL SET HEAVY REPAIR
(REPLACEMENT OF DISC) IN POH OF WDM2 & EL



NO	NAME OF MACHINE	
WHEEL SHOP		
1	E.O.T. CRANE (3t x 14m)	1
2	INDUCTION HEATER FOR BEARING INNER RACE	1
3	ROLLER BEARING CLEANER (FOR WDS)	1
4	ULTRASONIC FLAW DETECTOR	1
5	WHEEL LATHE	2
6	AXLE JOURNAL TURNING AND BURNISHING LATHE	2
7	JB CRANE (3t)	3
8	WHEEL SET TRAVERSER	1
9	ROLLER BEARING WASHER	1
10	OIL BATH FOR HEATING BEARING INNER RACE	1
11	E.O.T. CRANE (3t x 18m)	1
12	WHEEL PRESS	2
13	VERTICAL LATHE (NC TYPE)	1
14	VERTICAL TURRET LATHE	1
15	AXLE TURNING LATHE	2
16	VERTICAL LATHE FOR TYRE	1
17	TYRE HEATING FURNACE	1
18	TYRE DRILLING MACHINE	1
19	AXLE BEARING GREASE FILLER	1
20	AXLE BOX ASSEMBLING MACHINE	1

Fig. 1-9 FLOW OF WHEEL SET FOR HEAVY REPAIR
(REPLACEMENT OF AXLE) IN POH OF WDM2 & EL

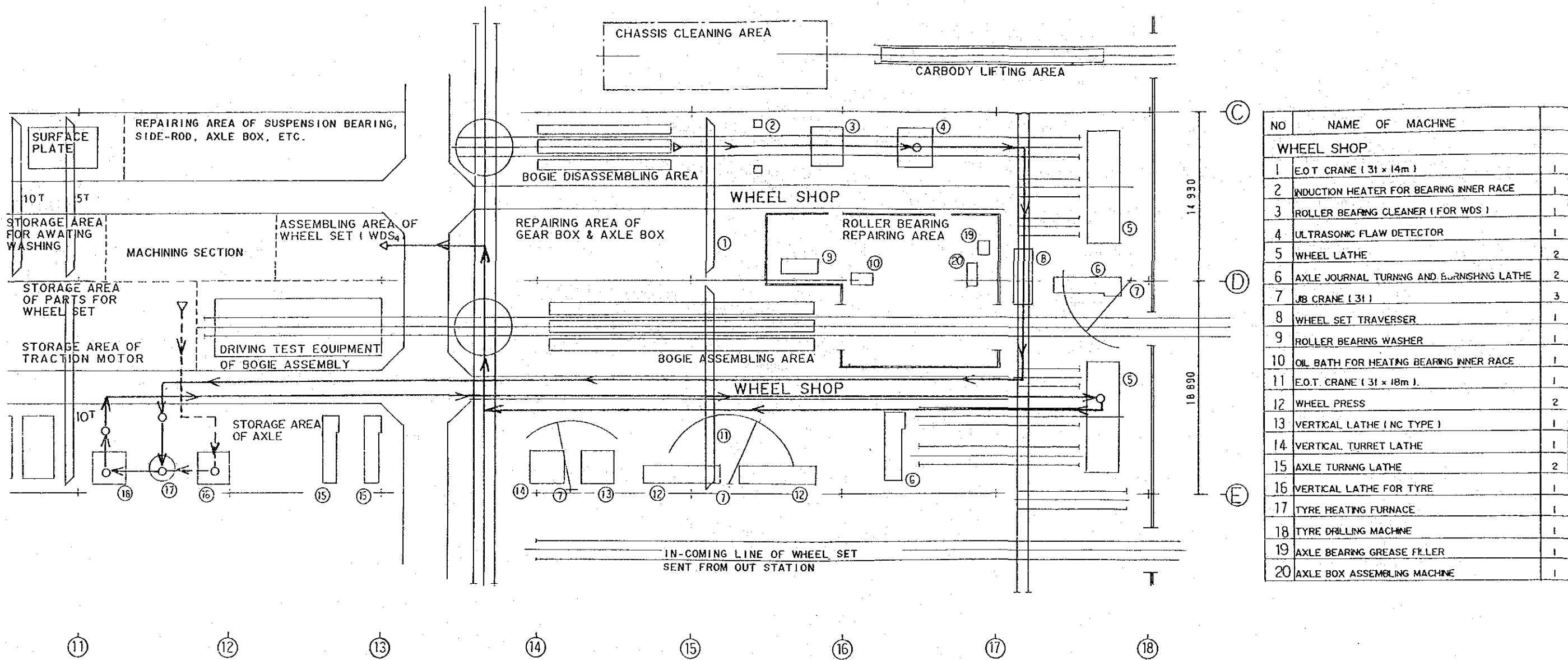
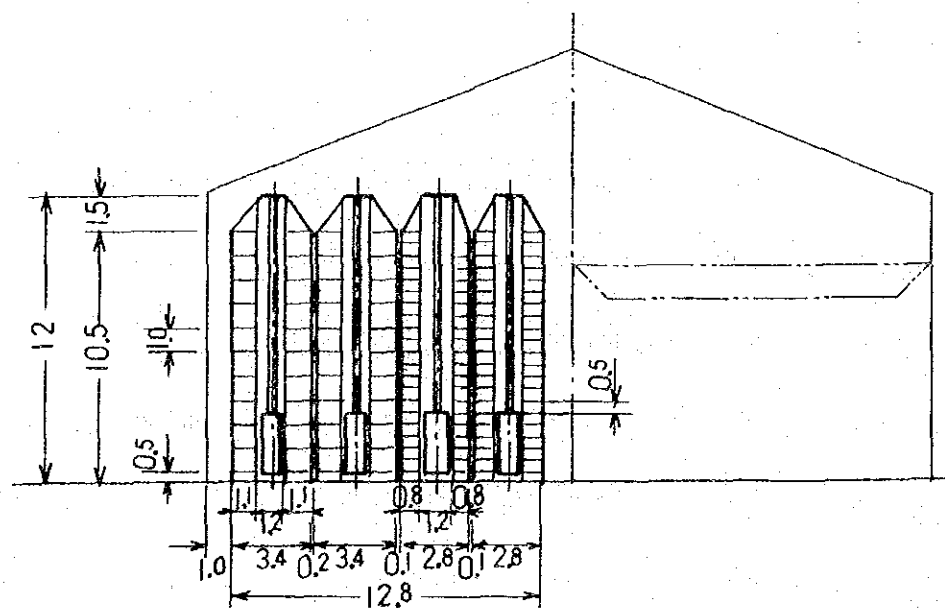
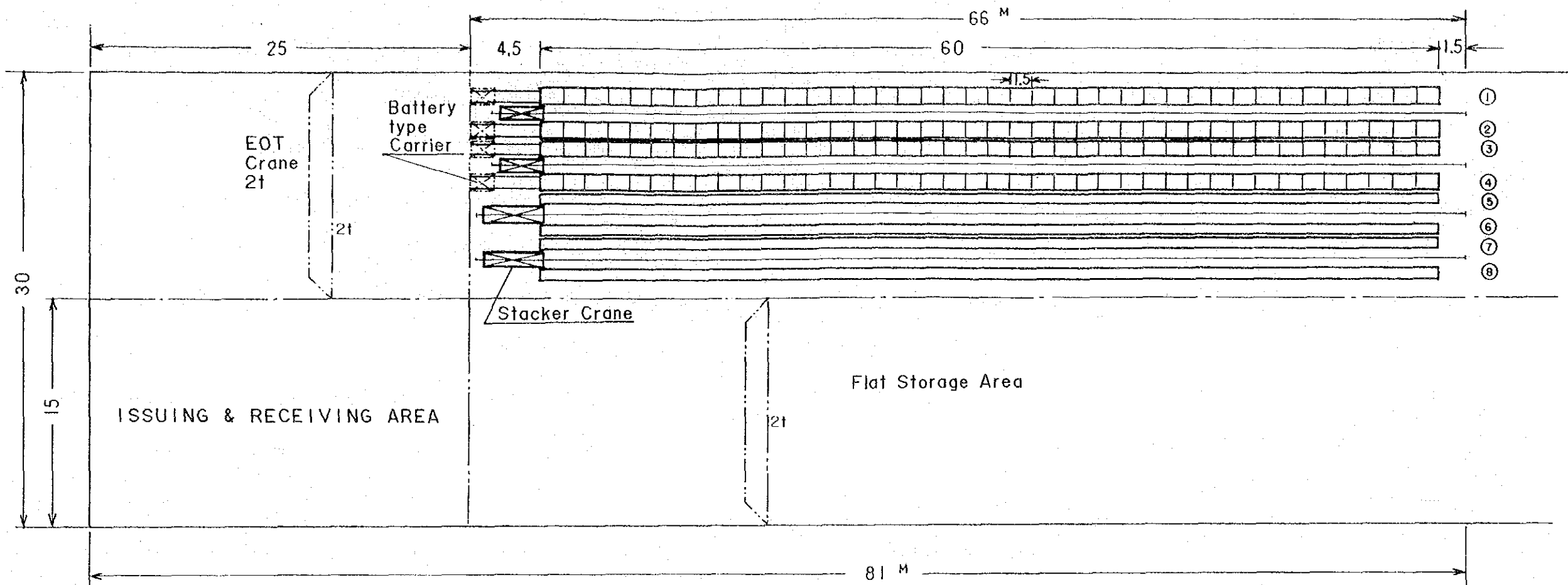


Fig. I-10

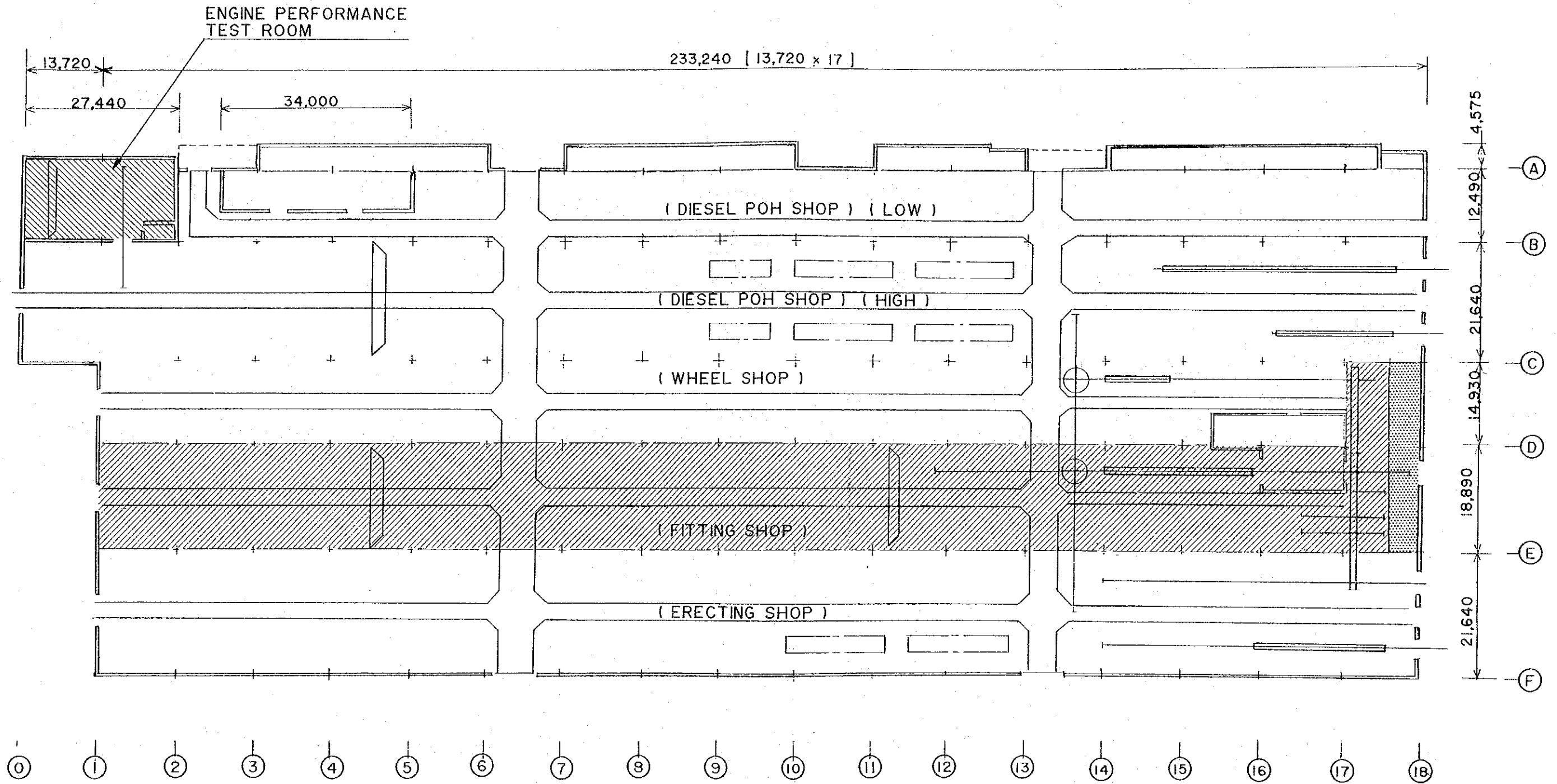
FLOW OF WHEEL SET FOR HEAVY REPAIR
(REPLACEMENT OF TYRE) IN P O H OF WDS4



No.	Stacker crane	No.	Rack arrangement (row x series x stage)	Dimension of rack m	Dimension of pallet m	Receivable Area m ²
① ~ ④	Fork type (Pallet, automatic)	2	4 x 40 x 10	L W H 1.5 x 1.1 x 1.0	1.4 x 1.0 (Effective area 1.0 m ²)	1,600 m ²
⑤ ~ ⑧	Picking type (Operator ride-on) [Hand-cart]	2	4 x - x 20	60 x 0.8 x 0.5	-	3,840 m ²
Total Receivable Area						5,440 m ²

For reference : Installation area for the Stocker 66 x 15 = 990 m²

Fig. 1-II SCHEMATIC DRAWING OF AUTOMATIC MECHANICAL STOCKER




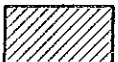

-  NEWLY BUILT
-  REBUILT
-  EXTENSION

Fig. 1-12 REMODELLING PLAN OF THE WORKSHOP BUILDING

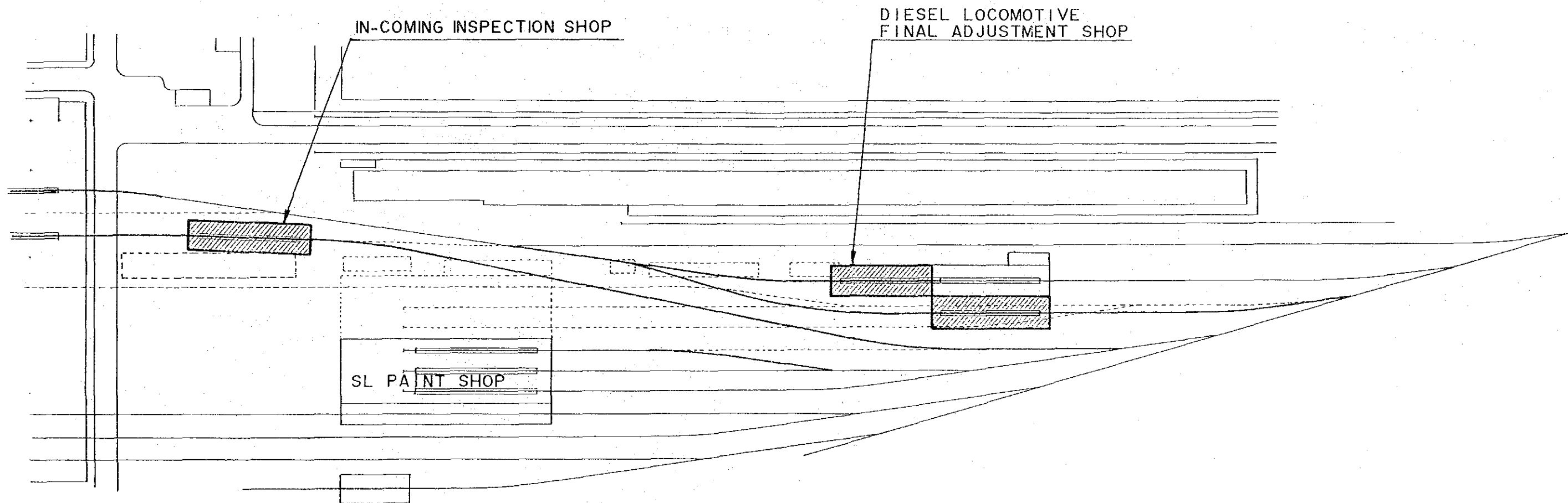


Fig. 1-13 LAYOUT PLAN OF IN-COMING / OUT-GOING TRACK (TEMPORARY STAGE)

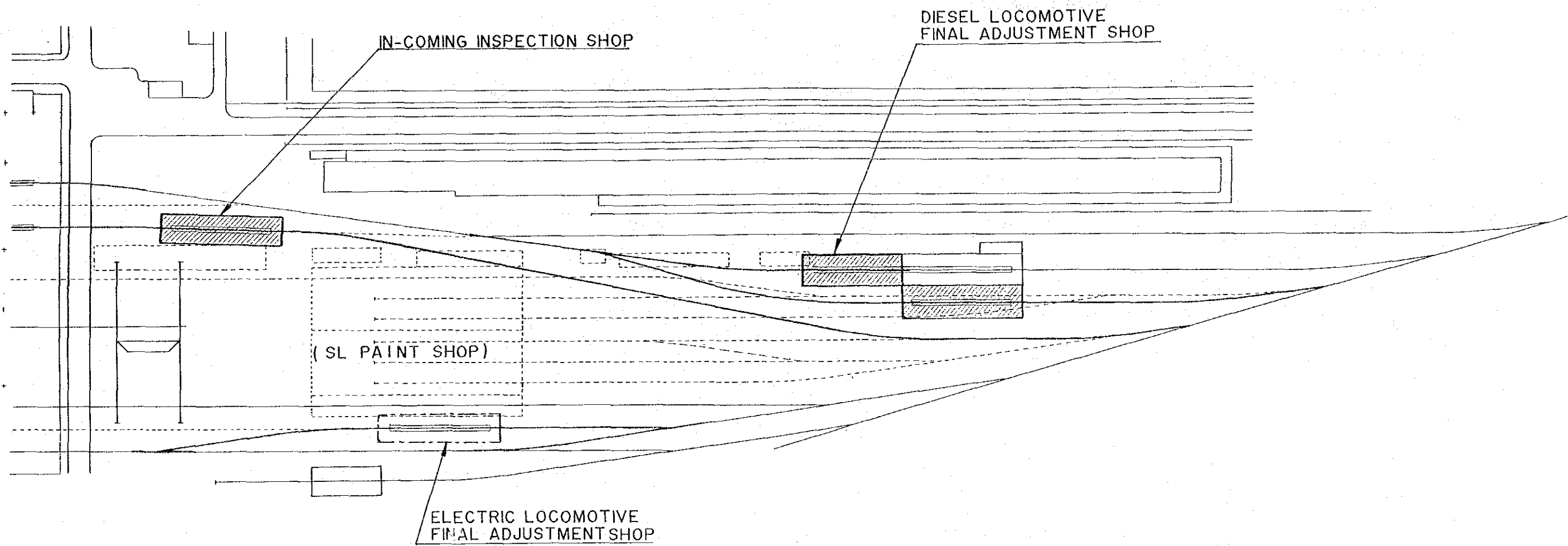
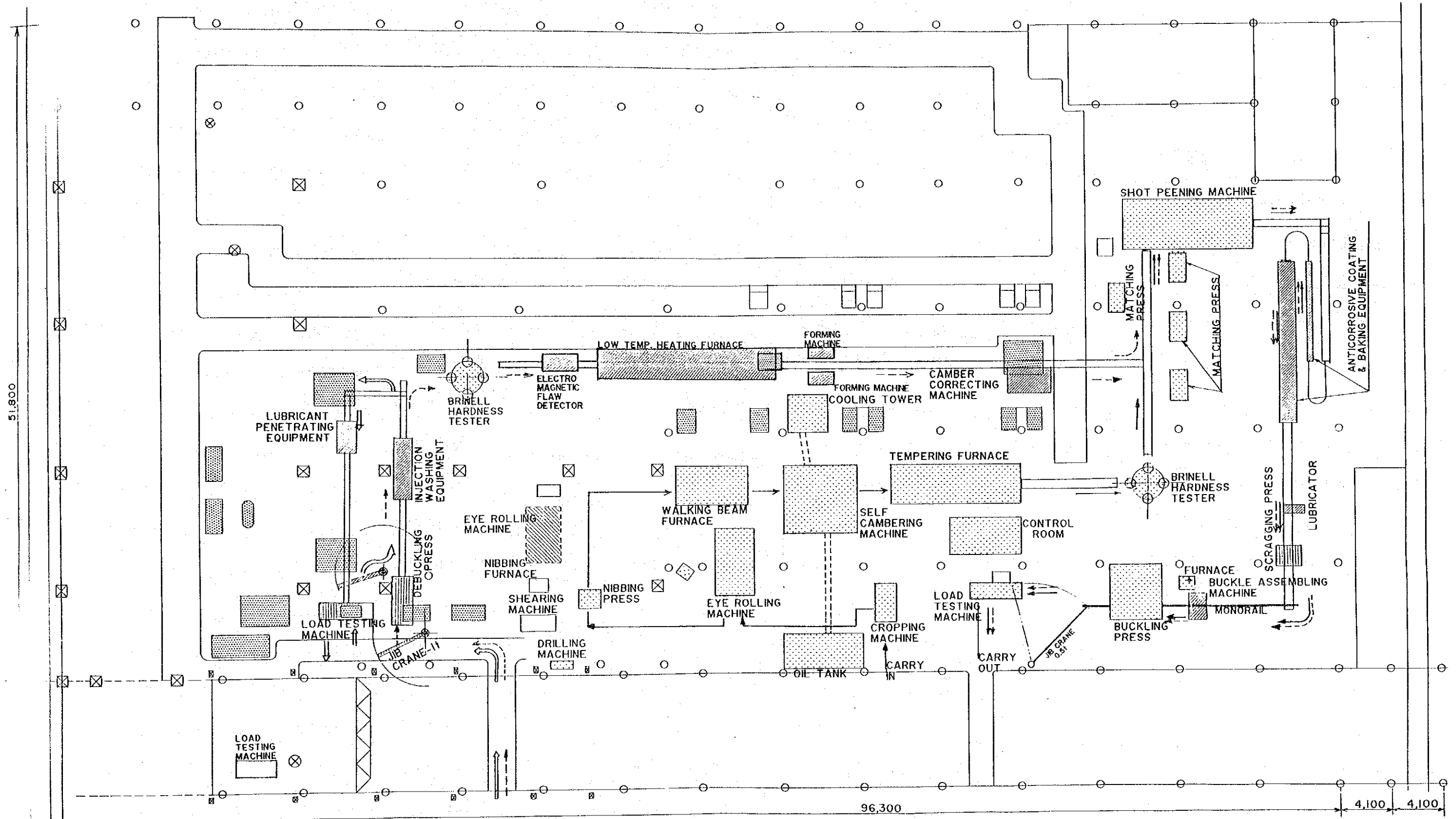


Fig. I-14 LAYOUT PLAN OF IN-COMING / OUT-GOING TRACK (FINAL STAGE)



- > FLOW OF DEBUCKLING REPAIR
- > FLOW OF SPRING LEAF MANUFACTURE
- =====> FLOW OF NON DEBUCKLING REPAIR

- TO BE NEWLY INSTALLED - [Solid Line]
- EXISTING - [Dashed Line]
- M/C REPLACED - [Diagonal Hatching]
- TO BE REMOVED - [Cross-hatching]
- PLANNED BY IR - [Dotted Line]

Fig. I-15 LAYOUT OF LAMINATED SPRING MANUFACTURE & REPAIR SECTION

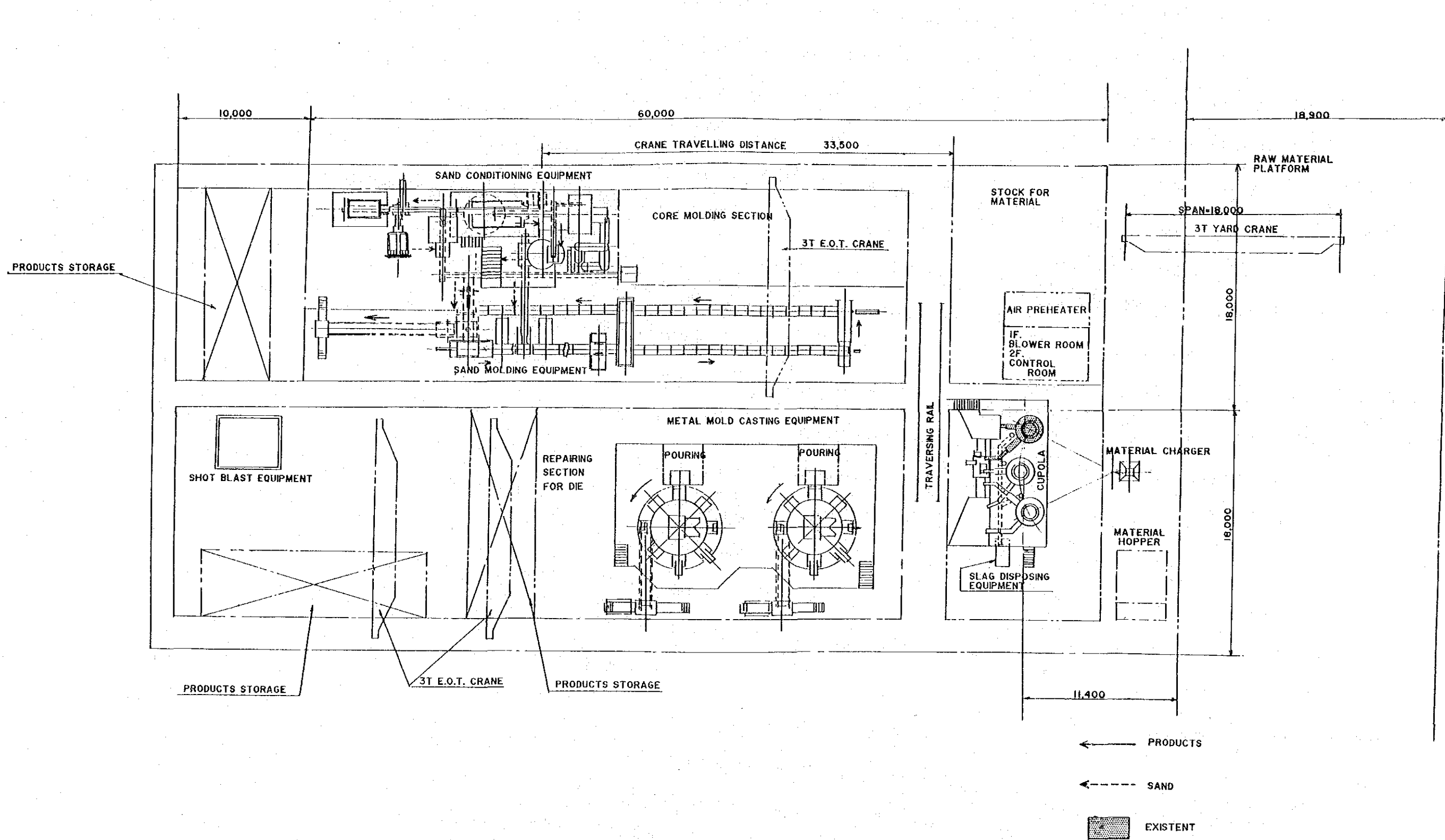


Fig. I-16 PROPOSED LAYOUT OF THE BRAKE BLOCK FOUNDRY

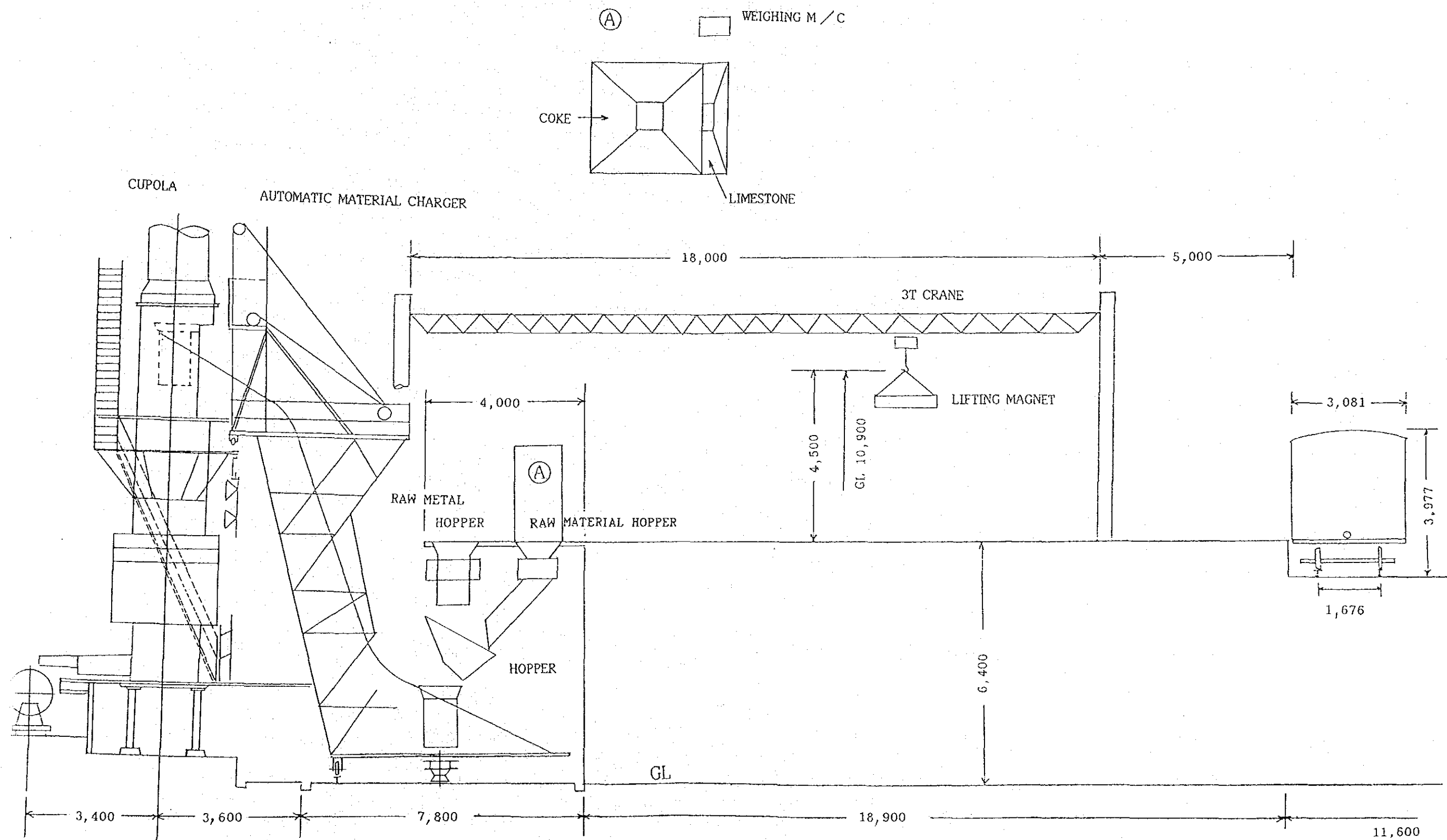


Fig. 1-17 PROPOSED LAYOUT OF RAW MATERIAL PLATFORM & CHARGING EQUIPMENT

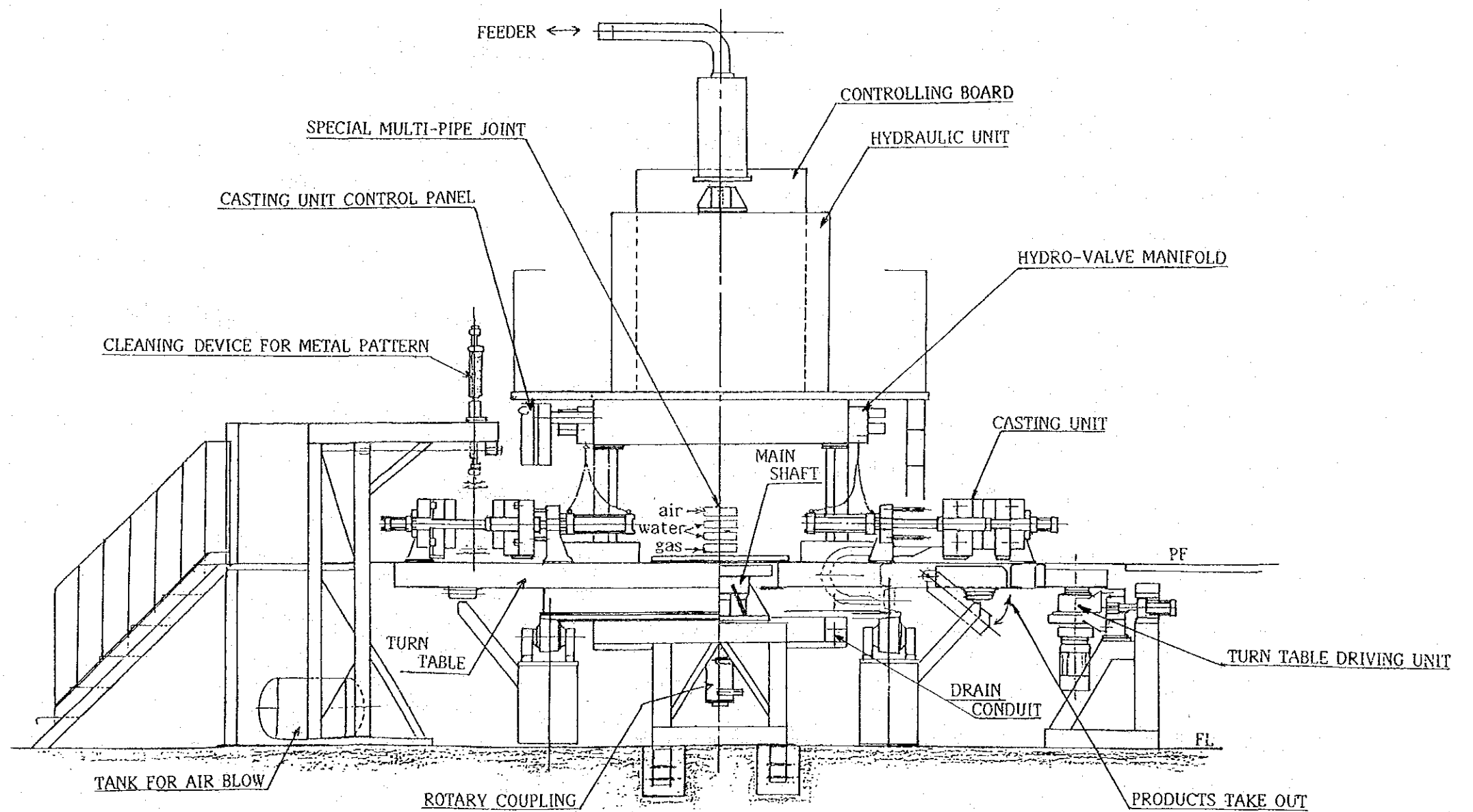


Fig. 1-18 METAL MOLD CASTING EQUIPMENT

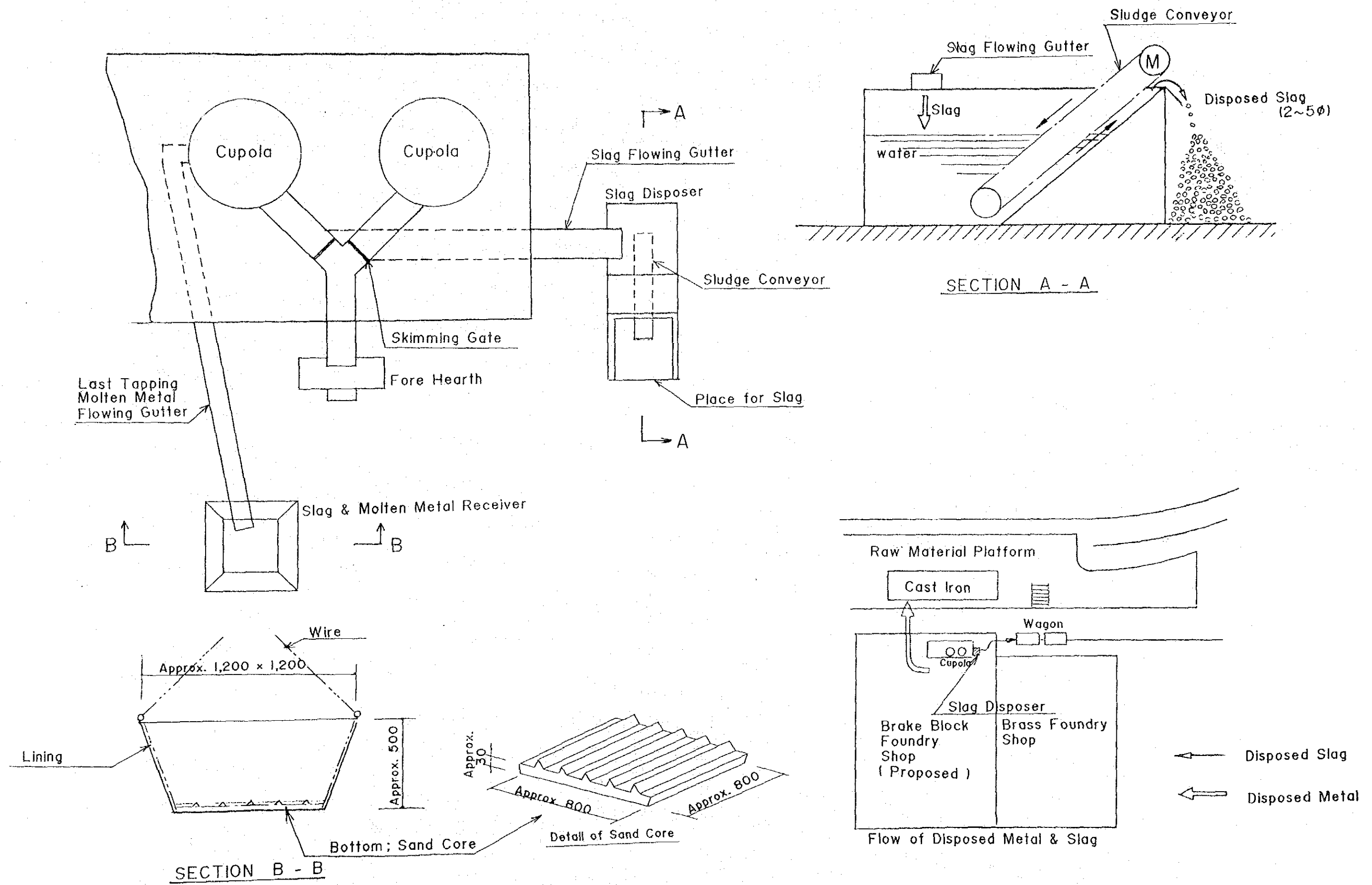


Fig. 1-19 SLAG DISPOSER & MOLTEN METAL RECEIVER

PERAMBUR WORKSHOP
(CARRIAGE)

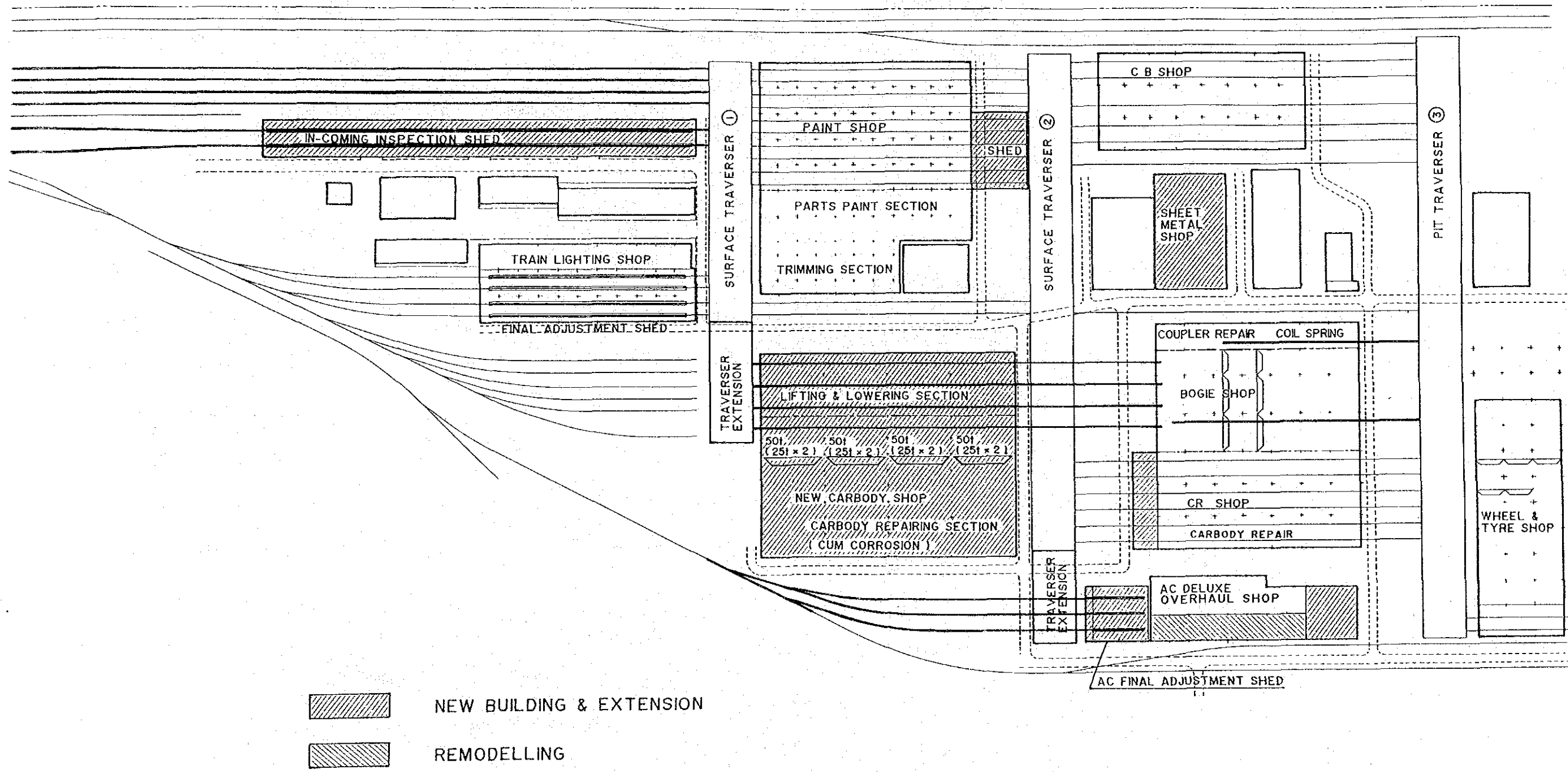


Fig. 2-1 LAYOUT PLAN OF CARRIAGE REPAIR AREA (PHASE I)

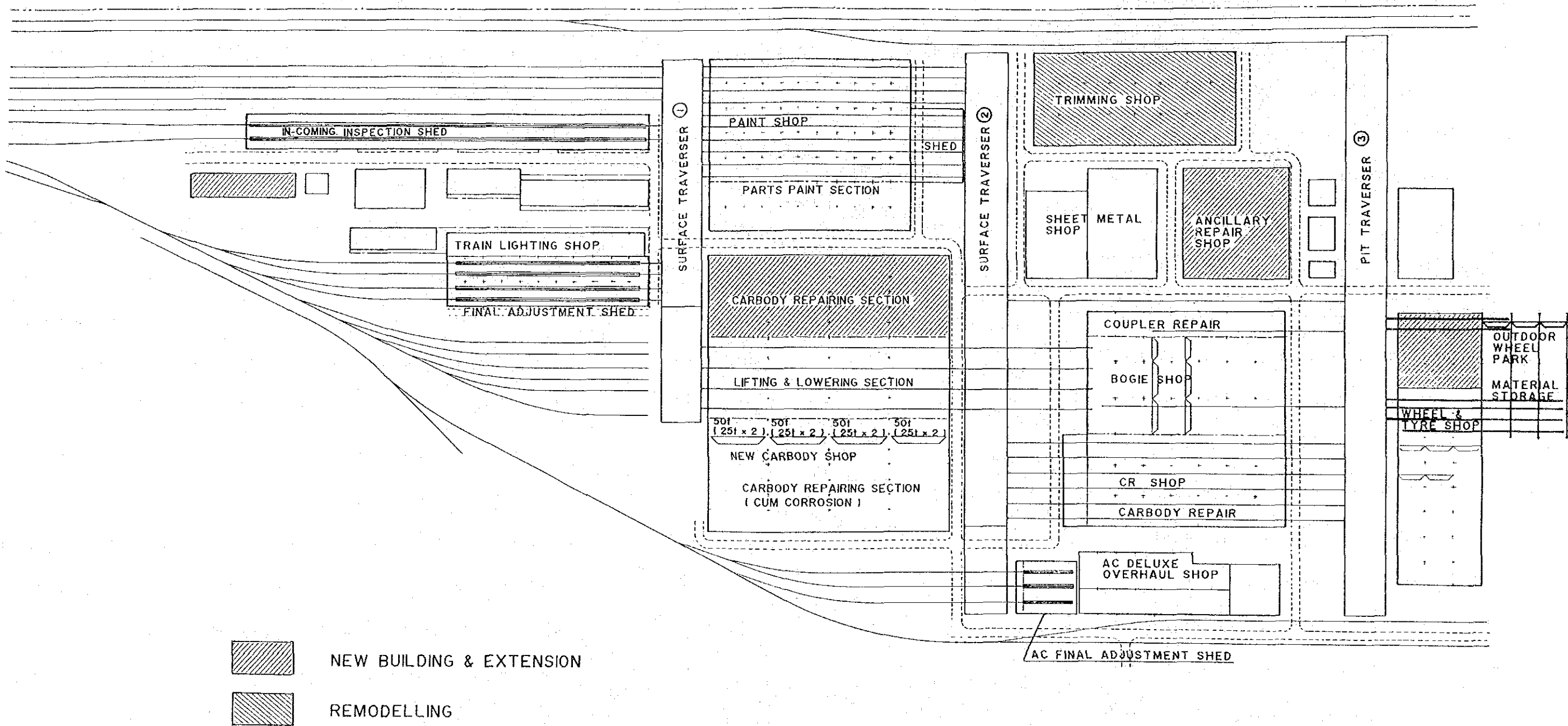


Fig. 2-2 LAYOUT PLAN OF CARRIAGE REPAIR AREA (PHASE II)

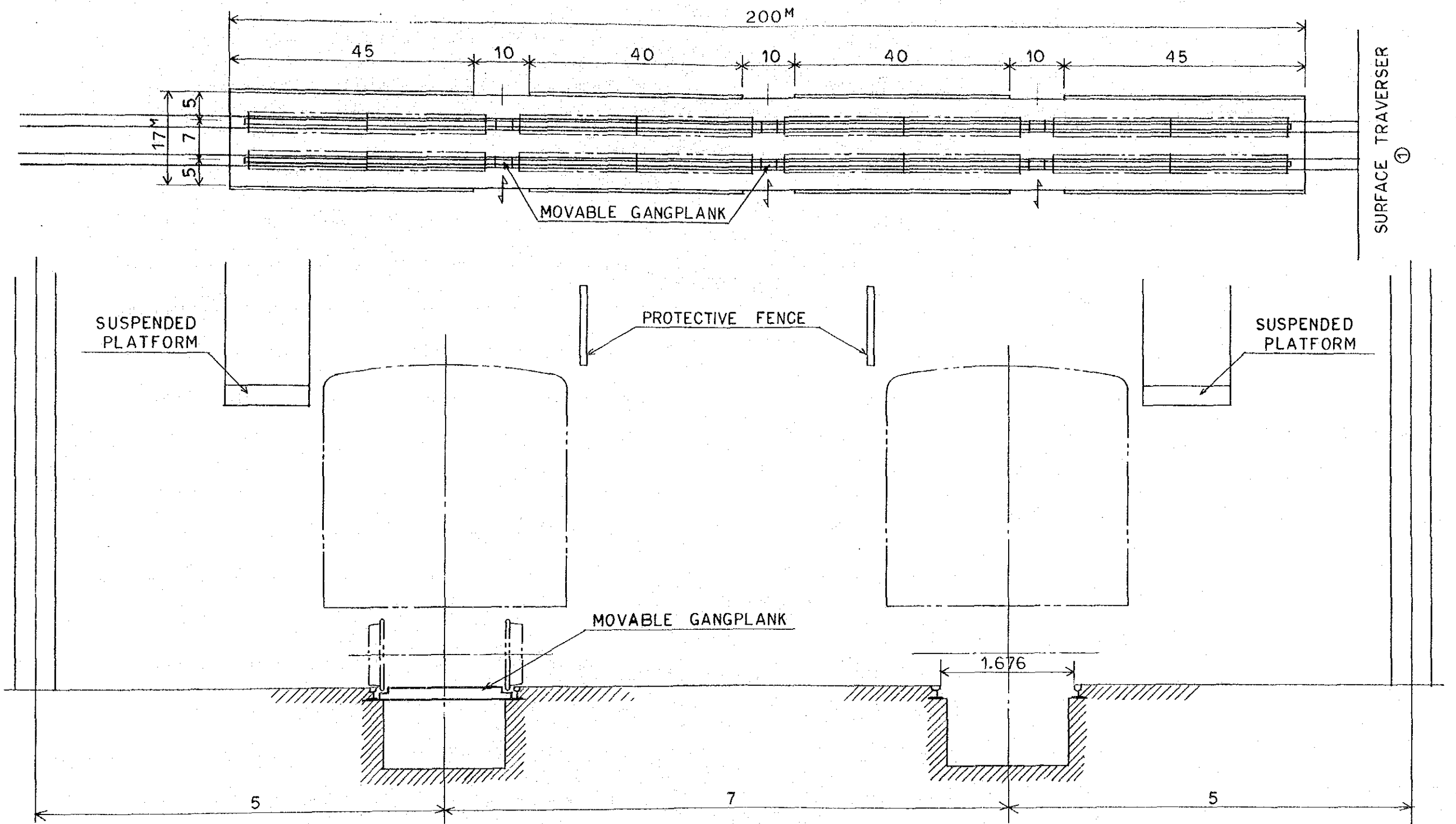


Fig. 2-3 LAYOUT PLAN OF IN-COMING INSPECTION SHED

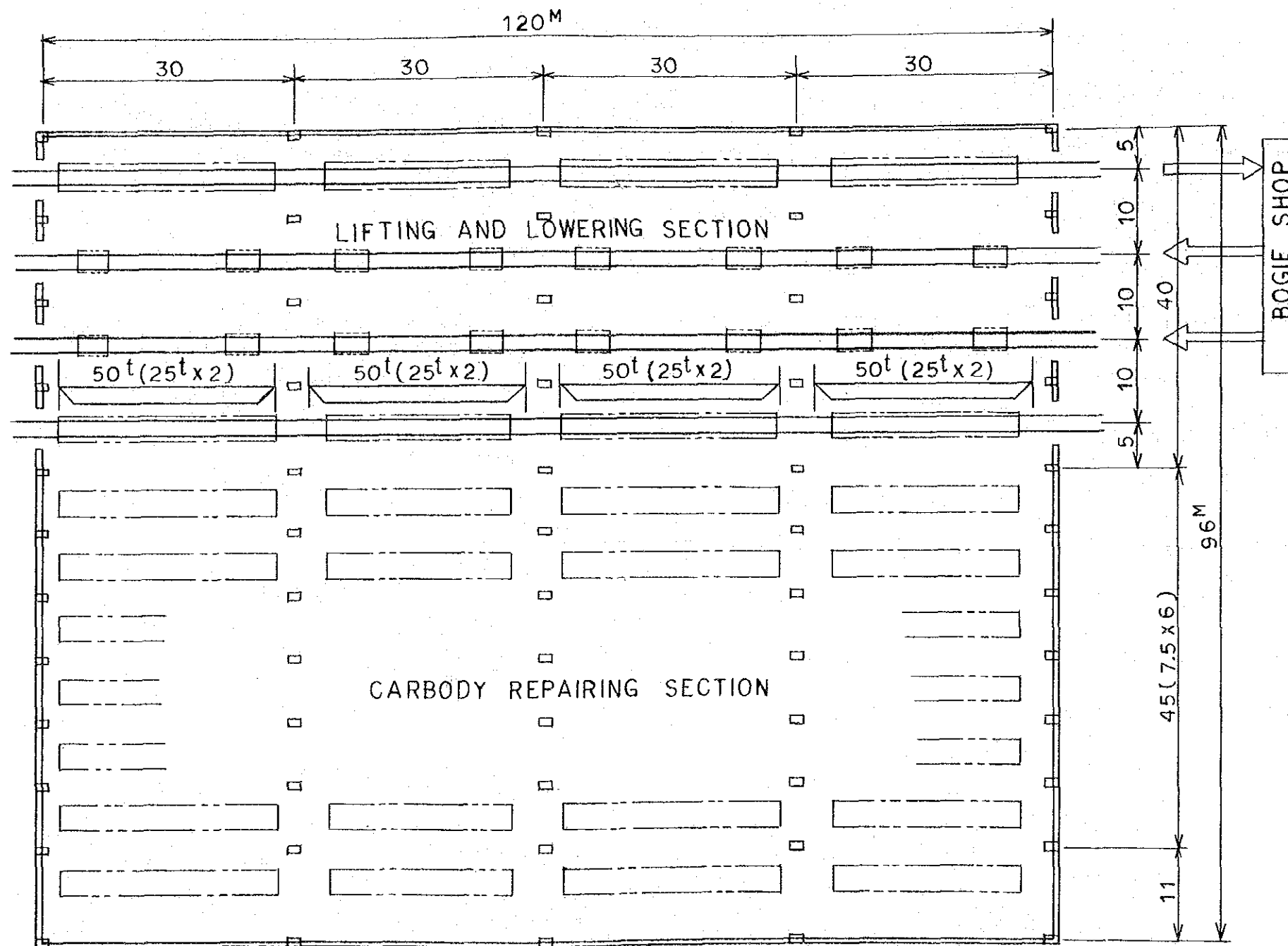


Fig. 2-4 LAYOUT PLAN OF NEW CARBODY SHOP (PHASE I)

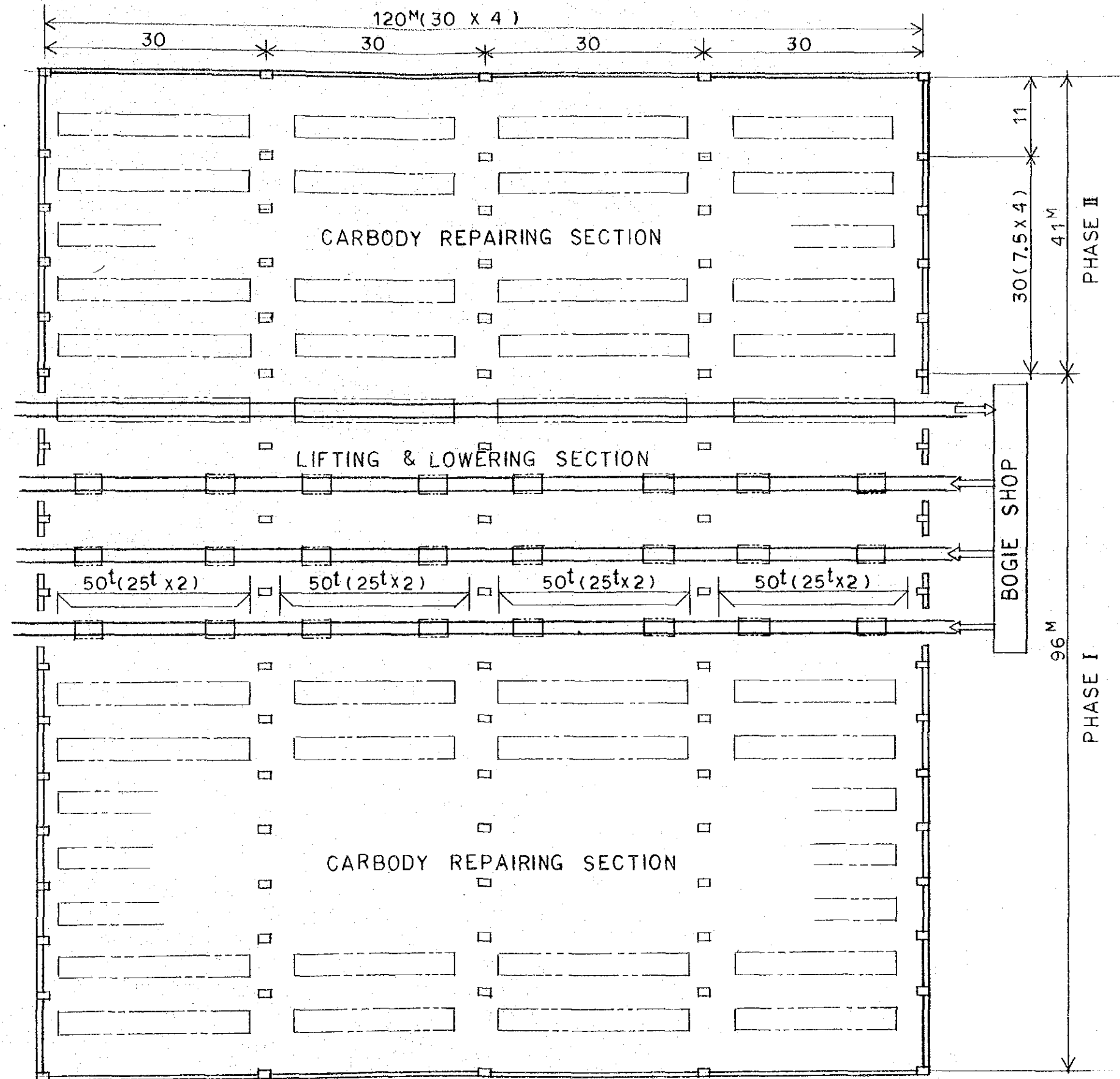
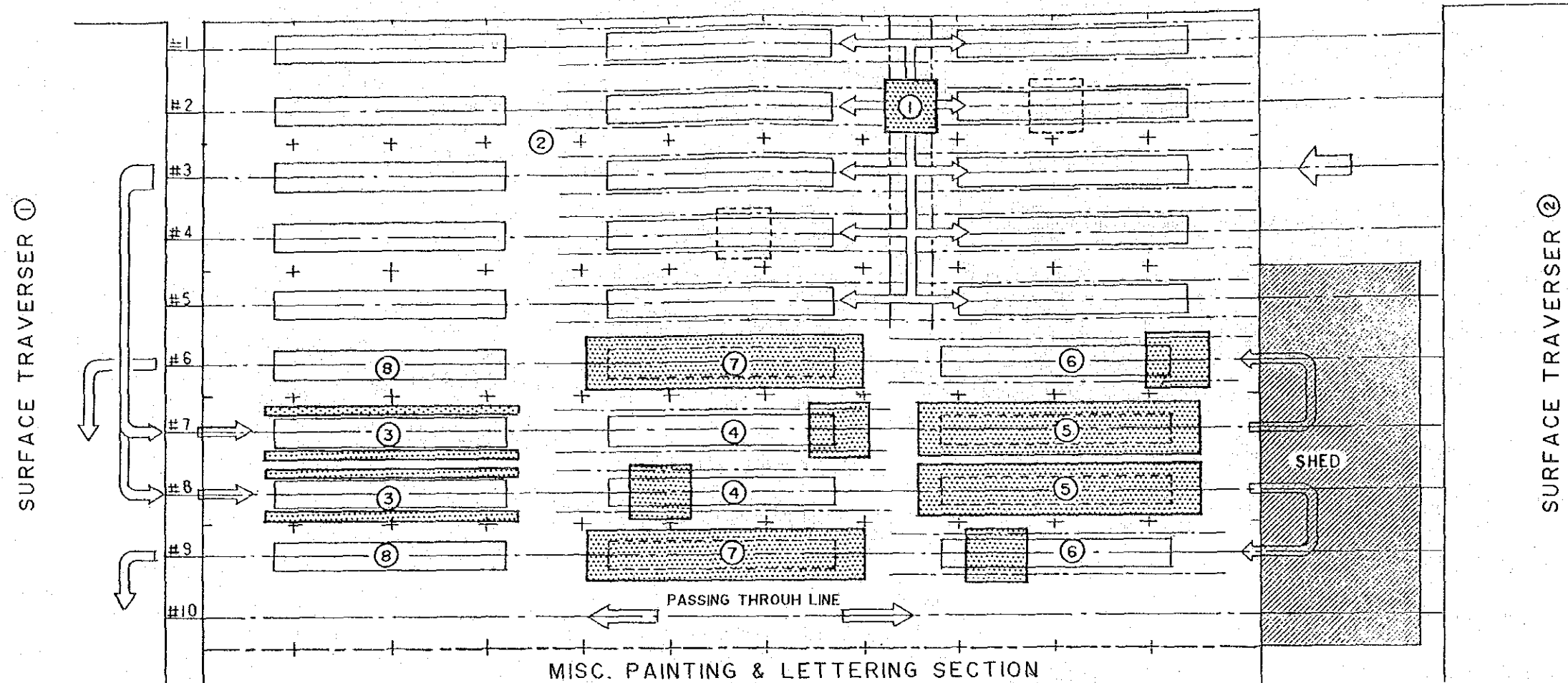


Fig. 2-5 LAYOUT PLAN OF NEW CARBODY SHOP(PHASE II)



No.	NAME OF WORK SECTION	REQUIRED EQUIPMENT	Q'ty	DESCRIPTION
①	PRE-PAINT TREATMENT SECTION	GRINDING/WASHING DEVICE (TRAVERSE TYPE)	1	TREATMENT CAPACITY 20 MIN/COACH
②		PORTABLE SANDER	30	FOR PUTTY GRINDING
		LIFTING PLATFORM VEHICLE	30	
③	MASKING SECTION	FIXED LIFTING PLATFORM	4	
④	PAINTING SECTION	AUTOMATIC PAINTING EQUIPMENT	4	
⑤	DRYING SECTION	DRYING BOOTH	4	
⑦				
⑧	LETTERING SECTION	LIFTING PLATFORM VEHICLE	4	
	CARBODY TRANSFER	ENDLESS WIRE TRACTION DEVICE	10SET	

Fig. 2-6 PAINT SHOP IMPROVEMENT PLAN

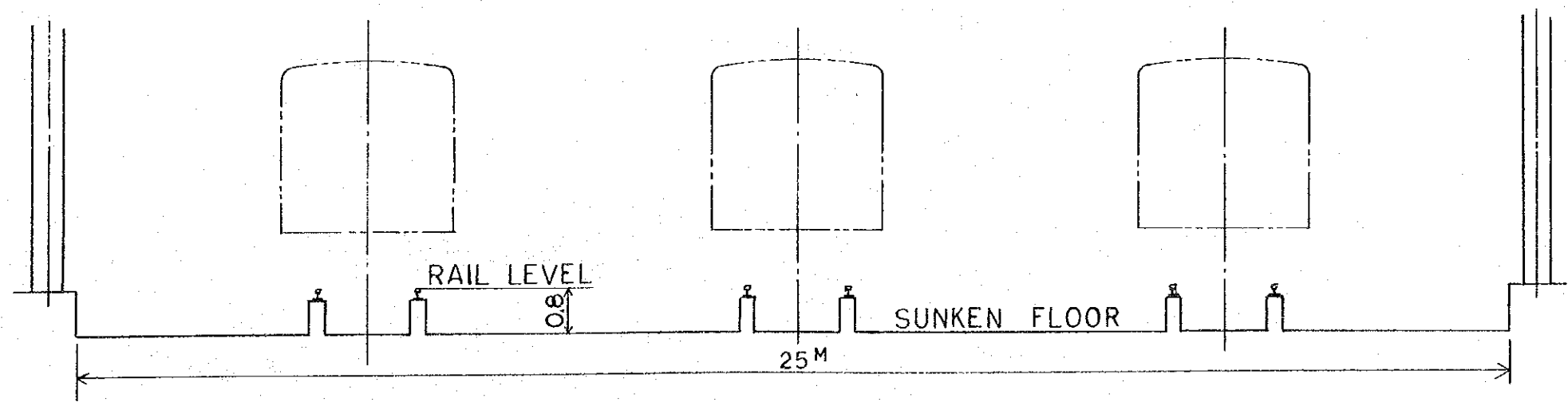
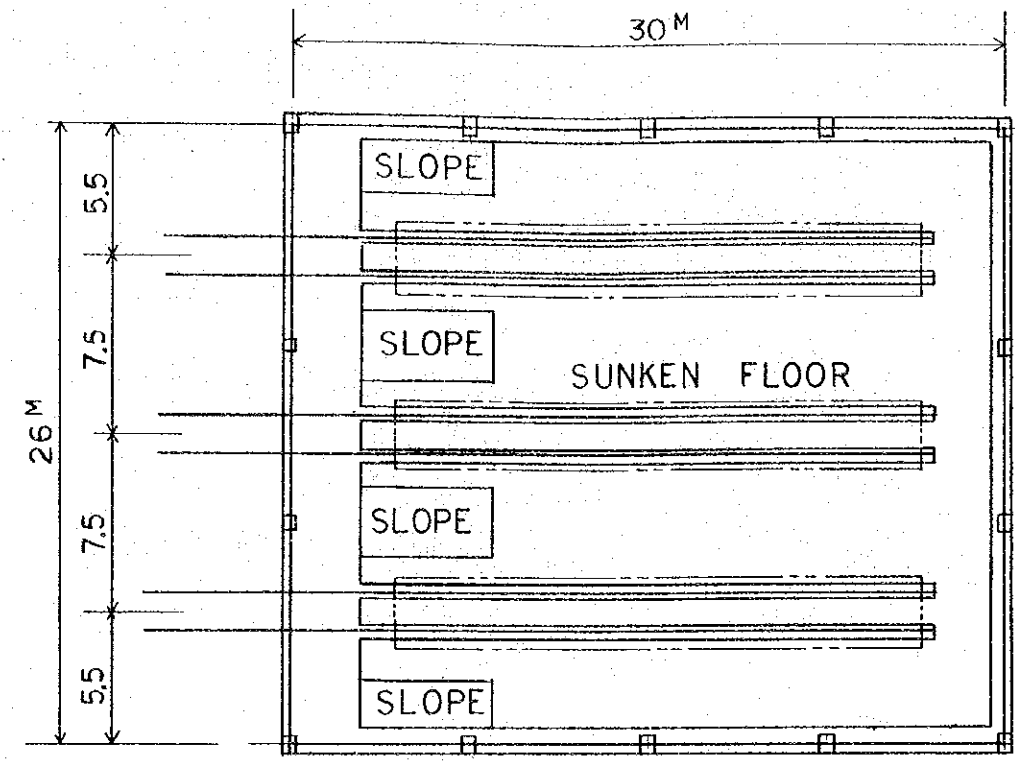


Fig. 2-7 LAYOUT PLAN OF AC FINAL ADJUSTMENT SHED

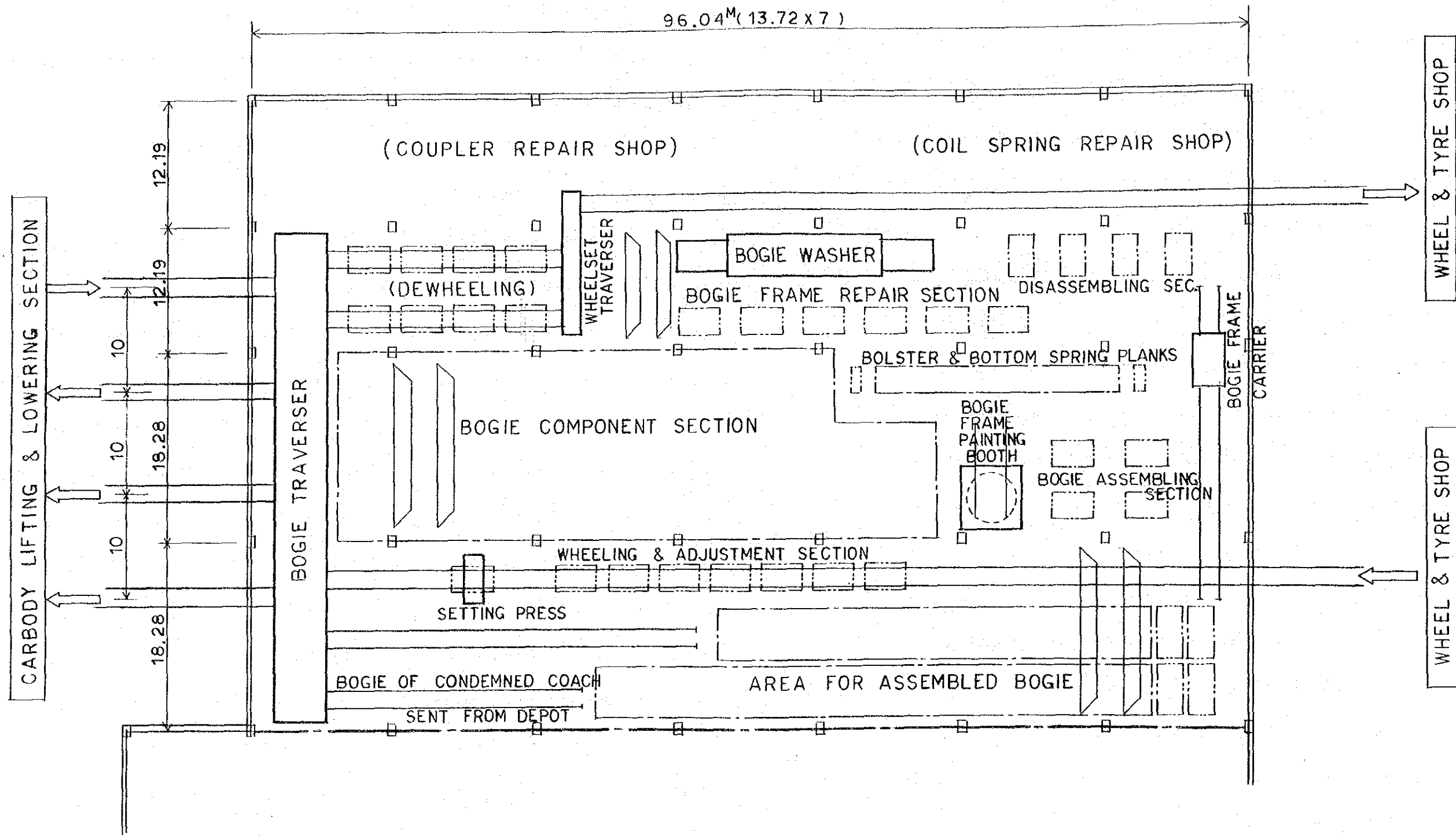


Fig. 2-8 LAYOUT PLAN OF BOGIE SHOP

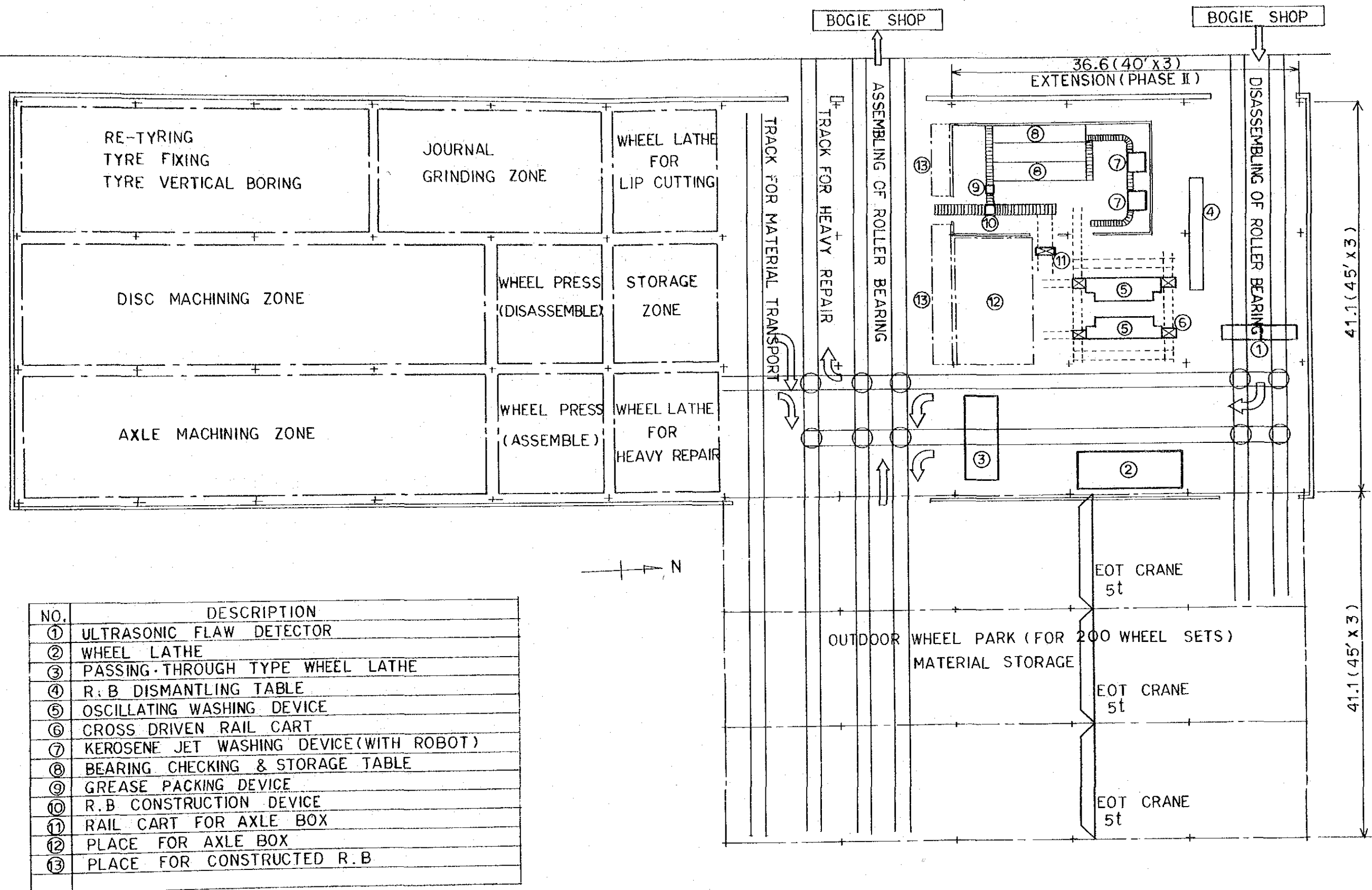


Fig. 2-9 LAYOUT PLAN OF WHEEL & TYRE SHOP

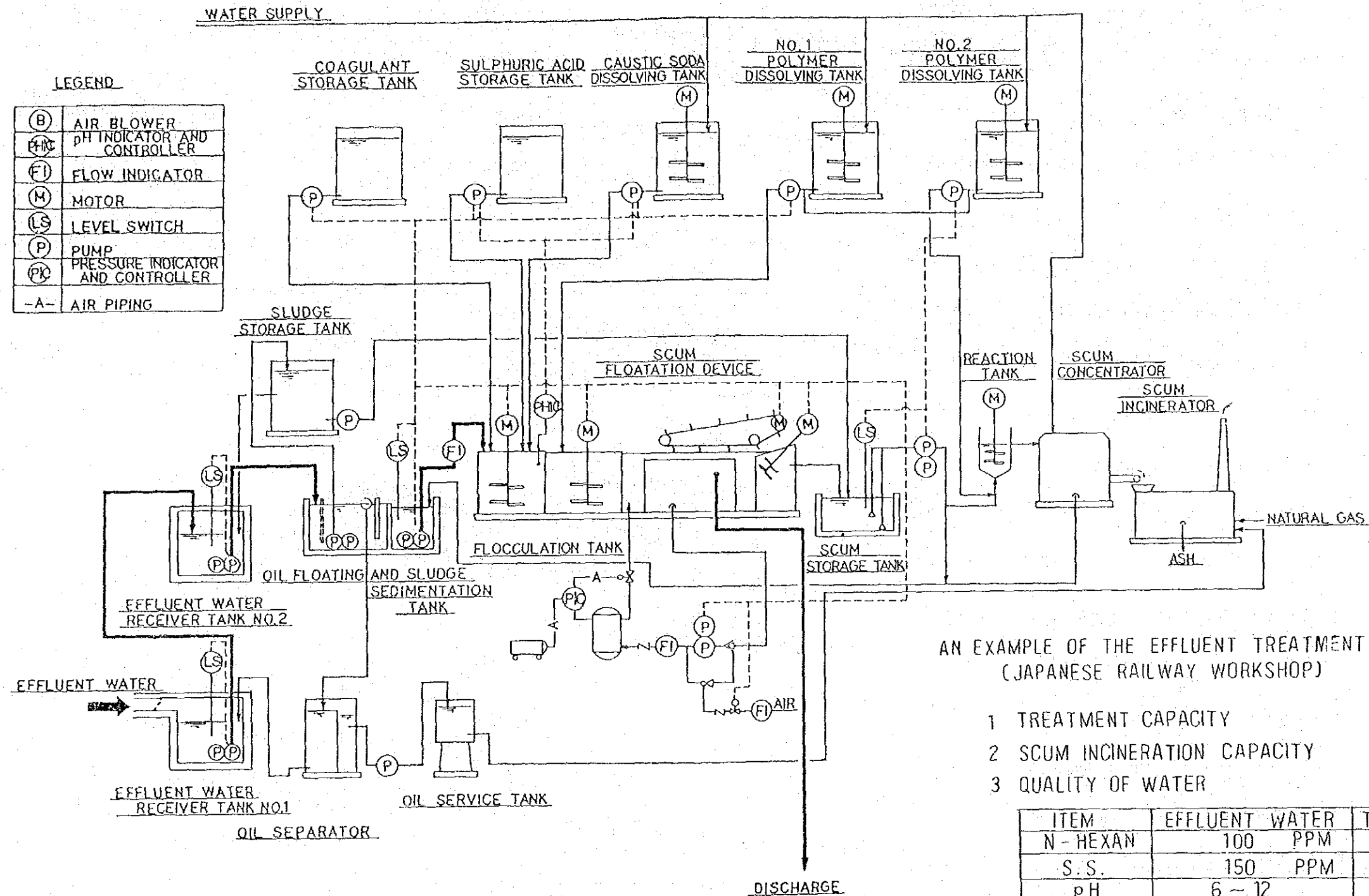
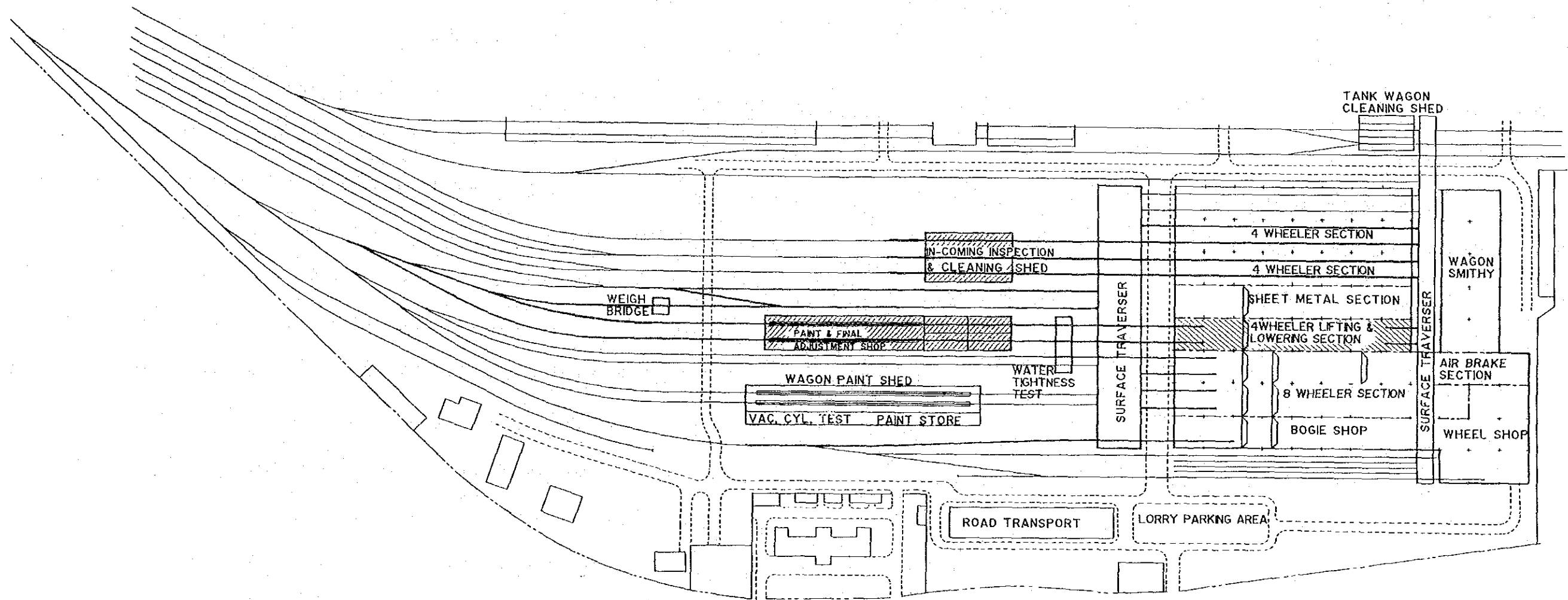


Fig. 2-10 FLOW SHEET OF EFFLUENT TREATMENT

PERAMBUR WORKSHOP
(WAGON)





-  NEW BUILDING
-  REMODELLING

Fig. 3-1 LAYOUT OF WAGON REPAIR AREA

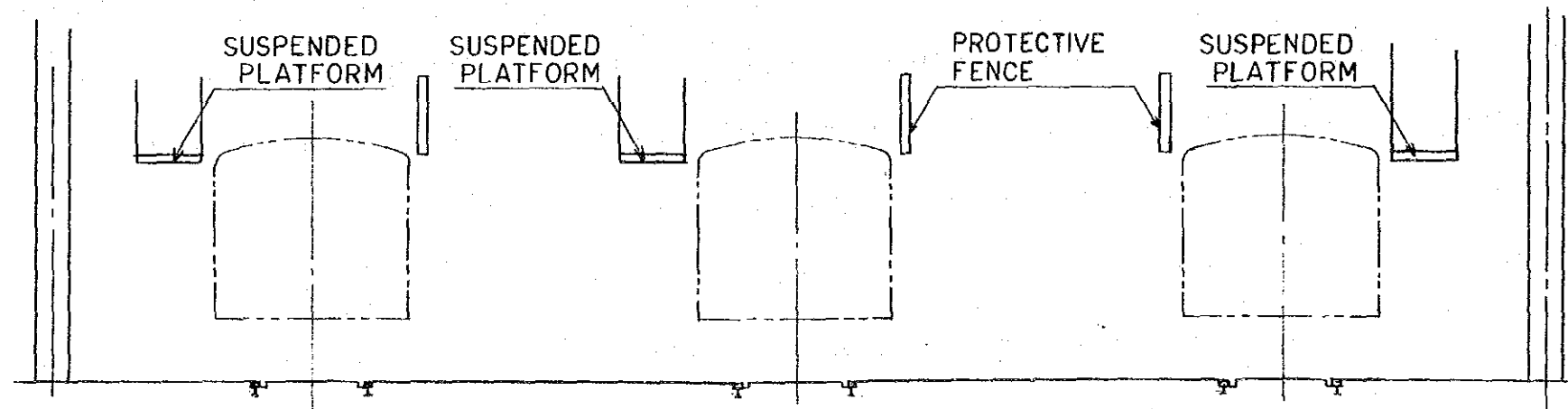
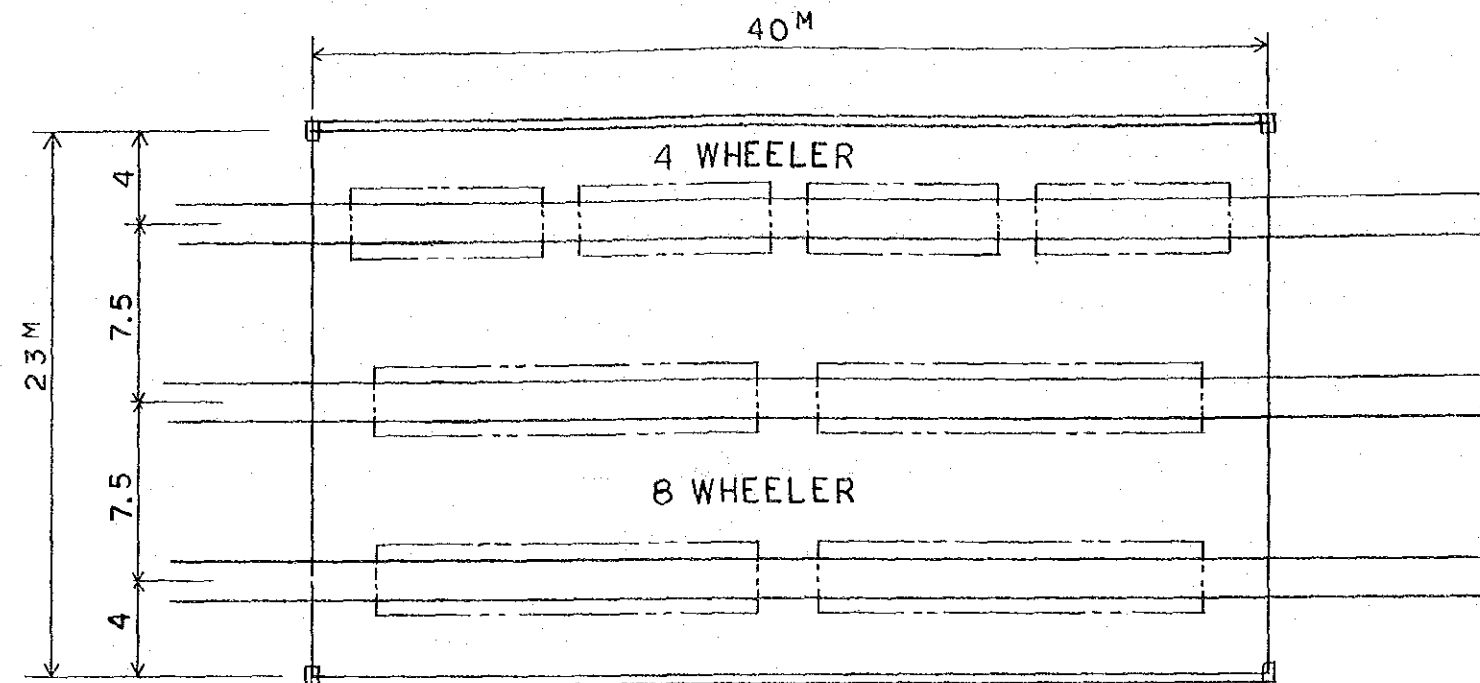


Fig. 3-2 LAYOUT PLAN OF IN-COMING INSPECTION & CLEANING SHED

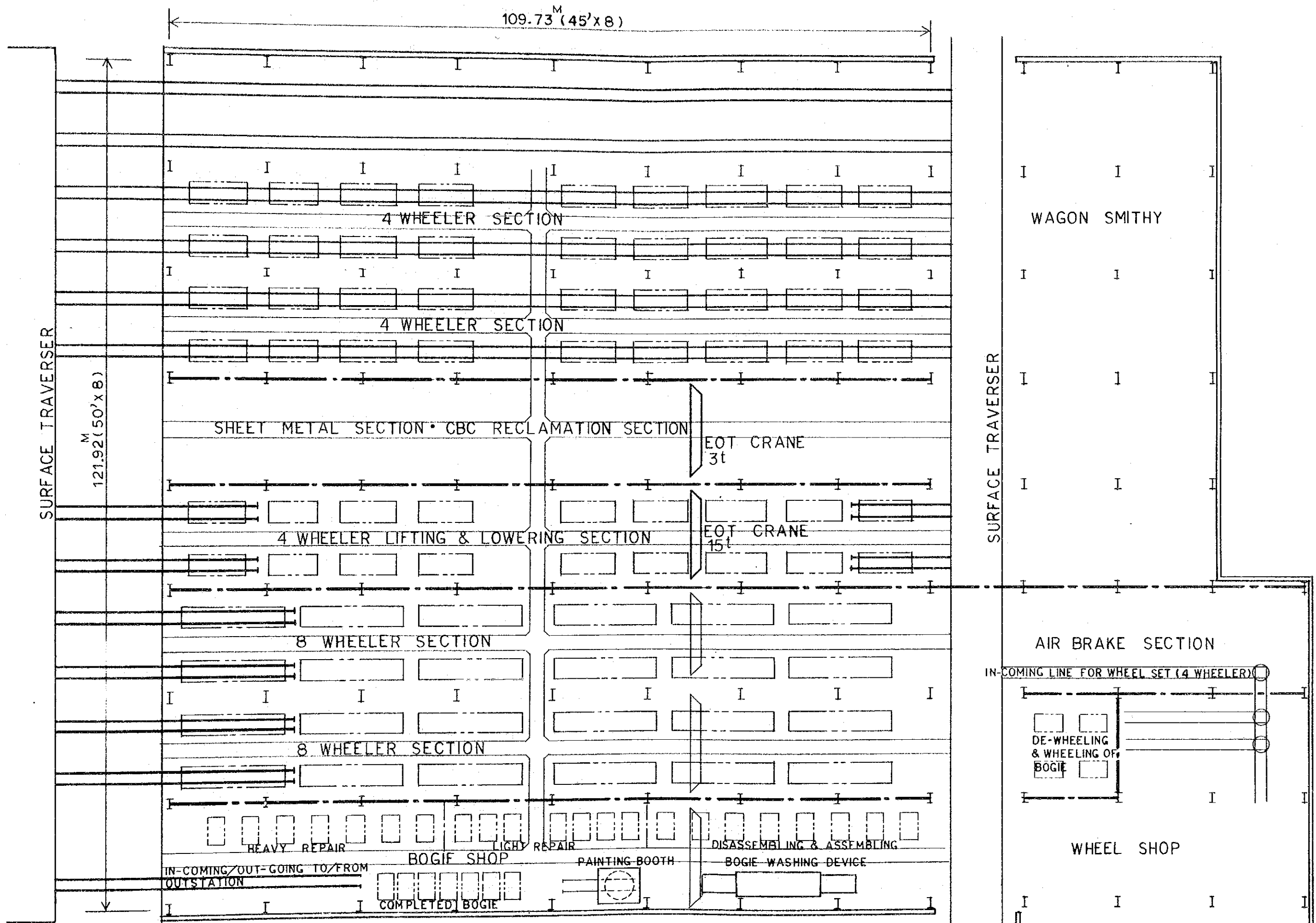
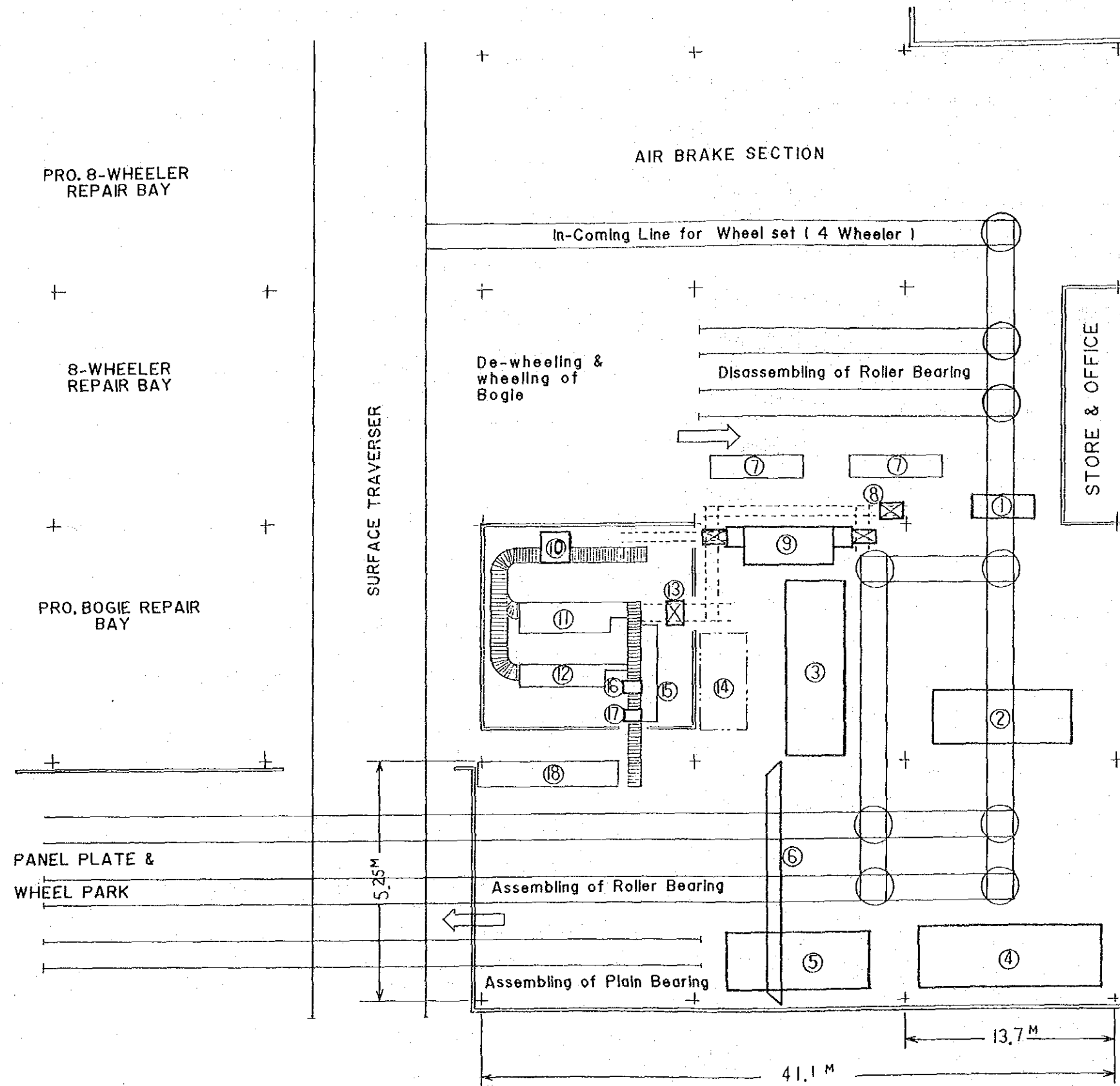


Fig. 3-3 LAYOUT PLAN OF WAGON REPAIR SHOP



No.	DESCRIPTION	REMARK
①	ULTRASONIC FLAW DETECTOR	
②	WHEEL LATHE	Passing through type
③	HEC WHEEL LATHE	Resting
④	TYRE FLANGE WELDING PLANT	"
⑤	AJT B LATHE	"
⑥	EOT CRANE	2 ton
⑦	R.B. DISMANTLING TABLE	
⑧	CROSS DRIVEN RAIL CART	for washing device
⑨	OSCILLATING WASHING DEVICE	
⑩	KEROSENE JET WASHING DEVICE	with robot
⑪	ROLLER CHECKING TABLE	
⑫	PARTS CHECKING TABLE	
⑬	RAIL CART	for axle box
⑭	PLACE FOR AXLE BOX	
⑮	AXLE BOX TABLE FOR CONSTRUCTION	
⑯	GREASE PACKING DEVICE	Automatic
⑰	R.B. CONSTRUCTION DEVICE	
⑱	PLACE FOR CONSTRUCTED R.B.	

Fig. 3-4 LAYOUT PLAN OF WHEEL SHOP (WAGON)

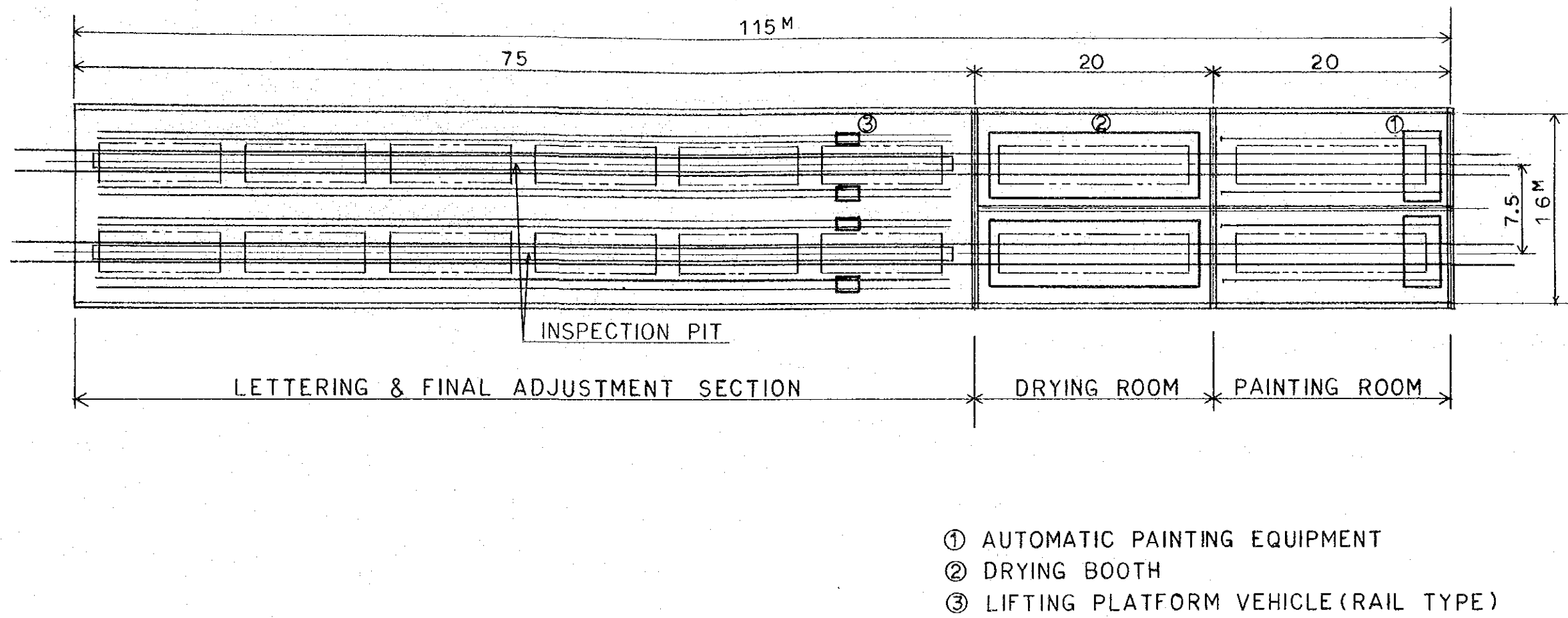


Fig. 3-5 LAYOUT PLAN OF PAINT AND FINAL ADJUSTMENT SHOP

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