PRE-FEASIBILITY REPORT

FOR

CONTINUOUS CAST COPPER ROD PLANT:CCR-3

HINDALCO INDUSTRIES LIMITED
(UNIT: BIRLA COPPER)
PO: DAHEJ, LAKHIGAM
DIST: BHARUCH - 392 130

INDEX

01 INTRODUCTION

1.01 General

Birla Copper (a unit of Hindalco Industries Limited) has set up a mega green field Copper Smelting and Refining complex at Dahej in Bharuch district of Gujarat. Hindalco Industries Ltd. is a flagship company of Aditya Birla Group. Birla Copper is one of the world's largest copper smelting & refining complex at a single location and possibly the most integrated in terms of captive infrastructure and by-product streams. The complex employs 15 technologies from leading world suppliers and own a captive deep sea all weather Jetty along with power plants.

1.02 Existing Manufacturing Plants:

Following are the main manufacturing plants in the existing integrated copper smelter complex.

Plant	Technology	Capacity
Copper Smelter Plant	1. Outo Kumpu's Flash Technology, Finland. 2. Ausmelt Technology, Australia. 3. Mistibushi Technology, Japan.	5,00,000 TPA
Copper Refinery	Mount Isa Mines, Australia.	5,00,000 TPA
Sulphuric Acid plant	Monsanto, USA.	14,70,000 TPA
Phosphoric Acid plant	SNC Lavalin, Belgium.	3,60,000 TPA
Precious Metal Recovery plant	Outo Kumpu Engg, Finland.	26.0 TPA Gold 200 TPA Silver
DAP/NPK fertilizer plant	INCRO, Spain.	8,00,000 TPA
Copper Cast Rod Plant	South Wire, USA.	2,40,000 TPA
Captive Power Plants	Krupp & DLF	145.6 MW
Oxygen plant	Prax Air, USA & Air Liquid, France	2200 TPD

The GPCB has renewed the Common Consent & Authorization vide order No. AWH-62117 dated 11-06-2014 which is valid up to 02/03/2020.

The proposed expansion is for increase in the capacity of Continuous Cast Copper Rod from 2,40,000 TPA to 4,84,000 TPA by setting up of a new Continuous Cast Copper Rod plant of 2,44,000 TPA capacity in the existing Copper smelter complex.

Name of Product	Capacity TPA		
	Existing	Proposed	Total
Continuous Cast Copper Rod *	2,40,000	2,44,000 *	4,84,000
Copper Cathode	5,00,000	Nil	5,00,000
Sulphuric Acid	14,70,000	Nil	14,70,000
Phosphoric Acid	3,60,000	Nil	3,60,000
DAP/NPK fertilizer	8,72,000	Nil	8,72,000
Precious Metal - Gold	26.0	Nil	26.0
Precious Metal - Silver	200	Nil	200
Oxygen (Tech) (TPM)	65000	Nil	65000
Captive Power (MW)	145.6	Nil	145.6

***** The product 20334 TPM (2,44,000 TPA) will be copper rods (Dia. 8 mm to 26 mm) in the form of coils. The coil ID will be 1650 mm & OD will be 1000 mm. Coil weight will be 2.0 – 5.0 MT.

1.03 Objectives of Pre-feasibility report:

The aim of preparation of report is to provide basic and essential information to understand generation of environmental impacts, their effects and control measures while hearing at the first instance and also as per the guidelines of seeking Environmental Clearance. The proposed project is covered under Category 'A' as per the schedule of EIA Notification 2006.

02 PROJECT PROFILE

2.1 Location

The proposed Continuous Cast Copper Rod Plant shall be set up in the existing Copper smelter complex located at 21° 42'N latitude and 72° 33'E longitude near Dahej, about 55 km west of Bharuch city in Gujarat. The site is approachable from state highway, connecting Dahej and Bharuch. The nearest National Highway (NH-8) passes about 45 km from Dahej. Narmada River is on the south of the site nearly 3.5 km away and the site is 500 m from high water tide line of Gulf of Cambay.

2.2 Resource Requirement

2.2.1 Land:

Total land area under possession of Birla Copper is 327 Ha. Total land area will be required for the setting up the proposed Continuous Cast Copper Rod Plant is 130 meter x 36 meter (4680 SQM).

2.2.2 Raw Materials:

Key raw materials required for the manufacturing of Continuous Cast Copper Rod Plant is Electrolytic grade Copper Cathodes conforming to international quality standards BS 6017 1981 (1989) Cu-Cath-1/ASTM B-115 (1999). These are square shaped with purity levels of >99.99% copper and are characterized by high grade with lowest level of various group and individual impurities.

Requirement of Raw Materials:

Raw Materials	Unit	Unit Consumption per MT	Quantity (TPM)		Total
			Existing	Proposed	
Copper Cathode*	MT	1.00	20000	20334	40334
IPA Solution	Ltr.	0.75	1500	1525	3025
Coolant	Ltr.	0.0625	1250	1271	2521

***** This will consumed from existing refineries.

2.2.3 Water:

The fresh water supply to Birla Copper is made available by GIDC. The existing water supply as agreed by GIDC is 5.5 MGD. The demand of water for the complex is 40,000 KL /day with full production capacity utilization. The source of water supplied to Dahej Industrial area by GIDC is the upstream of river Narmada. GIDC has agreed to provide total water requirement up to 11 MGD for Birla Copper Complex. Thus the complete water demand for the project will be met from GIDC supply. The water requirement for the manufacturing of proposed CCR plant will be approximately 400 KL/Day.

2.2.4 Power:

Power requirement for the project will be about 2500 KW which will be sourced from existing captive power plants or proposed to be met from Gujarat Electricity Board supply. Two DG sets of 2.5 MW capacities are already provided at site for power backup, which will be used only during power failure.

2.2.5 Fuel:

Liquified Natural Gas will be used as a fuel in plant and the consumption will be 27000 SCM / Day. The gas will be procured from GAIL, GSPL & IOCL through pipelines.

2.2.6 Manpower:

Total number of employees will be required 43 including managers, operators and workers.

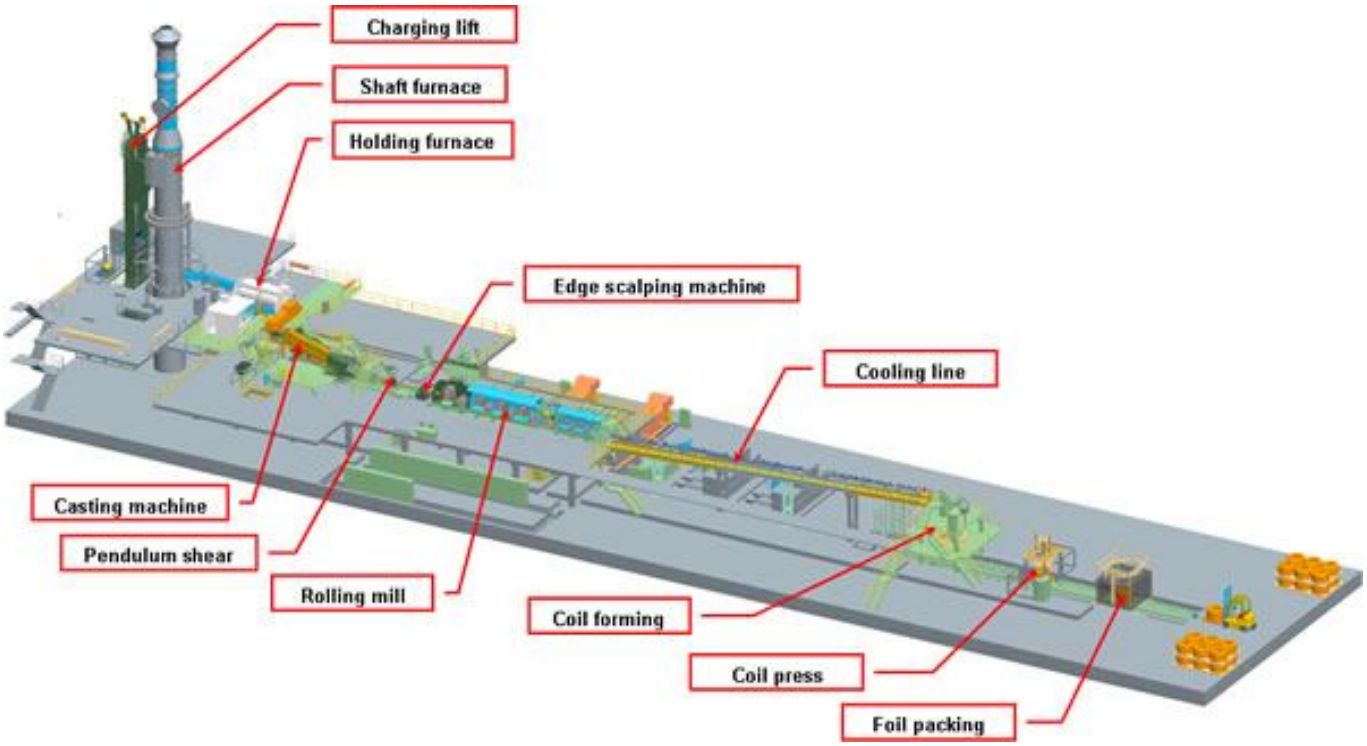
2.2.7 Project Cost:

The capital cost for the proposed plant is estimated to be about Rs. 240 crores.

2.3 Manufacturing Process:

The manufacturing process is CONTIROD of M/s SMS-Meer, Germany. The process flow diagram is mentioned as below:

The detail of each section is as described below:



Cathode loading station:

Consist of a bucket operated through winch motor assembly to charge copper cathodes to the melting furnace. Lifting capacity will be 3.5 MT.

Melting/Shaft Furnace:

The melting furnace is a shaft furnace, lined with heat-resistant & chemically inert refractory equipped with 19 numbers of nozzle mixed type of gas-fired burners. Melting capacity will be 35 Mt/hr.
Furnace height will be 12 meter and diameter will be 2.65 meter. One conical shaped stack will be provided supported in roof construction with height of approximate 8 meter; thus total height of the stack will be ~ 26 meter.

Holding furnace:

Molten metal will flow from the bottom tap hole of melting furnace through launders and will accumulate in holding furnace of 20 MT capacity. The furnace will be rotated according to casting sump level requirement through hydraulic cylinder.

Casting machine:

Molten metal from holding furnace will flow through second launder and to tundish. Level in tundish will be controlled through stopper pin according to signal received from level sensor between dam block & twin belt. The solid bar formed will be of 6300 mm2. Soothing material will be applied to both, dam block and twin belts.

Bar preparation machine:

The cast bar is carried forward up to the rolling mill along a set of conveyor rollers and before rolling, it requires to be trimmed on the edges for prevention of rolled-in oxide. These purposes are served by the Bar Preparation Unit. It is having a set of straightner rollers, notcher assembly & trimmer tools and a high pressure-spray box (for removal of scales before it enters the rolling mill).

Rolling mill:

In the rolling mill, the cast bar undergoes gradual deformation in 12 stages, depending on the cross-section of the bar, its temperature & final product size. The roll passes are designed for hot working at the level of 28-40% deformation and the drive assembly is synchronized with the casting motor through DCS. Besides the rolling mill coolant distribution arrangement within the mill, the initial stands are also equipped with high pressure sprays to ensure that no scales get embedded on to the stock surface.

Cooling and non acidic picking system:

At the end of rolling, the rod needs to be immediately quenched and cooled to prevent surface oxidation. The pickling arrangement is meant for that. An aqueous solution of isopropyl alcohol is used as the pickling medium.

Waxing, coiling and packaging unit:

The pickled rod, before coiling and packing, is waxed for improving its shelf-life. An aqueous solution of wax is sprayed on the moving rod and it gives a transparent protection to the rod. The coil is made on a wooden pallet, laying of the coil is pre-designed for a very high packing density, compacted hydraulically, covered with HDPE sheets all over and finally strapped at six places with PET straps. Coil and pallet weight is captured. Once the coil is packed, it is moved to the warehouse for onward dispatch.

2.4 Details of Equipments:

- Loading cart
  - Capacity: 3.5 MT
  - MOC: MS

- Melting furnace
  - Melting capacity: 35 Mt/hr
  - MOC: MS
  - Height: 12 meter
  - Diameter: 2.65 meter
  - Burners: 19, nozzle mix type
  - Centrifugal blowers: 3 numbers, total capacity: 15000 nm3/Hr, pressure: 0.270 bar
  - Cooling blower: 1 number, total capacity: 2500 nm3/Hr, pressure: 0.16 bar

- Stack
  - Height: conical shaped stack will be provided supported in roof construction with height of approximate 8 meter; thus total height of the stack will be ~ 26 meter.
  - MOC: MS

- Holding furnace
  - Holding capacity: 20 MT
  - Centrifugal blowers: 1 number, total capacity: 700 nm3/Hr, pressure: 0.10 bar
  - Burners: 1 numbers, pre mixed type

- Upper launder
  - MOC: MS
  - Combustion blowers: 1 number, total capacity: 1100 nm3/Hr, pressure: 0.10 bar

- Lower launder
  - MOC: MS
  - Combustion blowers: 1 number, total capacity: 800 nm3/Hr, pressure: 0.10 bar

- Cooling towers
  - Qty: 02
  - Fan: 02
  - Heat load: 6000 KW

- Overhead crane with 10 T capacity, qty: 02
- Air compressors, Capacity: 2664 m3/hr, pressure: 7 kg/cm2

2.5 Environmental Aspects:

2.5.1 Air Pollution Management System

In the proposed CC rod plant the technology uses natural gas as fuel with high efficiency burners, hence polluting gaseous emission is minimal. Adequate stack height will be provided to the flue gas stack for proper dispersion of gaseous pollutant in to the atmosphere.

2.5.2 Waste Water Management System

There would not be any waste water generation on daily basis from the manufacturing of CCR but the only negligible generation of waste water from the cleaning of coolant water tank of rolling mill intermittently. This will be about 1000 liters in a six month (@0.006 KL/day) and will be send to the existing ETP.

The existing ETP capacity is 320 m^3/hr (peak load 400 m^3/hr) and capable to take care of negligible quantity of effluent generated from CCR plant. The treated effluent is utilized for the lime slurry preparation, make up in slag granulation and in gas cleaning system within the premises.

Category	Water Consumption KL/Day		Waste water Generation L/Day		Total
	Existing	Proposed	Existing	Proposed	
Industrial Cooling Water	630	400	------	------	930
Coolant waste water	----	-------	6.0	6.0	12

03 CONCLUSION

The installation of Continuous Cast Copper Rod plant will not have any negative impact on environment. The air pollutants that may be generated in significant quantities & may not affect ambient air quality are SOx, NOx and PM. However with proper air pollution control measures the effect on ambient air quality is negligible. Even after contribution of these pollutants by proposed CCR plants, the GLC values will be below statutory norms with respect to ambient air quality.

Process Flow Diagram:

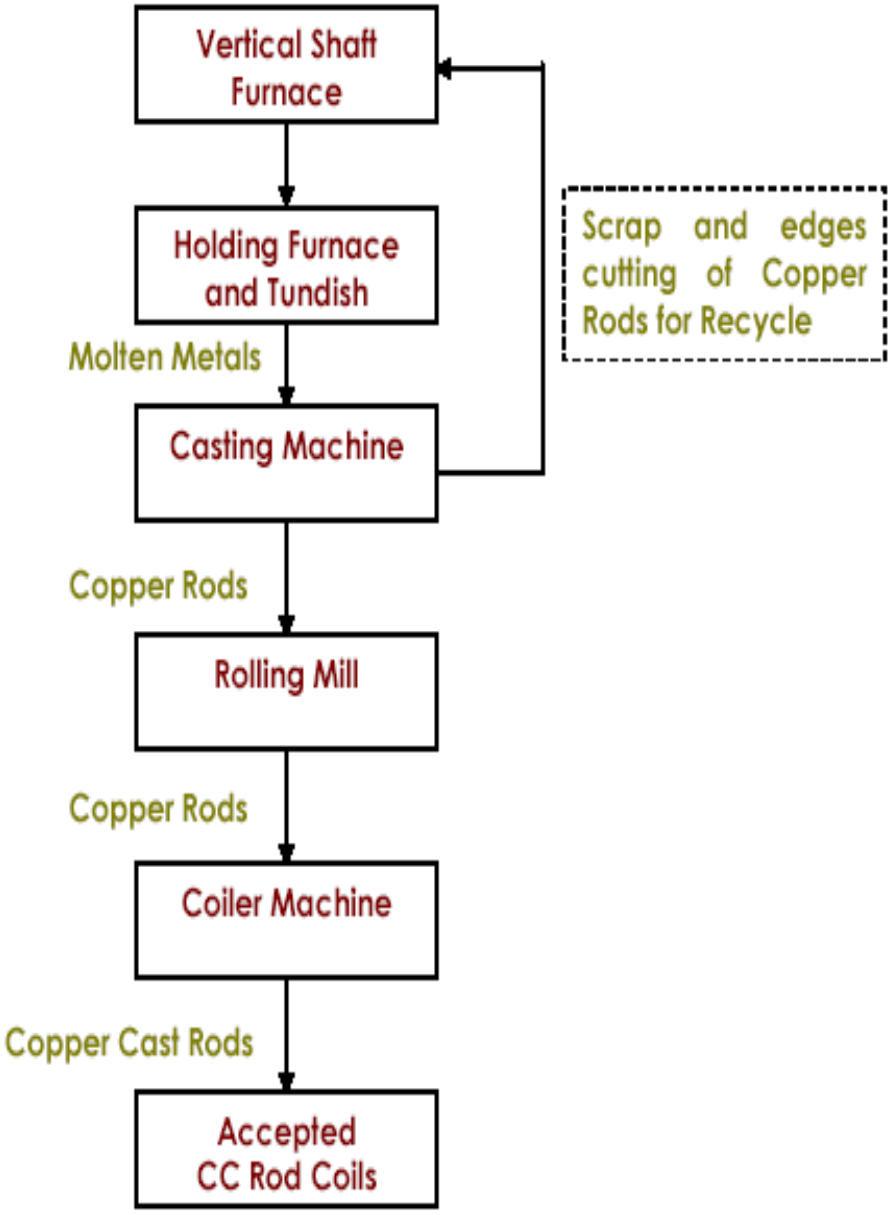


Figure 1: Process Flow Diagram for Continuous Cast Copper Rod Manufacturing

Table 1: Chemical Composition of Raw Material and Product material

Properties	**Unit**	**Copper Cathode***	**Continuous Cast Copper Rod***
Copper	%	99.99	> 99.95
Selenium	ppm	2.0	2.0
Tellurium	ppm	2.0	2.0
Bismuth	ppm	1.0	1.0
Antimony	ppm	4.0	4.0
Lead	ppm	5.0	5.0
Arsenic	ppm	10.0	10.0
Iron	ppm	10.0	10.0
Nickel	ppm	10.0	10.0
Tin	ppm	5.0	5.0
Sulfur	ppm	15.0	15.0
Silver	ppm	25.0	25.0

*Copper Cathode as per ASTM B115-2010
*Copper Cast Rod as per ASTM B49-2010

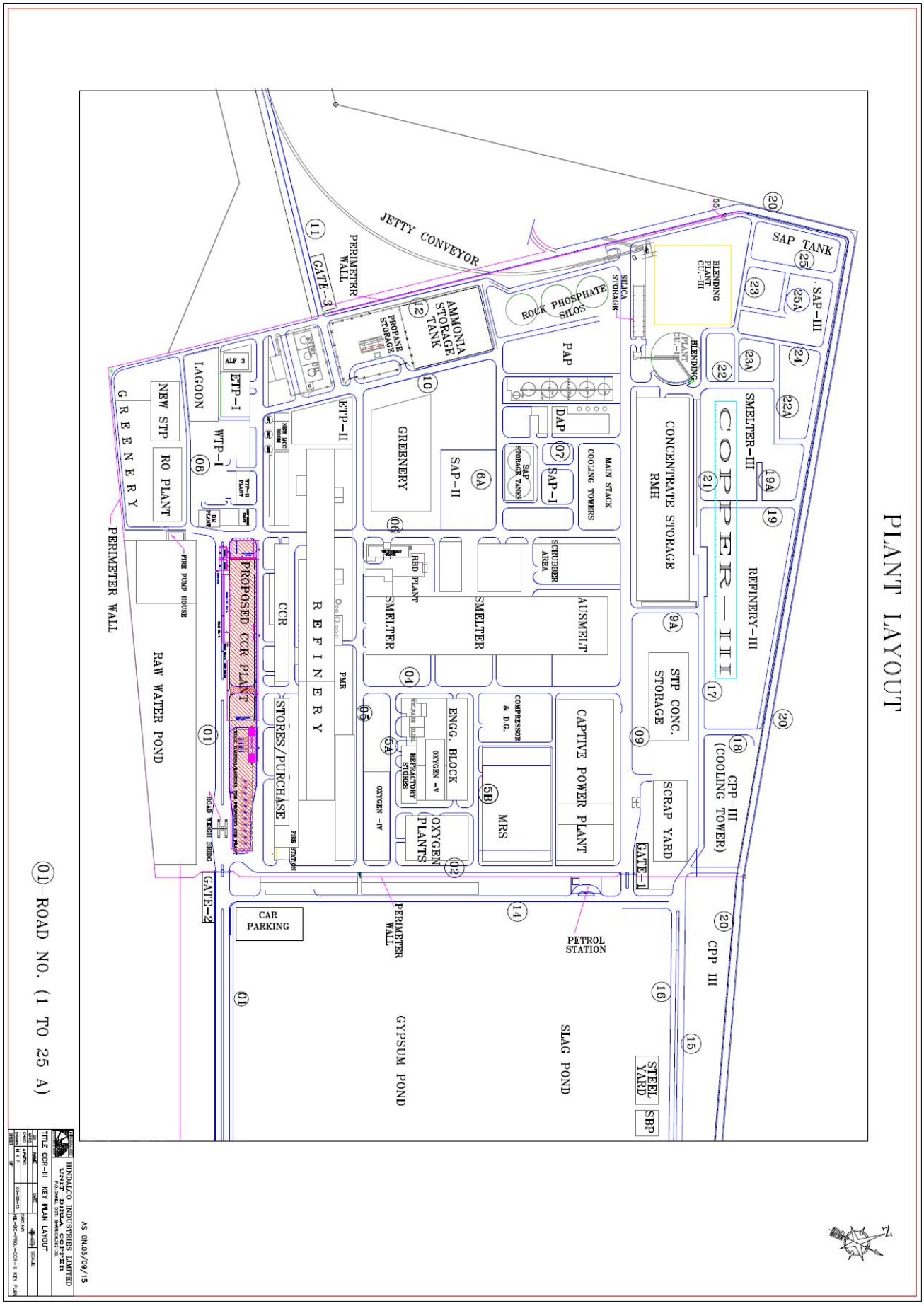


Figure 2: Proposed Plant Layout

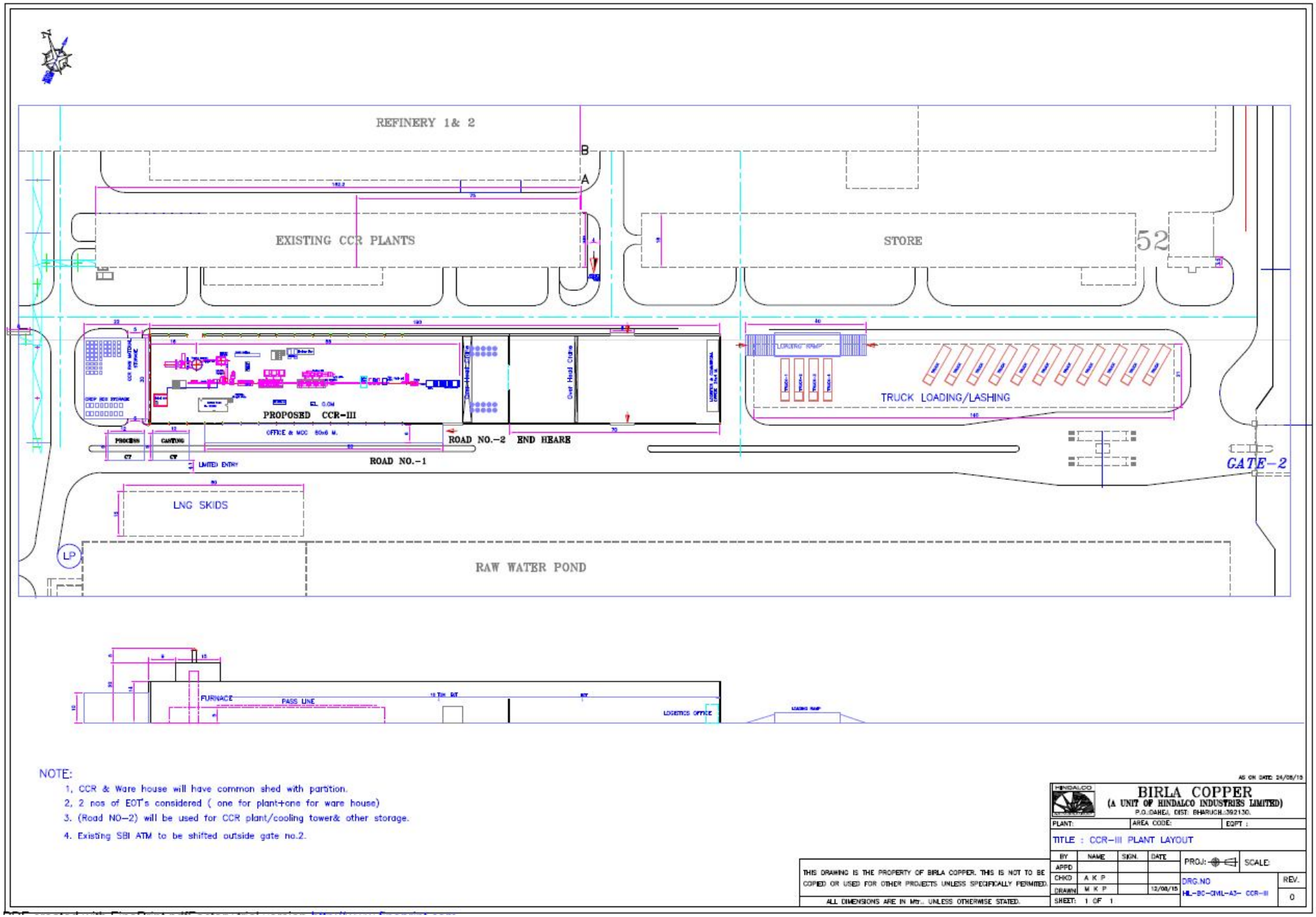


Figure 3: Proposed Plant Layout