OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

18499

R.P. ANGOLA

SIDERURGIA NACIONAL, UEE (SINA)

SITUATION REPORT

Elaborated by: João Manuel de Sousa Moreira (Eng.)

1990/FEBRUARY

Country: The People's Republic of Angola

Project: SIDERURGIA NACIONAL DE ANGOLA (SINA)

SUMMARY

At the request of the UNIDO, an inspection took place at the installation of Siderurgia Nacional de Angola, UEE (SINA) on Estrada do Cacuaco, Zona Industrial do Farol das Lagostas, LUANDA.

SINA is an official and priority enterprise stablished by the law 189/80 of 18 November 1980, through the confiscatior and racionalization of "Fabrica de Luanda da Siderurgia Nacional Portuguesa (Seixal - Lisboa - PORTUGAL)".

Before the visit to the installation were contacted the Vice-Minister of Industry Augusto da Silva Tomas and Mrs Bernarda Anapaz, Director for the Ministry of Industry and Mr. Marco Wallenburg, UNIDO programme officer industrial sector.

The government representative showed there anxiety for the present situation of the SINA and requested that our work be of the almost objectivity, advising the measures deemed indispensable in overcoming the serious crise existent in this economic unit.

In the SINA factory we were welcomed by the General Director Mr. Jorge Teixeira who enlighted us on the whole situation giving all the oral and written information necessary to our task and allowing us a detailed visit to the installation which unfortunately where completaly inactive.

The factory is mainly formed by the smelting unit and a rolling mill plant with supporting infrastructure using as raw material mainly scrap iron very abandonely supplied by the state enterprise SUCANOR, U.E.E.

.../..

The main conclusions reached througt the exchange of ideas between the General Director and his collaboraters and the inspection carried on the installaion among others, are the following:

- The entreprise is in a situation of technical bankruptcy.

- The workers has not been paid for 9 months, consequentely they are unmotivated.

- The production for 1989 was 1286 in ton of the finished product for an capacity 55 000 ton/year installed.

- Problems in maintenance.

- The equipament shows problems due to lack of personnel with adequate training in the steel sector.

- Shortage of spare parts, refractories and, in time, materials to consume.

- Problems with the lack of transports because SINA is situated far from the town and harbour of the city of LUANDA.

- Frequenty cuts of energy.

Were is not for the strategic interest for the country to maintain the steel plant (SINA) with the capacity for supplying the internal market with reinforced bars of 6-25mm diameter we would advice its closing.

However because of the impact steel can have an overall national economic development and considering that the supply of the 12.000 ton/ /year of reinforced bars which we think the internal market will absorb, are within the range of SINA we recomend and urgent emergency support for the reabilitation of the installations for SINA, so us to reach the following immediate objectives:

.../..

1) Training of angolan operational tecnician who should run the existing metallurgical installations, since national indepen - dence led into exodus of foreign technicians.

2) The drawing out of "Specification for the Rehabilitation" of the industrial units allowing the issue of international consultation.

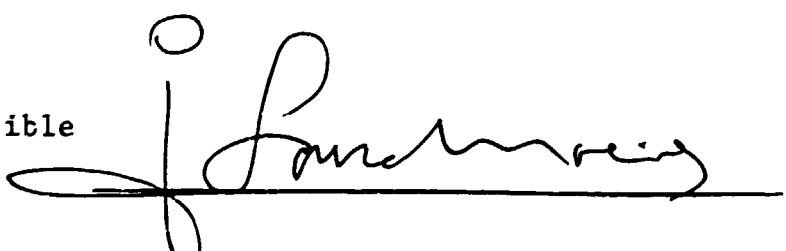
3) Attendance of the above mentioned consultation and technical and economical support to the analyses of the proposals.

4) Support to the celebration of technical and financials contracts.

In a second phase:

- To formulate directives for the steel industry in conjunction with ANGOLA's Economic Programmes and a feasibility study covering investment in new projects and investment in according to the rehabilitation plan.

Person primarily responsible
for this summary



Name: João Manuel Sousa Moreira

Title: Engineer

INDEX

1. JUSTIFICATION
2. PURPOSE
3. PRECEDINGS AND ACTUAL SITUATION
4. INSTALLATIONS
5. HUMAN RESOURCES
6. FINANCIAL MANAGEMENT
7. DIAGNOSTIC OF THE SITUATION
8. CONCLUSIONS
9. WARNINGS
10. ANNEXES

A - ELEMENTS ABOUT ANGOLA
I - D.R. Nr. 102
II - D.R. Nr. 272
III - TYPICAL DIAGRAM OF FLUXES
IV - STEEL TYPES
V - GENERAL IMPLANTATION
VI - DRAWING SNL 2.01.01.07 - STEEL MAKING PLANT
VII - ELECTRICAL FURNACE CHARACTERISTICS
VIII - DRAWING SNL 1.02.01.05 - ROLLING MILL
IX - CHARACTERISTICS OF EQUIPMENTS FOR ROLLING MILL
X - ORGANIGRAM
XI - TRAINING. BUDGET ESTIMATION.
XII - LIST OF MAIN PROBLEMS
XIII- SCHEDULE DIAGRAM

REPORT

1 - JUSTIFICATION

For request of the R.P. of Angola Government, UNIDO decided the elaboration of a report about the "SIDERURGIA NACIONAL" of Angola (SINA).

2 - PURPOSE

To proceed to the actual situation results of the manufacturing installations of SINA and to establish warnings in order to a rehabilitation program.

3 - PRECEDINGS AND ACTUAL SITUATION

3.1 - SINA Factory is constituted by:

- Steel Making Plant
- Rolling Mill
- Auxiliary Installations

At the beginning there was only the Rolling Mill which worked with imported ingots and only in 1970 the Steel Making Plant was built. This is prepared for scrap-iron melting, having as main equipment an Electric Furnace of 16 Ton.

This one is able to produce 36 000 Ton. steel ingots by year, working in perfect conditions and in three shifts.

The Rolling Mill is mainly composed by:

- Re-heater furnace of ingots with a capacity of 8 Ton./h;
- Rough Mill of Ø 450 mm, formed by two trio boxes in line;
- Mill Ø 300 mm equipped with seven trio boxes;

- Finishing Mill ∅ 280 mm, formed by two boxes;
- Finishing Mill ∅ 260 mm, formed by six boxes placed in continuous.
- Coiling line, cooling and coil transport, where the coiling is made by two coil-winder type garrett;
- Cooling place;
- Cutting and steel bar bending machines.

The Rolling Mill is prepared to produce reinforcingfor concrete from 6 to 25 mm till a maximum capacity of 60 000 Ton./year in three shifts.

The main above referred equipment is supported, in a whole, by Auxiliary Installations:

- Electrical sub-station 60 000/15 000 V
- Distribution places of electric power
- Compressed Air central
- Oxygen central
- Mechanical and electrical workshops
- Laboratory
- Social Installations

3.2 - Table I points out the SINA activity since 1973 to 1989.

3.3 - After Angola independence in 1975 the foreign technicians failed their technical support because they left the country and till now it was not possible yet to substitute them with satisfactory results.

3.4 - Since September 1975, the factory management was given to the Heavy Industry branch of Angola. In order to create the conditions for SINA should work, the authorities of R.P. Angola developed the following actions:

1976/MAY

The Government Daily of R.P. Angola (D.R.) Nr. 102 - I serie of 1st May 1976 publishs the law 17/76, in which all the estates of "SIDERURGIA NACIONAL, SARL" - Luanda Factory - were confiscated in the terms of the law 3/76 published in (D.R.) Nr. 52 - I serie of 3th May of 1976 (Annexe I) and the following emergency commission was named:

- Firmino Leitão Dias (Coordinator)
- José Raimundo Mendes
- Dionísio de Almeida

1977/78

A Management formed by Fragoso dos Santos (ZARGA), Machado Agostinho Matos and Ana Maria was named.

Technical assistance made by Cuban groups (8/10 persons).

1979

Signature of a technical assistance contract with an Italian Company CITACO which had initiated the work in August/79.

The gathered information considers the established form of cooperation not very good. The production purpose of 12 000 Ton./Year was not aimed.

1980/NOVEMBER

Approvement and publication of the Edict Nr. 189/80 of 18th November in (D.R.) - Nr. 272 - I serie - where SIDERURGIA NACIONAL, SARL confiscated by Law 17/76 was transformed in a State Company denominated SIDERURGIA NACIONAL - Economical State Unity - SINA, UEE with its main office in Luanda (Annexe II).

TABLE 1

TON

DESIGNATION	1973	1974	1975 (a)	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	198
INGOTS PRODUCTION	32.650	28.769	12.069	2.013	3.899	3.230	6.021	4.523	3.508	2.360	2.962	4.404	6.488	6.923	3.392	4.731	2.946
BAR PRODUCTION	24.823	26.572	8.552	2.517	3.573	2.411	4.107	3.589	2.669	1.660	2.328	1.833	4.096	6.589	2.574	3.761	1.286
PURCHASES	25.931	30.474	5.833	4.027	7.439	8.986	3.493	4.695	2.897	1.672	2.277	1.833	4.270	5.244	2.752	4.446	1.667

(a) R.P.Angola Independence Year (November)

- 1981/82

A General Manager is named (Antônio Barata de Figueiredo).

Beginning of the negotiations with VOEST ALPINE which were finished in 19th November 1982 in order a foreseen start in May of 1983.

- 1983

The start of the contract with VOEST ALPINE was not concretized with all the inconveniences which resulted from that fact. However, during three months the Polish Company CENTROZAP had given its technical assistance.

- 1984

The technical assistance contract with VOEST ALPINE for SINA rehabilitation had its starting in 13th April though a year later.

- 1985

The 2nd phase of the contract initiated in 13th April 1984 was developed.

- 1986/FEBRUARY

The Industry Ministry decides to confirm the development of this technical assistance contract which everything indicated that it was not performing the planed purposes, as it was confirmed later.

- 1986/OCTOBER

VOEST ALPINE had accomplished the contract signed in 19th November 1982 and whose beginning had started in 13th April 1984.

The production purposes of this contracts were as follows:

Phase 1 - Period of 6 months - 1 000 Ton. steel ingots/month

TOTAL ..... 6 000 Ton.

Phase 2 - Period of 24 months - First 12 months - TOTAL ....24 000 "
and the remaining 12 months ..... 30 000 "

GENERAL TOTAL ..... 60 000 "

The real value in the thirty months was 16 980 Ton. of steel ingots.

- 1987/NOVEMBER

Beginning of a technical support contract with the Portuguese Company TRADING POR for a period of three months.

A production purpose was not established because of the small period of execution.

When this contract was over the production of steel ingots was 3 100 Ton. in 70 (seventy) days.

- 1988/FEBRUARY

The contract with TRADINGPOR ends. Its aim was to study the situation and concretize an offer of support for the management and technical assistance by a period of 3 (three) years.

- 1989/SEPTEMBER

R.P. Angola Government made an assistance request to PNUD.

- 1990/JANUARY

Since 1988/February , they are without any type of technical assistance.

4 - INSTALLATIONS

4.1 - Production Process

SINA is an half-integrated steel factory formed by an Steel Making Plant and a Rolling Mill as we have already mentioned.

Now, we will do a brief summary about the production process. ANNEXE III presents a typical diagram.

The used raw material is the scrap-iron prepared and supplied by SUCANOR which is placed in yards in the open air.

The electric Furnace is fed by scrap-iron through adequated baskets carried out by trailors. An over-head crane holds the basket and by opening it, unloads the scrap-iron into the Furnace

After this operation, the scrap-iron melting takes place in a time which varies according to the number of unloaded baskets (3 to 6 depending on the scrap-iron quality).

After the scrap-iron is completely melted,you proceed to the refine in order to obtain the quality of the desired steel.

During this operation, you add metallic products (Fe and Mn ore) and not metallic (Limestone and fluor spar).

The dross obtained during the melting is discharged through the furnace rolling into the called dross pot.

When the refining is over and the dross which results of this operation is discharged, the steel with a temperature of about 1 650º C is removed by rolling the Furn. into a pot placed in the removing cess-pool.

During this operation, the laboratory is retiring prooves in order to proceed to the necessary corrections and so the obtaining of the final wished product. On the point of the removing, you proceed to the addition of desoxydation products (aluminium bars and silicium iron).

Afterwards, the pot is transported by the over-head crane to the removing place where two plates with ingots moulds are already prepared.

After the removing of the liquid steel in the moulds, the ingots with an weight of about 150 Kg are taken off the moulds.

Then the obtained ingots are marked, tied in groups and stored in a park. So, they are in conditions, if approved, to be laminated. The produced steel is of two categories A24 and A40 (Annexe IV).

The Rolling Mill is situated in a building perpendicular to the steel factory and not far more than 200 meters.

The ingots are transported from the storehouse, where are placed by a crane, with an aid of a trailer, to near the furnishing table of the laminating kiln.

With the help of scrapers, the ingots are introduced in the kiln and according to the steel type to laminate they reached the temperature of 1 220º C (A24) to 1 180º C (A40).

When the ingots reached the convenient temperature, they are transported to the first laminating box of train 450.

The ingots passes successively by the trains 450, 300, 280 and 260, according to the diameter od the product to fabricate, being the final product gathered in the cooling bed (Ø 10 to Ø 25) or in the coiling machines (Ø 6 to Ø 8).

In the production circuit there are auxiliary equipments, such as: scissors, scrapers and circular guides.

The final product is weighted and placed in the finished product park. Its utilization in exclusively for the home market (Annexe V - General Layout).

4.2 - Steel Making Plant

It is constituted by two aisles, the first one of the Kiln and the second one of the casting, both having an over-head crane (Annexe VI).

The principal equipment is an electrical triphasic arc furnace TAGLIAFERRI, with the main characteristics referred in Annexe VII.

The electrical power for the kiln is supplied by a transformer with the following characteristics:

- Transformer capacity ..... 6 000 KVA
- Number of positions in the comutator ... 17
- Maximum voltage of the secondary ..... 260 V
- " current by phase ..... 15 000 A
- " active power ..... 4,8 MW

4.3 - Rolling Mill

4.3.1 - Description

The laminating is installed in a building formed by two aisles with 202 m of length by 39 in width (Annexe VIII).

They are installed three over-head cranes.

As we have already referred, the ingots for the laminating feeding are stored in parks with the indication of casting they belong and the steel type (A24 or A40).

They are transported by tractor and trailer till near the feeding table of the Furn.,where the ingots are introduced in the kiln. It is possible to kiln from 200 to 240 ingots.

After the re-heating of the ingot till the advised temperature 1 220° C (A24) or 1 180° C (A40), this one is removed by a lance and transported on an adequate roller way till the 1st box of the train 450. In this box, the ingot passes 9 times. Afterwards it passes to the 2nd box, going to the train 300 through a first scraper (TRO 3201), a scissor (CV50 FR1), a 2nd scraper (TRO 3201) and, at last, an oval rotator.

The material passes in the five first boxes of the train 300 drived by a engine with 1000 HP and by circular guides, going to the cooling bed through a scissor (CV 30 FR1) which cuts the bar with the previously choosen length. It happens, when the production is with the measures from 10 to 25 mm Ø.

The medium times spending by charge are:

- Melting ..... 105 min.
- Refining ..... 57 "
- Acessory ..... 21 "
- Troublings ..... 22 "
- TAP to TAP ..... 205 "
- Power to TAP ..... 183 "

In the interior of the steel factory, there are all the equipments and installations necessary to support the steel ingots production, namely those one which permit to prepare the pots for casting the steel and the machine to remove the ingots from the moulds.

In short, we have:

- Machine to remove the ingots from the moulds
- Pestle hammer
- Addition balance
- Pyrometer
- Facing mould of the vault
- Drying heater of rods
- Pots drying
- Cooling bed for the ingots moulds
- Machine for removing the ingots (shorts)

When we are producing in the diameters 6 or 8 mm, the material after the 5th box of the train 300 passes by more two boxes of this train drived by a motor with 700 HP and afterwards they move along the train 250 (two boxes), after passing in a scissor (CV 20 FR1) by a scraper (TRO 250.1) and a circular guide.

The train 250 is drived by two engines with 220 HP with a speed variation by group KRAMER.

From the train 280, the material goes to the train 260 (six boxes) moving along a scraper (TRO 250.1) and a gutter for moulding the lace. The train 260 is drived by an engine with 1 200 HP.

After the train 260, there is a cooling line for the laminated material, a scraper (TR 250.1) and a desaccelerator. The material with a speed of 18 min./sec. reached to the coiling machines.

The obtained wire coils are automatically placed on a conveyor from which are placed on a carrousel for cooling through a pneumatic scraper and from where they are carried out by an automatic receiver.

Afterwards, they are placed on the park of finished products with the help of an over-head crane and a trailer.

4.3.2 - Equipments characteristics

See Annexe IX

4.4 - Auxiliaries

4.4.1 - Electricity

General description of the installations

4.4.1.1 - Electric power station 60 KV/15KV

Transforming power station type internal with an arrival by cable (oil by pression)

All the 60 KV installation is made in copper pipe, equipment assemblage in masonry cells, with a net door.

On the 15 KV side, there is a chest type "NORMABLOCO" with extractable circuit breakers.

In parallel with the 15 KV outlet to the electrical kiln there is a compensation system of reactive energy which is installed on the exterior of T.P.S. (Transforming Power Station).

4.4.1.2 - 60 KV Equipment

- An arrival cell. This section divider is similar to type SL of EFACEC.
- A measure cell with TTs and TIs (one set for SN and other for ENE)

- Two protection cells and transformer cut (10 MVA and other of 5 MVA) each one equiped with a section divider and one circuit-breaker HPGE 9-12 E 800 A with control BNR 4 ME, fabricated by EFACEC.
- 2 Transformer cells

The inter-connections, transformer/circuit-breaker are getting by copper pipes and isolated passages (Type HAEFLEY).

4.4.1.3 - 15 KV Equipment

a) - 15 KV Switchboard

Switchboard type "NORMABLOCO" with the following cells:

- Two arrival cells (cell 2, transformer 10 MVA and cell 8 transformer 5 MVA)
- One cell of bar interconnection (cell 5)
- One cell of bar [illegible]ting (cell 4)
- Two counting cells (cell 6, counting SN and cell 7 counting SONEFE)
- Four outlet cells, being:
  - . One for the compensation equipment, cell 1
  - . One for the electrical kiln (kiln transformer) - cell 3
  - . On e for the laminating TPs - cell 9
  - . One for the Auxiliary services of the Steel Factory (Transf. 1 MVA 15/0,4 KV) - cell 10

Every cell is equiped with rotative section dividers of 400 A, except the cells 4, 6 and 7.

The cells 2,3,8,9 and 10 are equiped with circuit-breakers HK5-6 400 A EFACEC.

b) - Compensation Equipment of Reactive Energy

The equipment installed on the exterior park is fabricated by BBC and its assemblage is very recent.

They are connected with the switchboard of 15 KV through unipolar cables and they are its cutting and protection mechanism in an own and normalized cell, fabricated by BBC equiped with a circuit breaker type HB.17.06.16C.

This equipment is out of service.

4.4.1.4 - Control switchboard and auxiliary services of TPS

Switchboard type chest formed by:

- 1 Synoptical panel - Panel 1
- 2 Panels for protection of transformers 5 and 10 MVA - panels 2 and 3
- 1 Measure and registered panel - panel 4
- 1 panel of d.c. - panel 5
- 1 panel of auxiliary services - panel 6
- 3 panels - emergency group - panels 7,8 and 9
- 4 panels - transformer 1 MVA. General switchboard of l.t. - panels 10, 11, 12 and 13.

This switchboard has the following measures:

- length ..... 10 620 mm
- height ..... 1 985 mm
- Profundity . 700 mm

4.4.1.5 - Battery Room

At the start, the battery installed was a stationary one, type Planté, fabricated by TUDOR.

- Type 55x1J1D
- Number P186
- Nominal tension . 110 V
- Capacity ..... 10h/144 A/h

4.4.1.6 - Emergency Diesel Group

This group purposes to feed an emergency system which will maintain the essential equipments, in fonction, such as the pumping central of the steel factory, the casting over-head crane, the train cooling circuits, etc. if the tension of TPS fails.

4.4.1.7 - Steel Making Plant

a) - Electrical equipment of the Furnace

The electrical equipment of the Arc Furn. is composed by:

- 1 Transformer 6 MVA - 15 000/290-90 V, fabricated by INDUSTRIE ELLETTRICHE DI LEGNANO
- Electric coilto 6 MVA, settled in succession with the transformer of the same fabricator
- 1 Auxiliary switchboard of the kiln fabricated by TAGLIAFERRI
- 1 Feeding in cable NHKBY 3x95, 15KV coming from TPS
- 1 Circuit-breaker of 15 KV (cut in vacuum) for cutting and protection of the kiln transformer
- 1 Tripolar section divider 15 KV (for by-pass to the reactivation)

b) - LT Switchboard of the steel factory

Switchboard type chest, equiped with two halfbars with inter-connection possibility which has two feedings (normal and emergency).

On the beginning, that one fed the following equipments:

- Casting over-head crane
- Water pumping station
- Air Compressor
- Rod stove burner
- Ventilator of pans cooler
- Pestle hammer
- Short ingots dismoulder
- Furn.over-head crane
- Triphasic sockets
- Furn. auxiliary switch-boards
- Differential gear of Oxygen park
- Heating "On-line" for pans heater
- Heating "On-line" for short ingots stove
- Heating of fuel-oil tank of the Steel factory
- Draining pump of the tunnel
- Dryer of the switchboards room

c) - Electric light system

The electric light system of the steel factory aisle is made by arms seemed to those of type PC of SCHREDER equiped with mercury steam lamps of 250 W.

The rooms of the switch-boards, electrical equipments of the kiln, compressor, etc. are iluminated by fluorescent arms of 1x40W or 2x40W.

d) - Over-heads cranes

The over-head cranes of the steel factory, kiln and casting are controled from small cabinets erected below the same ones.

They are fed through a contact point which moves on a tripolar bar of 380 V 50 HZ erected near the rails of the rolling railway.

e) - Pumping Central

The pumping central of the steel factory is created essentially, taking into account the cooling circuit of the electrical kiln equipments.

The control switch-board feeding and the protection of the electro--pump groups engines are made from tne switch-board of the steel factory.

f) - Oxygen Park

This park was initially projected to store the oxygen bottles and nowadays a system was installed which allows the direct injection in the kiln.

g) - Fuel-Oil Storage

A combustible park is created, taking into account the pans heating systems of the steel factory and the laminating kiln.

4.4.1.8 - Rolling Mill

a) - Transforming places - 15 KV

There are two TPs, type opened cells in masonry with net doors.

1 - TP Nr.1

- 1 Feeding cell ring type (outlet to TP2)
- 3 Cutting and transformers protection cells
- 1 Cell with transformer Nr. 1 - 1 600KVA-15/0,4KV
- 1 Cell with transformer Nr. 2 - 1 250KVA-15/3 KV
- 1 Cell with transformer Nr. 3 - 500KVA-15/0,4KV

The transformer Nr. 1 feeds the engine of 380 V - 1 550 HP of the train 450 Ø.

The transformer Nr.2 feeds the engine of 3KV 1 200 HP of the train 260 Ø .

The transformer Nr. 3 feeds the electric light switch-board of the laminating installation.

2 - TP Nr.2

- 1 Feeding cell (cable)
- 2 Cutting and transformers protection
- 1 Cell with transformer 1 250 KVA - 15/0,4 KV
- 1 Cell " " 1 600 KVA - 15/0,4 KV

This TP was initially fed through an air line which is out of service.

The transformer of 1 250 KVA feeds the engine of 380V - 700 HP of the 2nd section of the train 300 Ø.

The transformer of 1 600 KVA feeds the engine of 380 V 1 000 HP of the 1st section of the train 300 Ø.

b) - Rolling Mill Furnace

This Furn. with a capacity of 8 Ton./h, as already mentioned before, is destinated for the heating of the ingots fabricated in the steel factory.

The heating system is obtained through the fuel-oil burning.

The control of the equipment which is available to put the ingots into the kiln and to remove them from it is made by hand.

This kiln has a smoke exhausting system.

c) - Train of 450 Ø

The principal engine of this train has the following characteristics:

- Power ..... 1 550 V
- RPM 960
- Tension ..... 380 V, 50 HZ
- Start ..... by a rotorical starter
- Manufacture .. PELLIZARI

The switch-board for control and engine protection, the starting rheostat and the condensators batteries are placed on the same room of the engine.

The train has its auxiliary equipment as follows:

- 2 Lubrication centrals
- 1 Water pump with rheostat

Besides the main engine and its auxiliary equipment there is the following equipment:

- 1 Pinion box with an incorporated reducer
- 1 Train coupling
- 1 Lifting table type PO 265
- 1 Guide set of authomatic laminating
- 1 Rolling railway
- 1 Scissor type CM75
- 1 Scraper type TRO320
- 1 Scissor type CV 50 FR1
- 1 Circular guide

d) - Train of 300 Ø

Similar equipment to the train of 450 Ø but with two sections.

The 1st section is equiped with an engine with 1 000 HP, 380 V 50 HZ and the 2nd with an engine with 700 HP, 380 V, 50 HZ.

The engines are of the same type of the train of 450 Ø engine.

Besides the main engines and respective auxiliary equipments, there is the following equipment too:

- 2 Pinion boxes with incorporated reducer
- 2 Train couplings
- 1 Lubrication central type CL200
- 6 Circular guides
- 1 Oval Turning type GOP
- 1 Scissor type CV 20 FR1
- 1 Scraper type TRO 320

e) - Continuous Train of 280 Ø

Train equiped with two engines 380 V 50 HZ, 160 KW, coiled rotor.

This train has more the following equipments:

- 1 Circular guide
- 1 Scraper type TRO 250

f) - Cooling Bed

This equipment is used on the fabricated products which comes from the trains 300 Ø and 280 Ø, as we already mentioned.

g) - Finishing Train 260 Ø

Train equiped with a main engine with 1 050 KV-3 000 V, 50 HZ, coiled rotor.

We refer the following equipments which makes part of this train:

- 1 Gutter of lace making
- 1 Lubrication central type CL 300
- 1 Pipe set for laminated conducting
- 1 Wire cooling line
- 1 Scraper type TRO 250
- 1 Removing of two ways type DDA
- 1 Laminated pipes set
- 2 Coils type BB 300

4.4.2 - Water distribution

4.4.2.1 - Steel Making Plant

- Pumping central

  Installed pumps: WORTHINGTON, SA

  - 3 for heat water: type 6H - 18 F2
  - 3 for cool water: " 6H - 18 F5

- Two cooling Towers: BALQUE BOCHUM

4.2.2.2 - Rolling Mill

- Pumping central

Installed pumps: One OCHSNER type CNx 200 - 315
Two JORRO type CD of 3 cells

- Cooling Towers - Out of service by ventilators damage

4.4.3 - Compressed Air distribution

4.4.3.1 - Steel Making Plant

- Compressor central

Installed compressor: ATLAS COPCO BT5

4.4.3.2 - Rolling Mill

- Compressor central

Equiped with two compressors

- 1 ATLAS COPCO BT 5
- 1 " " GA 237-7.5

4.4.4 - Oxygen distribution

The oxygen installation is essentially constituted by a storage tank, four vaporizors and the connection piping to the steel factory.

The storage and vaporizing installations are recent and so they are in very good conditions.

The tank type 110-VC has a total volume of 11 000 l, being the maximum volume of liquid of 10 400 l.

The vaporizors, type A64 are four and they are placed on a own file.

5 - HUMAN RESOURCES

5.1 - Organizing Structure

5.1.1 - General Data. Organigrams

During the last years, the main SINA responsibles tried to solve the difficulties created by the Portuguese exit in November 1975. The structure was prepared for a managing philosophy which had been, of course, changed because of the lack of intermediate and managing people with experience in the sector, which became impossible to maintain in fonction the procedures utilized till 1975.

Howewer, with the effort of the main intermediate and managing people which were successively passing in the Enterprise, a minimum fonctional organizing structure was created and had as result the drastic reduction of the hierarchic levels and the articulation of the several functions.

In spite of all this, the problems resulting from that situation were not the responsible by the drastic failing in the production.

The exit of the specialized technicians had been worst consequences.

The actual organizing structure of SINA, according to the information given by its General Manager is composed basically as follows:

- General Managing (DG)
- Operations Department (DOPR)
- Planning, Financial and Supply Department (DPF)
- Human Resources Department (DRH)
- Technical qualification Center of Metallurgy (C.F.T.M.)

These departments are formed by divisions, sections and turns (Rolling Mill and Steel Making Factory).

The Operations Department (DOPR) is managed by a Mettalurgic Engineer of R.P. Angola, who had taken the degree two years ago in the USSR. Just he had finished his term of probation in the factory he was named Department Chief.

The Planning, Financial and Supply Department (DPF) is managed by a medium Technician of Accounting with some experience.

The Human Resources Department (DRH) is managed by a person with "8ª classe".

The Technical Qualification Center of Metallurgy (C.F.T.M.) was constituted was formed three years ago.

The approved organigrams are those ones, which are presented in the pictures of Annexe X.

The General Manager who represents the Enterprise should act by the application of the orders coming from the Superior Social Organisms and control and coordinate the Enterprise activity.

The Managing Board is an organism foreseen on the law that establish the economical Unities of the State (Law 17/77)

5.1.2 - Manpower

The General Managing has given to us the following analysis of manpower.

BY SCHOOL LEVEL

	Illiterate People	I Level	II Level	III Level	Medium	Sup.
Nr.	71	174	113	69	6	5
%	15,9	39,1	25,4	15,5	1,3	1,1

BY AGES

Etary Group	18/25	25/35	35/50	50/60
Nr.	90	170	179	6
%	20,2	38,2	40,2	1,3

BY WORK TIME

Work Time	1 Year	1 to 5 Years	5 to 10 Years	10 Years
Nr.	60	169	167	49
%	13,4	37,9	37,5	11,0

According to these data,we can see that the school level is low and the most part of the workers is not in the Enterprise since long time. We must take into account too, that the oldest workers at the Company are those ones which have less professional qualification too.

5.1.3 - Professional Qualification

The illiterateness (about 80% on the point of independence) and the very lowest medium levels of scholarship were one of the greatest problems which R.P. Angola had to face.

SINA was not an exception and so its problems were aggravated taking in account the very specialized sector of the Company.

Finally, SINA was well successful in 1984 with the starting of a qualification center called by Technical Center of Metallurgic Qualification) which has capacity for 100 pupils.

The pupils have access to these courses with the "8ª classe".

We refer some of the courses that are teached there:

- Metallurgy/Steel works
- Metallurgy/Phisical and Chemical Laboratory
- Electricity and Electronics
- Mechanics (including Hydraulics and Pneumatics)

The Qualification Center has a benefit of one million USD from the OPEP Found and of a gift of 0,5 million USD from Australian Government.

5.2 - Social Installations

5.2.1 - Medical Center

The medical center works 24 hours a day, has a hired doctor, one male-nurse and two health promoter. The installations are in bad conditions and the medical supply is not enough. Usually, there is not any type of medicaments.

5.2.2 - Refectory

There, meals for three shifts are cooked and we have already mentioned that is in bad conditions. The main difficulty is on its goods supply by the Home Commerce, taking into account the type of work developed by its workers. The expenses are similar to the other Companies, not being in account tne irregular situations(such as: temperature, dust, etc.) of which the steel workers are submitted.

5.2.3 - Accommodation

The steel factory has an Accommodation (pre-fabricated) with a capacity of 27 to 30 places with refectory, cooking and laundry. Just the moment, besides the Helpers of the Qualification Center, four Company workers with their families live in this Accommodation being the others hired, in order to obtain a device found that helps to solve small problems of accessories and supply materials.

Its fonctionment concerning to the meals supply is stopped by lack of goods and one accommodation manager.

6 - FINANCIAL MANAGEMENT

6.1 - Organization

In spite of the effort developed by the Company and as the actual General Managing confirms, this area presents great difficulties.

These one are the result of the lack of professional qualification of the persons who had to substitute the foreign people who had left the country after the independence.

In order to solve the difficulties, a contact was made with a Portuguese Company which had recuperated the general Accounting and closed the financial years till 1985.

In spite of some delay and by its own means, the Company has already closed the financial years of 1986 and a987.

We verify that the Company has assured with more or less difficulty, its General Accounting but the analytical Accounting was not assure by lack of human resources.

6.2 - Financial Situation

The financial years whose reports and accounts were already approved, have had negative results as follows in short:

		KZ	
Accumulated till 1981	.....	409 500 000,00	
Years 1982	.....	53 800 000,00	
1983	.....	61 922 641,14	
1984	.....	74 850 357,37	
1985	.....	89 942 291,60	
1986	.....	119 391 559,60	
1987	.....	110 700 000,00	(a)
1988	.....	111 500 000,00	(a)
1989	.....	n.d.	
Total of Accumulated	.....	1 031 606 850,05	

(a) - Not approved yet.

7 - Diagnostic of the Situation

7.0 - Once, it was establish the references and the Company structure we will pass to the last chapter resulting from the established contacts and the installations observation.

7.1 - Envolved environment

The economical situation of the country is difficult as result of the paralization of many economical Units and of the not good agricultural fonctionment that did not permit the supply of the essential products to the population.

The war climate that is felt in some regions of R.P. Angola reflects itself on the quality of the envolved environment too.

This situation is also felt by SINA, either with its manutention and factory laboration problems, or by its personnel desmotivation which had 9 months of wages in retard.

The needs of transport and food adequated to the effort develcped by the workers result in a great rotation of manpower and not in the settlement of those more graduated.

7.2 - Market

The great obstacle to the economical growing of Angola is financial, as we can see in the Program of Economical and Financial Repairing.

The resolution of this problem as a macro-economical one is solved , in our opinion, at long date and based on the resolutions of the II MPLA-PT Congress.

In the actual situation of the country it is very difficult to be sure about the capacity of its home market in what concerns the tonnage of bars, that we estimate in about 15 000 Ton. If the gas agreement is definitively established the market could increase about 10% year.

If it happens, SINA rehabilitation will permit a economy of valuable bill of exchange.

Nowadays the sale of produced bars is made through the Enterprise of the State TRANSAPRO. The sale prices, in force, in February 1990, are as follows:

DIMENSION	VALUE (KZ)	
	A24	A40
6	42,800	45,800
8 and 10	41,200	44,200
12	40,400	43,400
16,20 and 25	39,600	42,600

7.3 - Raw materials and subsidiary supply

7.3.1 - Scrap-iron

Because of the low production there are no problems in what concerns the scrap-iron at medium date.

Actually, SINA is supplied by SUCANOR UEE, a Company founded in 1983 with the purpose of getting the scrap-iron on its zone of influence and of preparing it,in order to be casted in the electrical kiln of SINA.

7.3.2 - Use materials dor the Steel Factory

7.3.2.1 - Metallic additions

In normal conditions, you use the following:

- Iron ore
- Manganese iron
- Silicon iron
- Aluminium bars

The quantities to be used depend on the kind of steel (A24 or A40).

There are no difficulties in order to accomplish the productions.

7.3.2.2 - Non metallic additions

The main products are:

- lime
- limestone
- coke
- fluor spar

7.3.2.3 - Refractary Material

This material is also of importation and is applied on the coating of the electric Furnace, pan and casting in group. Its supply has not been the cause of the production pressing.

7.3.2.4 - Haematitical material

This material is essential on the casting operation of liquid steel in order to obtain the ingots. It is constituted by funnels, plates and ingot moulds. Material of importation too. SINA has imported the minimum material that is necessary.

7.3.3 - Steel Making Factory Spares

These ones are constituted by equipment and materials whose origin is of the kiln fabricator. The obtaining of 1st emergency spares is very important and its list should be prepared by SINA.

7.3.4 - Use materials for Rolling Mill

TheRolling Millis fed, as we already mentioned, by the ingots produced in the steel factory and from its quality depends on the good fonctionment of that installation.

7.3.4.1 - Rolls

The rolls are of several dimensions and qualities as referred on the following pictyre and they are a vital material for a good operation in the laminating. In fact, the conjugation of a good calibration with the roll quality and a good cooling too, allows that an efficient laminating with a good profit is possible. Those rolls are in sufficient quantity (TABLE : 2).

7.3.4.2 - Several materials

The laminating uses a set of several materials, whose lack do not justify the low production levels.
We refer, for example, berаings for shafts; plastics and several accessories.

TABLE . 2

TRAIN	STAND BOX	HARDNESS	NEW ROLL Ø	MINIMUM Ø	Ø FOR RECTIFY-ING	PRODUCTION WITHOUT RECTIFICATION
450 Ø	1en	45-50	475mm	430mm	9mm	1 692 ton
	2en	46-48	470mm	423mm	6mm	3 122 ton
300 Ø	1en	36	310mm	270mm	5mm	3 778 ton
	2en	36	310mm	260mm	4mm	2 432 ton
	3en	36	310mm	260mm	4mm	3 764 ton
	4eh	45	310mm	260mm	4mm	1 901 ton
	5eh	55	310mm	260mm	3mm	3 246 ton
	6eh	50-55	310mm	260mm	3mm	1 759 ton
	7eh	60-65	310mm	260mm	3mm	1 865 ton
280 Ø	1eh	70-75	270mm	240mm	2mm	1 648 ton
	2eh	70-75	270mm	240mm	2mm	1 833 ton
260 Ø	1eh	79-83	277mm	247mm	3mm	1 500 ton
	2eh	79-83	277mm	247mm	3mm	1 502 ton
	3eh	79-83	277mm	247mm	3mm	1 502 ton
	4eh	79-83	277mm	247mm	3mm	1 502 ton
	5eh	79-83	277mm	247mm	3mm	1 502 ton
	6eh	70-75	277mm	247mm	3mm	1 319 ton

7.4 - MAIN INSTALLATIONS

7.4.1 - Electrical Steel Making Plant

As we can see by picture with the Steel Factory perturbations elaborated by the Company itself, the installations are in bad conditions. The lack of adequated technical manpower and of an efficient assistance cause many stops.

It is necessary a general intervention in the installation to be included in the rehabilitation plan and the hiring of adequated technicians who will give an hand to the qualification plan "on job".

7.4.2 - Rolling Mill

7.4.2.1 - General Data

This operational Unity is that one with a most preoccupying situation. In fact, the laminating technology is complicated and the lack of adequated technical support which could give the qualification "on job"for local manpower, in due time, has taken to the actual difficulties.

As we can verify by the production values, the laminating efficiency is very low. The production in 1989 was 1 286 Ton. for an installed capacity of 55 000 Ton. in 3 shifts.

In spite of the reduced fonctionment, the trains and auxiliary equipment present a deficient maintenance and they need an urgent intervention.

The following Table 3 presents, in short, the Rol.Mill Plant perturbations till 1988.

TABLE 3

STEEL MAKING PLANT

(In % of the total foreseen hours)

CAUSE/YEAR	84	85	86	87	88	MEDIUM
Electrics	20,9	11,3	11,2	49,6	4,8	12,0
Mechanics	12,8	8,9	10,5	12,2	25,6	14,5
Fabrication Time	7,8	8,4	5,8	4,5	27,9	12,5
Scrap-iron lack	5,7	4,2	3,8	0,6	0,8	3,6
Manpower lack (Transports)	5,2	5,4	2,8	1,5	7,0	5,1
Useless time	2,9	2,1	0,7	0,4	0,2	1,5
Coating time	2,8	6,1	5,3	3,2	8,7	5,7
Maintenance time			22,4	9,1	3,6	13,0
Productive hours	49,1	53,6	38,6	18,9	29,8	41,0
Productivity t/h	2,91	2,40	2,69	2,8	2,51	2,63

TABLE 4

ROLLING MILL

(In % of the total foreseen hours)

CAUSE/YEAR	84	85	86	87*	88	MEDIUM
Electrics	40,0	11,1	6,9	35,0	7,3	16,3
Mechanics	18,2	19,6	12,5	9,9	12,9	15,8
Fabrication Time	9,3	26,4	26,4	16,4	20,3	20,7
Ingots deficiency	4,0	4,2	2,5	3,3	9,6	5,1
Manpower lack (Transports)	7,0	8,8	11,4	4,6	10,0	9,3
Maintenance	4,8	1,2	8,3	17,9	7,9	5,6
Production hours	16,6	28,7	32,0	12,9	24,6	25,5
Productivity t/h	4,91	3,35	3,42	3,12	2,37	3,5

* By a serious electrical damage was not taken in media.
The Factory had been stopped 5 months in 1987.

7.4.2.2 - Re-heating Furnace

It is working in deficient conditions, namely without temperature control which prejudices seriously the production profits and causes quality problems.

The combustible pumping station and the drawing out system of kiln are in bad conditions. It is necessary the refractary reparation too.

7.4.2.3 - Roll.Mill . Trains (450/300/280/260)

The old equipment, the lack of adequated technical support and the bas work of the re-heating Furn. are the three main factors for the deficient conditions of the referred equipments.

There are constant stops and a great material waste. There are cooling problems and spares lack too.

It is very urgent to create the minimum conditions which can assure the adequated fonctionment of the trains to a shift, at least.

The assistance on the laminating area and mainly in this sector is vital, in order to reach the production purpose whatever it be.

The mechanic problems are serious and there are troubles with the cooling circuits.

7.4.2.4 - Other Roll.Mill . Equipments

The bad conditions is notorious, in spite of its rehabilitation can be possible, since that is fastly assured.

7.5 - WORKSHOPS

7.5.1 - Calibration Workshop

This installation is very connected to the laminating process and it is sufficiently equiped for the actual necessities.

It has the following machines:

- 3 ancient lathes whose origin we can not identify - 4 000 m/m x x 520 m/m.

- 1 Lathe SANT'EUSTACCHIO of 1972 - type TC 52 KA - 2 620 m/m x 520 m/m.
- 1 Lathe SMOL (SOCIEDADE METALURGICA OVARENSE) - 2 000 m/m x 300 m/m
- 2 limes, one with 650 m/m of lenght and other with 750 m/m
- 2 Milling machines
- 1 Machine for opening grooves in the rolls calibers

This calibration workshop has a reactor dedified to the maintenance and assemblage of bearings for shafts of the file bloc too.

The dynamic guides (Swedish guides) are also prepared in an own sector and in the forge sector (with a very reduced activity) are made and repaired the other train pieces, besides other works of this speciality.

The insuficient knowledge of the Chiefs, the no preparation of the manpower, the no experience of work plannings and the lack of control, concerning to the laminating tools execution, is one more perturbation factor of laminating.

This sector needs of much qualification.

7.5.2 - General Workshops

Although deficiently equiped, they will answer to the necessities, in spite of its equipments antiquity, but they must be filled witn qualified manpower.

There are no plans of preventive maintenance.

There are lack of stored pieces and the most of them have to be imported.

The manpower is not motivated.

7.6 - STOREHOUSES

The Company has a great preoccupation in maintaining the storehouses minimum organized and controles.

Although the lack of materials and accessories, its fonctionment is adequated to the Company activity level.

7.7 - LABORATORY

This Department is very important for the production efficiency and it is in very bad conditions.

There are lack of materials, in order to make the necessary analysis, which becomes difficult to guarantee a production quality.

The traction machine is out of service. In the sector of chemical analysis the apparatus are with failure problems and there is lack of materials.

7.8 - Refractary Maintenance

There are great lacks on this area, mainly in what concerns human and materials resources.

We even consider a critical area that is needing an adequated and urgent decision.

7.9 - Transports

Being the means of transport very important for the production process, SINA has a great difficulty in what concerns the transports. SINA installations are far away of the population centers and so it is necessary to assure the personnel and goods transport. According to the General Manager information, the normal fonctionment of the Factory is needing the following supply:

- Buses 2
- Motor lorries 3
- Wheel loader scooper 1
- Digging machine 1
- Tractor 1
- Loading machines 2
- Dumpers 2
- Cars 3
- Cargo Vehicles 1,5 Ton .. 1
- " " 3,5 " .. 1

7.10 - HUMAN RESOURCES

It is known by everyone that one of the problems which has more reduced the social and economical development of the new African countries is the insufficience of technical manpower and managers in the managing field.

Some of the experiences that were tried by SINA with the utilization of foreign helpers do not answer with an adequated form to the local needs. The situation that we were found at SINA certifies that the cooperation do not result.

So, it is very important for R.P. Angola that future actions result in an efficient and quick preparation of technical manpower and managers on several levels.

This is a field where the international cooperation has to act its part with a great relief. The qualification center that is well equiped, can support future actions to develop.

The human resources quality is the development basis in any country and the fundamental support of the Companies.

Finally, we can refer the exceeding concentration of decisions on the General Manager by lack of adequated collaborators.

7.11 - FINANCIAL AND ADMINISTRATIVE AREA

The reduced activity in the Company has shorted the serious lacks on this area. The lack of professional qualification and experience is evident with the manpower who works in this sector.

A negative point on the Company managing is the Accounting sector which has been maintained during sometime with the support of a technical assistance contract.

The Costs Accounting does not exist with all the inconvenience which results from this. Only the General accounting exists but it is defficient.

As we have already referred SINA has accumalated looses which puts it in a technical insolvency situation.

It is very important and urgent an administrative and financial Auditorship to the Company, in order to get a real knowledge of the economical and financial situation.

7.12 - ACTIONS TO BE RULED

In sequence of the Diagnostic we short in this Chapter the areas of most preoccupation.

7.12.1 - Steel Making Plant

All the equipments are in bad conditions. So, it is very urgent the inspection and refining of all the command and control pieces of the Electrical Kiln, namely the electrical and hydraulical ones.

We admit the necessity of substitution of some vital pieces for the kiln working.

The transformer of 6 MVA and respective reactance connected to the kiln fonctionment command should be inspected and eventually substituted in part.

The over-head cranes required a convenient assistance, because they are fundamental equipments for the steel factory working.

The water, compressed air and oxygen systems are needing of maintenance too. In several cases will be necessary the total or parcial substitution of piping and/or equipments.

The fuel-oil system presents a preoccupying condition mainly from the product receiving.

The re-construction of the casting and cooling cess-pools is necessary. The compensation and stabilization equipment of the electrical tension whose investment was expensive is not working, without any explanation.

7.12.2 - Rolling Mill

In this area the situation is very serious by reasons of technological nature.

All the equipments are in bad conditions, either by its bad maintenance or because they are old, that become difficult the well performing of this area.

The revision of the laminating trains is imperative, because the total degradation of this installation can happen.

All the trains movings and commands is needing a professionalized intervention.

The cooling bed and the unbending machines is requiring an immediate inspection.

All the wire coils system are in bad conditions. so it is needing maintenance and pieces substitution.

The power energy, air and water systems are also needing of repairing and substitution of some equipments.

The over-heads cranes should be inspected.

The own laminating building is requiring a reparation, because rains in its interior.

Finally, the ingots re-heating kiln is in a very bad condition, needing a great reparation.

7.12.3 - GENERAL AUXILIARIES

On the point of our inspection the power energy system was the most preoccupying sector, because the transformers 10 and 5 MVA were out of service and its substitution and/or reparation is a work to be executed not less than 6 months.

The guarantee of water supply to the Factory is also difficult, what puts in danger the equipment working.

The re-structure of the workhouses which are supporting the Factory, the warehouses managing and the administrative and financial control is requiring an adequated plan of recuperation.

The transport sector must be recuperated, because it is a vital area too.

At last, the social installations are not adequated for a Unity like this one. It is not possible to rehabilitate SINA without giving to its workers the minimum sanitary and security conditions.

8 - CONCLUSIONS

A) - We want to apologize the support given to us by SINA General Manager who allowed us the realization of this report, authorizing the access to all information and the contact with the personnel of all levels.

B) - We was acquaintted with the Managing medium delay purposes, which are essentially to give value to the human resources and to supply the home market, avoiding the foreign currencies expenses.

C) - The Governamental Authorities with whom we have contacted, namely the Vice-Minister - Mr. Augusto da Silva Tomas and the male-engineer - M. Bernarda Anapaz told us their great preoccupation about the actual situation of SINA and the necessity of defining an enterprising strategy for this Company on the ambit of the Economical Recuperation Plan for the sector MIND/MINCO 89/90.

D) - At last, for all we have already written in this report we conclude:
- If emergency rules are not immediately taken, R.P. ANGOLA will be deprived of an industrial sector with a great contribution for the country development, according to the Government plans.

9 - WARNINGS

In this report, we have tried to identify the Enterprise, its past and its actual situation.

We have mentioned some problems which cause damage to it and for that reason must be solved, in order to avoid its total collapse.

However, we are sure that the R.P. Angola Government is very interested in surpassing the difficulties, but they need a great support.

So, we suggest the following actions to act with urgency:

a) - To add the present report in an economical and financial analysis which will have as out-put an improvement plan of the actual situation;

b) - The elaboration of a technical specification to open an international bid, being in consideration the project of SINA REHABILITATION;

c) - Opening of an international bid by the R.P. Angola authorities;

d) - Eventual support of UNIDO in the selection and analysis of the offers;

e) - The UNIDO assistance to the contract signature with the choosen entity.

f) - Opening, with the UNIDO help, of a support plan for the qualification of local technicians (Estimated cost USD 400 000 / Annexe XI).

g) - By the councillor opinion, a Manager Plan should be elaborated, on a second phase, for the Siderurgic Plan development of R.P. Angola, bearing in mind the country potentialities on the natural resources area.

Simultaneously to these actions, the R.P. Angola Government have to find a partner who can transform SINA in a mixed capital Enterprise of private law which could assume the leadership of the new Enterprise to create.

If this "status quo" is maintained, we will see the total degradation of SINA with its consequent closing and the negative reflex in the R.P.Angola economy.

10. ANNEXES

ANNEXE A

DATA ABOUT R.P. ANGOLA

ANNEXE A

R.P. ANGOLA

Some dat about the country

1 - LOCALIZATION

Western Region of Austral Africa with the latitudes 4º 22' and 18º 02'S and the longitudes 11º 41' and 24º 05' E.

2 - SURFACE

1 246 700 Km2. On the direction North-South it has a maximum length of 1 277 Km and on the direction West-East , a maximum extension of 1 236 Km.

3 - FRONTIERS

North: R.P. Congo and Zaire. South: Namíbia. East: Zaire and Zambia. West: Atlantic Ocean.

4 - POPULATION

(1970) - 5 711 136 people
(1980) - 7 151 009 people
(1989) - 8 000 000 (estimated)

Demographical density - 5,7 people/km2. Anual growth rate (1970-1980) - 22,7%. Life duration - 41 anos. People characteristics - less than 15 years old: 42%; more than 60 years old: 4%; medium age: 18,6 years old. Mortality Rate - 2,25% (in working age) - 44% . Analphabetism (estimated) - 1975: 85%; 1979: 75%.

ANNEXE I

D.R. Nr. 102 of 01/05/76

LAW Nr. 17/76

Sábado, 1 de Maio de 1976 — I SÉRIE — N.º 102

DIÁRIO DA REPÚBLICA

ÓRGÃO OFICIAL DA REPÚBLICA POPULAR DE ANGOLA

Preço deste número — 4$00

Toda a correspondência, quer oficial, quer relativa à assinatura e anúncios do «Diário da República», deve ser dirigida à Administração da Imprensa Nacional de Angola, em Luanda, Caixa Postal 1306. — End. Telegr.: «imprensa».

ASSINATURAS

	Ano
Ao três meses	135$00
A 1.º mês	50$00
A 2.º mês	50$00
A 3.º mês	45$00

O preço dos anúncios é de 2$5 a linha, acrescido do respectivo imposto do selo, dependendo a sua publicação do depósito prévio a efectuar na Tesouraria da Imprensa Nacional de Angola.

3.º SUPLEMENTO

Conselho da Revolução

Lei n.º 11/76:
Confisca a totalidade dos bens da Sociedade Agrícola do Cassequel, S. A. R. L.

Lei n.º 12/76:
Confisca a totalidade dos bens da Tecmangi — Sociedade Têxtil de Luanda, S. A. R. L.

Lei n.º 13/76:
Confisca a totalidade dos bens da Companhia do Açúcar de Angola.

Lei n.º 14/76:
Confisca a totalidade dos bens da Sociedade Angolana de Tecidos Estampados, S. A. R. L., com sede em Luanda.

Lei n.º 15/76:
Confisca a totalidade dos bens da Companhia de Cimento de Angola, S. A. R. L., com sede no Lobito.

Lei n.º 16/76:
Confisca a totalidade dos bens da Açucareira do Bom Jesus, com sede em Bom Jesus.

Lei n.º 17/76:
Confisca a totalidade dos bens da Siderurgia Nacional, S. A. R. L. — Fábrica de Luanda.

Lei n.º 18/76:
Confisca várias empresas agrícolas, situadas em vários pontos do País.

CONSELHO DA REVOLUÇÃO

Lei n.º 11/76

de 1 de Maio

1. Considerando que a Sociedade Agrícola Cassequel, S. A. R. L. exerce a sua principal actividade no sector do açúcar que é estratégico para a economia do País:

2. Considerando o elevado volume de emprego da empresa, cerca de 4000 trabalhadores:

3. Considerando que a administração da empresa abandonou o País, tendo um dos seus elementos estado implicado numa importante conspiração reaccionária movida pela UPA/FNLA:

4. Considerando a situação de monopólio exercida pela empresa (produz cerca de 40% da produção total açucareira):

5. Considerando o disposto na Lei n.º 3/76;

Ao abrigo da alínea *a)*, do artigo 38.º, da Lei Constitucional e no uso da faculdade conferida pela alínea *e)* do artigo 36.º da mesma Lei, o Conselho da Revolução decreta e eu promulgo o seguinte:

ARTIGO 1.º

É confiscada a totalidade dos bens da Sociedade Agrícola do Cassequel, S. A. R. L., nos termos dos artigos 1.º, n.º 1), n.º 2), alínea *a)*, *b)* *c)* e *d)* e n.º 3 e artigo 4.º, alíneas *a)* e *c)* da Lei n.º 3/76.

ARTIGO 2.º

Os actuais órgãos de gestão continuarão a administrar a empresa até que o Conselho de Ministros aplique o artigo 7.º da Lei n.º 3/76.

Ao abrigo da alínea *a)* do artigo 38.º da Lei Constitucional e no uso da faculdade conferida pela alínea *e)* do artigo 32.º da mesma Lei o Conselho da Revolução decreta e eu promulgo o seguinte:

ARTIGO 1.º

É confiscada a totalidade dos bens da Sociedade Angolana de Tecidos Estampados S. A. R. L., com sede em Luanda, nos termos dos artigos 1.º, n.º 1), n.º 2), alíneas *a), b),* e *e)* e artigo 3.º da Lei n.º 3/76

ARTIGO 2.º

Os actuais órgãos de gestão continuarão a administrar a empresa até que o Conselho de Ministros aplique o artigo 7.º da Lei n.º 3/76.

ARTIGO 3.º

Esta Lei entra imediatamente em vigor.

Visto e aprovado pelo Conselho da Revolução.

Promulgado em 1 de Maio de 1976

Publique-se.

O Presidente da República, ANTÓNIO AGOSTINHO NETO.

Lei n.º 15/76
de 1 de Maio

1. Considerando que a Companhia de Cimentos de Angola, S. A. R. L., é uma unidade económica estratégica para o processo de Reconstrução Nacional;

2. Considerando que a antiga Administração da empresa procedeu, através de cheques o desvio de fundos, o que é considerado como sabotagem económica;

3. Considerando que a empresa foi abandonada pelos administradores, tendo sido encerrada uma secção da fábrica, e os trabalhadores ficado privados do seu trabalho, o que é considerado como sabotagem económica;

4. Considerando que a empresa se situa num sector de forte incidências cambiais para a economia do País;

5. Considerando o disposto na Lei n.º 3/76;

Ao abrigo da alínea *a)* do artigo 38.º da Lei Constitucional e no uso da faculdade conferida pela alínea *e)* do artigo 32.º da mesma Lei, o Conselho da Revolução decreta e eu promulgo o seguinte:

ARTIGO 1.º

É confiscada a totalidade dos bens da Companhia de Cimentos de Angola, S.A.R.L., com sede no Lobito situada em território nacional, nos termos dos artigos 1.º, n.º 1, n.º 2, alíneas *a), b) c) d)* e *e)* e artigo 3.º, alíneas *b)* e *i)* da Lei n.º 3/76.

ARTIGO 2.º

Os actuais órgãos de gestão continuarão a administrar a empresa até que o Conselho de Ministros aplique o artigo 7.º da Lei n.º 3/76.

ARTIGO 3.º

Esta Lei entra imediatamente em vigor.

Visto e aprovado pelo Conselho da Revolução.

Promulgado em 1 de Maio de 1976.

Publique-se.

O Presidente da República, ANTÓNIO AGOSTINHO NETO.

Lei n.º 16/76
de 1 de Maio

Considerando que o sector do açúcar é estratégico para a economia nacional;

Considerando que a Açucareira do Bom Jesus fornece trabalho a centenas de trabalhadores angolanos;

Considerando que desde longa data esta empresa vem sendo subsidiada com créditos bancários de modo a cobrir os seus deficits sistemáticos;

Considerando que, por despacho de 28 de Junho de 1975, do então Primeiro Ministro, do Ministro da Economia e do Secretário de Estado de Indústria e Energia, os corpos sociais da empresa foram suspensos, por se considerar a sua actuação como conducente à sabotagem económica;

Considerando o disposto na Lei n.º 3/76;

Ao abrigo da alínea *a)* do artigo 38.º da Lei Constitucional e no uso da faculdade conferida pela alínea *e)* do artigo 32.º, da mesma Lei, o Conselho da Revolução decreta e eu promulgo o seguinte:

ARTIGO 1.º

É confiscada a totalidade dos bens da Açucareira do Bom Jesus, com sede no Bom Jesus, nos termos dos artigos 1.º, n.º 1), n.º 2), alínea *a) b), c),* e *e),* artigo 3.º, nomeadamente a alínea *d),* da Lei n.º 3/76:

ARTIGO 2.º

Os actuais órgãos de gestão continuarão a administrar a empresa até que o Conselho de Ministros aplique o artigo 7.º da Lei n.º 3/76.

ARTIGO 3.º

Esta Lei entra imediatamente em vigor.

Visto e aprovado pelo Conselho da Revolução.

Promulgado em 1 de Maio de 1976.

Publique-se.

O Presidente da República, ANTÓNIO AGOSTINHO NETO.

Lei n.º 17/76
de 1 de Maio

1. Considerando que a Siderurgia Nacional, S. A. R.L. é uma indústria básica, e como tal, estratégica para a Reconstrução Nacional;

ANNEXE II

D.R. NR. 272 of 18/11/1980

EDICT NR. 189/80

Terça-feira, 18 de Novembro de 1980 — I SÉRIE — N.º 272

DIÁRIO DA REPÚBLICA

ÓRGÃO OFICIAL DA REPÚBLICA POPULAR DE ANGOLA

Preço deste número — Kz 4.00

Toda a correspondência, quer oficial, quer relativa a anuncios e assinaturas do «Diário da República», deve ser dirigida à Imprensa Nacional — U. E. E., em Luanda, Caixa Postal 1306. — End. Teleg.: «imprensa».

ASSINATURAS

	Ano
As três séries	Kz 1.350.00
A 1.ª série	Kz 500.00
A 2.ª série	Kz 500.00
A 3.ª série	Kz 450.00

O preço dos anuncios é de Kz 22.00 a linha, acrescido do respectivo imposto do selo, dependendo a sua publicação do deposito prévio a efectuar na Tesouraria da Imprensa Nacional — U. E. E.

IMPRENSA NACIONAL — U. E. E.

AVISO AOS ASSINANTES

Todos os assinantes do «Diário da República» que desejem renovar as suas assinaturas para o próximo ano, deverão remeter a importância respectiva, até 30 de Novembro impreterivelmente, a fim de não sofrerem interrupção na remessa.

Devem também indicar a esta Imprensa, o endereço completo incluindo o número da Caixa Postal, e se pretendem que o mesmo seja enviado por via aérea ou via normal.

SUMÁRIO

Conselho de Ministros

Decreto n.º 189/80:

Constitui a Empresa Siderurgia Nacional — Unidade Económica Estatal, abreviadamente SINA — U. E. E., com sede em Luanda e aprova os seus Estatutos.

Nota — Foi publicado um suplemento ao *Diário da República* n.º 217, 1.ª série, com a data de 12 de Setembro de 1980, inserindo o seguinte:

Ministérios do Plano, do Trabalho e Segurança Social e das Finanças

Decreto executivo conjunto n.º 68-A/80:

Aprova o qualificador de ocupações próprias dos trabalhadores da Justiça. — Revoga toda a legislação que disponha em contrário.

CONSELHO DE MINISTROS

Decreto n.º 189/80

de 18 de Novembro

Considerando que a base para o arranque da economia do País depende principalmente do desenvolvimento da indústria pesada com destaque para o sector siderúrgico;

Considerando a importância da siderurgia nacional dentro do contexto da economia do País;

Considerando que a siderurgia nacional além de ser uma fornecedora de meios de produção é também geradora de divisas;

Visto o disposto nos artigos 6.º e 8.º da Lei n.º 17/77, de 15 de Setembro;

Sob proposta do Ministro da Indústria;

Nos termos do artigo 59.º da Lei Constitucional e no uso da faculdade conferida pela alínea *i*) do artigo 53.º da mesma lei, o Governo decreta e eu assino e faço publicar o seguinte:

Artigo 1.º — É constituída uma Empresa Estatal que adopta a denominação de Siderurgia Nacional — Unidade Económica Estatal, abreviadamente SINA — U. E. E. e tem a sede em Luanda.

Art. 2.º — A Siderurgia Nacional — U. E. E. tem por objectivo principal o fabrico de aço e produtos laminados do aço, podendo dedicar-se a actividades, complementares ou em que se verifique afinidade tecnológica com o seu objecto principal.

Art. 3.º — A empresa ora criada é de âmbito nacional e depende do Ministério da Indústria, através da Direcção Nacional da Indústria Pesada.

Art. 4.º — São aprovados os Estatutos anexos ao presente decreto e que dele fazem parte integrante.

Art. 5.º — 1. São transferidos para a Empresa por incorporação no seu Fundo de Constituição, os bens, valores e direitos considerados necessários à sua actividade e resultantes do confisco da empresa Siderurgia Nacional, S. A. R. L., operado pela Lei n.º 17/76, de 1 de Maio.

2. O Fundo de Constituição compreende:

a) Fundo de Constituição de Meios Fixos;
b) Fundo de Constituição de meios circulantes próprios.

3. As modificações ou alterações ao Fundo de Constituição regular-se-ão por normas do Ministério das Finanças.

ARTIGO 7.º

1. A Empresa possuirá ainda os seguintes fundos:

a) Um Fundo de Amortização constituído pelas amortizações que efectuar segundo o artigo 8.º do presente Estatuto, devendo a sua utilização obedecer à regulamentação sobre a matéria;
b) Um Fundo Social, obtido a partir de uma percentagem dos excedentes de cada exercício ou, excepcionalmente, por dotações orçamentais e destinado à realização de benefícios sociais ou serviços colectivos dos trabalhadores da Empresa, bem como à atribuição a estes de prémios e recompensas.

2. O Fundo Social compreenderá o fundo para actividades Sócio-Culturais e o Fundo de Estímulo Material, devendo ser nele incorporados quarenta por cento do valor diferencial quando os resultados líquidos da Empresa excederem o limite previsto no respectivo Plano.

ARTIGO 8.º

(Amortizações)

A Empresa realizará amortizações segundo as taxas previstas nas leis em vigor.

ARTIGO 9.º

(Contabilidade e relatórios)

1. A Contabilidade da Empresa obedecerá às regras estabelecidas no Plano de Contas Nacional e às definidas pelos Ministérios do Plano, das Finanças e da Indústria, tendo em vista a sua uniformização e por forma a permitir a fácil verificação da correspondência entre os fundos disponíveis e os valores contabilísticos.

2. A empresa deverá elaborar com referência a 31 de Dezembro de cada ano, os seguintes documentos de prestação de contas:

a) Balanço;
b) Demonstração da Conta de Resultados;
c) Demonstração do Fundo de Constituição;
d) Demonstração do Fundo de Amortização;
e) Demonstração do Fundo Social.

3. Adicionalmente, poderão ser solicitados à Empresa outros documentos relativos à sua gestão, tais como relatórios sobre vendas, salários e custos de produção.

4. Os documentos referidos no n.º 2 e, quando solicitados, no n.º 3, serão enviados, após apreciação pelo Conselho de Direcção da Empresa e até 31 de Março do ano seguinte, ao Gabinete do Plano do Ministério da Indústria, com cópia ao Ministério das Finanças.

5. Após aprovação pelo Ministro da tutela e nos termos da lei geral, os documentos de prestação de contas serão remetidos aos Ministérios do Plano e das Finanças.

ARTIGO 10.º

(Órgãos, sua constituição e atribuições)

1. São órgãos da Empresa:

a) Director-geral;
b) Director-geral adjunto;
c) Conselho de Direcção.

2. O director-geral, como representante do Estado, é a autoridade máxima dentro da Empresa, gerindo-a, administrando-a e organizando-a de acordo com as atribuições que lhe são consignadas na Lei n.º 17/77, de 15 de Setembro, em especial no seu artigo 37.º e ainda com as seguintes:

a) Assegurar o fornecimento dos meios de produção e serviços, com vista ao cumprimento dos planos estabelecidos;
b) Criar na empresa escolas, ou centros técnico-profissionais;
c) Elaborar e apresentar as propostas de quadros de pessoal, tendo em conta o previsto nas alíneas *h*) dos artigos 41.º e 49.º da Lei n.º 17/77, de 15 de Setembro;
d) Submeter a parecer favorável do Ministério da Indústria a nomeação dos chefes de departamento;
e) Apresentar ao Ministério da Indústria as propostas e documentos relativos aos actos previstos nas alíneas *b*) a *e*) do n.º 2 do artigo 4.º;
f) Convocar e presidir às reuniões de Conselho de Direcção.

3. O director-geral será assessorado, no exercício das suas funções, por um director-geral adjunto, cuja competência virá expressa no Regulamento Interno da Empresa.

4. O conselho de direcção terá a constituição fixada nos artigos 40.º e 43.º, n.ºs 1 e 2 da Lei n.º 17/77, de 15 de Setembro, possuirá as atribuições previstas no artigo 41.º da mesma lei e estabelecerá as normas do seu funcionamento no Regulamento Interno da Empresa.

ARTIGO 11.º

(Estrutura interna da empresa)

1. A estrutura interna da empresa compreende:

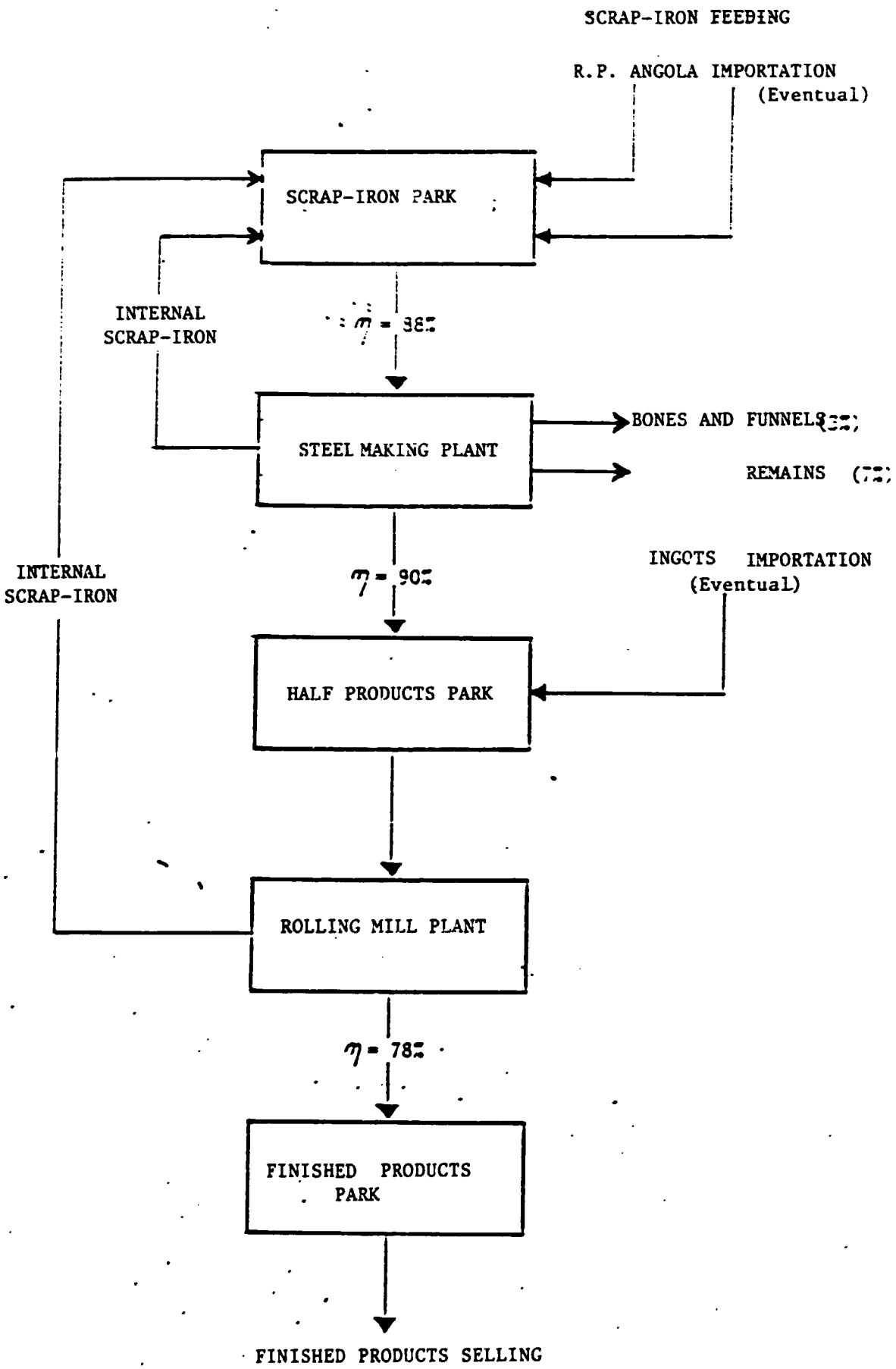
a) Departamentos Centrais:
— Departamento Financeiro e de Planificação;
— Departamento de Organização do Trabalho e Formação Profissional;
— Departamento de Abastecimentos;
— Departamento de Produção;
— Departamento de Manutenção;
— Departamento de Transportes e Serviços.

ANNEXE III

TYPICAL DIAGRAM OF FLUXES

ANNEXE III

TYPICAL DIAGRAM OF FLUXES



ANNEXE IV

STEEL TYPES

STEEL TYPES

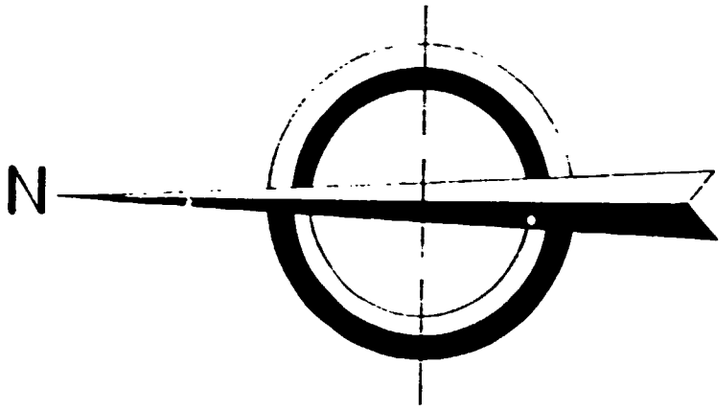
COMPOSITION PERCENTAGES OF STEEL BARS FOR CONCRETE

A 24 [illegible]	%
IRON	99,41 to 99,11
MANGANESE	0,30 to 0,50
CARBON	0,11 to 0,17
SILICIUM	0,08 to 0,12
PHOSPHORUS	0,05
SULPHUR	0,05

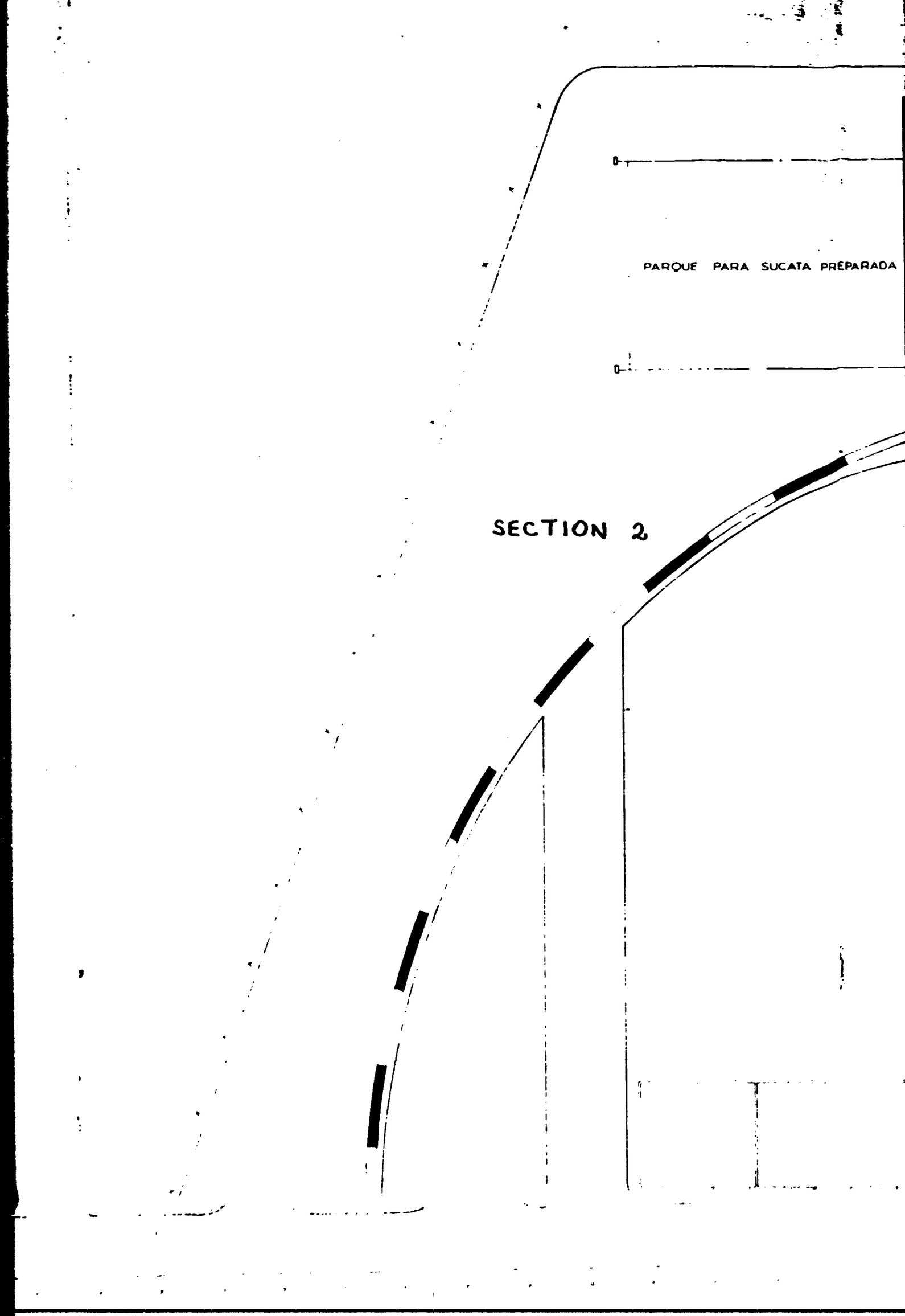
A 40	%
IRON	98,23 to 97,73
MANGANESE	1 to 1,3
CARBON	0,32 to 0,45
SILICIUM	0,35 to 0,45
PHOSPHORUS	0,05
SULPHUR	0,05

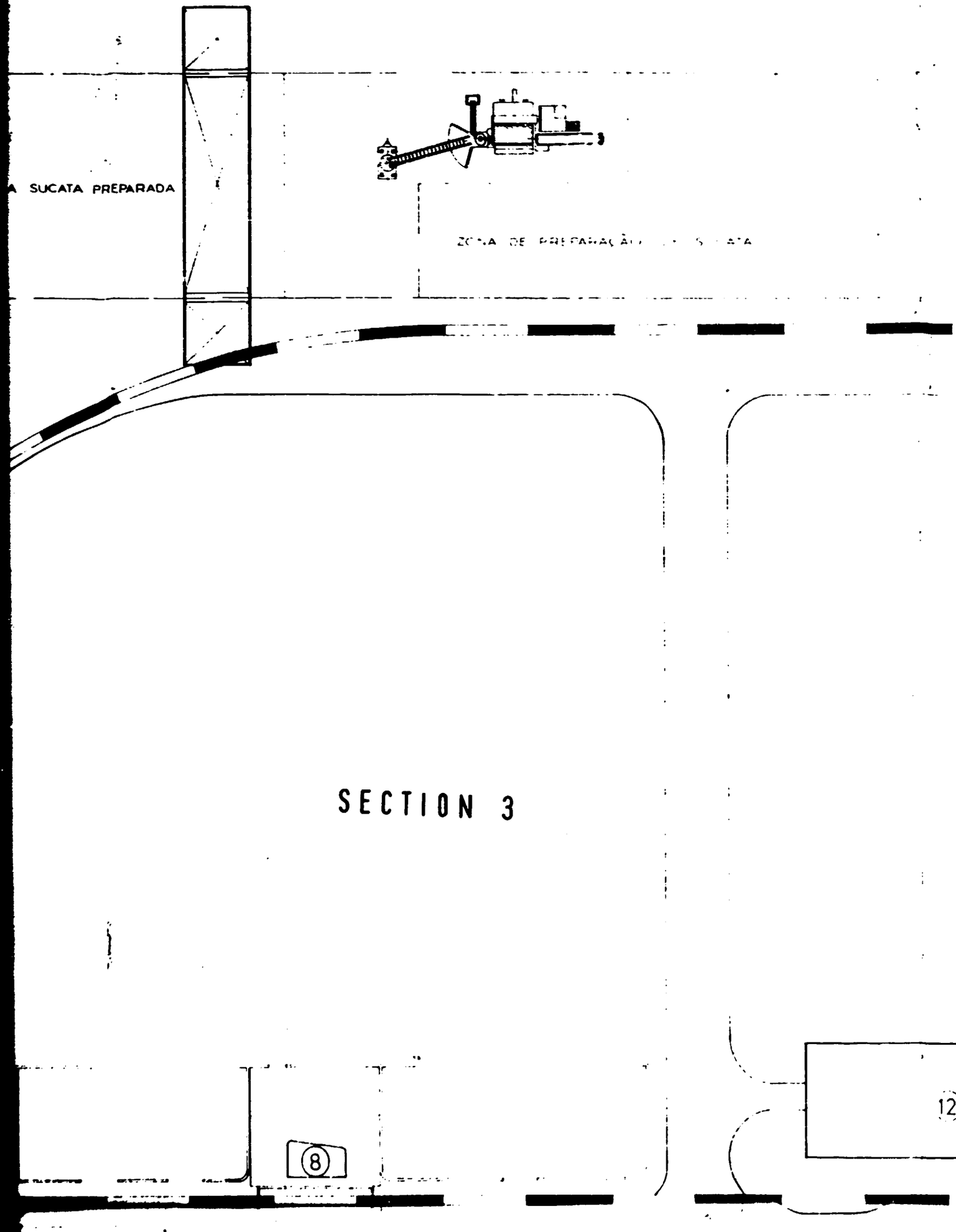
ANNEXE V

GENERAL IMPLANTATION

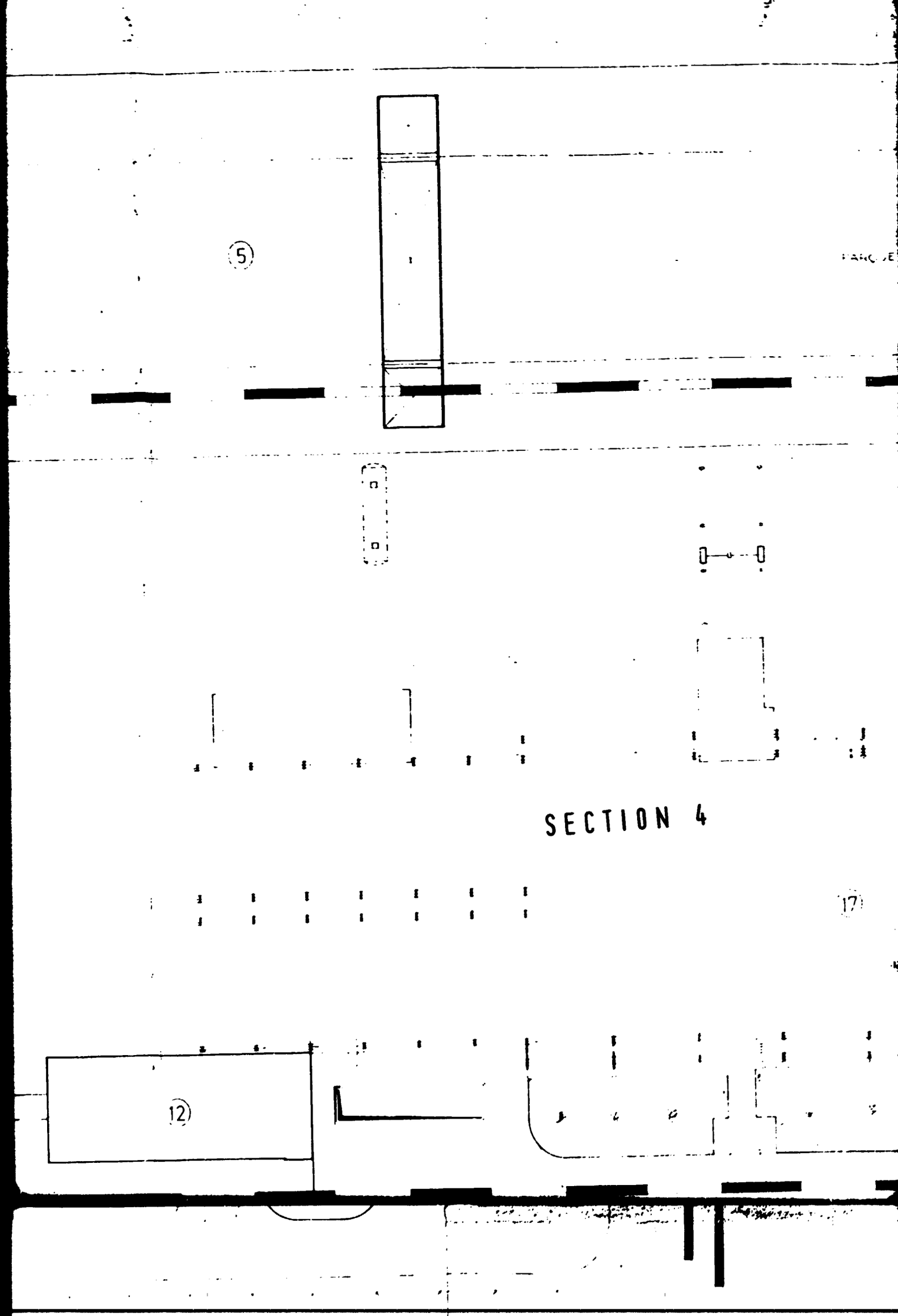


SECTION 1

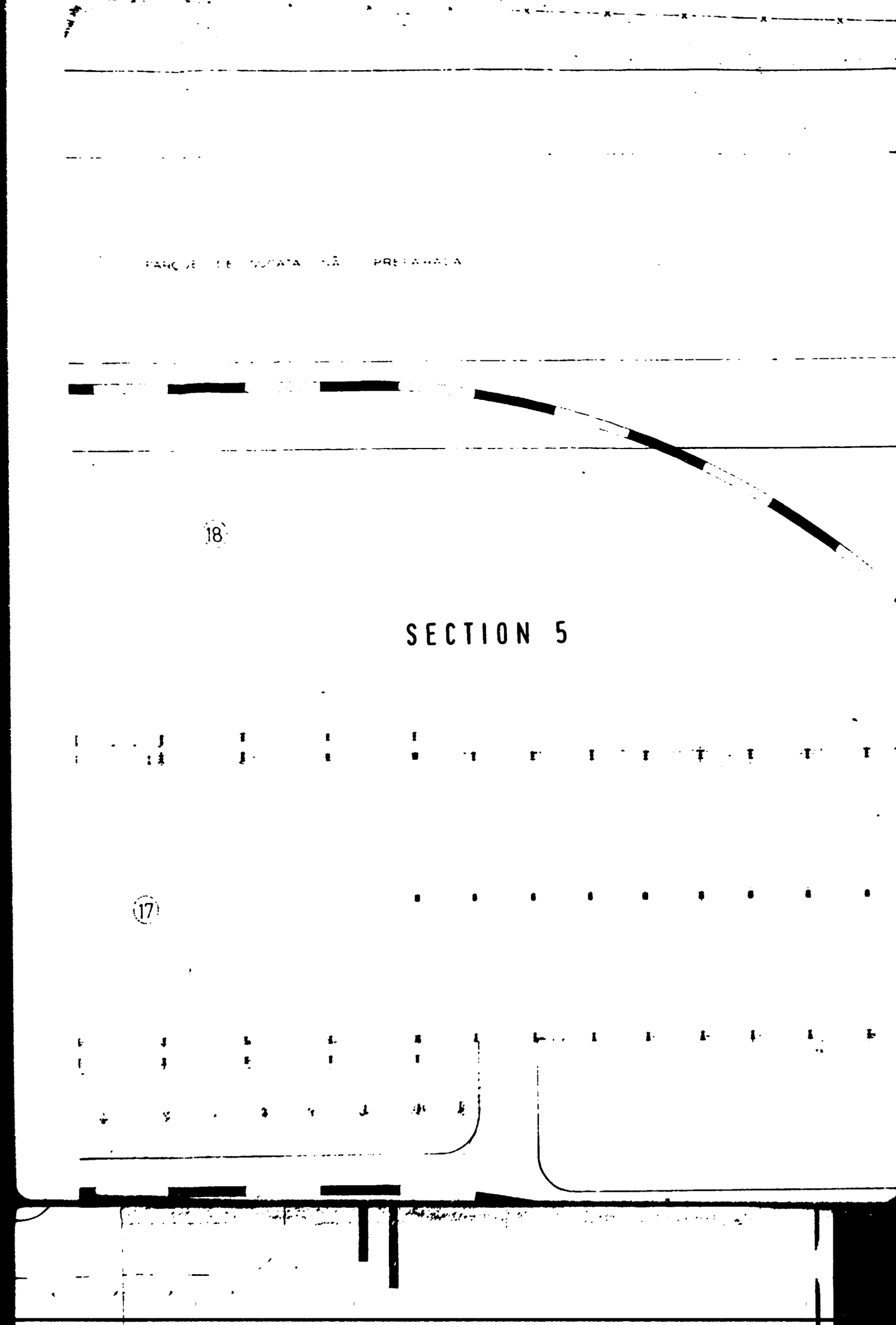

PARQUE PARA SUCATA PREPARADA
SECTION 2

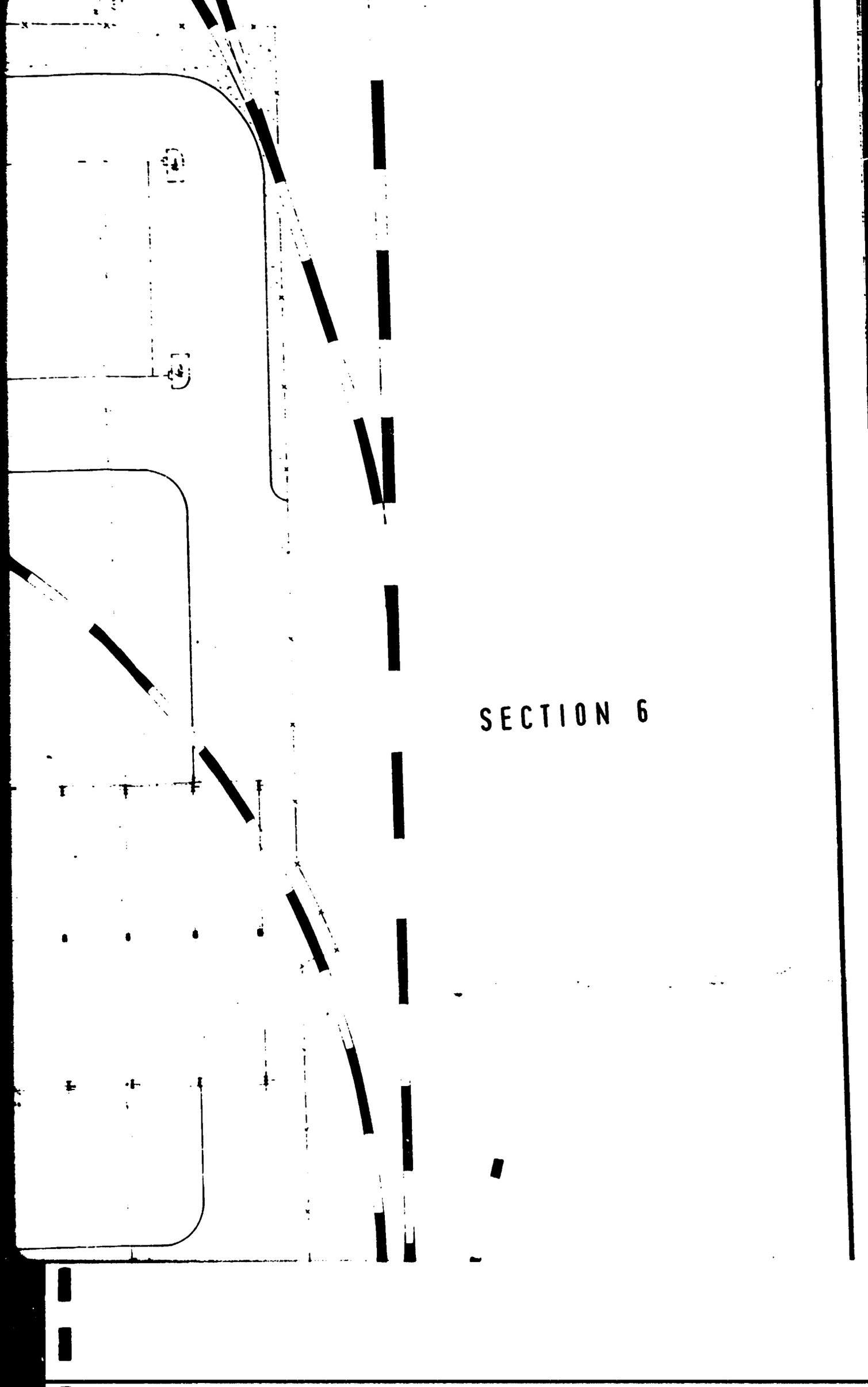


SECTION 3

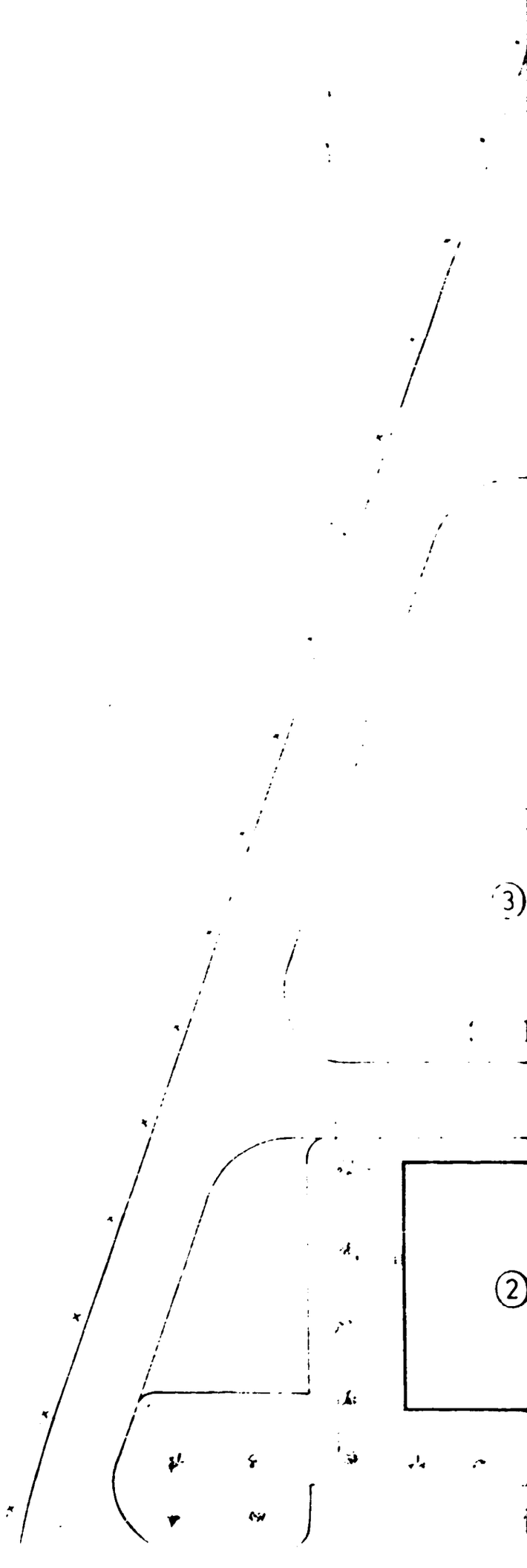


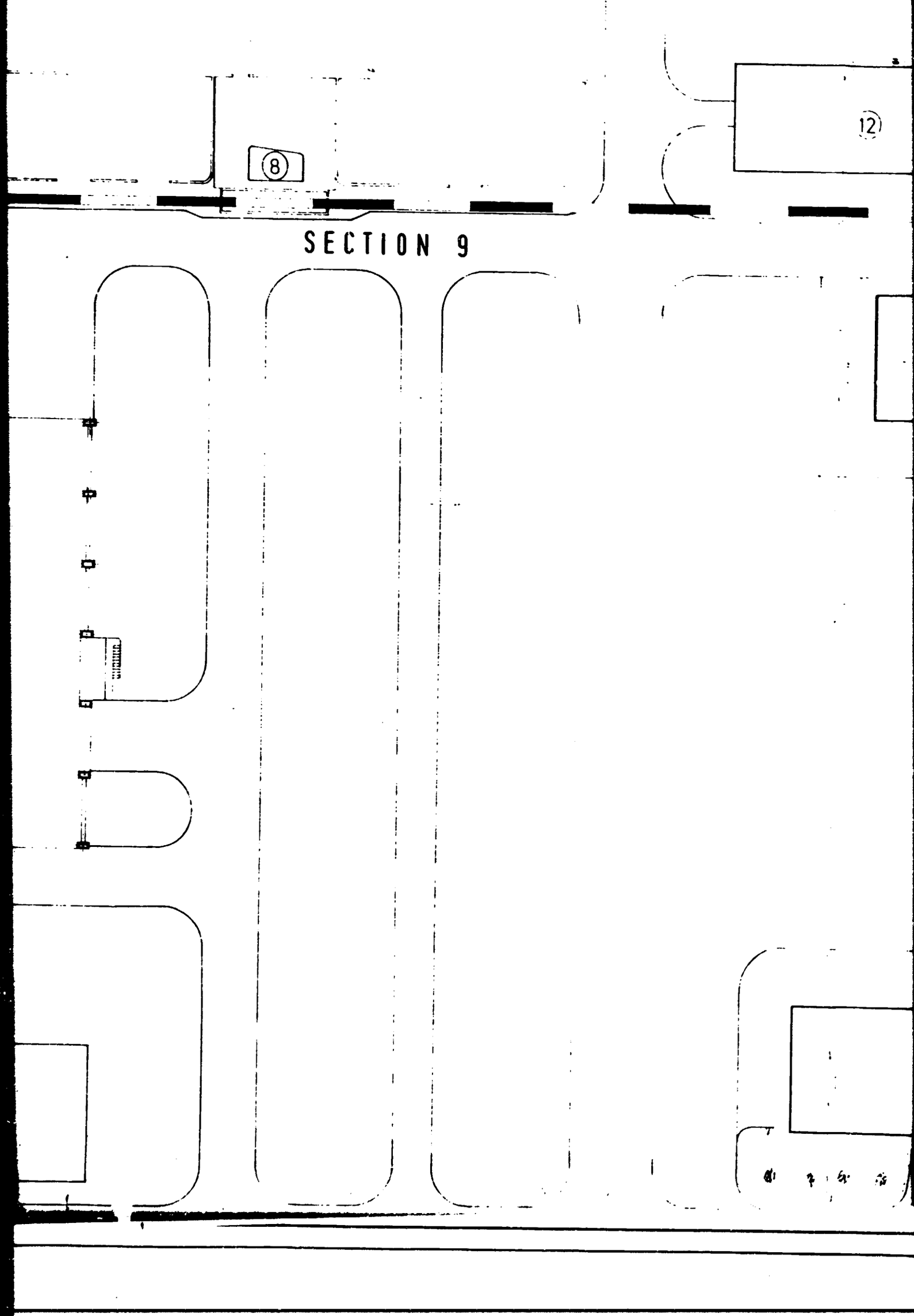
SECTION 4

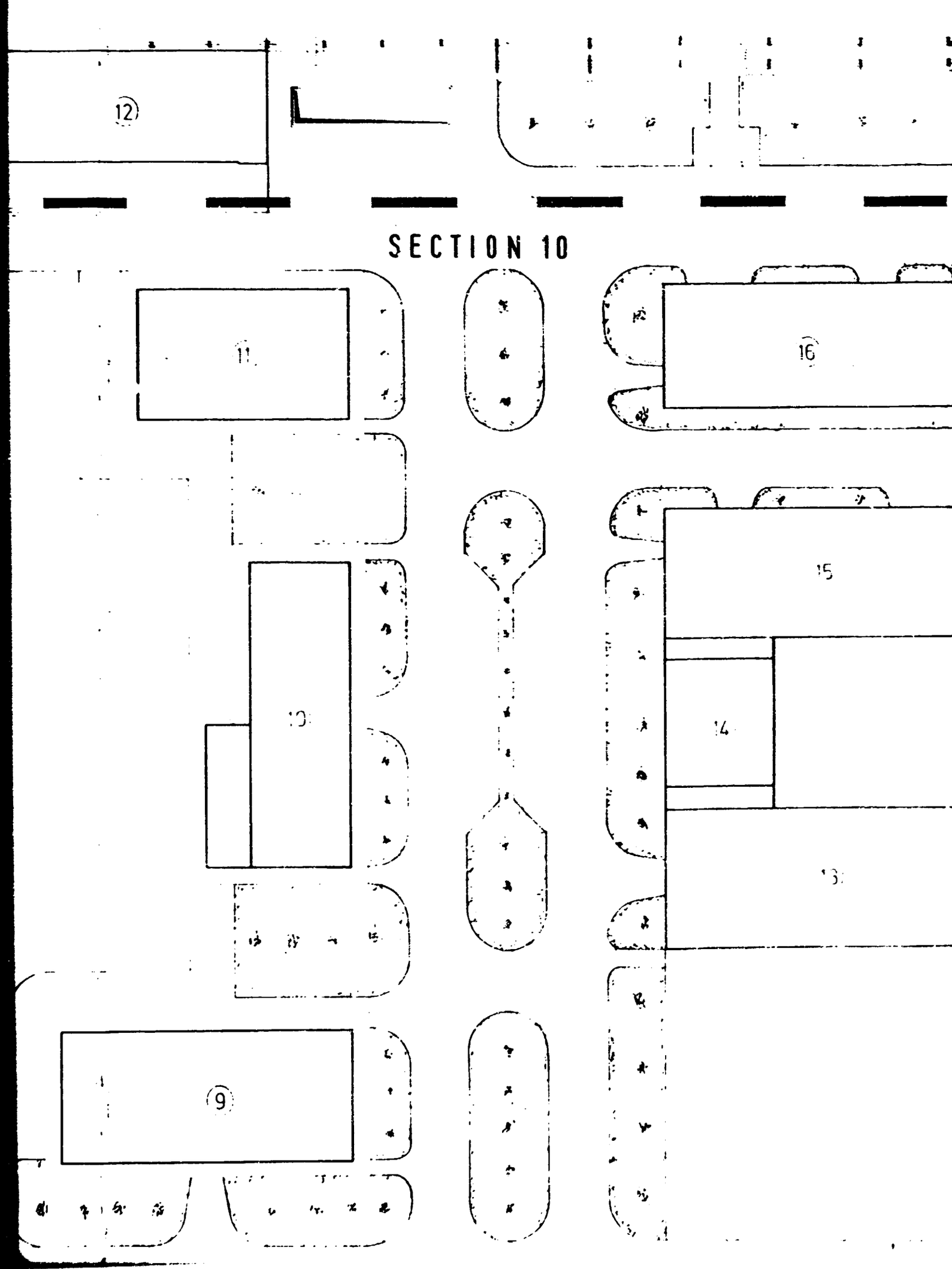

18
SECTION 5
17

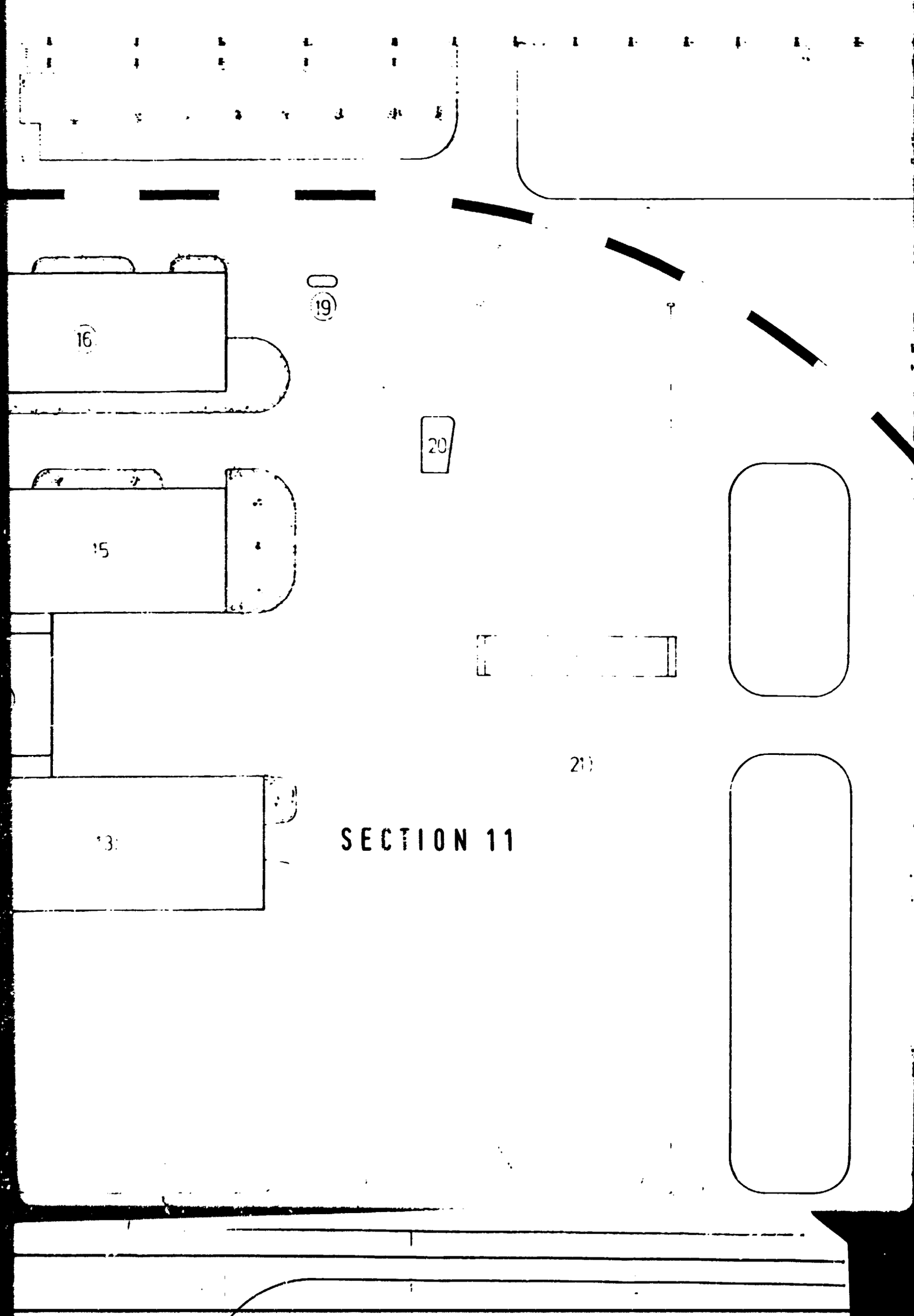

SECTION 6

SECTION 7



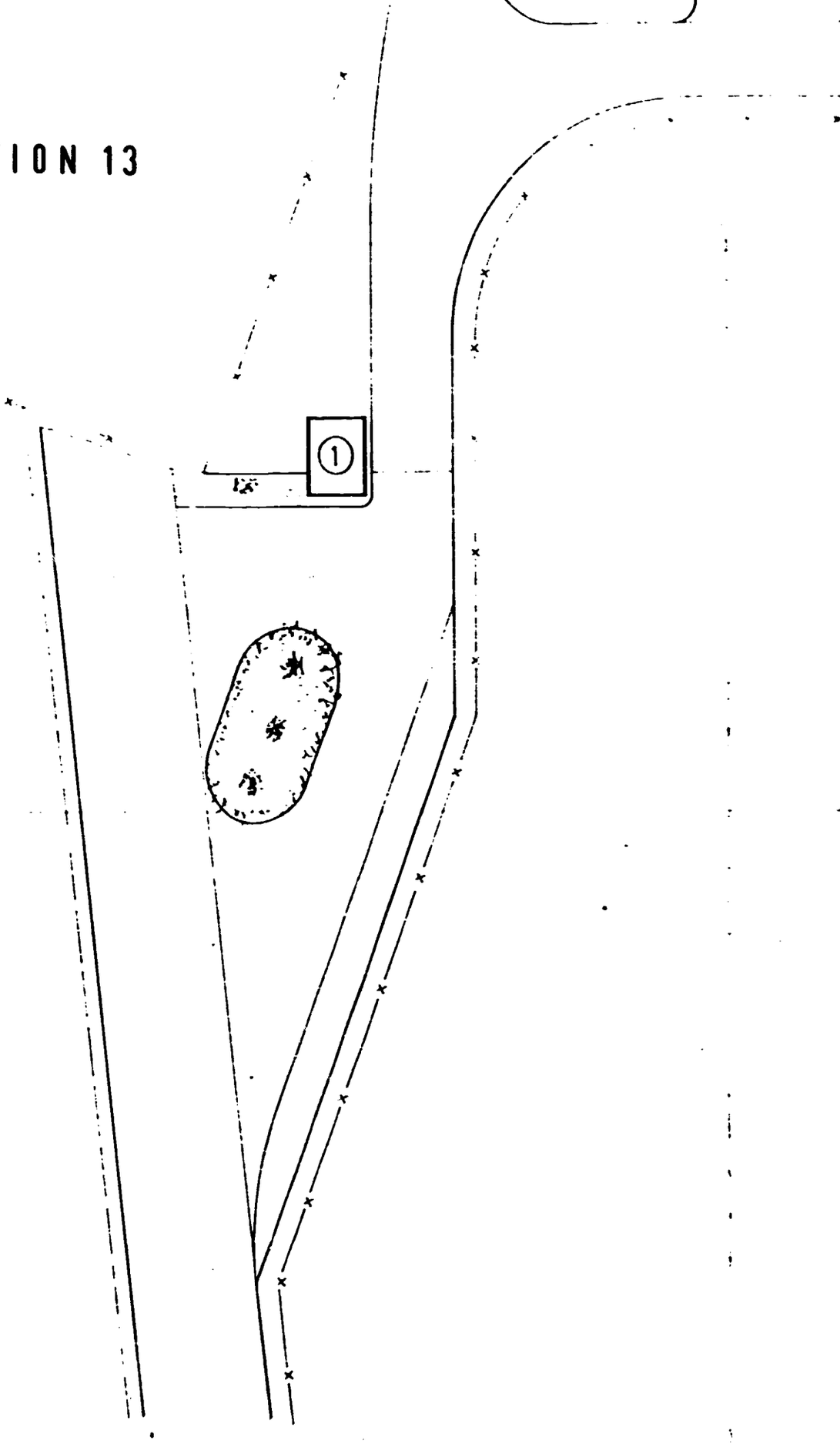

8
12
SECTION 9


12
SECTION 10
11
16
15
14
13
10
9


16
19
20
15
SECTION 11

SECTION 12

SECTION 13



SECTION 14

1 PORTARIA

2 SUBSTAÇÃ

3 CENTRAL

4 PARQUE D

5 PARQUE P
E PREPA

5 CONSERVA

SECTION 15

PORTARIA	7	ACIARIA	1
SUBSTAÇÃO 60/15 Kv	8	BÁSCULA II AC	1
CENTRAL DE BOMBAGEM	9	REFEITÓRIO	1
PARQUE DE OXIGÊNIO	10	ESCRITÓRIO E LABORATÓRIO	1
PARQUE PARA ARMAZENAMENTO	11	BALNEÁRIOS	1
E PREPARAÇÃO DE SUCATA	12	ARMAZÉM AC E LM	1
CONSERVACAO MECÂNICA AC	13	ARMAZÉM DE REFRACTÁRIOS	2
			2
			2

SECTION 16

14 TRANSPORTES

15 ARMAZÉM GERAL

16 OFICINAS MECÂNICAS

ÓRIO 17 LAMINAGEM

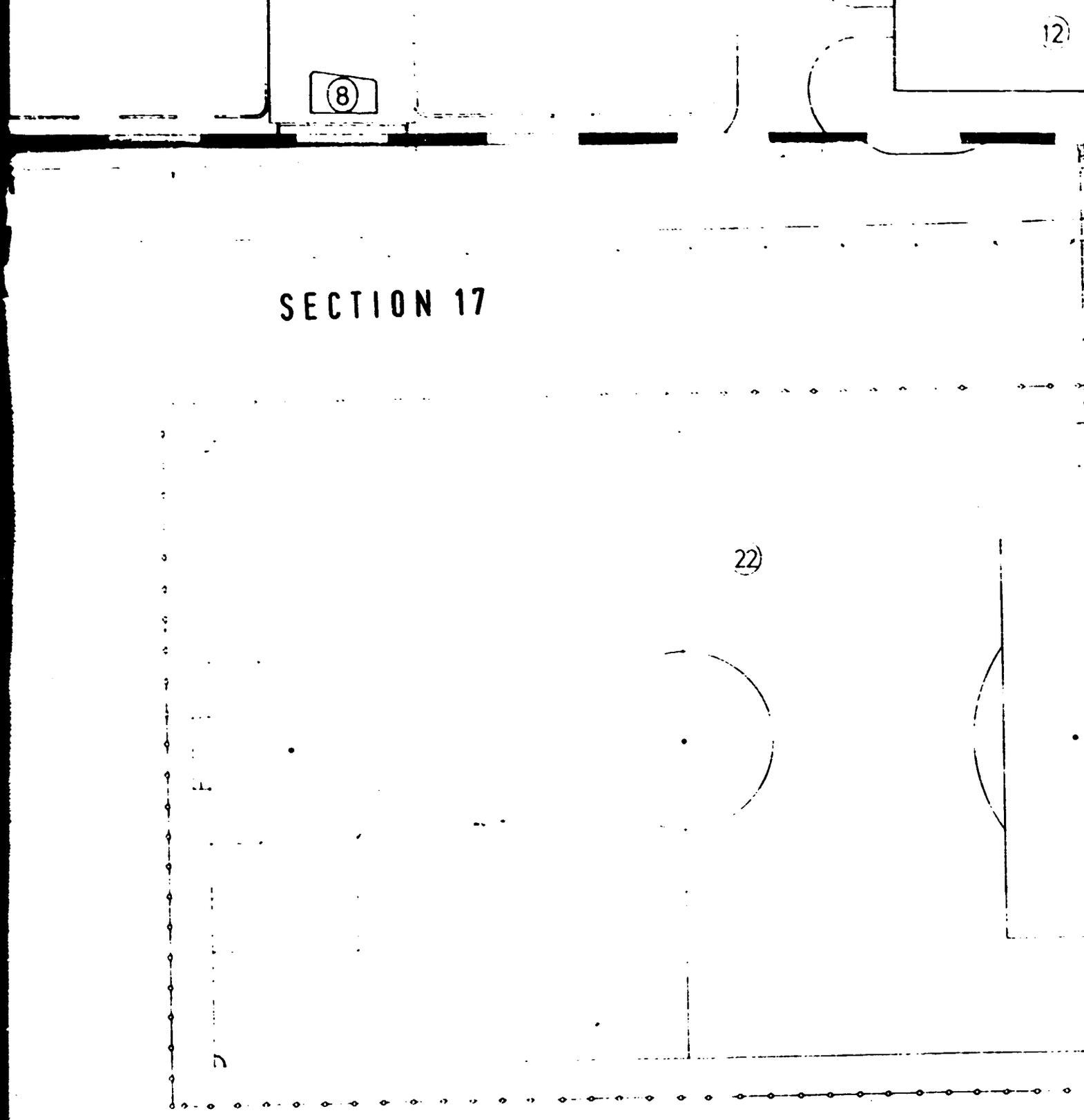
18 PARQUE DOS LINGOTES

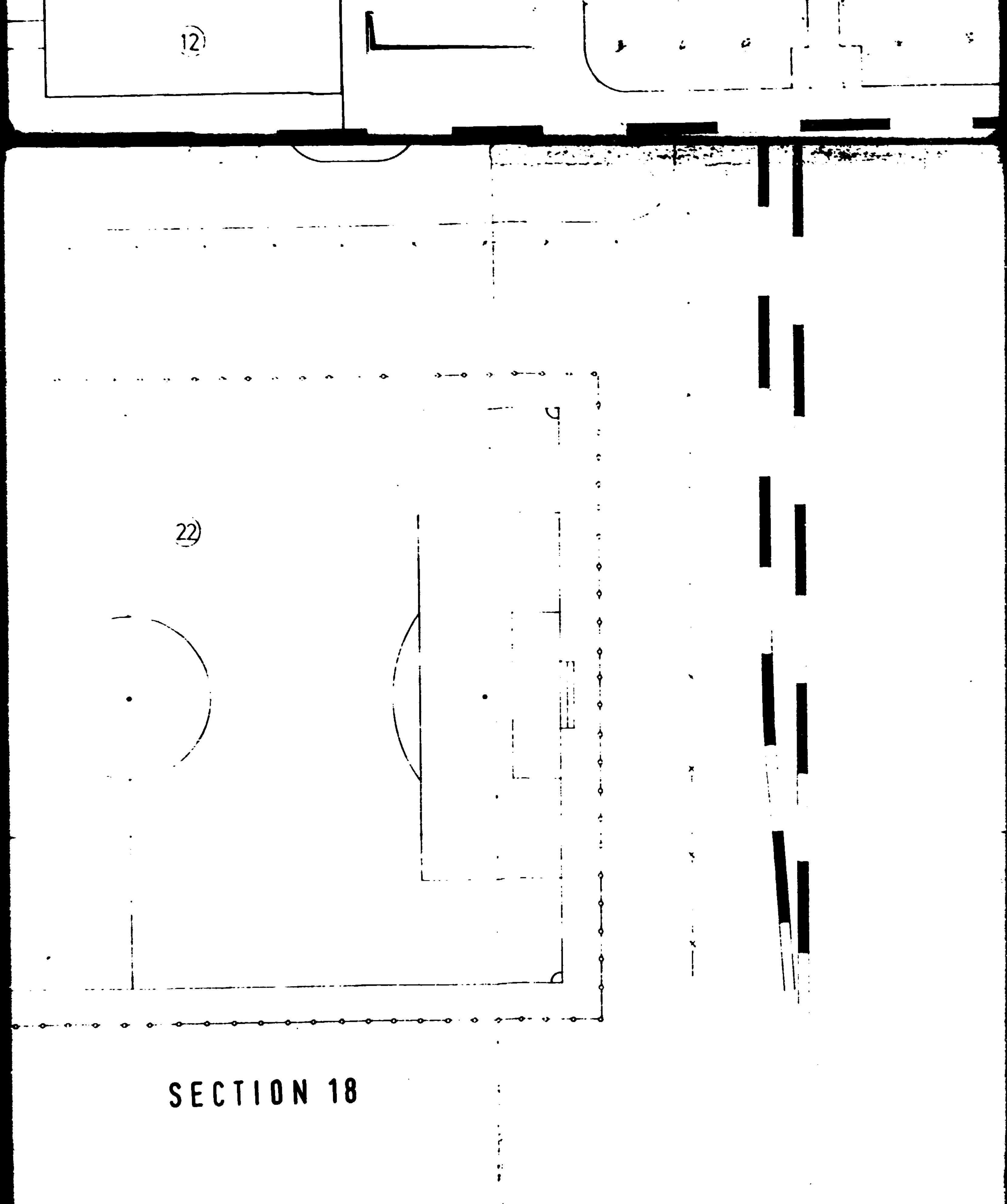
19 BOMBAS DE COMBUSTÍVEIS

ÁRIOS 20 BÁSCULA I

21 PARQUE DOS PRODUTOS ACABADOS

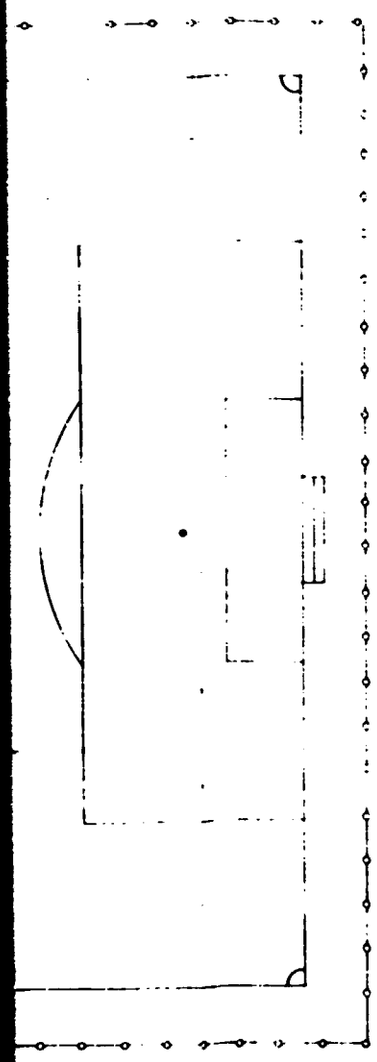
22 CAMPO DE FUTEBOL


12
8
SECTION 17
22



SIDERURGIA NACIO

PROJ	10/6/81	[signature]	FÁBRICA DE LUANDA — *INSTALA*
DES	10/6/81	[signature]	
CONF	10/6/81	[signature]	IMPLANTAÇÃO GERAL DA FÁB
VISTO	/ /		ESCALA 1 [illegible] 00 — Ref — Origem



SECTION 19

SIDERURGIA NACIONAL U.E.E.

PROJ	10/6/81	
DES	10/6/81	
CONF	10/6/81	
VISTO	/ /	

FÁBRICA DE LUANDA — *INSTALAÇÕES*

IMPLANTAÇÃO GERAL DA FÁBRICA

ESCALA 1 : 500

Ref. Origem

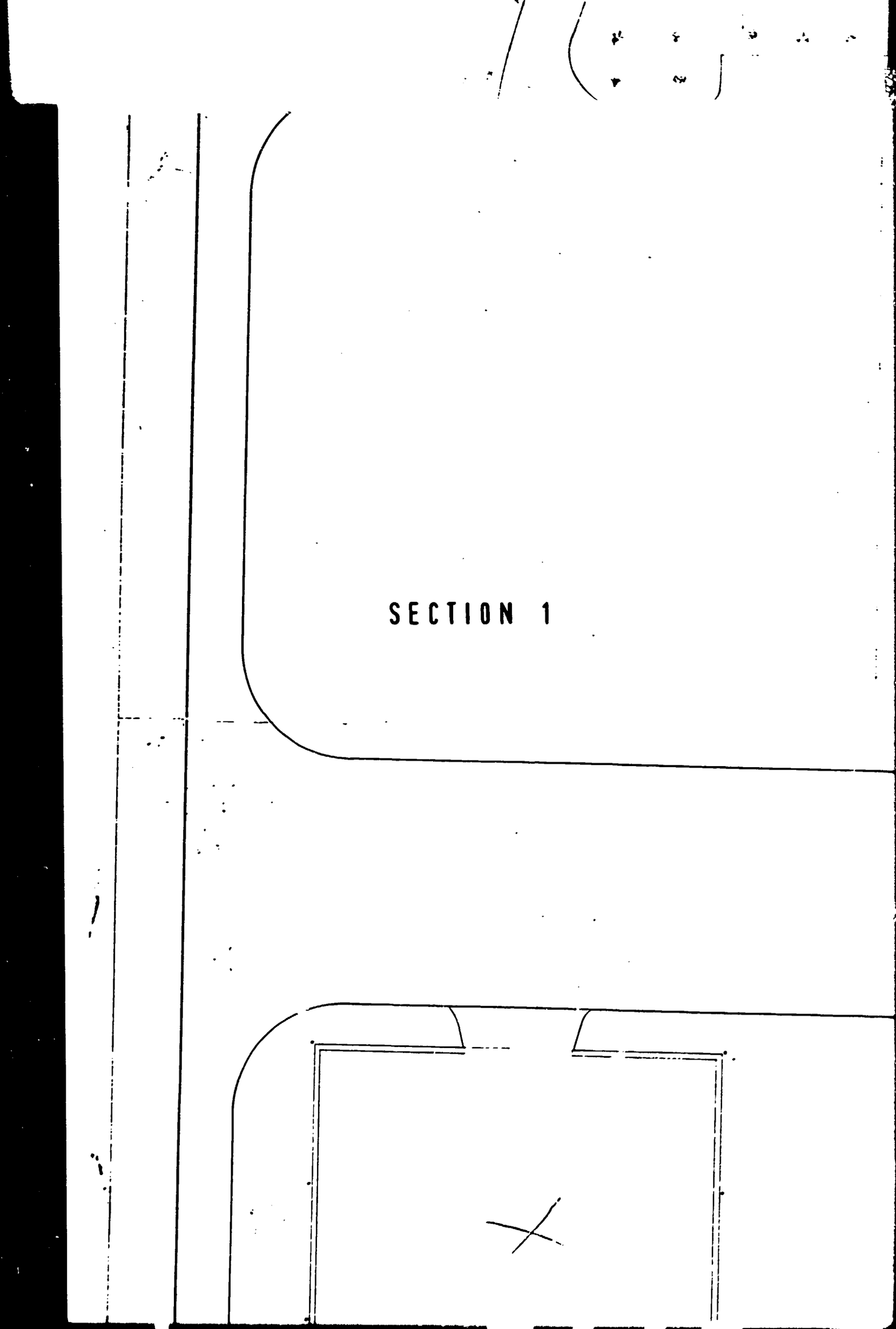
Des. Orig. | Ref.

SINA 5.01.15

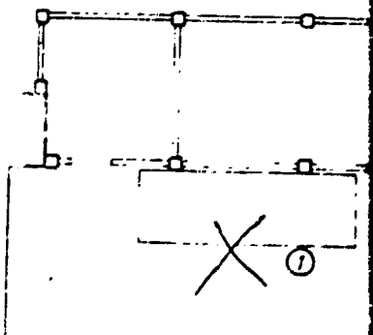
ANNEXE VI

STEEL FACTORY

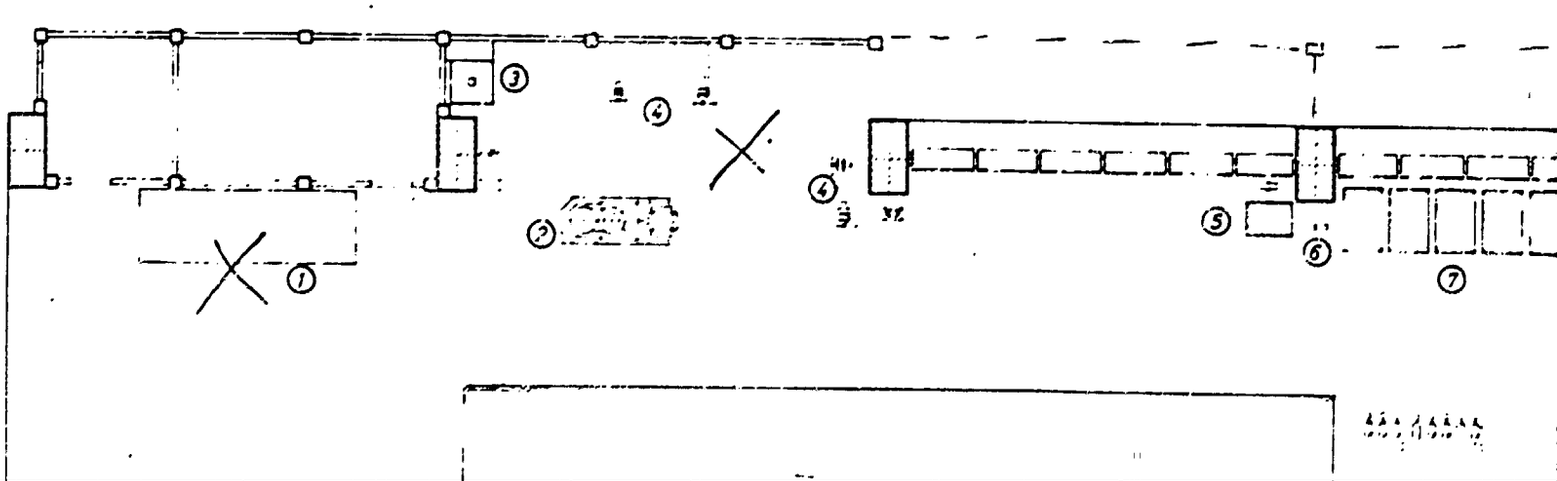
SNL 2.01.01.07

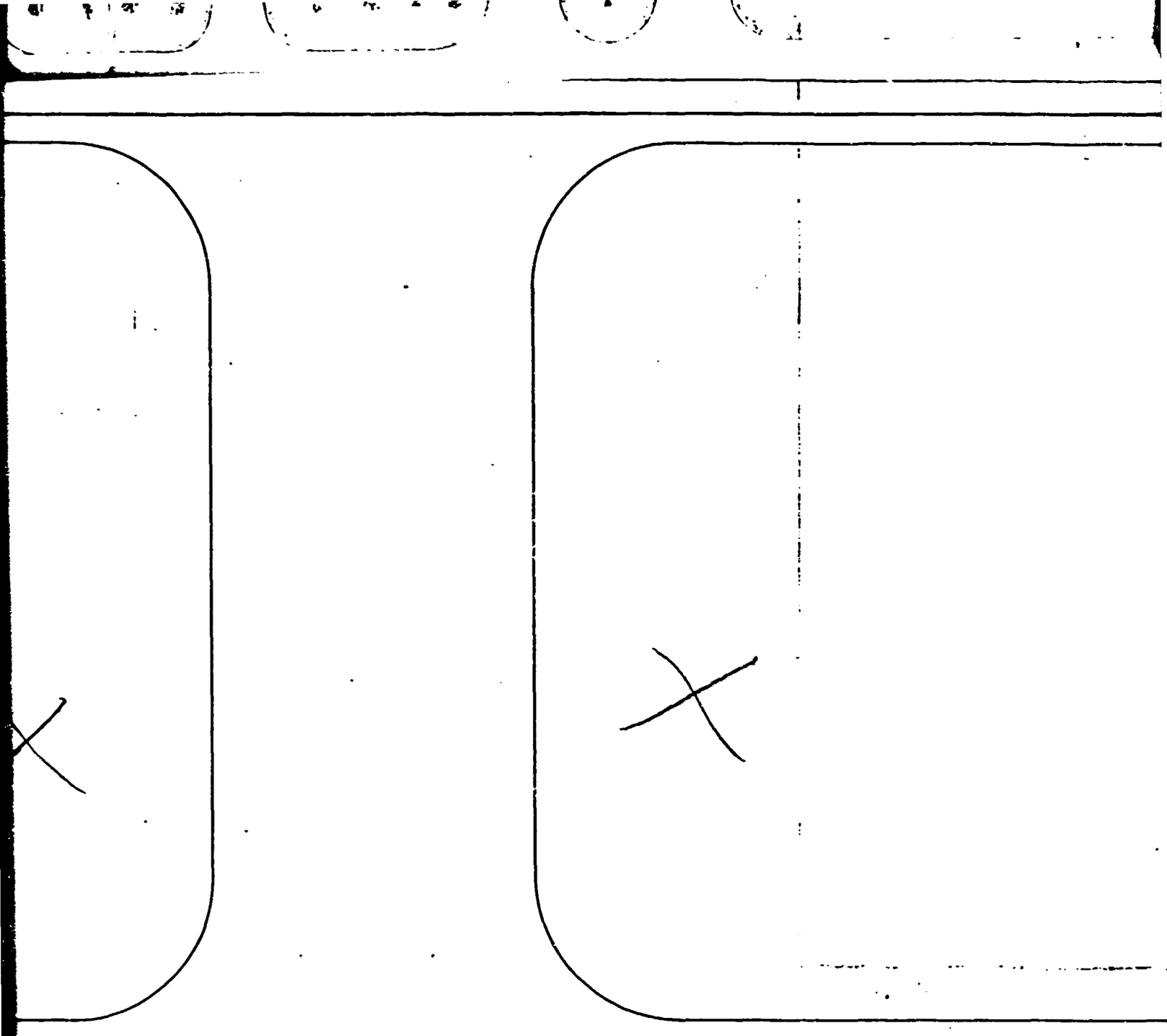

SECTION 1

SECTION 2



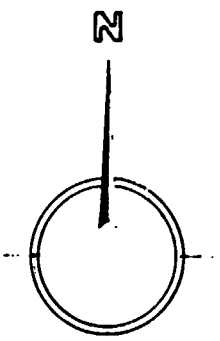
SECTION 3

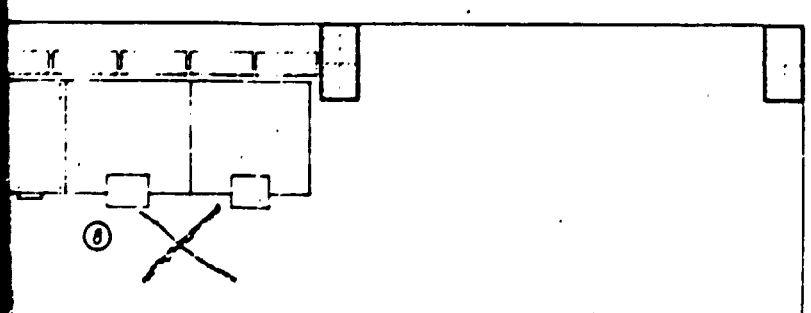


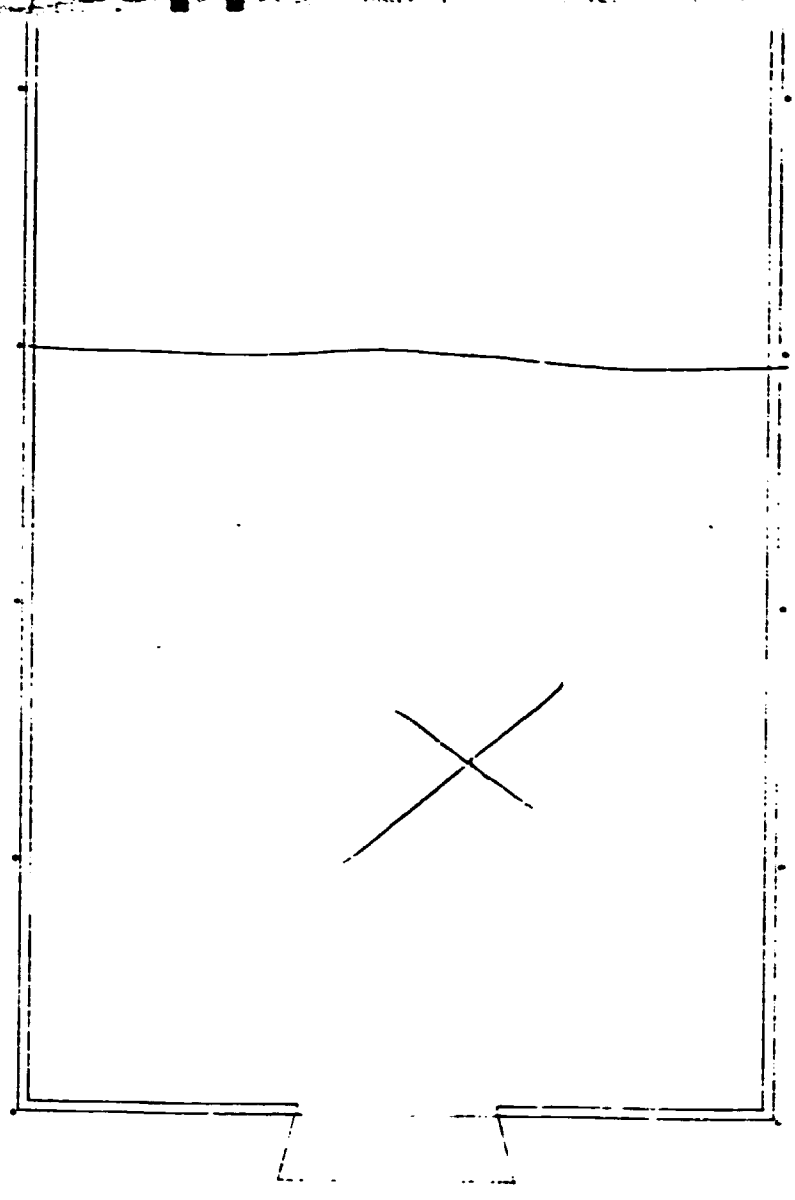


SECTION 4

SECTION 5

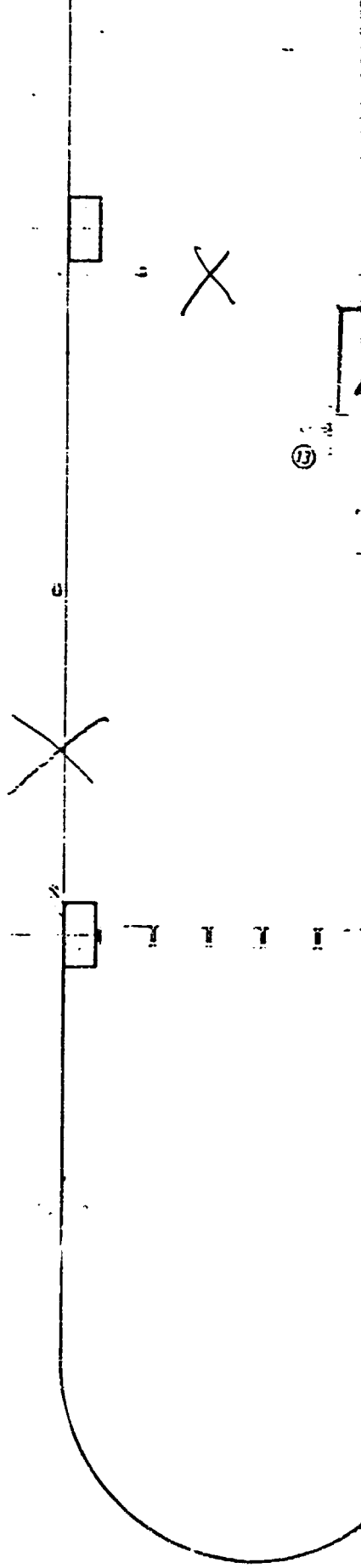


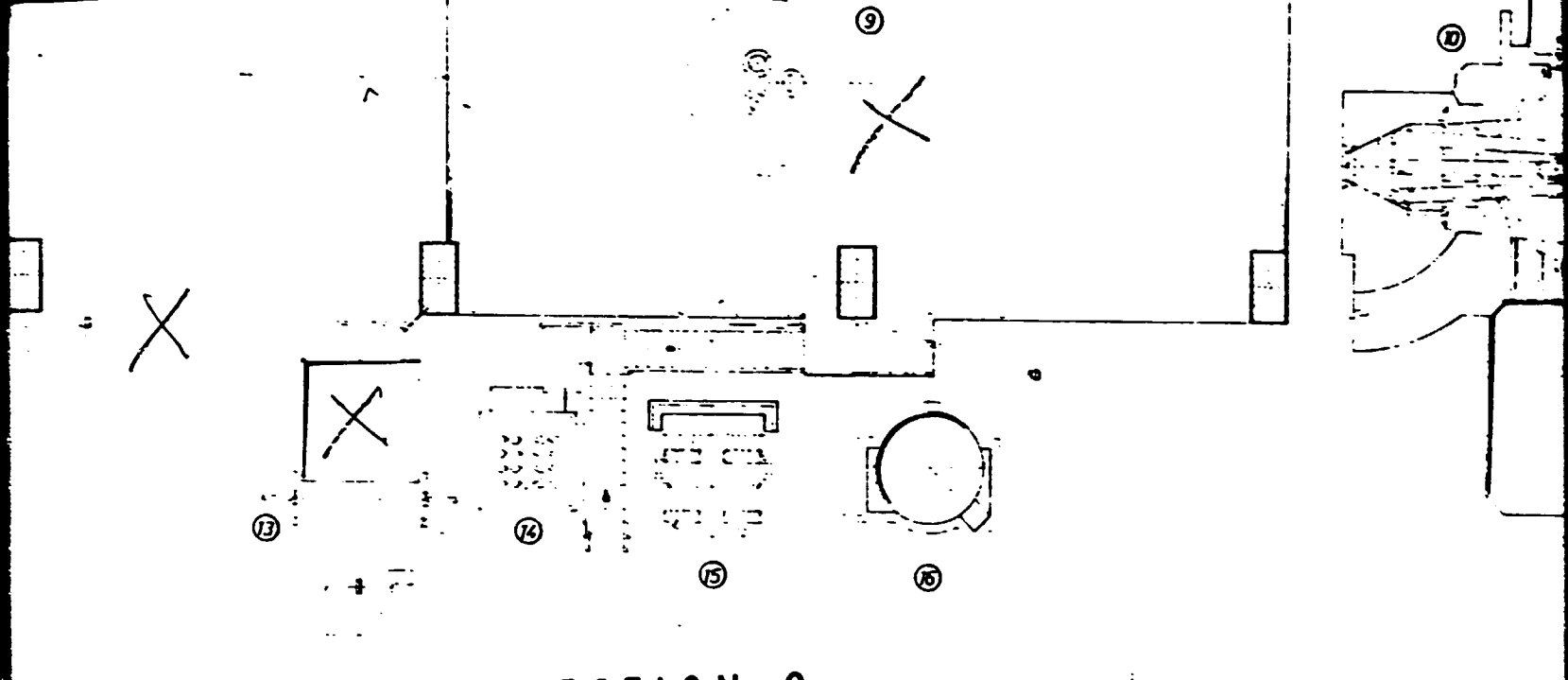




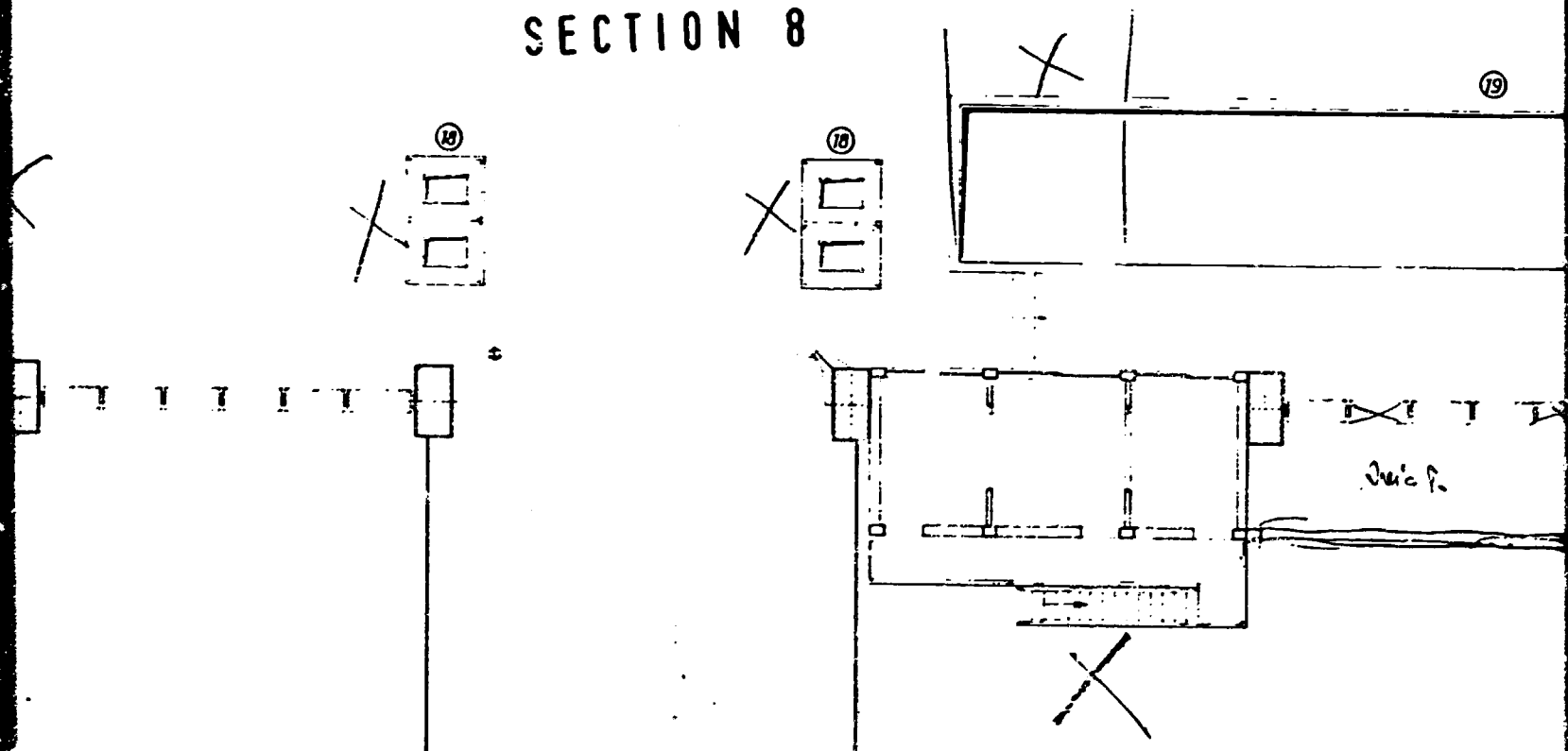
SECTION 6

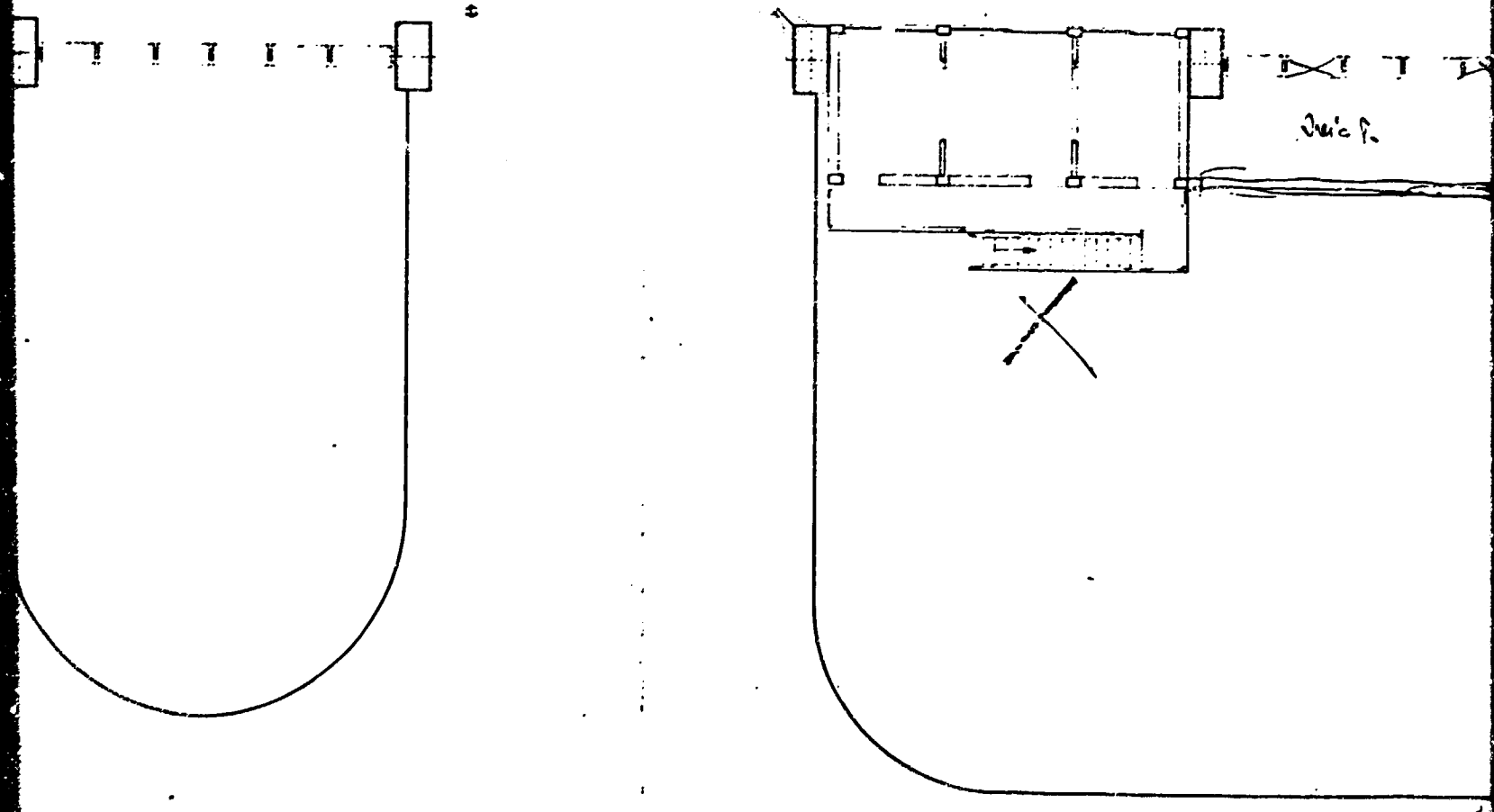
SECTION 7

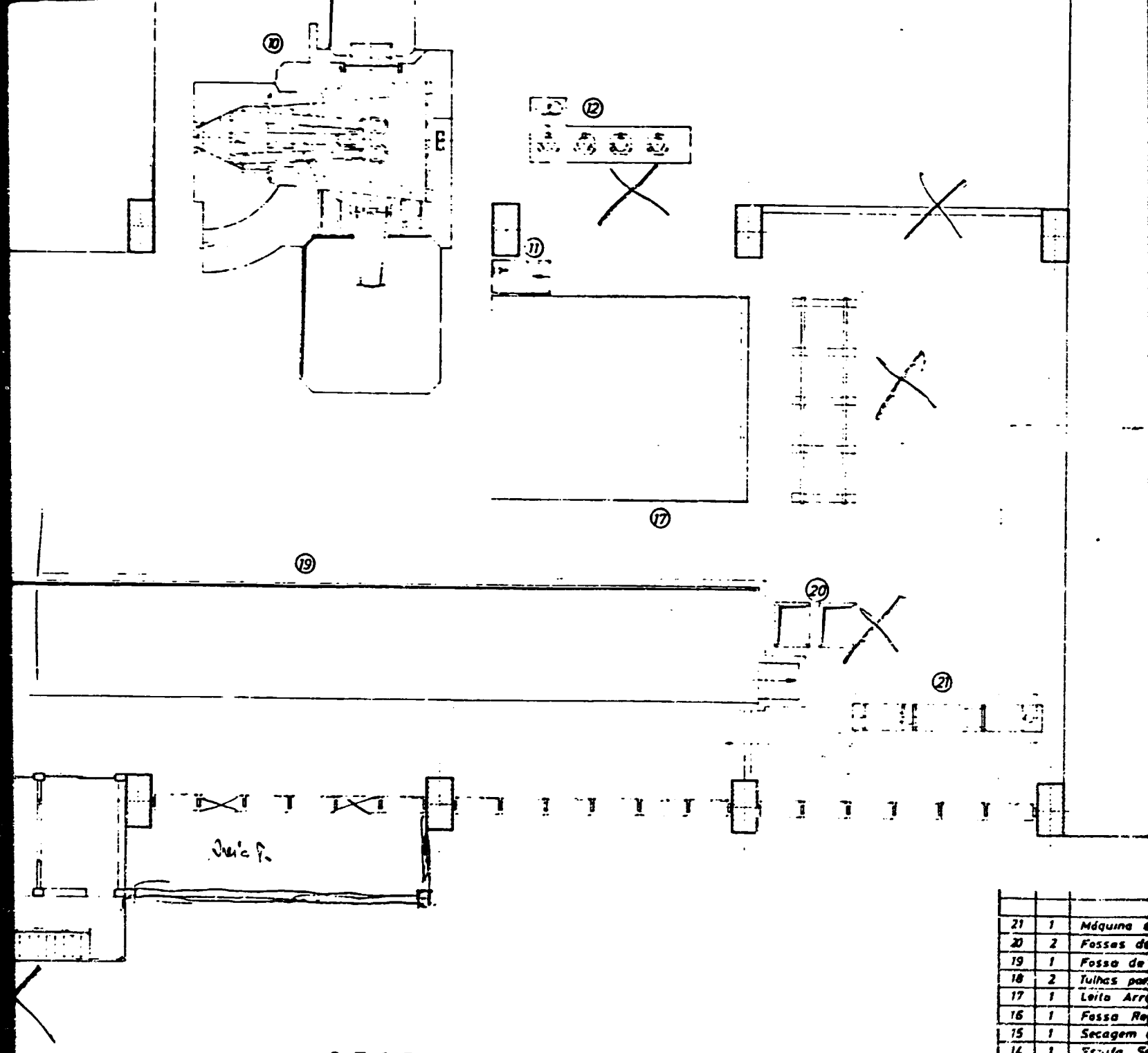




SECTION 8





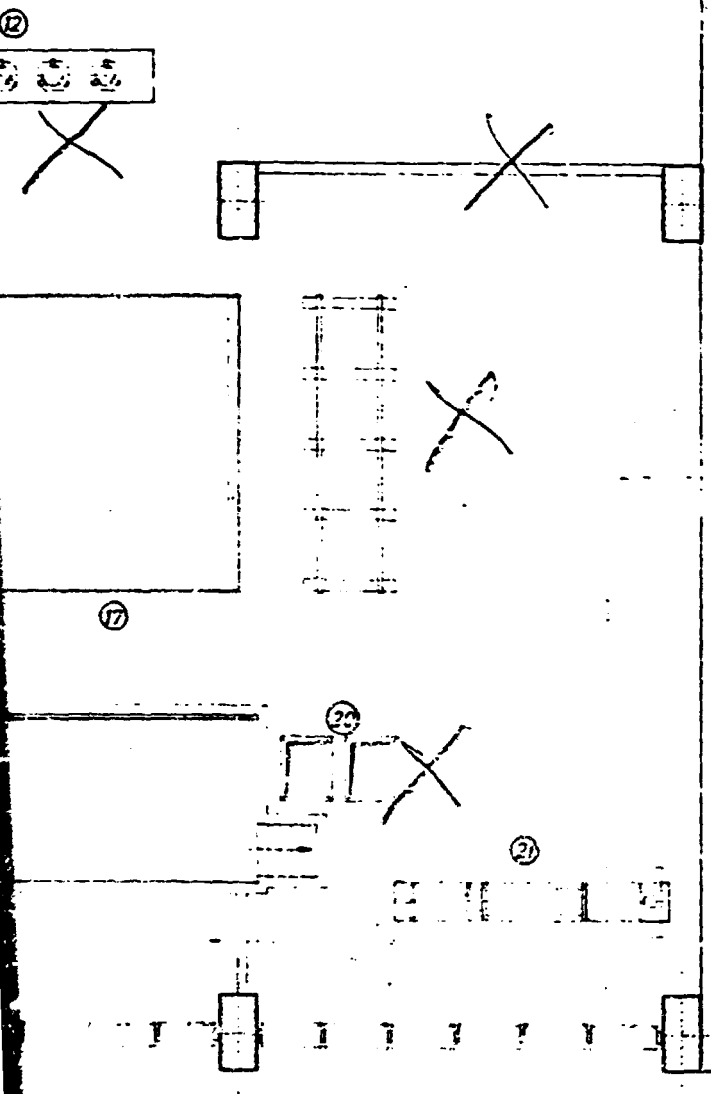


SECTION 9

Ref.	Quant.	
21	1	Máquina
20	2	Fossas
19	1	Fosso
18	2	Tulhas
17	1	Leito
16	1	Fosso
15	1	Secagem
14	1	Estufa
13	1	Fossa
12	1	Fossa
11	1	Cabine
10	1	Fuma
9	1	Moldo
8	4	Silos
7	5	Caixas
6	1	Medidor
5	1	Balança
4	2	Bancadas
3	1	Forja
2	1	Martelo
1	1	Ferramenta

SIDER

Proj.	11	FA
Des.		
Cont.	11	
Visto	11	



SECTION 10

Ref.	Quant.	Designação	Norma Desenho Nº	Material	Unit. Peso	Total Peso
21	1	Máquina de Deslingotar Curtos				
20	2	Fossas de Emergência				
19	1	Fossa de Vazamento				
18	2	Tulhas para Detritos de Vazamento				
17	1	Leito Arrefecimento Lingoteiras				
16	1	Fossa Reparação Panelas				
15	1	Secagem de Panelas				
14	1	Estufa Secagem Hastes				
13	1	Fossa Preparação Panelas				
12	1	Fosse Montagem Electrodos				
11	1	Cabina Basculamento Forno				
10	1	Forno Eléctrico a Arco				
9	1	Molde Revestimento Abóbadas				
8	4	Silos para Minérios e Cal				
7	5	Caixas de Adições				
6	1	Pirómetro				
5	1	Balança de Adições				
4	2	Bancadas				
3	1	Forja				
2	1	Martelo Pilão				
1	1	Ferramentaria				

SIDERURGIA NACIONAL S.A.R.L.

Proj.	11	FABRICA DE LUANDA — ACIARIA	SNL 2.01.0107
Des.	27/6/77	EDIFICIO DA ACIARIA	
Cont.	11	IMPLANTAÇÃO DA INSTALAÇÃO	
Visto	11	PLANTA	
		ESCALAS 1:100	Ref.: Origem:
			Anula: Anulado por:

ANNEXE VII

ELECTRICAL FURNACE CHARACTERISTICS

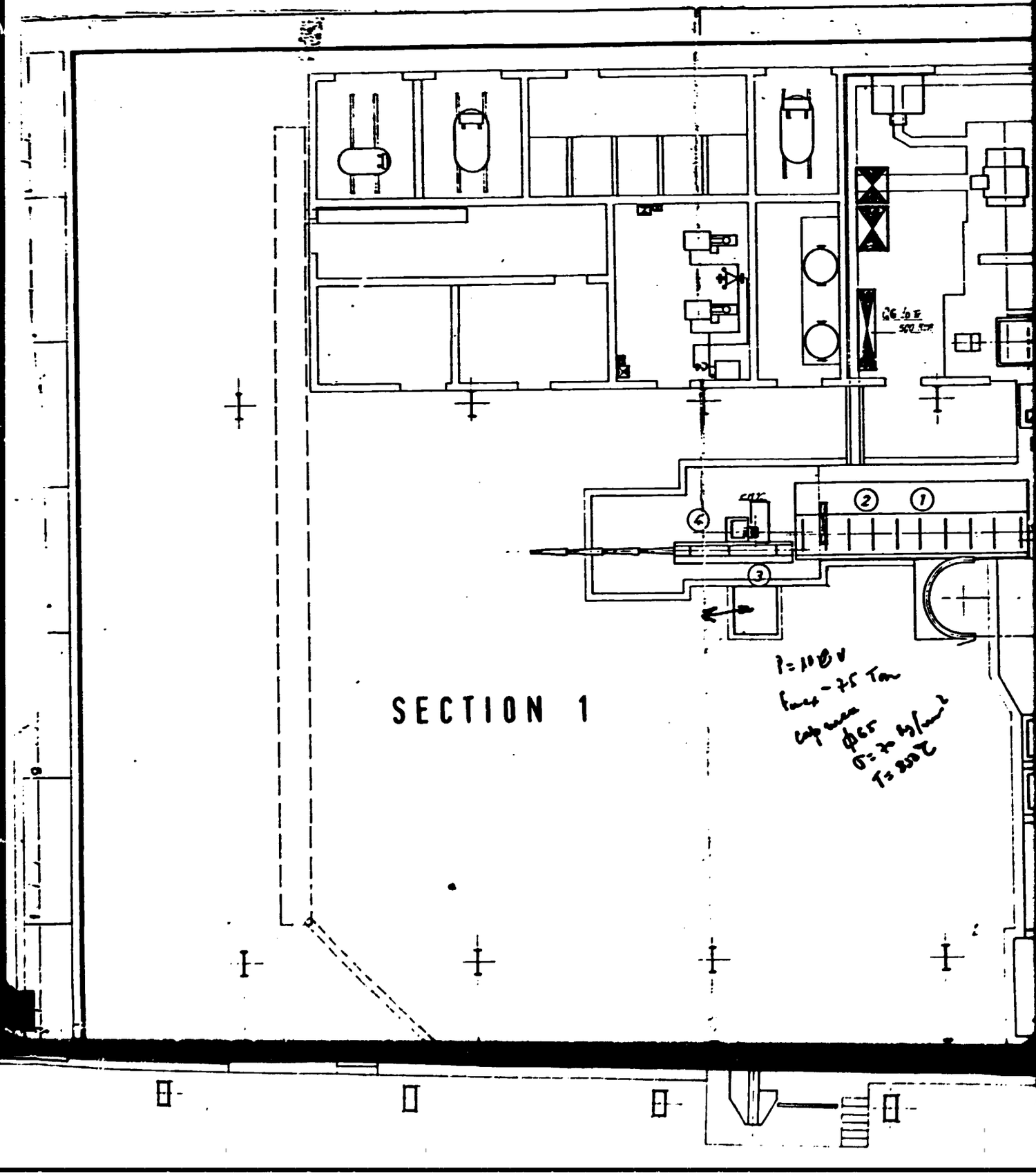
ELECTRICAL FURNACE CHARACTERISTICS

- Fabrication Year 1970
- Nominal Capacity ..... 16/18 Ton.
- Maximum Capacity with metallic charge ..... 20,5 Ton.
- Tub diameter ..... 3,460 Ton.
- Thickness of walls facing ..... 350 mm
- Interior volume of the faced tub 10,8 m3
- Interior volume of the scrap-iron basket 6,2 m3
- Circumference diameter of the electrodes ..... 900 mm
- Distance among electrodes ..... 780 mm
- Somke catching ..... Not exist
- Oxygen Utilization ..... Adjustment
- Quantity of charges/day 7/8
- Type of produced steel ..... 100% ingots
- Operation output 87%
- Casting output 95%
- Hourly production in laboration ..... 6,5 T/H
- Quantity of charging baskets 4/6
- Energy consumption (liquid steel) ..... 580 Kwh/t
- Electrodes consumption (liquid steel) ..... 6,0 Kg/t
- Lime consumption (liquid steel) ..... 35 Kg/t
- Oxygen consumption (liquid steel) 6 m3/t
- Electrodes diameters ..... 300 mm
- Medium life of the vault Si 02 ..... 55 castings
- " " of the " $Al_2 O_3$ ..... 110 "
- Medium life of walls (Magnesite) ..... 180 "

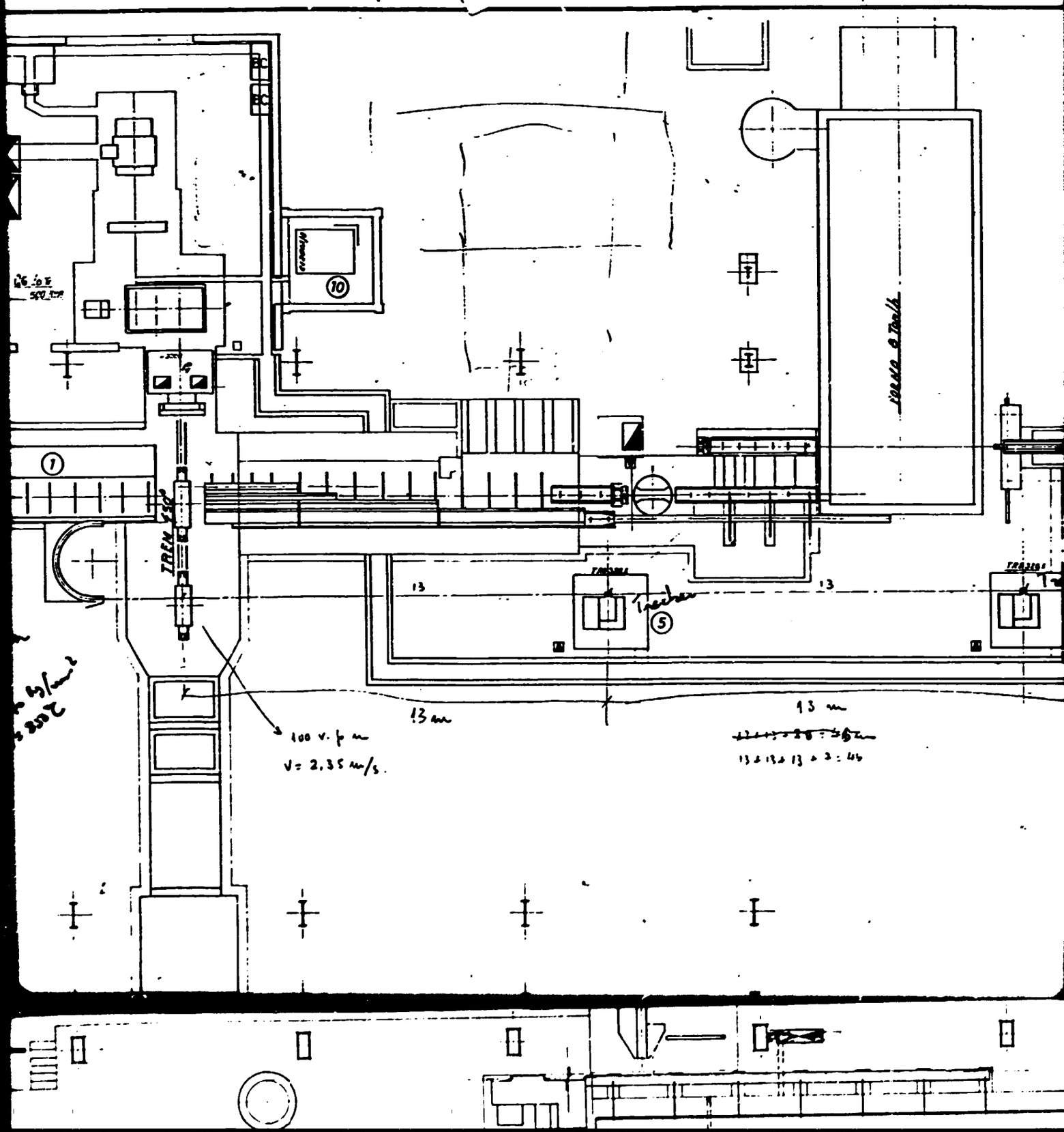
ANNEXE VIII

ROLLING MILL

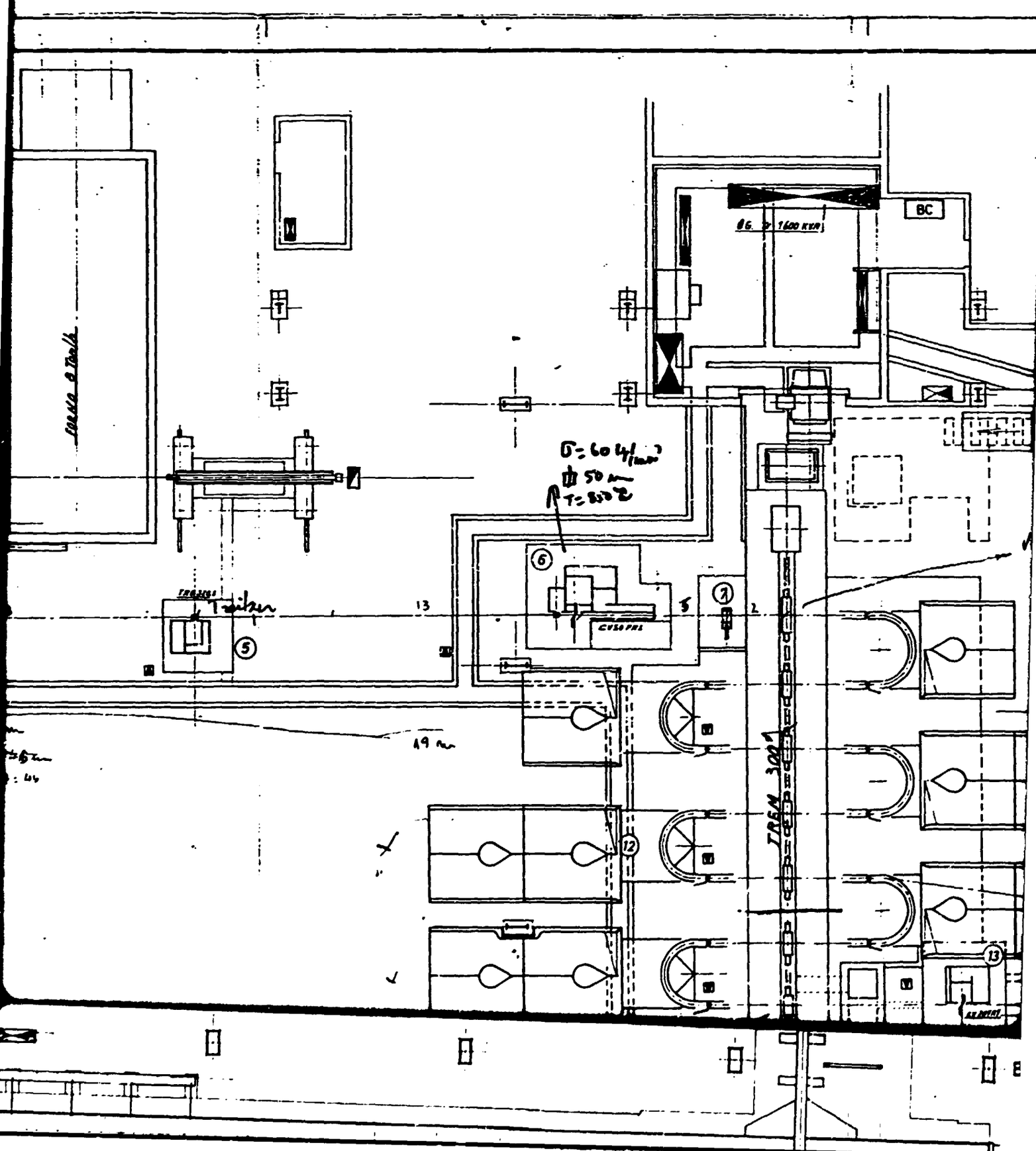
SNL 1.02.01.05


SECTION 1

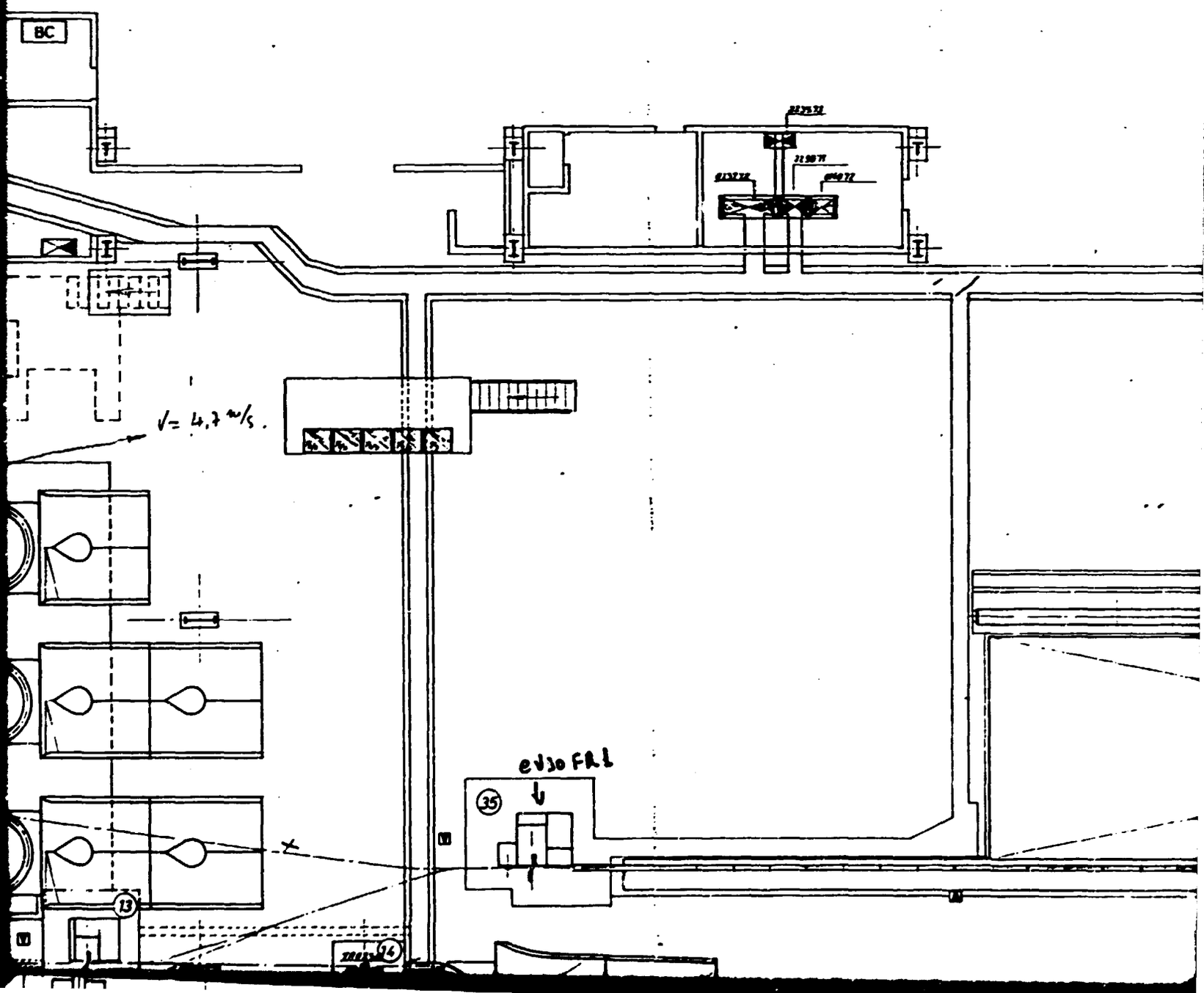
SECTION 2



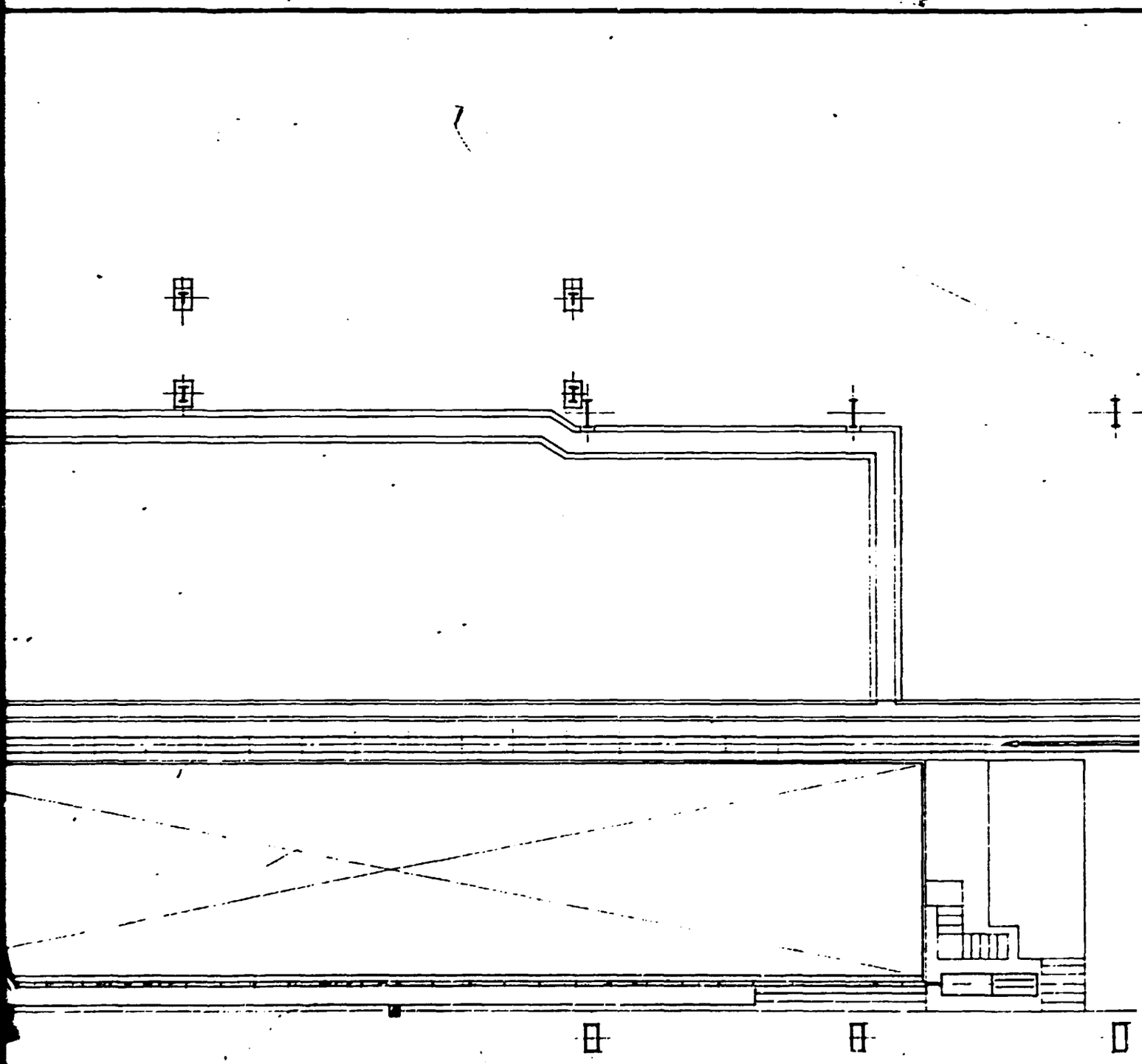
SECTION 3



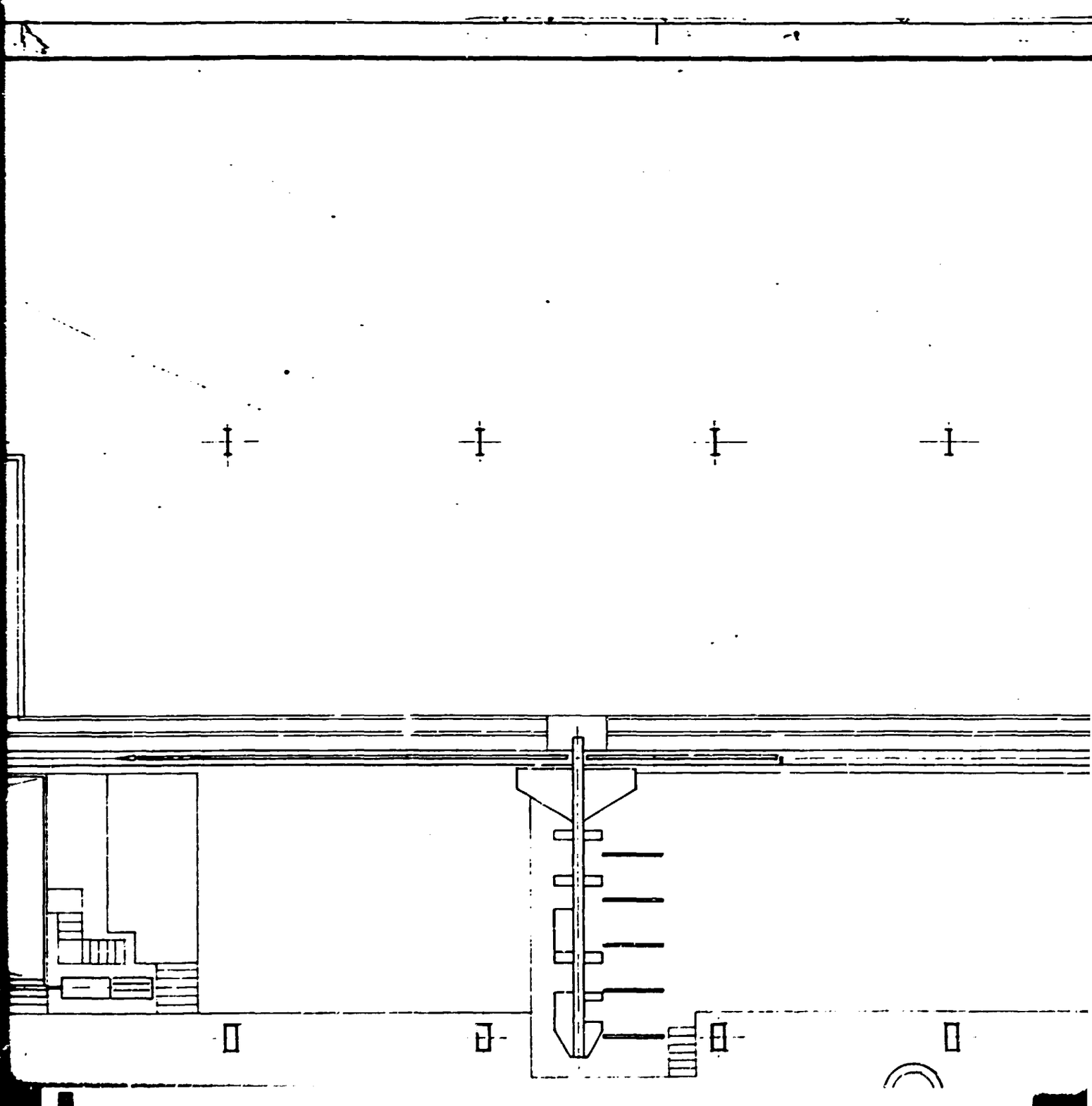
SECTION 4



SECTION 5

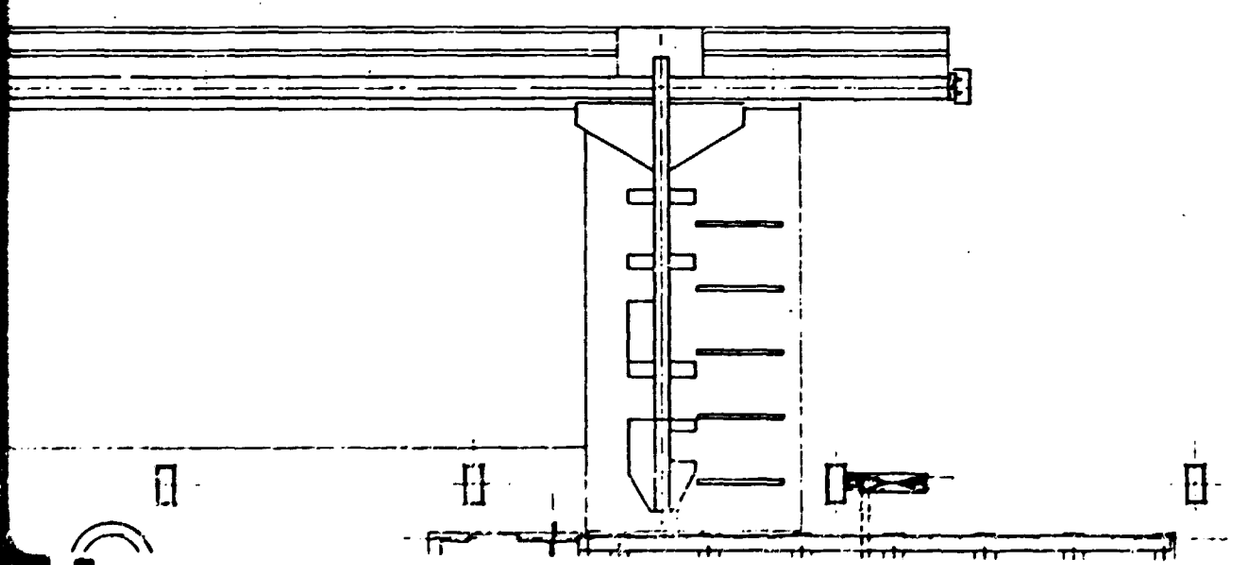


SECTION 6

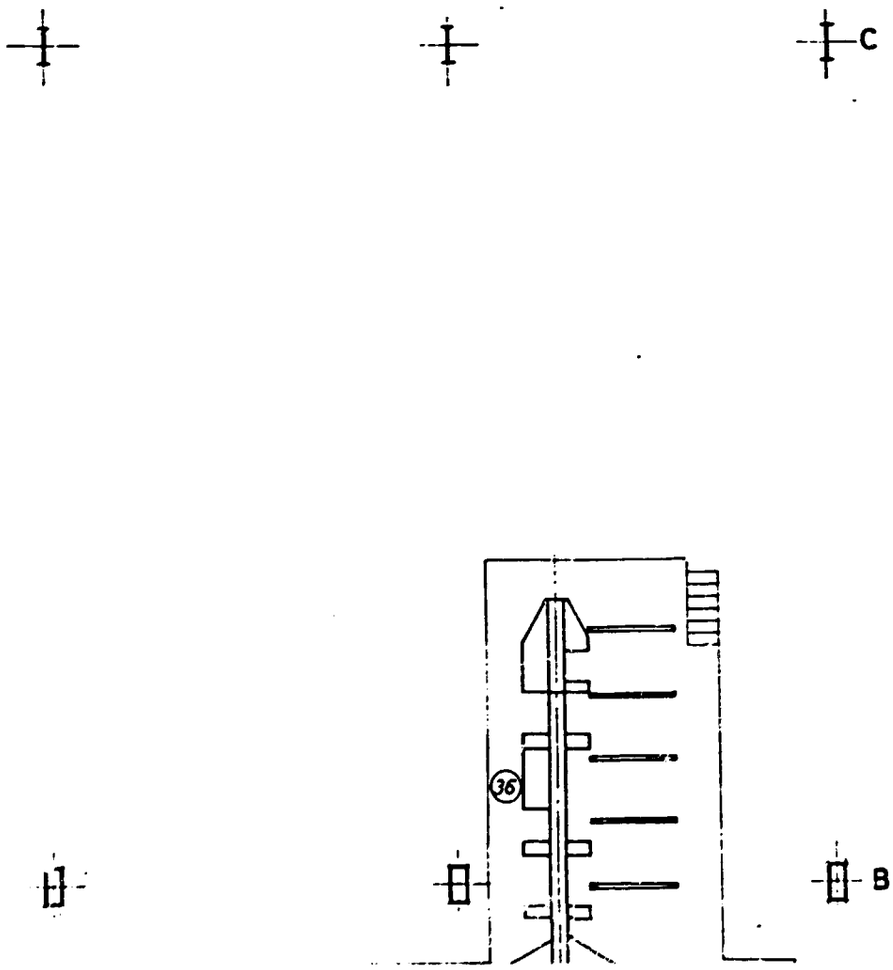


ANNEXE IX

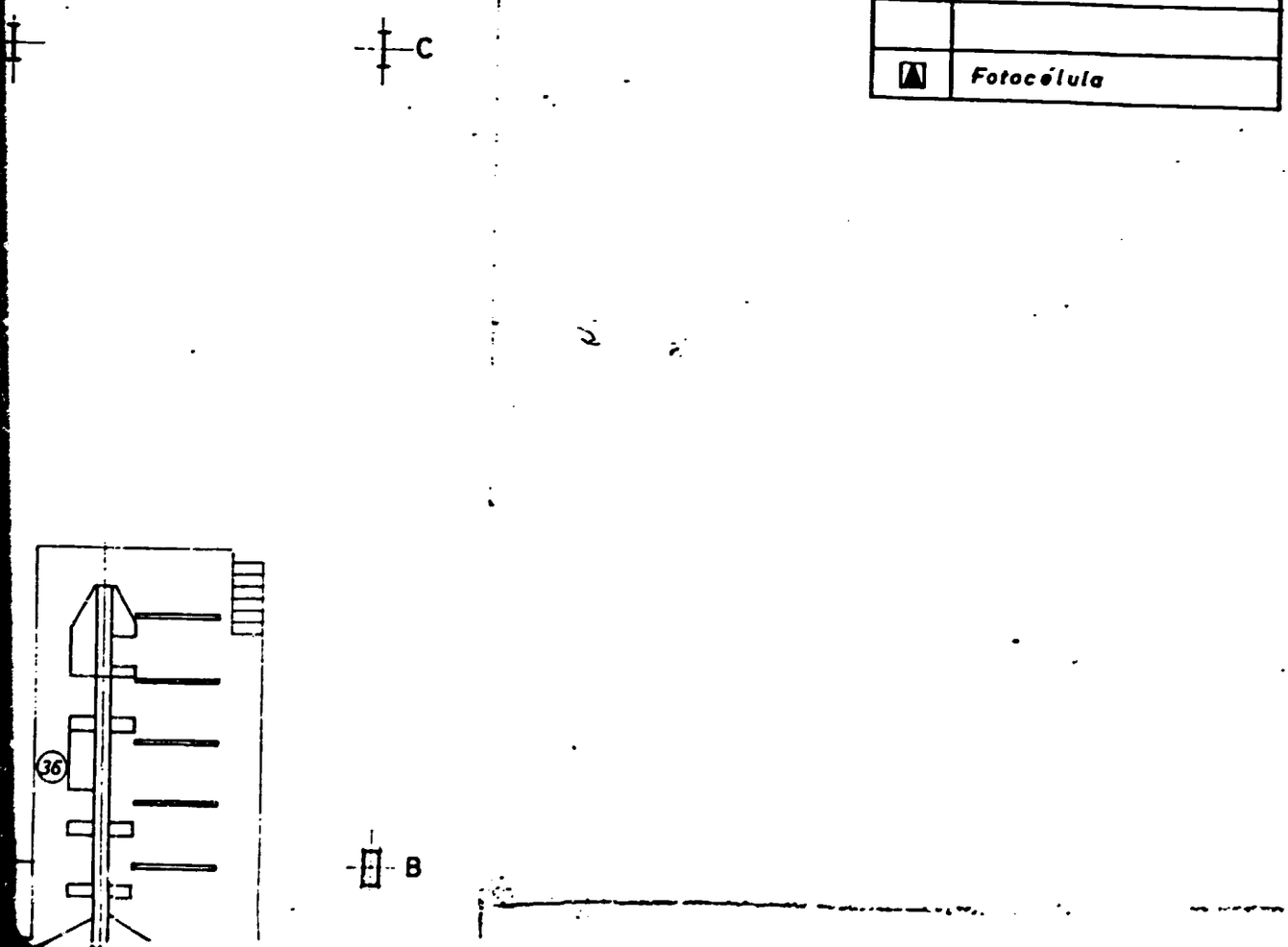
SECTION 7

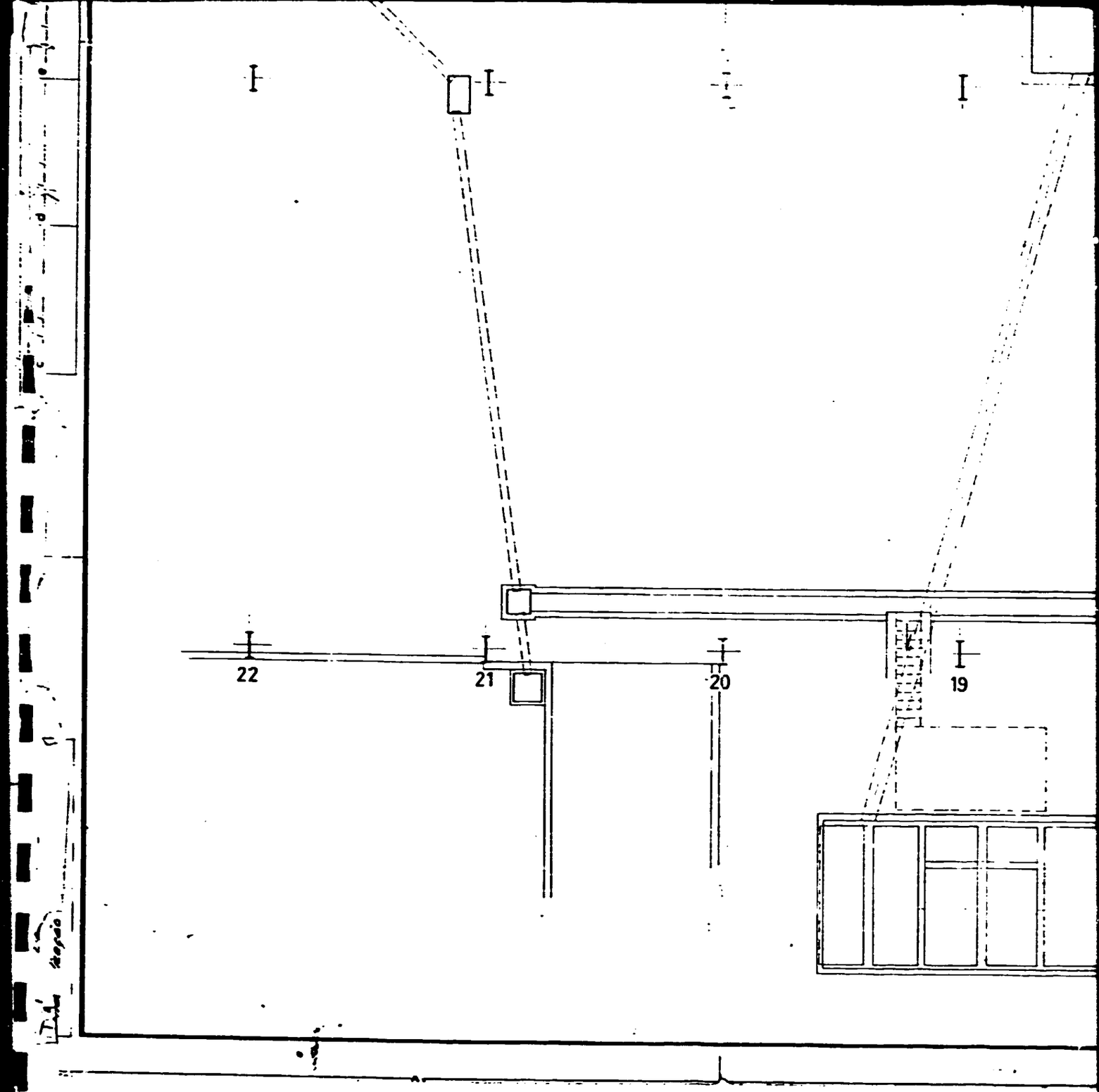


SECTION 8



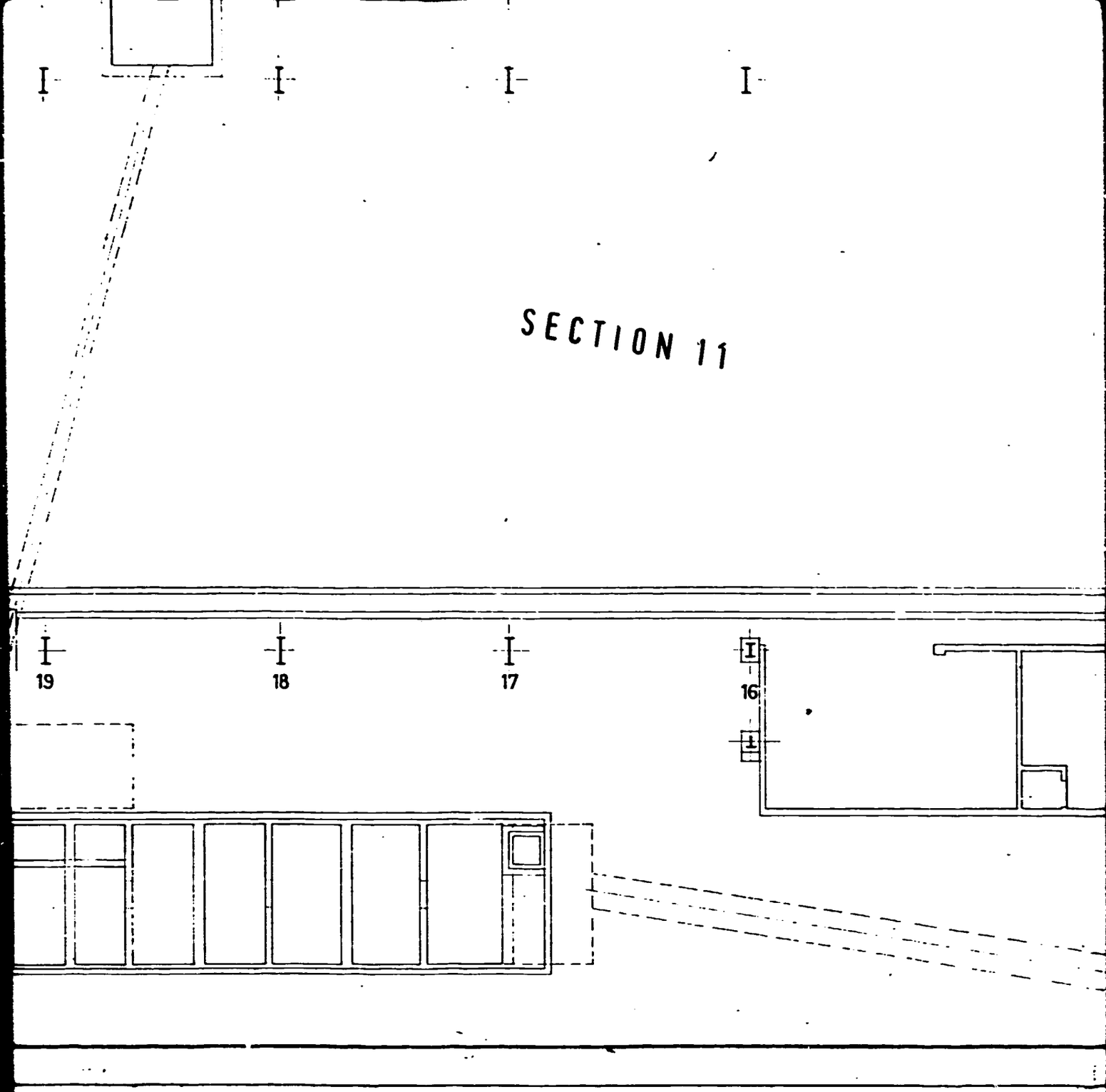
SECTION 9

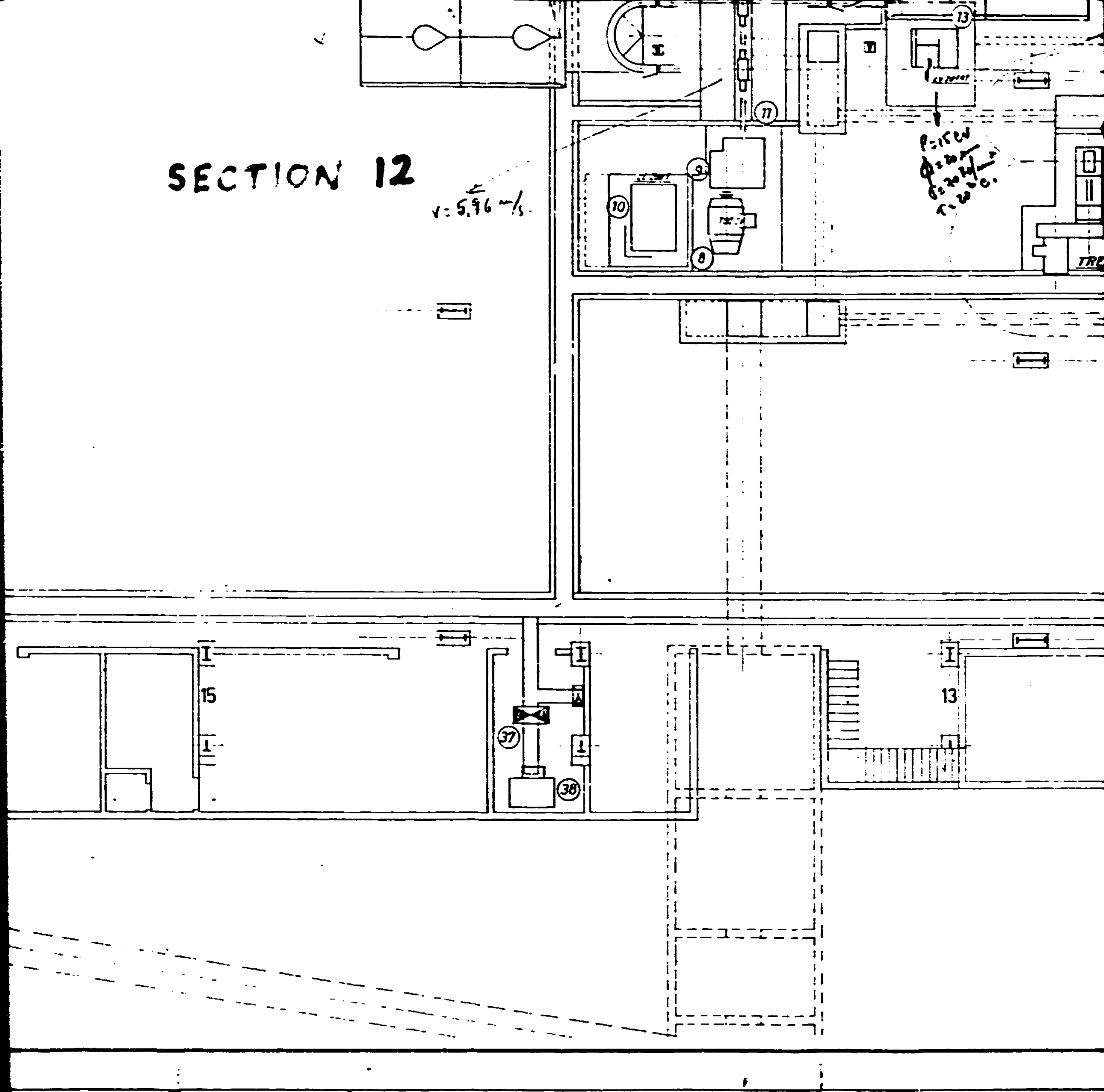

Quadro Força Motriz
Quadro de Iluminação
Mesa Comando
Fotocélula
C
B
36



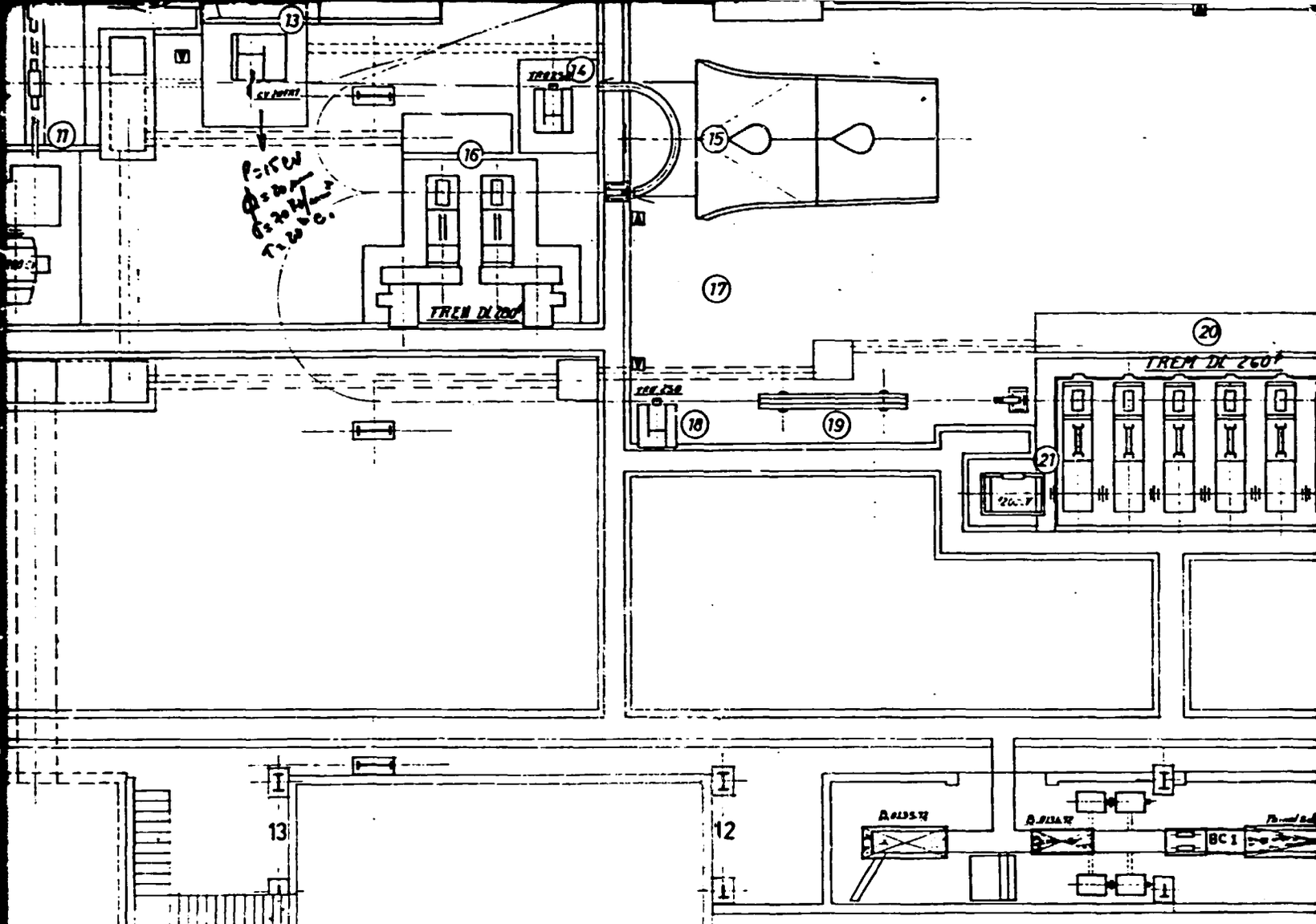
SECTION 10

ROLLING MILL

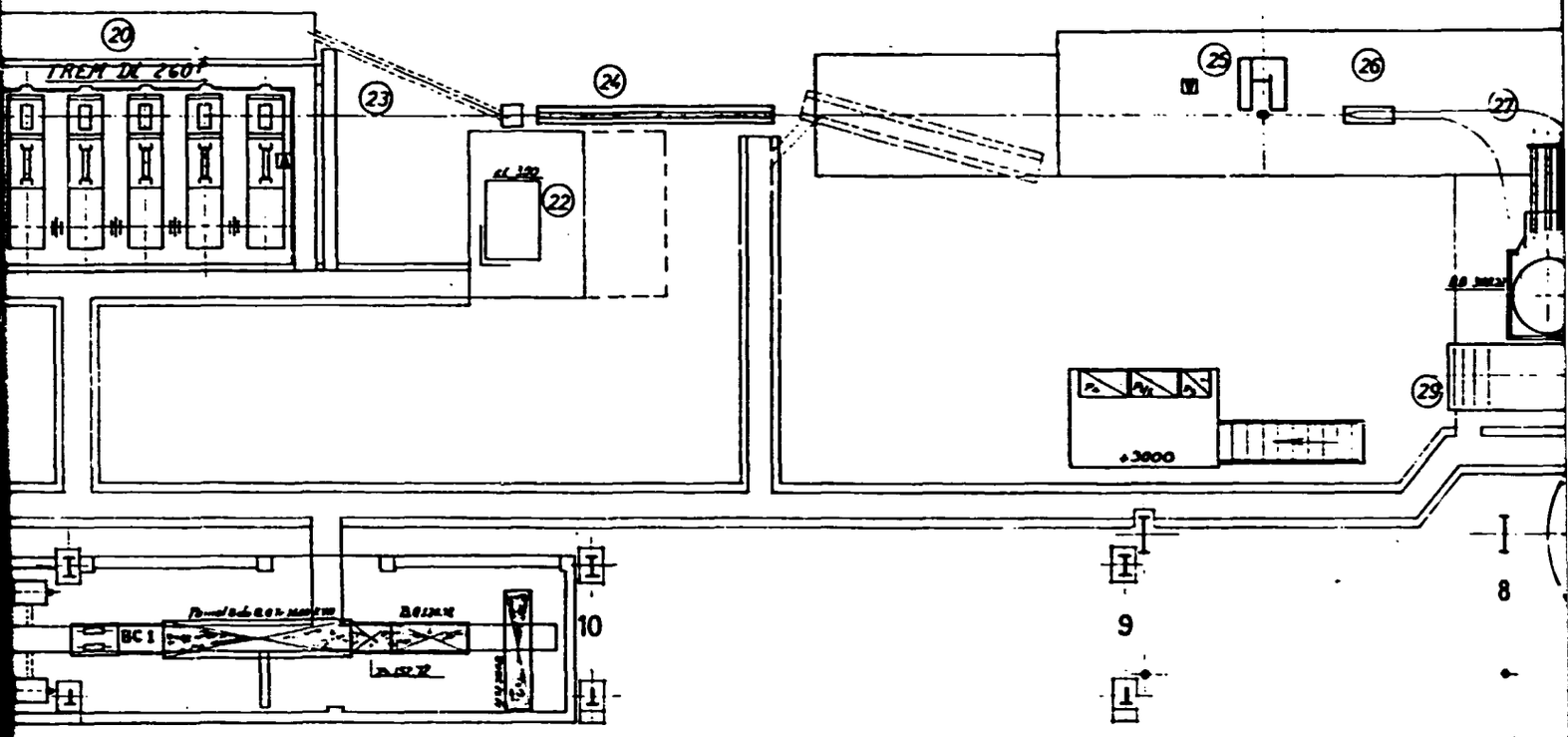

SECTION 11
19
18
17
16



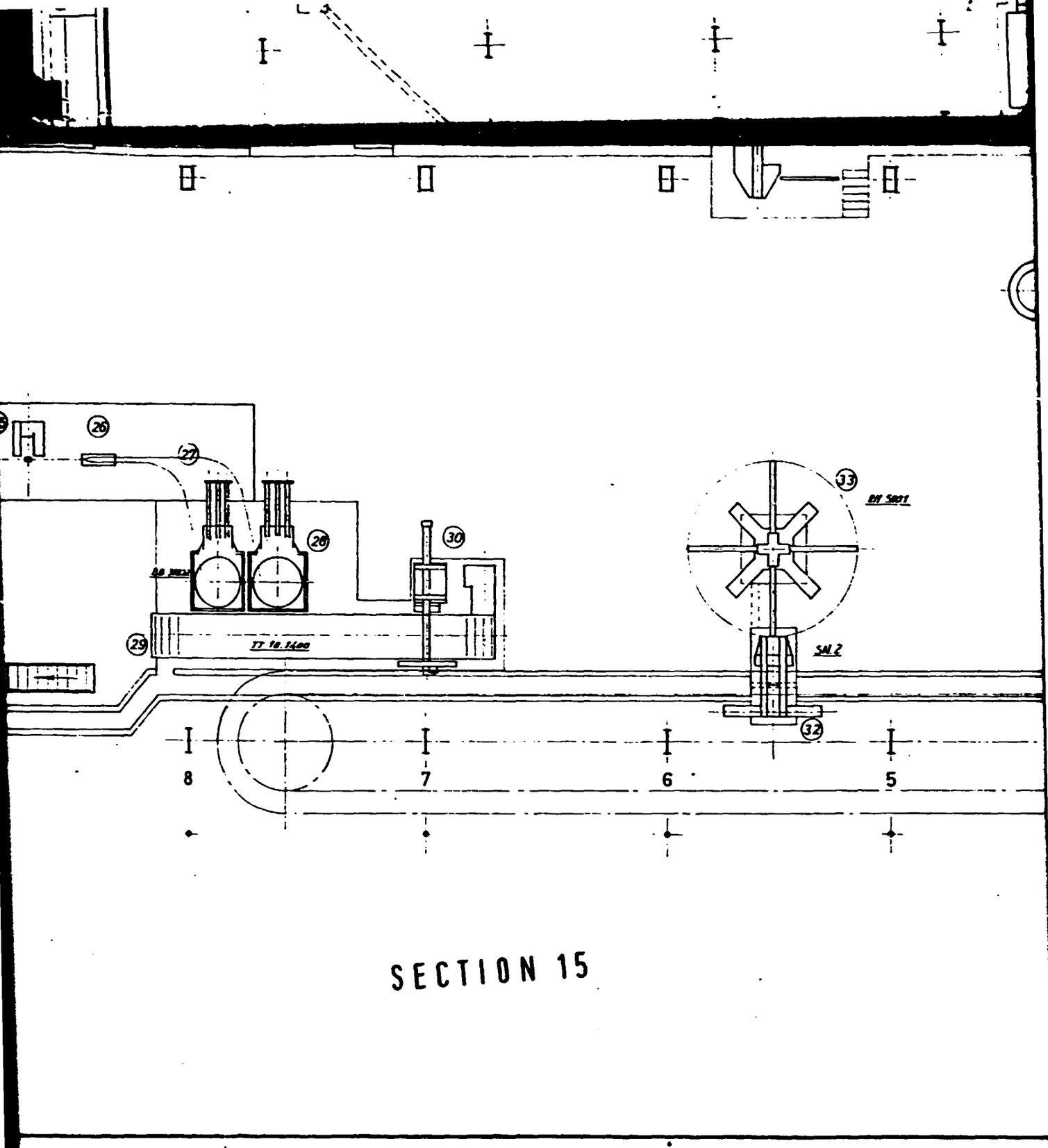
ROLLING MILL



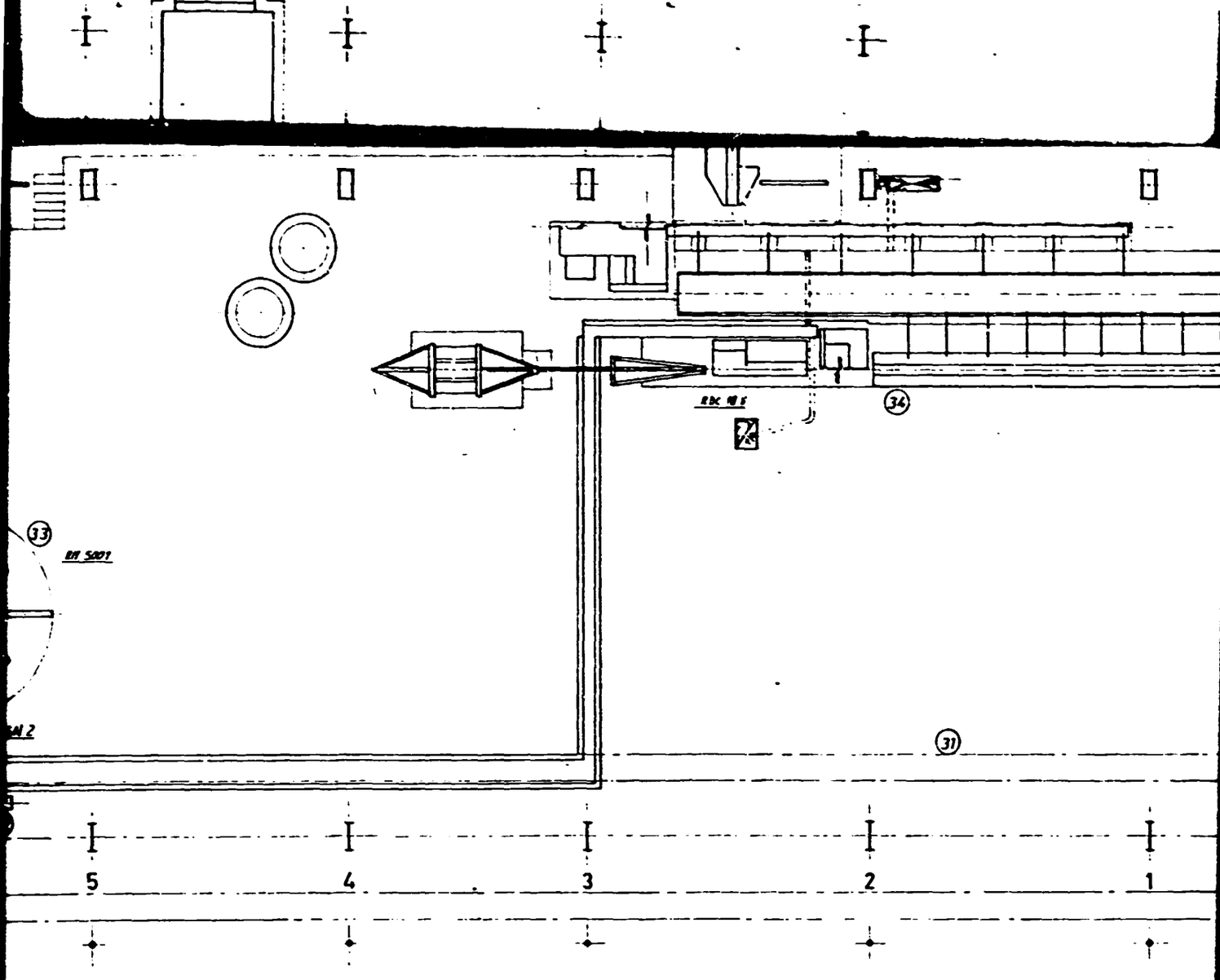
SECTION 13



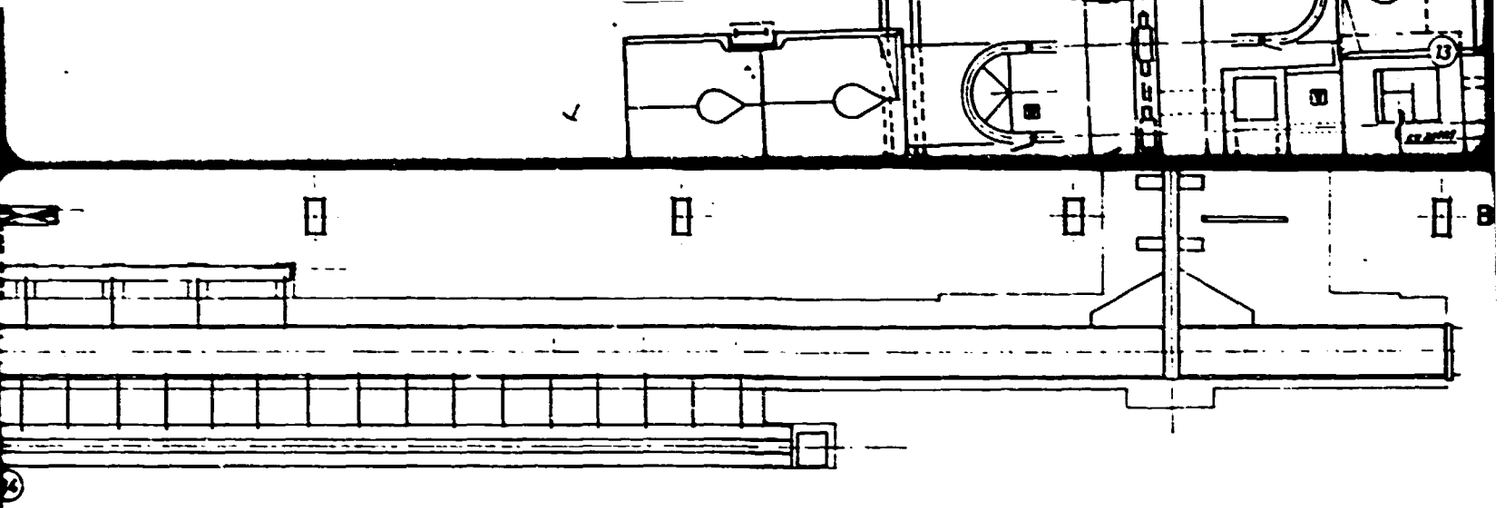
SECTION 14



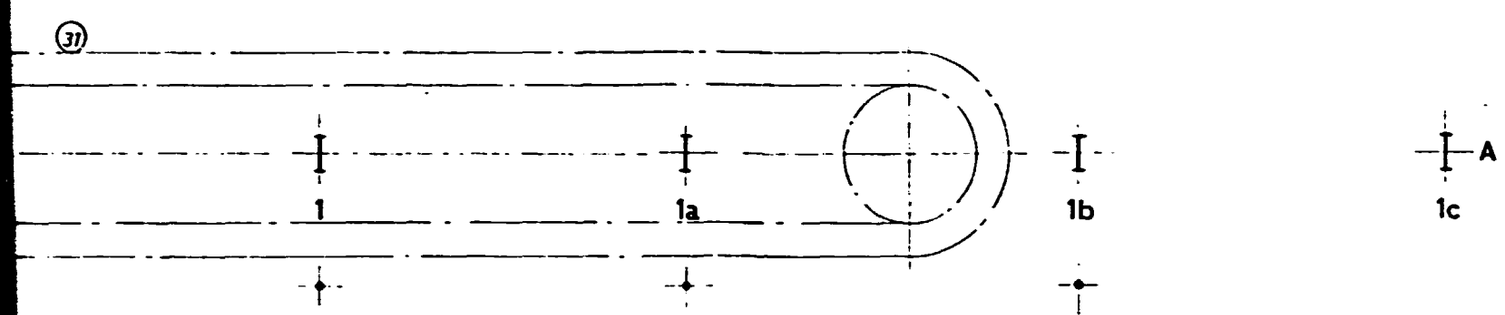
SECTION 15

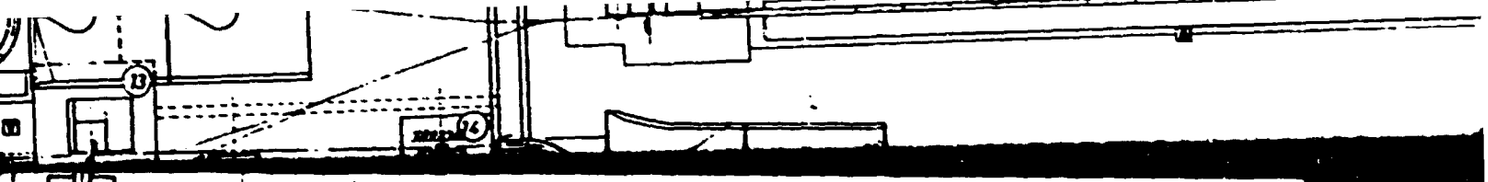


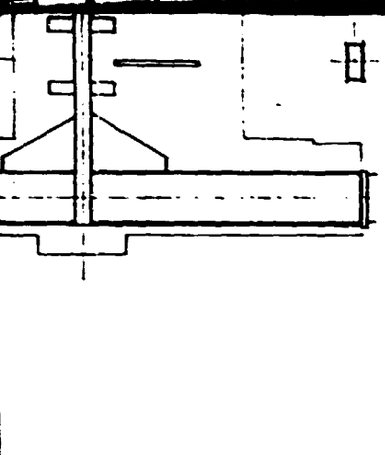
SECTION 16



SECTION 17







38	Reostato do Motor 515 KW
37	Quadro do Motor 515 KW
36	Máquina de Dobrar tipo PTL 16
35	Tesoura tipo CV 30 FR 1
34	Máquina de Endireitar e Cortar tipo RDC 10 V
33	Recolhedor Rotativo de Bobines tipo RM 500.1
32	Descarregador de Bobines tipo SM 2
31	Transportador Aéreo tipo TA 8
30	Empurrador Pneumático de Bobines
29	Transportador de Bobines tipo TT 10.14.00
28	Bobinadores tipo BB 300.22
27	Tubos de Conoução de Laminados
26	Desviador de 2 vias tipo DDA 1
25	Arrastador tipo TRO 250.1
24	Linha de Arrefecimento de Arame
23	Tubos de Condução de Laminados
22	Central de Lubrificação tipo CL 300.1
21	Motor 880 KW (1200 HP)/1450 rpm/3000V
20	Trem Acabador tipo 6 DL 260
19	Caroleta de Formação do Laço
18	Arrastador tipo TRO 250.1
17	Motores 160 KW/960 rpm/380V
16	Trem Continuo 280
15	Guia Circular
14	Arrastador tipo TRO 250.1
13	Tesoura tipo CV 20 FR 1
12	Guias Circulares
11	Acoplamento do Trem 300
10	Central de Lubrificação tipo CL 200.1
9	Caixa de Pinhões c/ Redutor Incorporado tipo GPR 300.13
8	Motor 515 KW (700 CV)/960 rpm/380 V
7	Gira-Ovais tipo GOP.1
6	Tesoura tipo CV 50 FR 1
5	Arrastador tipo TRO 320.1
4	Tesoura tipo CM 75
3	Caminho de Rolos
2	Guias para Laminagem Automática
1	Mesa Elevadora tipo PO 265.7.2.10
REF	DESIGNAÇÃO

SIDERURGIA NACIONAL S.A.R.L.

PROJ	A.I	FABRICA DE LUANDA – LAMINAGEM	Des. Orig.	Ref.
DES.	ZANETTI	AMPLIAÇÃO	SNL 1.02.0105	
CONF	I I	Localização do Equipamento Novo	a/b	
VISTO		ESCALAS 1:100	Ref. 0540S.H	Anula SNL 102.0103
			Origem: ING DANIELI (Itália)	Anulado por

SECTION 18

ANNEXE IX

ROLLING MILL

EQUIPMENTS CHARACTERISTICS

ANNEXE IX

ROLLING MILL

EQUIPMENT CHARACTERISTICS

1 - FURNACE

- Capacity ..... 8 T/H
- Ingot heating in two zones
  - Heating zone with 4 lateral burners
  - Equalizing zone with 4 frontal burners
- Fuel-oil Burners temperature ..... 70º C
- Unmoulding temperature:
  - A24 ..... ≥ 220º
  - A40 ..... ≥ 180º
- Furn. atmosphere - lightly oxidizing
- Ingot staying time in the kiln ..... 3,5 hours

2 - TRAIN 450 Ø

- Open train
- 2 boxes
  - 1 (one) box TRIO
  - 1 (one) box DUO
- Rolls with pivots supported by plastic bearings for shafts type microtex
- Vertical and axial regulation
- Engine ..... 1 500 HP
- Speed reducer box i=1/96
- Rolls ..... 100 r.p.m.
- Laminating speed . 2,35 m/s
- Rolls quality (hardness)
  - 1st box - casted steel, knothy, treated and temperated ..... 45/50 SHORE
  - 2nd box - ..... 46/48 "

ROLLING MILL

EQUIPMENT CHARACTERISTICS

(Cont.)

3 - TRAIN 300 Ø

- Open Train
- Seven boxes "TRIO" with a spongy roll
- Rolls with pivots supported by plastic bearings for shafts type microtex
- Vertical and axial regulation
- 1st to 5th boxes:
  - Engine ..... 1 000 HP
  - Reducer ..... i=1/3,2
  - r.p.m. ..... 300 (roll)
  - Laminating speed .. 4,7 m/s
- 6th to 7th boxes
  - Engine ..... 700 HP
  - Reducer ..... i=1/2,8
  - r.p.m. 340
  - Laminating speed .. 5,96 m/s
- Rolls quality (hardness)
  - 1st and 2nd boxes ..... 36 SHORE
  - 3th and 4th " ..... 45 " C
  - 5th box ..... 50 " C
  - 6th box ..... 50/55 SHORE
  - 7th box ..... 65/70 SHORE C

4 - TRAIN 280 Ø

- Continuous Train
- Two boxes "DUO" with pivots of rolls supported by rolling bearings for shafts
- Vertical and axial regulation
  - 1st box ..... r.p.m. = 425 ± 20% Adjusted
    Engine - 215 C4

ROLLING MILL

EQUIPMENT CHARACTERISTICS

(Cont.)

5 - TRAIN 260 Ø

- Continuous Train type "MORGAN"
- Vertical and axial regulation
- Six boxes "DUO" with pivots of the rolls supportes by rolling bearing for shafts
- Engine ..... 1 200 HP (3 000/V)
- r.p.m. 1 480
- Laminating speed
  - 1st box ..... r.p.m. = 604
  - 2nd " ..... " = 712
  - 3th " ..... " = 832
  - 4th " ..... " = 938
  - 5th " ..... " = 1087
  - 6th " ..... " = 1256

6 - SCISSOR

- Mark ..... DANIELI
- Type ..... CM 75
- Maximum capacity of cutting to 850º C - squared bars 65
- Engine power ..... 20 HP
- Cutting command ..... Electropneumatic

7 - SCRAPER

- Mark ..... DANIELI
- Type ..... TRO 320.1
- Rolls diameter ..... 320 mm
- Engine power ..... 20 HP
- Speed ..... variable
- Opening command and rollq closing - Electropneumatic

ROLLING MILL

EQUIPMENT CHARACTERISTICS

(Cont.)

8 - OVAL TURNINGS

- Mark ..... DANIELI
- Type ..... GDP 1
- Maximum dimensions of the ovals - 50 x 100 mm
- Command ..... Electropneumatic

9 - ELECTRICAL ENGINE 700 HP

- Mark ..... PELLIZZARI
- Type ..... GA 1000/6
- Power ..... 700 HP
- Driving ..... Boxes 6 and 7 of train 300
- Speed ..... 960 r.p.m.
- Estator tension ..... 380 V
- Rotor tension ..... 635 V
- Estator intensity ..... 915 A
- Rotor intensity ..... 500 A
- Starting ..... Switched rheostat
- Service ..... continuous

10 - LUBRICATION CENTRAL

- Type ..... CL 200.1
- Fluid ..... 200 l/min.
- Tank capacity ..... 2 000 l
- Electro-pumps power (2) ..... 7,5 HP

ROLLING MILL

EQUIPMENT CHARACTERISTICS

(Cont.)

11 - SCISSOR

- Mark ..... DANIELI
- Type ..... CV 20 FR1
- Engine power ..... 15 HP
- Cutting command ..... Electropneumatic

12 - SCRAPER

- Mark ..... DANIELI
- Type ..... TRO 250.1
- Rolls diameter ..... 250 mm
- Engine power ..... 15 HP
- Speed ..... variable
- Opening command and rolls closing - Electropneumatic

13 - ASYNCRONICAL ENGINES

- Application ..... Train 280
- Mark ..... SIEMENS
- Type 1RSL 263
- Power ..... 165 KW
- Speed ..... 975 sec./p.m. with regulation by KRAMER group
- Estator 380V, 300A
- Rotor 280V, 350A
- Cos phy 0,88
- Protection ..... IP 23
- Starting ..... By electrical resistor

ROLLING MILL

EQUIPMENT CHARACTERISTICS

(Cont.)

14 - KRAMER GROUP (2)

It is used for speed regulation (0-20%) of the train 280 driving engines and it is constituted by 2 engines

One is asyncronic and fed with a trifasic electrical power, with the main following characteristics:

- MArk ..... SIEMENS
- Type 1RA 4186
- Power ..... 30 KW
- Speed ..... 1 440 sec./p.m.
- Cos phy 0,8
- Starting ..... Direct
- Constructive range B3
- Class ..... B
- Protection ..... B 33

and the other is fed by continuous electrical power (DC) with the following main characteristics:

- Mark ..... SIEMENS
- Type ..... 1 GA 9
- Power ..... 30 KW
- Speed ..... 1 440 sec./p.m.
- Tension ..... 8 - 85V
- Separated induction ..... 12-190 V
- Constructive range ..... B 3
- Class ..... B
- Protection ..... P 33

ROLLING MILL

EQUIPMENT CHARACTERISTICS

(Cont.)

15 - COILING MACHINES

- Mark ..... DANIELI
- Type ..... BB 300.22 rotative plate type GARRETT
- Maximum coiling speed ..... 22 m/sec.
- Maximum section which can be coiled - 18 mm
- Coils dimensions ..... max. 1 200 mm / min. 600 mm
- Coils weight ..... 250 Kg

16 - COILS CONVEYOR

- Type 10,400
- Length ..... 10 m
- Wide ..... 1 400 mm
- Driving ..... engine with 7,5 HP with reducer R5

17 - AIR CONVEYOR

- Type ..... TA 8
- Total length of steel cable .. 130 m
- Diameter ..... 24 m
- Transport capacity ..... one coil of 250 Kg by cat-hooks

  Number of cat-hooks 72
- Distance among the baskets .... 1 900 mm
- Driving ..... moto-reducer 20 HP
- Heavy Wheel diameter ..... 2 860 m

18 - COILS DISCHARGER

- Type ..... SM 32 (rotative)
- Maximum capacity ..... 250 Kg
- Command ..... Electropneumatic

ROLLING MILL

EQUIPMENT CHARACTERISTICS

(Cont.)

19 - ROTARY GATHERER

- Type ..... RM 500 1
- Gathering arms ..... 4 devices to 90º
- Maximum capacity by arm ..... 5 coils of 250 Kg
- Driving ..... moto-reducer of 3 HP

20 - ROD STRAIGHTING MACHINE

- Mark ..... DANIELI
- Type ..... ROC 10-V
- Capacity ..... Rounded / 6-12 m
- Straighting speed ..... 5 m/sec.
- Cutting length ..... 7,5 to 15 m
- Number of scrapers ..... 2 of 20 HP
- " of straighteners 2
- Remover 1
- Rotary scissor ..... 1 of 10 HP

21 - BENDING MACHINES

- Mark ..... DANIELI
- Type ..... PTL 14
- Bending capacity ..... Rounded of 5 to 25 m
- Maximum length ..... 7 to 14 m
- Command ..... By gear with moto-reducer of 7,5 HP

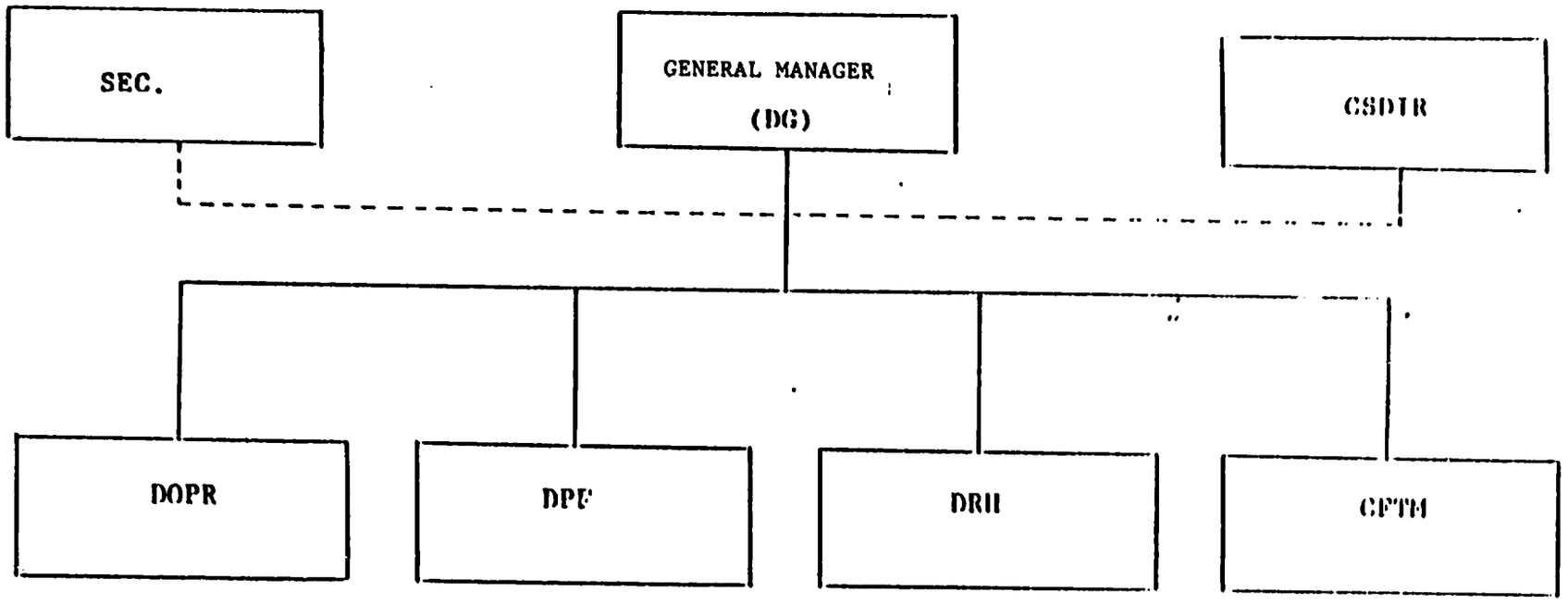
ANNEXE X

HUMAN RESOURCES

ORGANIGRAMS

S I D E R U R G I A N A C I O N A L U.E.E.

ORGANIGRAM

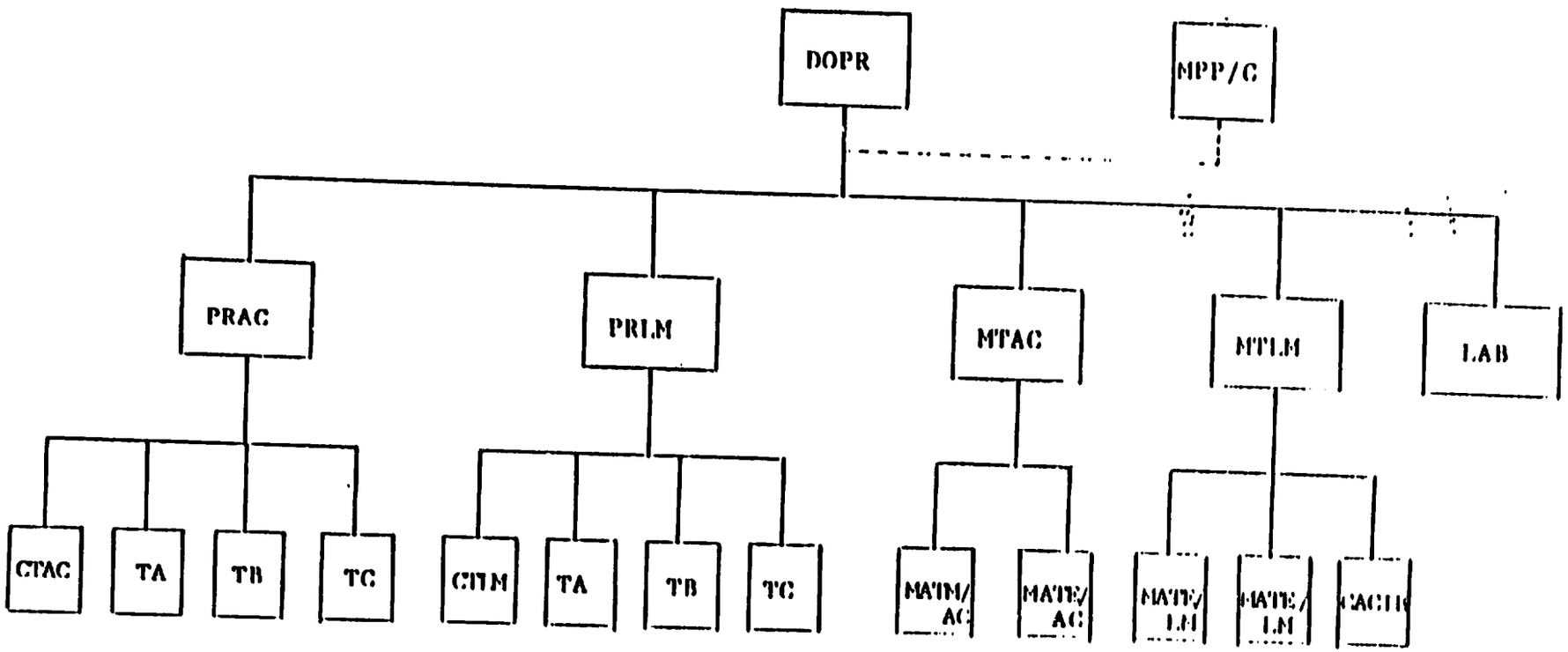


GENERAL MANAGEMENT

ANNEXE X
(1/5)

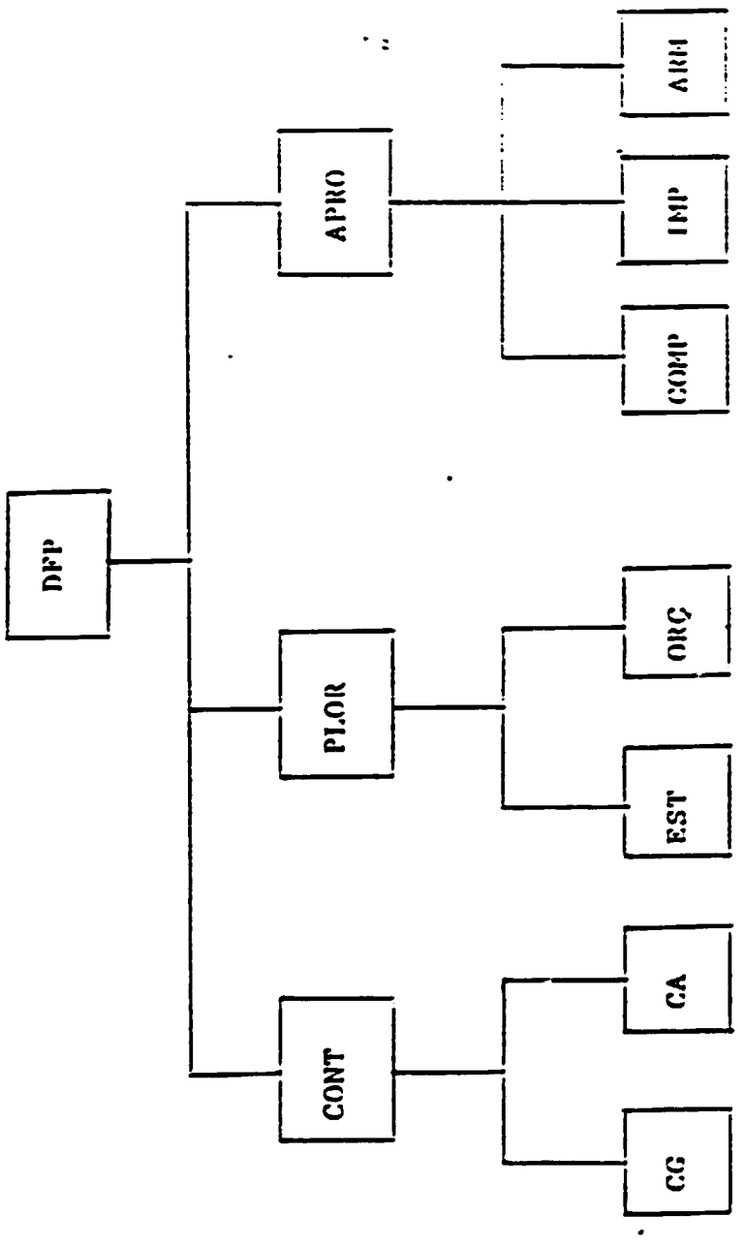
S I D E R U R G I A N A C I O N A L U.E.E.

ORGANIGRAM



PLANNING, FINANCIAL AND SUPPLY DEPARTMENT

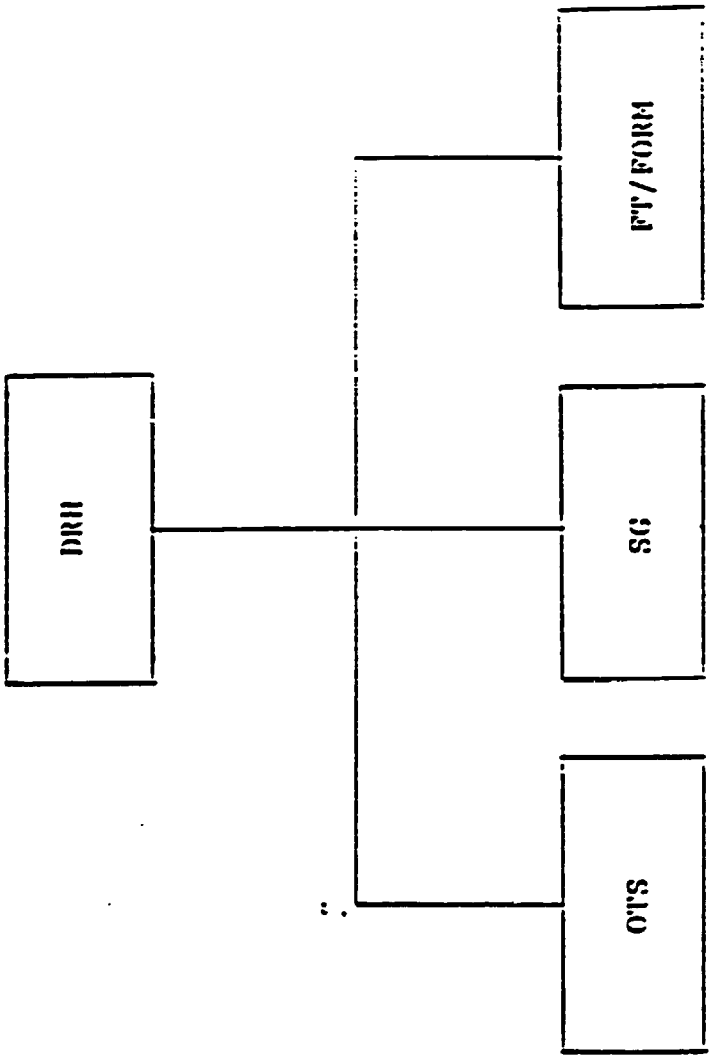
SIDERURGIA NACIONAL, E.E.



- HUMAN RESOURCES DEPARTMENT

SIDERURGIA NACIONAL U.E.E.

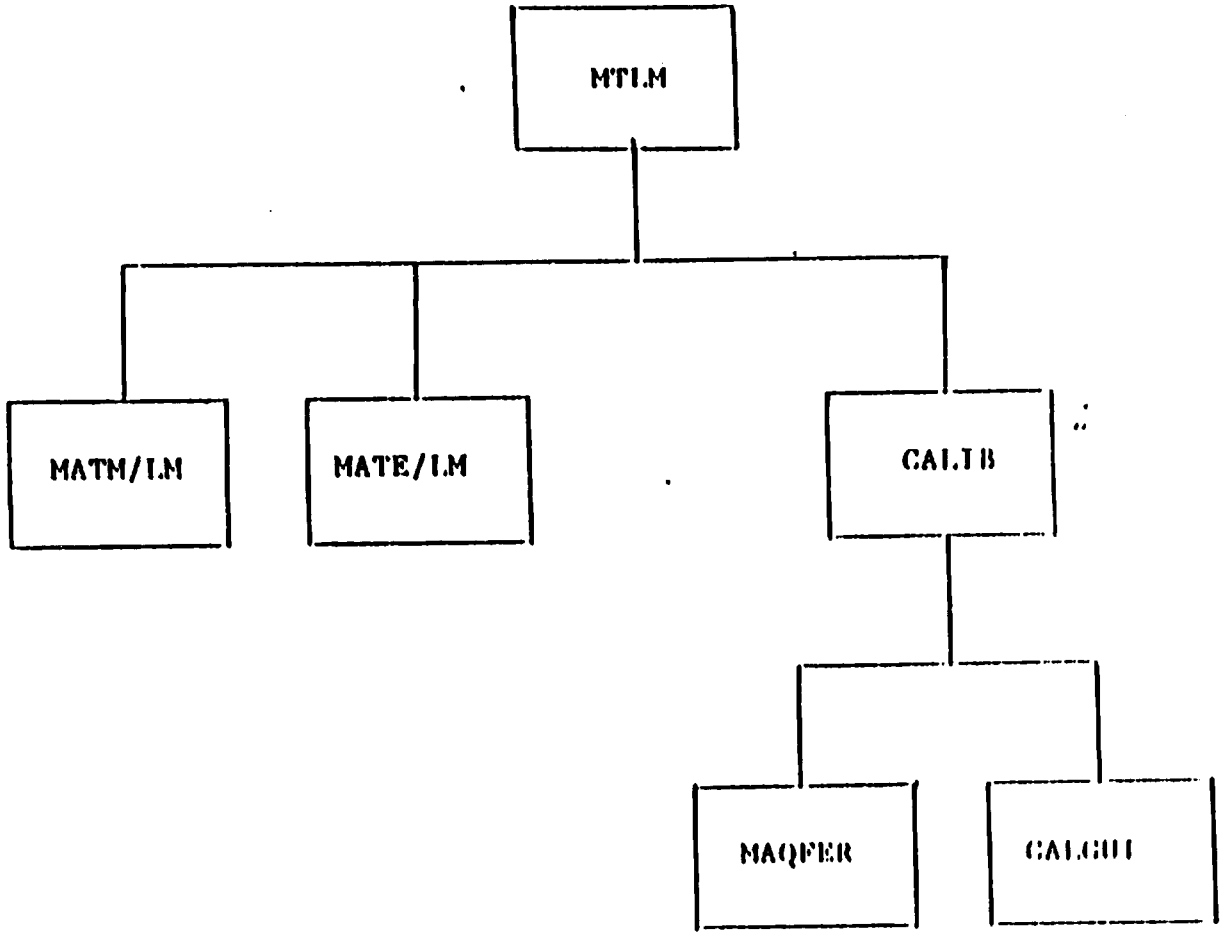
ORGANIGRAM



S I D E R U R G I A N A C I O N A L U.E.E.

ORGANIGRAM

7 - MAINTENANCE AND ROLL.MILL DEPARTMENT



ANNEXE XI

TRAINING

BUDGET ESTIMATION

ANNEXE XI

TRAINING

BUDGET ESTIMATION (USD)

	NACIONAL	FOREIGN	
1 PERSONNEL	60 000	-	
2 TRAVELS	30 000	-	
3 ACCOMMODATION	-	180 000	
4 TRAINING COSTS	-	115 000	
5 MISCELLANEOUS	-	15 000	
SUB-TOTAL	90 000	310 000	
GENERAL TOTAL			400 000

1 - PERSONNEL

20 persons x 6 months x Kz 15 000 0 KZ 1 800 000

contravalue in USD - $\frac{1\ 800\ 000}{30}$ = 60 000

2 - TRAVELS

20 persons x USD x 1 500 = USD 30 000

3 - ACCOMMODATION

20 x 6 months x 30 days x USD 50 = USD 180 000

NOTE: The value of USD 90 000 will be paid in the local money.

ANNEXE XII

LIST OF MAIN PROBLEMS

ANNEXE XII

LIST OF THE MAIN PROBLEMS

1 - STEEL MAKING PLANT

DESIGNATION	PROBLEM
Electrical Furnace	Refractaries
Transformer 6 MVA	Electrical revision
Electric coil	Bad conditions
Electrical switch-boards	Lack of equipments
Power compensation system	Damaged
Fuel-oil system	Bad conditions
Water system	Pumps
Air compresses system	Maintenance
Over-heads cranes	Electromechanics
Spare parts	Do not exist

ANNEXE XII

(Cont.)

2 - ROLLING MILL

DESIGNATION	PROBLEM
Ingots re-heating Furnace	Refractories
Auxiliar Equipment of the kiln	Some are out some service
Train 450 and driving	Electromechanics
Train 300 and "	"
Train 280 and "	"
Train 260 and "	"
Cooling bed	Deficient working
Coiling machines	Damaged
Carrousel for coils transportation	Bad working
Cooling water system	Pumps. Tank
Over-heads cranes	Maintenance lack
Straightening Machines	Damaged
Building	Key
Spares parts of 1st urgency	Do not exist

ANNEXE XII

(Cont.)

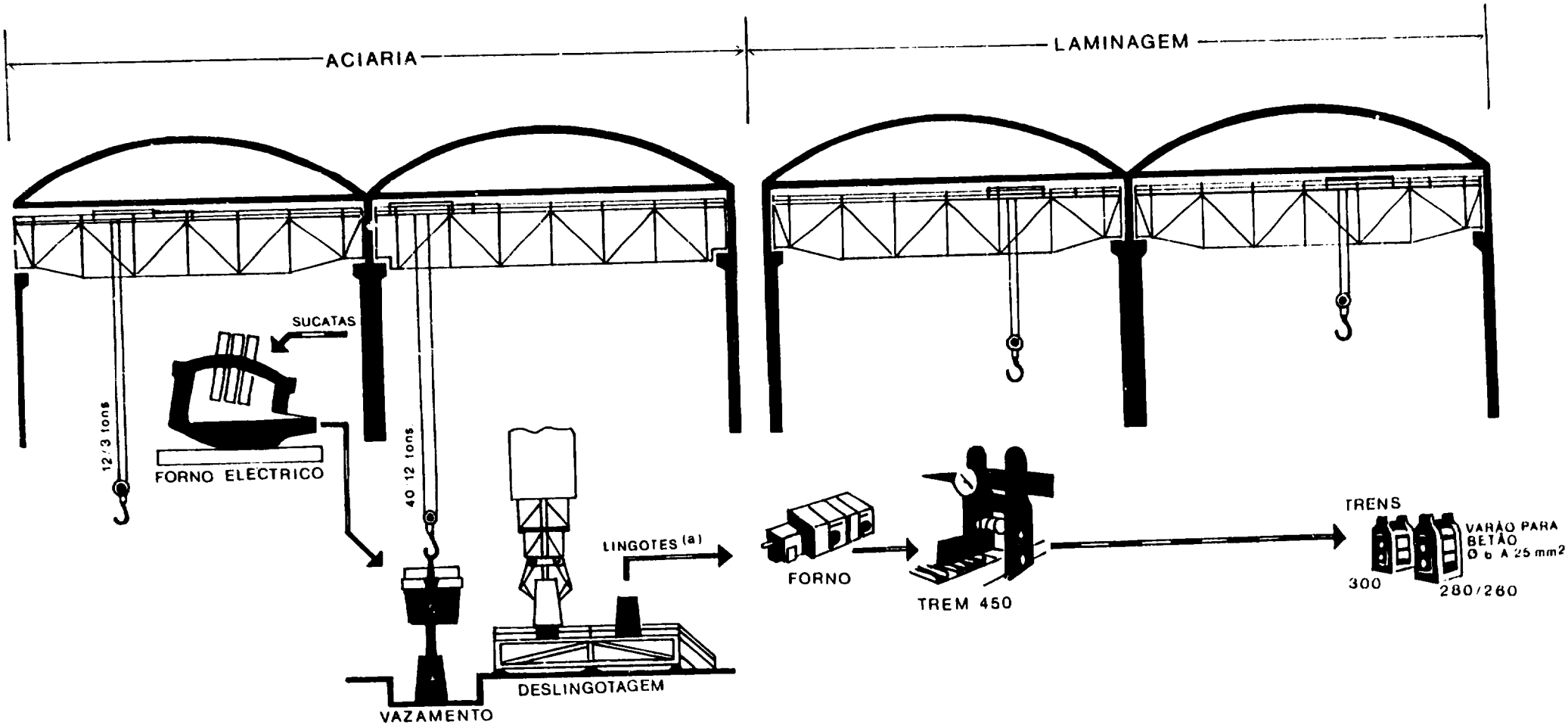
3 - AUXILIARIES

DESIGNATION	PROBLEMS
Transformer 10 MVA	Damaged
Transformer 5 MVA	"
Tools	lack
Security material	Do not exist
Social Installations	In bad conditions
Laboratories	Lack of Equipment
Transport material	Damaged
4 - MANAGEMENT	Deficient
5 - PERSONNEL	Without qualification

ANNEXE XIII

SCHEDULE DIAGRAM

DIAGRAMA ESQUEMÁTICO



(a) - 120 X 120 mm, 1500 mm 150 Kg

ANEXO XIII