

# 102<sup>nd</sup> STREET LANDFILL SITE

NIAGARA FALLS, NEW YORK

## FINAL CLOSE OUT REPORT

OPERABLE UNITS 1 & 2

### VOLUME 8

*(Response to Comments by Additions to Revision 0, Dated August 13, 1999)*

Prepared for:  
Occidental Chemical Corporation  
Olin Corporation

Prepared by:  
IT Corporation  
Greenville, SC

September 22, 2000  
Revision 1 to August 13, 1999 Report

Prepared for:  
Occidental Chemical  
Corporation  
Olin Corporation

Volume 8

102<sup>nd</sup> Street Landfill Site  
Niagara Falls, New York  
Final Close Out Report  
Operable Units 1 & 2

September 22, 2000  
Revision 1 to  
August 13, 1999  
Report

Prepared by:  
IT Corporation  
Greenville, SC

932022



P.O. BOX 248, 1188 LOWER RIVER ROAD, NW, CHARLESTON, TN 37310-0248  
(423) 336-4000 FAX: (423) 336-4183

September 22, 2000

Mr. Paul Olivo, Proj. Mgr.  
New York/Caribbean Response Superfund Branch II  
Emergency and Remedial Response Division  
U.S. Environmental Protection Agency  
290 Broadway  
New York, NY 10007-1866

RE: 102<sup>nd</sup> Street Landfill Site, Niagara Falls, NY  
Final Closeout Report and Remedial Action Report, Response to EPA comments dated July 11, 2000  
Landfill Residuals, Perimeter Soils, Shallow Groundwater,  
Non-Aqueous Phase Liquids (NAPL), and Embayment Sediments  
Operable Units 1 & 2

Dear Mr. Olivo:

Enclosed are three (3) copies of the signed and sealed Response to Comments (Volume 8) for the Final Closeout and Remedial Action Reports for Operable Units (OU) 1 and 2 at the 102<sup>nd</sup> Street Landfill Site. This is an addition to the original Revision 0 "Report", dated August 13, 1999 per your request.

We believe with addition of this information the Report is comprehensive, thorough, complete, and meets the requirements of the USEPA. However, should you have any questions or comments, please contact us at (423) 336-4587 or (859) 543-2159 respectively. We look forward to the end of this project. Your review and final approval of this document is appreciated. Thank you for your assistance.

Very truly yours,

Michael Bellotti  
Site Team Leader, 102<sup>nd</sup> Street Site  
Olin Corporation

George W. Luxbacher, P.E., Ph.D.  
Director and Project Coordinator  
Glenn Springs Holdings, Inc.

cc: Gary Kline - NYDEC w/ 6 copies  
John Burns - Olin Corp w/ 1 copy  
James Thornton, P.E. - CRA Services w/ 1 copy  
Ming Kuo - Foster Wheeler w/ 5 copies  
Charles Taylor, P.E. w/ 2 copies  
Michael Bellotti w/ 3 copies  
George W. Luxbacher, P.E., Ph.D. w/ 3 copies  
Ben Tubridy, 1 copy

RECEIVED

NOV 1 2000

NYDEC - Rec'd w/ 6  
REL - UNREL

102<sup>nd</sup> STREET LANDFILL SITE  
NIAGARA FALLS, NEW YORK

FINAL CLOSE OUT REPORT  
OPERABLE UNITS 1 AND 2

VOLUME 8

*(Response to Comments by Additions to Revision 0, Dated August 13, 1999)*

IT Corporation

Prepared for  
Occidental Chemical Corporation  
Olin Corporation

September 22, 2000  
Revision 1 to August 13, 1999 Report

**List of Drawings (Modified Additions for detailed "as-built" Electrical Drawings and  
Modified P&IDs per Comment 3)**

| <u>Drawing Number</u>       | <u>Title</u>                                       |
|-----------------------------|--|
| 594000-25J-01 Rev. 4        | APL System Flow Diagram                            |
| 594000-25J-02 Rev. 7        | P&ID APL System                                    |
| 594000-25J-03 Rev. 1        | Piping & Instrumentation Diagram NAPL System       |
| 594000-65U-01 Rev. 6        | Electrical Plan                                    |
| 594000-65U-02 Rev.5         | One Line Diagram                                   |
| 594000-65U-03 Rev. 11       | Elementary Wiring Diagram                          |
| 594000-65U-04 Rev. 4        | Details  |
| 594000-65U-05 Rev.7         | Cable Block Diagram/Schedule                       |
| 23594010-SK-270-001 Rev. 5  | Control Panel (SP-1)                               |
| 23594010-SK-270-002 Rev. 6  | Local Wet Well Panel                               |
| 23594010-SK-270-100 Rev. 10 | Control Panel (SP-1) Wiring                        |
| 23594010-SK-270-101 Rev. 9  | Local Wet Well Panel (CP-1) Wiring                 |
| 23594010-SK-270-102 Rev. 9  | Local Wet Well Panel (CP-2) Wiring                 |
| 23594010-SK-270-103 Rev. 9  | Local Wet Well Panel (CP-3) Wiring                 |
| 23594010-SK-270-104 Rev. 9  | Local Wet Well Panel (CP-4) Wiring                 |
| 23594010-SK-270-105 Rev. 6  | Manholes 8, 9, & 10 & Sample Pit Wiring Diagram    |
| 23594010-SK-270-106 Rev. 6  | Leak Detection Pump Trip & Surge Protection System |
| 23594010-SK-270-107 Rev. 5  | Instrument Block Diagram                           |
| 23594010-SK-270-108 Rev. 3  | Control Panel (RTU) Wiring                         |

**from EXECUTIVE SUMMARY (Modified Additions per Comment 4)**

The remedial activities implemented for OU-1 and OU-2 were completed in conformance with the requirements of the Remedial Design Documents (RDDs), the Record of Decision (ROD), ROD Addendum, ROD Amendment, and the Administrative Order (AO). Exceptions to be noted include: the bulkhead walkway was not installed, and APL is pumped to the Love Canal Treatment Facility in lieu of being hauled off-site.

*The agencies required the original drawings to show a walkway along the river for use by the general public. Olin Corporation and Glenn Springs Holding, Inc. acting on behalf of Occidental Chemical Corporation (collectively referred to as the "Companies"), never agreed to the walkway and were reluctant to construct it. The Companies agreed to construct the walkway if the maintenance and liability responsibility for the walkway was assumed by a governmental entity such as the State of New York, Niagara County, or the City of Niagara Falls.*

*Only the City expressed any interest in the walkway but had reservations about safety and maintenance costs. As a result the City decided that at this time a walkway was not desired. The Companies gave the City the amount of money that it would have cost to build the walkway, which was then used to enhance Griffon Park.*

*The Companies have also granted an easement to the City for the area along the river so that in the future the City could build the walkway at the City's expense. The City would then assume all liability for the walkway area.*

## 1.2 Background (*Modified Additions per Comment 2*)

### OU-2:

- Removal and off-Site incineration of highly impacted embayment sediments, and removal of the remaining impacted sediments with subsequent placement on the Site.

*No incineration was actually performed since deletion of the incineration requirement was accomplished by a later modification of the ROD.*

### 4.1.1 Embayment Sediment Excavation and Placement (*Modified Additions per Comment 1*)

*The total volume of embayment sediments that was removed from the embayment area and placed on the landfill was 25,436 cubic yards.*

### 4.2.2 Triangular Area Excavation and Placement (*Modified Additions per Comment 1*)

The Triangular Area is a narrow triangular parcel of land with its long axis trending east-west and varied in width from approximately 10 feet (east end) to 125 feet (west end) and was approximately 1110 feet long. The triangular area is bordered on the south by Buffalo Avenue and on the north by the LaSalle Expressway. This parcel is located north of the landfill, across Buffalo Avenue. Excavation of soils took place in October and November of 1993, with the soils being placed in the Site's Fill Material Placement Cell. The excavated areas were backfilled with clay material and then covered by 6 inches of topsoil.

*The total volume of non-hazardous soils and debris excavated from the Triangular Area and placed on the 102<sup>nd</sup> Street Landfill Site was approximately 5,000 cubic yards. The SJB Services Inc., Laboratory Test Report LTR-1 dated November 17, 1993 indicated that 5,000 cubic yards of clay fill material was placed in the Triangular Area.*

#### 4.2.3 Perimeter Soils Excavation and Placement (*Modified Additions per Comment 1*)

"Off-site" perimeter soils located outside of the perimeter slurry wall were excavated and transported onto the Site for consolidation and placement.

*The total volume of perimeter soils that were removed and placed on the landfill was 6,497 cubic yards of non-hazardous materials and 1,602 cubic yards of soil contaminated with dioxin.*

#### 4.2.4 Filling and Grading (*Modified Additions per Comment 1*)

Materials generated by construction activities were placed on-site in bermed areas and used as fill to meet the contours of the design grades. The final "as-built" contours are shown on Drawing 594000-10U-01. Site fill was generated from the following sources with "as-built" volumes provided as follows.

|  |                  |
|--|------------------|
| Embayment Sediments - Silty sands                          | 25,436 cy        |
| Perimeter Soils - Mixed soils                              | 8,099 cy         |
| Slurry Wall Spoils- Mixed soils                            | 11,347 cy        |
| APL Collection Trench Spoils- Mixed soils                  | 1,891 cy         |
| Storm Sewer Spoils- Mixed soils                            | 4,298 cy         |
| Little Niagara River Dredge Spoils- Silty sands            | 1,993 cy         |
| Drill Spoils- Mixed soils                                  | 10 cy            |
| Cofferdam Material- Frontier Clay                          | 3,550 cy         |
| Cribwall Trench Spoils- Clayey soils                       | 200 cy           |
| Olin Building Demolition Debris from Buffalo Ave. Facility | 3,100 cy         |
| Riprap from river bank- Large armor stone                  | 2,333 cy         |
| Used Activated Carbon- Water Treatment System              | 20 cy            |
| Brine Solids from Olin's Niachlor Plant                    | 1,600 cy         |
| Quick Lime (used for soil stabilization)                   | 1,750 cy         |
| Gypsum (used for soil stabilization)                       | 3,800 cy         |
| Personal Protective Equipment                              | 10 cy            |
| <b>Total Construction Fill</b>                             | <b>69,437 cy</b> |



The materials listed above were generated by construction activities or brought onto the Site to be used as fill to meet the landfill-grading plan. Fill material overruns caused by over-excavation of materials and more than anticipated sediment stabilization required a new Grading Plan (Revision #7) to be developed. The landfill was re-contoured with minimum slopes of 3%. All fills existing on May 7, 1997 were re-graded to meet Revision 7 contours. Some previously placed subbase material was incorporated into the Site fills.

Erosion control and surface water control was always maintained to prevent erosion from occurring and the escape of materials from the Site. The fill materials were graded and continuously compacted by vibratory compaction equipment. The fill materials were moved using typical earth-moving equipment such as bulldozers, backhoes, front-end loaders, and dump trucks.

*Non-hazardous wastes from approximately 30 off-Site locations were brought to the Site and placed on the landfill as fill before construction. The data showing the individual quantities of the non-hazardous wastes brought from each location along with the name of each such location is listed herein as follows on Table 1.*

**TABLE 1**  
**PRE-CONSTRUCTION OFF SITE FILL MATERIALS**

| <b>Source</b>                                 | <b>Cubic Yards</b> | <b>Material</b>    |
|---|--------------------|--------------------|
| 93 <sup>rd</sup> Street Processing Facility   | 5,000              | Granular asphalt   |
| 93 <sup>rd</sup> Street School                | 7,000              | Excavated material |
| Lockport Waterline                            | 28,000             | Excavated material |
| 198 DiMatteo Drive                            | 600                | Soil fill          |
| Hennepin Avenue                               | 1,500              | Soil fill          |
| 104 <sup>th</sup> Street, 1331/1335           | 1,000              | Soil fill          |
| Love Canal Emergency Declaration Area (EDA 4) | 1,000              | Soils              |

|   |               |   |
|---|---------------|---|
| <i>Buffalo Avenue Plant Barrier Wall</i>                  | <i>2,750</i>  | <i>Soil fill</i>                                  |
| <i>10114 Buffalo Avenue</i>                               | <i>300</i>    | <i>Soil</i>                                       |
| <i>J Area of Niagara Plant</i>                            | <i>10,000</i> | <i>Brick, concrete, and rubble</i>                |
| <i>Niagara Plant Liquid Incinerator unused fire brick</i> | <i>100</i>    | <i>Fire brick</i>                                 |
| <i>Energy from Waste Facility (EFW) Soil</i>              | <i>530</i>    | <i>Soil</i>                                       |
| <i>EFW Fire Protection Pump House Excavation</i>          | <i>1,000</i>  | <i>Soil</i>                                       |
| <i>EFW</i>  | <i>14,000</i> | <i>Tipping floor ramp</i>                         |
| <i>EFW</i>  | <i>500</i>    | <i>Concrete debris form tipping floor ramp</i>    |
| <i>EFW</i>  | <i>4,000</i>  | <i>Soil from excavator form stack foundation</i>  |
| <i>EFW</i>  | <i>12,000</i> | <i>Soil, rock and asphalt</i>                     |
| <i>EFW</i>  | <i>4,500</i>  | <i>Soil form excavation of cooling water line</i> |
| <i>EFW</i>  | <i>20,000</i> | <i>Soil, rock, asphalt, concrete, and brick</i>   |
| <i>EFW</i>  | <i>1,000</i>  | <i>Concrete from old foundation</i>               |
| <i>EFW</i>  | <i>1,500</i>  | <i>Soil and crusher run</i>                       |
| <i>Durez Niagara Facility</i>                             | <i>900</i>    | <i>Soil</i>                                       |
| <i>Lower Gill Creek Remediation</i>                       | <i>5,000</i>  | <i>Soil</i>                                       |
| <i>Nash/Walck Road work</i>                               | <i>1,100</i>  | <i>Clay soil</i>                                  |
| <i>Fitch Farm</i>   | <i>1,200</i>  | <i>Clay soil</i>                                  |
| <i>Creekside Stone</i>                                    | <i>2,400</i>  | <i>Stone</i>                                      |
| <i>9802 Buffalo Avenue</i>                                | <i>50</i>     | <i>Demolition Debris</i>                          |
| <i>Buffalo Avenue Plant</i>                               | <i>62,500</i> | <i>Gypsum</i>                                     |
| <i>Niagara Durez</i>                                      | <i>100</i>    | <i>Soil and cement debris</i>                     |
| <i>Niagara Durez</i>                                      | <i>250</i>    | <i>Soil, concrete, and asphalt</i>                |

September 22, 2000

|   |                |   |
|---|----------------|---|
| <i>Buffalo Avenue Plant, L Area</i>                   | 1,053          | <i>Concrete and brick debris</i>                  |
| <i>Little Niagara River</i>                           | 3,000          | <i>River sediments</i>                            |
| <i>Love Canal</i>                                     | 86,000         | <i>Clay, plastic liner, and drain line debris</i> |
| <i>Niagara Plant 003 Outfall</i>                      | 120            | <i>Soil</i>                                       |
| <i>Niagara Plant Buildings V-18, 50, 65, and 68</i>   | 1,720          | <i>Concrete and red brick</i>                     |
| <b><i>Total Off-Site Fill before Construction</i></b> | <b>281,673</b> |   |

September 22, 2000

## 8.0 CERTIFICATION THAT REMEDY MEETS PERFORMANCE STANDARDS

NEW YORK STATE PROFESSIONAL ENGINEER'S CERTIFICATION FOR:

102<sup>nd</sup> STREET LANDFILL SITE

FINAL CLOSE OUT REPORT

LANDFILL RESIDUALS, PERIMETER SOILS, SHALLOW GROUNDWATER, NON-AQUEOUS  
PHASE LIQUIDS (NAPL), AND EMBAYMENT SEDIMENTS

OPERABLE UNITS 1 & 2

NIAGARA FALLS, NEW YORK

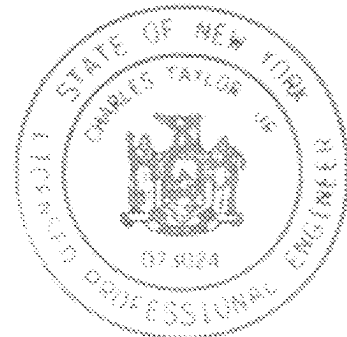
*September 22, 2000 (Response to Comments by Additions to Revision 0, Dated August 13, 1999)*

Prepared by IT Corporation

This report documents the remedial action activities completed at 102<sup>nd</sup> Street Landfill Site. The action included remediation for the landfill residuals, perimeter soils, shallow groundwater, and non-aqueous phase liquids and the sediments in the Niagara River within 300 feet of the shore. I certify that the remedial action implemented for these activities was completed in substantial conformance with the requirements of the Remedial Design Documents, the ROD, ROD Amendment, and the Administrative Order. The data presented is considered to be technically correct to the best of my knowledge.

*Charles Taylor, Jr. 9.22-2000*

Charles Taylor, State of New York Professional Engineer (073024)



JUL 11 2000

David L. Cummings  
Mgr., Environmental Remediation  
Olin Corporation  
P.O. Box 248  
Lower River Road  
Charleston, TN 37310

George W. Luxbacher, P.E., PhD  
Director and Project Coordinator  
Glenn Springs Holdings, Inc.  
2480 Fortune Drive, Suite 300  
Lexington, KY 40509

Re: 102<sup>nd</sup> Street Superfund Site  
Niagara Falls, New York  
Final Close Out Report, Operable Units 1 and 2

Gentlemen:

This letter pertains to your submittal dated August 13, 1999, wherein the Olin Corporation and Glenn Springs Holdings, Inc., acting on behalf of the Occidental Chemical Corporation, (collectively referred to as the "Companies"), forwarded to the U.S. Environmental Protection Agency (the "EPA") for the EPA's approval, the Final Close Out Report (the "Report") for Operable Units 1 and 2. The Report consists of seven volumes.

Please be advised that the EPA has reviewed the Report. The EPA's comments to the Report are as follows:

- 1.- The following data shall be added to the Report, Volume 1.:

Section 4.1.1 - Embayment Sediments Excavation and Placement

A statement shall be added to this section specifying the total volume of the embayment sediments which were removed from the embayment area and placed on the landfill.

Sections 4.2.2 and 4.2.3 - Triangular Area and Perimeter Soil Excavations

A statement shall be added to these sections specifying the total volume of non-hazardous soil and debris excavated from various off-Site areas,

transported to, and placed on the landfill.

Section 4.2.4 - Filling and Grading

A statement shall be added to this section to the effect that more than 300,000 cubic yards of non-hazardous wastes from approximately 30 off-Site locations were brought to the Site and placed on the landfill as fill. The Report shall indicate the total volume of this fill material. In addition, the data showing the individual quantities of the non-hazardous wastes brought from each location along with the name of each such location shall be listed in the appendix.

- 2.- The following revisions shall be made in the text of the Report, Volume 1:

Section 1.2 - Background, Pages 2 and 3

The text for OU-2 notes that a ROD requirement existed for the incineration of highly impacted embayment sediments. Since no incineration was actually done, an explanation to that effect shall be added. Clarification may be supplied by adding a sentence which indicates that the deletion of the incineration requirement was accomplished by a later amendment to the ROD.

- 3.- As-Built Drawings:

Drawings 594000-25J-02 (P&ID APL) and 23594010-SK-270-107 (INST. BLOCK)

These drawings are acceptable only as schematic drawings. Detailed as-built electrical drawings shall also be provided.

- 4.- Walkway:

A statement on the proposed Walkway shall be included in the Report. Such statement shall include the history of the Walkway, a description with appropriate schematic drawings, and the current status of the Walkway as well as details of the actions taken to date by the Companies and the City of Niagara Falls with respect to the Walkway.

The Companies shall incorporate their responses to the above comments into a separate volume to the Report. Such separate addendum shall be designated as "Volume 8." This addendum shall be re-submitted to the EPA for its approval.

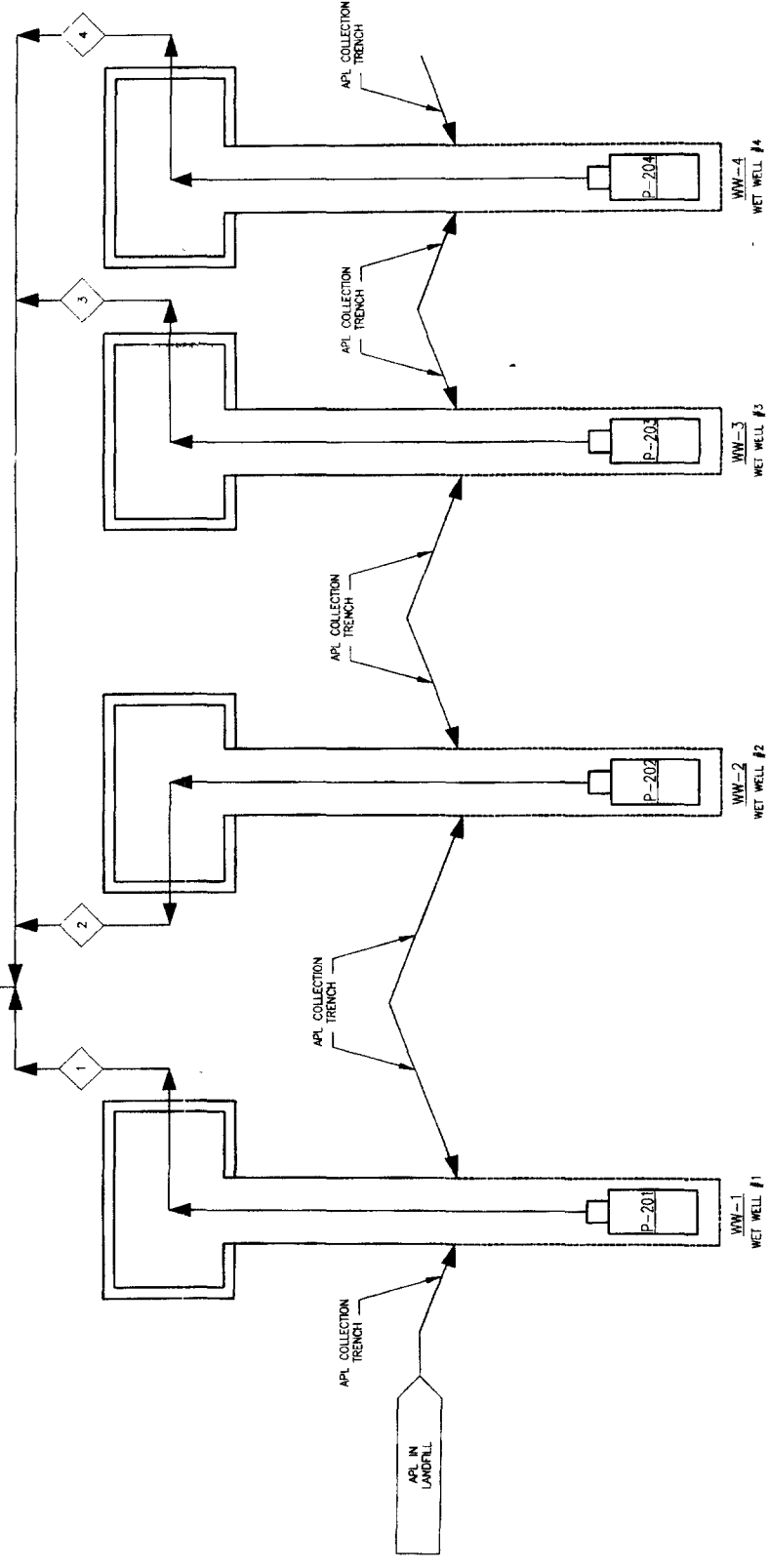
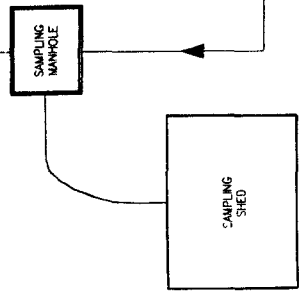
If either of you has any immediate questions or comments on this matter, please contact Paul J. Olivo of my staff at 212-637-4280.

Sincerely yours,

Kevin Lynch, Chief  
Western New York Remediation Section

cc: G. Kline - NYSDEC  
D. King - NYSDEC/Region 9  
A. Barkat - NYSDEC/Region 9  
T. Robinson - NYSDEC/Region 9  
G.A. Carlson - NYSDOH  
N. Spiegel - NYSDOL  
P. Olivo - USEPA  
G. Shanahan - USEPA  
M. Basile - USEPA  
J. Thornton - CRA Services

LOVE CANAL  
TREATMENT  
FACILITY



| NOMINAL DAILY FLOWS |                    |                    |                         |  |
|---------------------|--------------------|--------------------|-------------------------|--|
| STREAM NO           | DESCRIPTION        | INITIAL FLOW (GPD) | STEADY STATE FLOW (GPD) |  |
| 1                   | APL FROM WW-1      | 8000 MAX           | 125 AVG                 |  |
| 2                   | APL FROM WW-2      | 8000 MAX           | 125 AVG                 |  |
| 3                   | APL FROM WW-3      | 8000 MAX           | 75 AVG                  |  |
| 4                   | APL FROM WW-4      | 6000 MAX           | 75 AVG                  |  |
| 5                   | TOTAL APL RECOVERY | 20,000 AVG         | 400 AVG                 |  |

AQUEOUS PHASE LIQUID (APL) SYSTEM



OXYGEN/OIL -- REMEDIAL DESIGN  
102nd STREET LANDFILL SITE  
NIAGARA FALLS, NEW YORK  
APL SYSTEM FLOW DIAGRAM

| DATE     | BY  | REV | DESCRIPTION              |
|----------|-----|-----|--------------------------|
| 01/17/98 | ... | 1   | ISSUED FOR REVIEW        |
| 02/17/98 | ... | 2   | ISSUED FOR AGENCY REVIEW |
| 03/17/98 | ... | 3   | ISSUED FOR REVIEW        |
| 04/17/98 | ... | 4   | ISSUED FOR REVIEW        |

FLUOR DANIEL  
1000 WEST 10TH STREET, SUITE 200  
NIAGARA FALLS, NY 14303  
TEL: 716/285-1000  
FAX: 716/285-1001  
WWW.FLUIDANIEL.COM

| NO. | DATE     | DESCRIPTION              |
|-----|----------|--------------------------|
| 1   | 01/17/98 | ISSUED FOR REVIEW        |
| 2   | 02/17/98 | ISSUED FOR AGENCY REVIEW |
| 3   | 03/17/98 | ISSUED FOR REVIEW        |
| 4   | 04/17/98 | ISSUED FOR REVIEW        |

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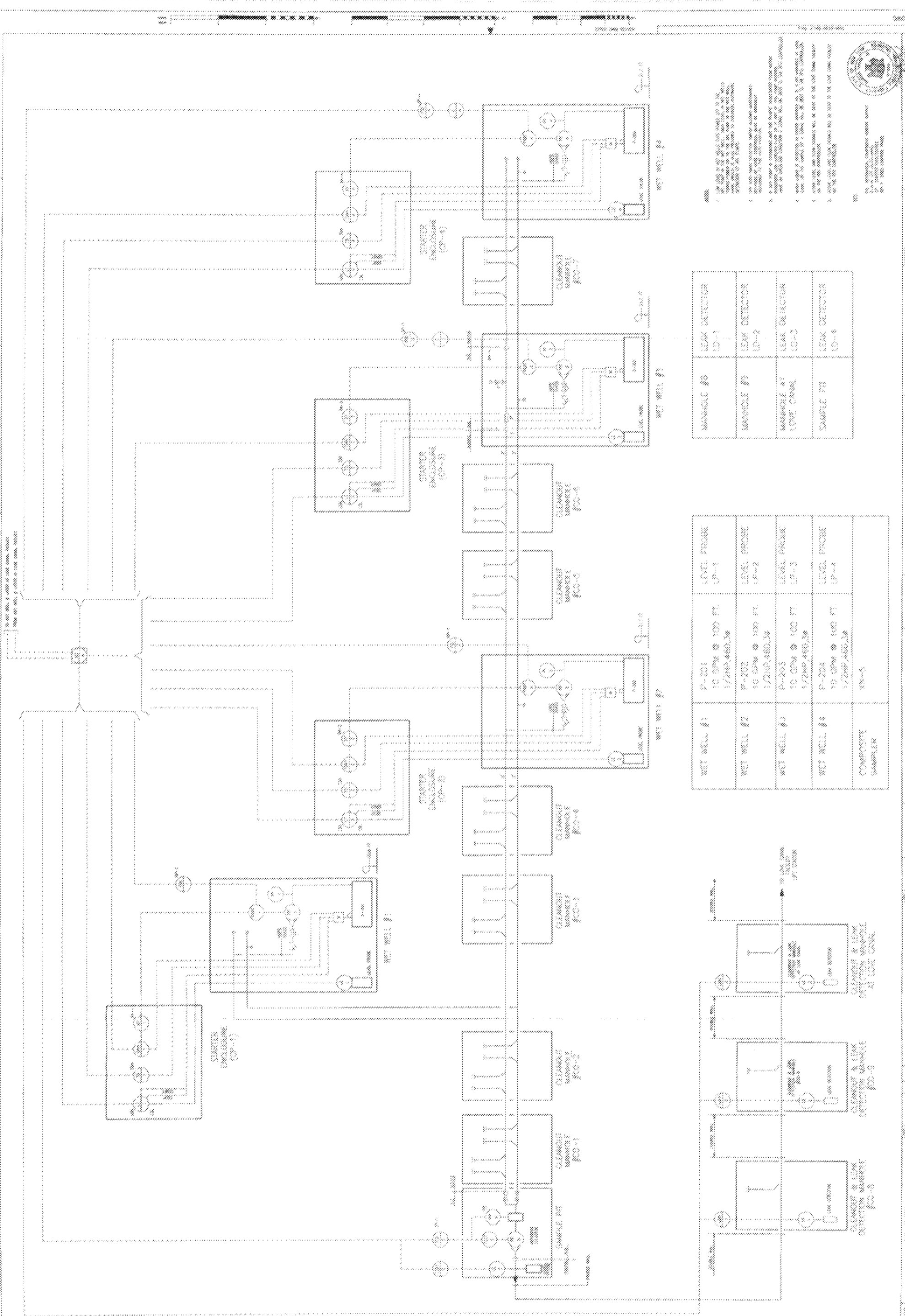
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| 3   | 03/17/98 | ISSUED FOR REVIEW        |
| 4   | 04/17/98 | ISSUED FOR REVIEW        |

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| 3   | 03/17/98 | ISSUED FOR REVIEW        |
| 4   | 04/17/98 | ISSUED FOR REVIEW        |

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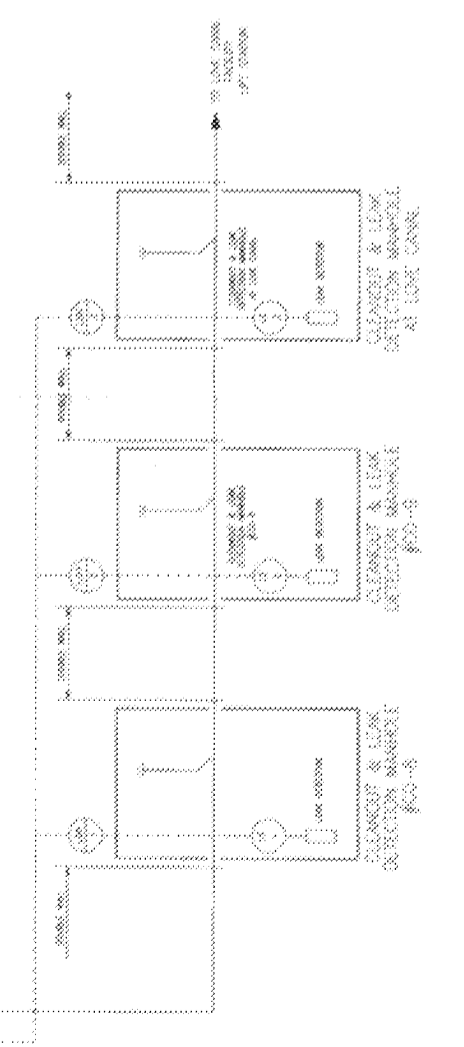


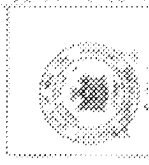
10 FT WELLS, 4" DIA. AT 100 FT. DEPTH  
 100 FT WELLS, 6" DIA. AT 100 FT. DEPTH

1. ALL WELLS TO BE INSTALLED WITH 10 FT. DEPTH AND 4" DIA. AT 100 FT. DEPTH.
2. ALL WELLS TO BE INSTALLED WITH 100 FT. DEPTH AND 6" DIA. AT 100 FT. DEPTH.
3. ALL WELLS TO BE INSTALLED WITH 100 FT. DEPTH AND 6" DIA. AT 100 FT. DEPTH.
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6. ALL WELLS TO BE INSTALLED WITH 100 FT. DEPTH AND 6" DIA. AT 100 FT. DEPTH.

|                          |                    |
|--------------------------|--------------------|
| MANHOLE #0               | LEAK DETECTOR LP-1 |
| MANHOLE #0               | LEAK DETECTOR LP-2 |
| MANHOLE #1<br>LOVE CANAL | LEAK DETECTOR LP-3 |
| SAMPLE PT                | LEAK DETECTOR LP-4 |

|                   |  |                  |
|-------------------|--|------------------|
| WET WELL #1       | P-201<br>10 GPM @ 100 FT.<br>1/2"HP, 480, 3P | LEVEL PROBE LP-1 |
| WET WELL #2       | P-202<br>10 GPM @ 100 FT.<br>1/2"HP, 480, 3P | LEVEL PROBE LP-2 |
| WET WELL #3       | P-203<br>10 GPM @ 100 FT.<br>1/2"HP, 480, 3P | LEVEL PROBE LP-3 |
| WET WELL #4       | P-204<br>10 GPM @ 100 FT.<br>1/2"HP, 480, 3P | LEVEL PROBE LP-4 |
| COMPOSITE SAMPLER | 300-5  |                  |

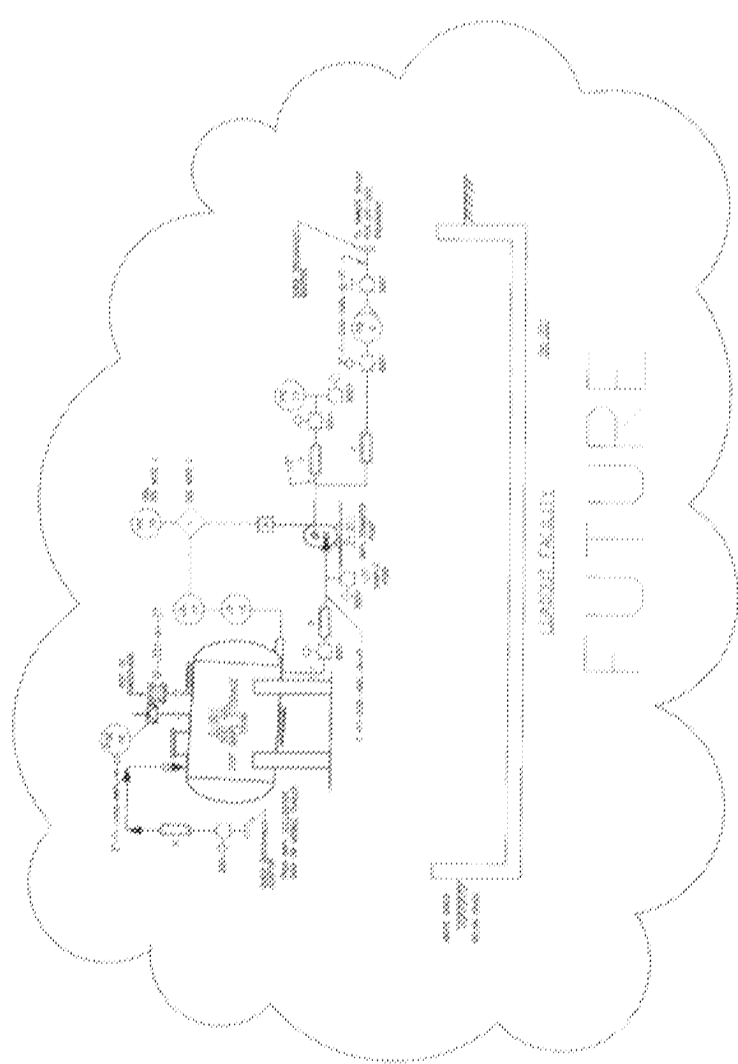
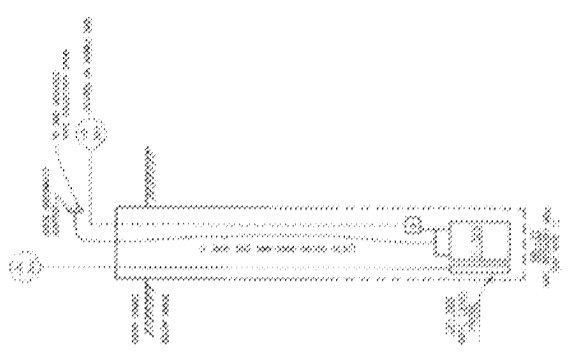




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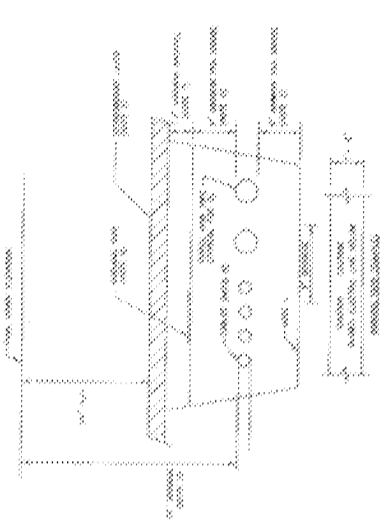
| Sl. No. | Topic | Date  | Grade |
|---------|-------|-------|-------|
| 1       | _____ | _____ | _____ |
| 2       | _____ | _____ | _____ |
| 3       | _____ | _____ | _____ |
| 4       | _____ | _____ | _____ |
| 5       | _____ | _____ | _____ |
| 6       | _____ | _____ | _____ |
| 7       | _____ | _____ | _____ |
| 8       | _____ | _____ | _____ |
| 9       | _____ | _____ | _____ |
| 10      | _____ | _____ | _____ |



\_\_\_\_\_

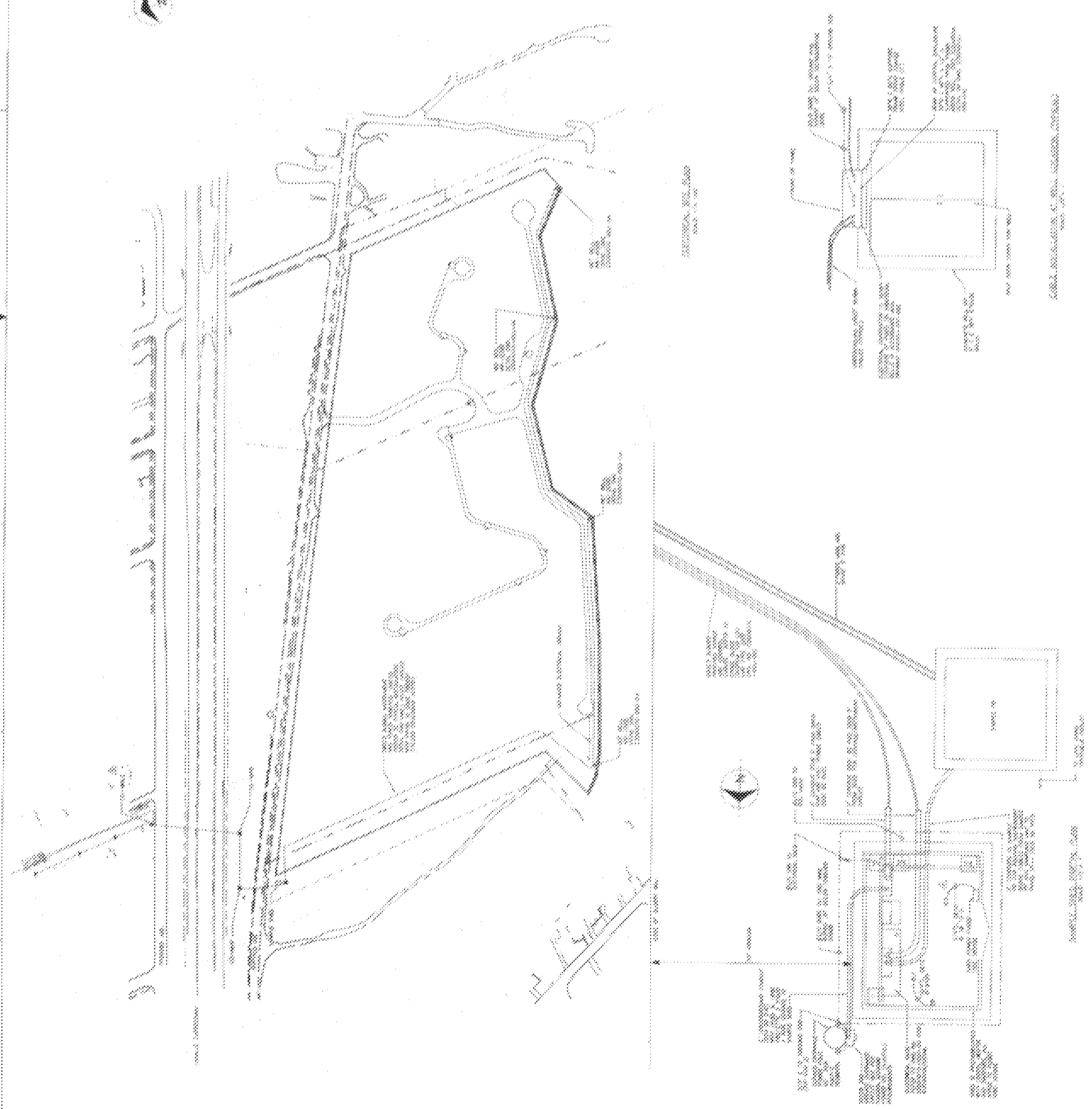
\_\_\_\_\_

1. ALL THE WORKS SHOULD BE  
 DONE BY HAND.  
 2. THE WORK SHOULD BE  
 DONE IN A NEAT AND  
 CLEAN MANNER.  
 3. THE WORK SHOULD BE  
 SUBMITTED ON TIME.




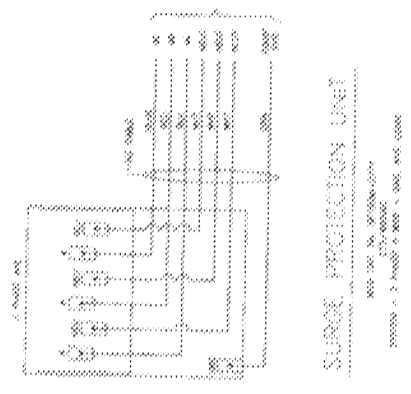
1. FLOOR SLAB SHALL BE CAST IN PLACE CONCRETE.
2. THE MINIMUM THICKNESS OF FLOOR SLAB SHALL BE 120 MM.
3. REINFORCING BARS SHALL BE PROVIDED AS PER DETAIL.
4. FINISH FLOOR SHALL BE 20 MM THICK.
5. FORMWORK SHALL BE USED FOR CASTING OF FLOOR SLAB.
6. CURING SHALL BE DONE FOR 7 DAYS.

NOTE: THE FLOOR SLAB SHALL BE CAST IN PLACE CONCRETE. THE MINIMUM THICKNESS OF FLOOR SLAB SHALL BE 120 MM. REINFORCING BARS SHALL BE PROVIDED AS PER DETAIL. FINISH FLOOR SHALL BE 20 MM THICK. FORMWORK SHALL BE USED FOR CASTING OF FLOOR SLAB. CURING SHALL BE DONE FOR 7 DAYS.



FLOOR PLAN OF THE BUILDING

|  |  |  |   |
|--|--|--|---|
|                 |  | <b>FLOOR PLAN</b><br>PROJECT NO. 12345<br>DRAWN BY: J. K. SINGH<br>CHECKED BY: M. N. SINGH<br>DATE: 15/08/2023 |   |
| NO. OF FLOORS: 1<br>NO. OF ROOMS: 10<br>NO. OF CORRIDORS: 5<br>NO. OF STAIRS: 1<br>NO. OF LIFTS: 1 | TOTAL AREA: 1000 SQ. M.<br>COVERED AREA: 800 SQ. M.<br>OPEN AREA: 200 SQ. M. | SCALE: 1:100<br>DRAWING NO. 12345/F.P.   | PROJECT NO. 12345<br>DRAWN BY: J. K. SINGH<br>CHECKED BY: M. N. SINGH<br>DATE: 15/08/2023 |

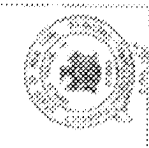
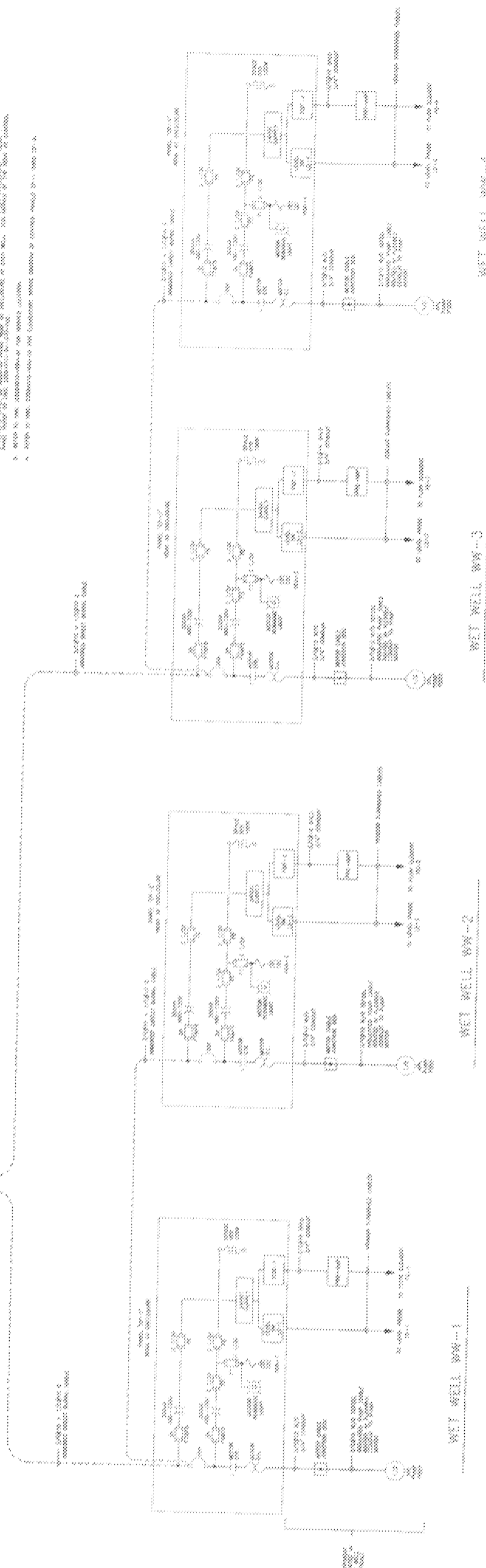


| NO. | DESCRIPTION      | QTY | UNIT | REMARKS |
|-----|------------------|-----|------|---------|
| 1   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 2   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 3   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 4   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 5   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 6   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 7   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 8   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 9   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 10  | 100V AC, 50/60Hz | 1   | PCB  |         |

| NO. | DESCRIPTION      | QTY | UNIT | REMARKS |
|-----|------------------|-----|------|---------|
| 1   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 2   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 3   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 4   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 5   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 6   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 7   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 8   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 9   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 10  | 100V AC, 50/60Hz | 1   | PCB  |         |

**NOTES:**

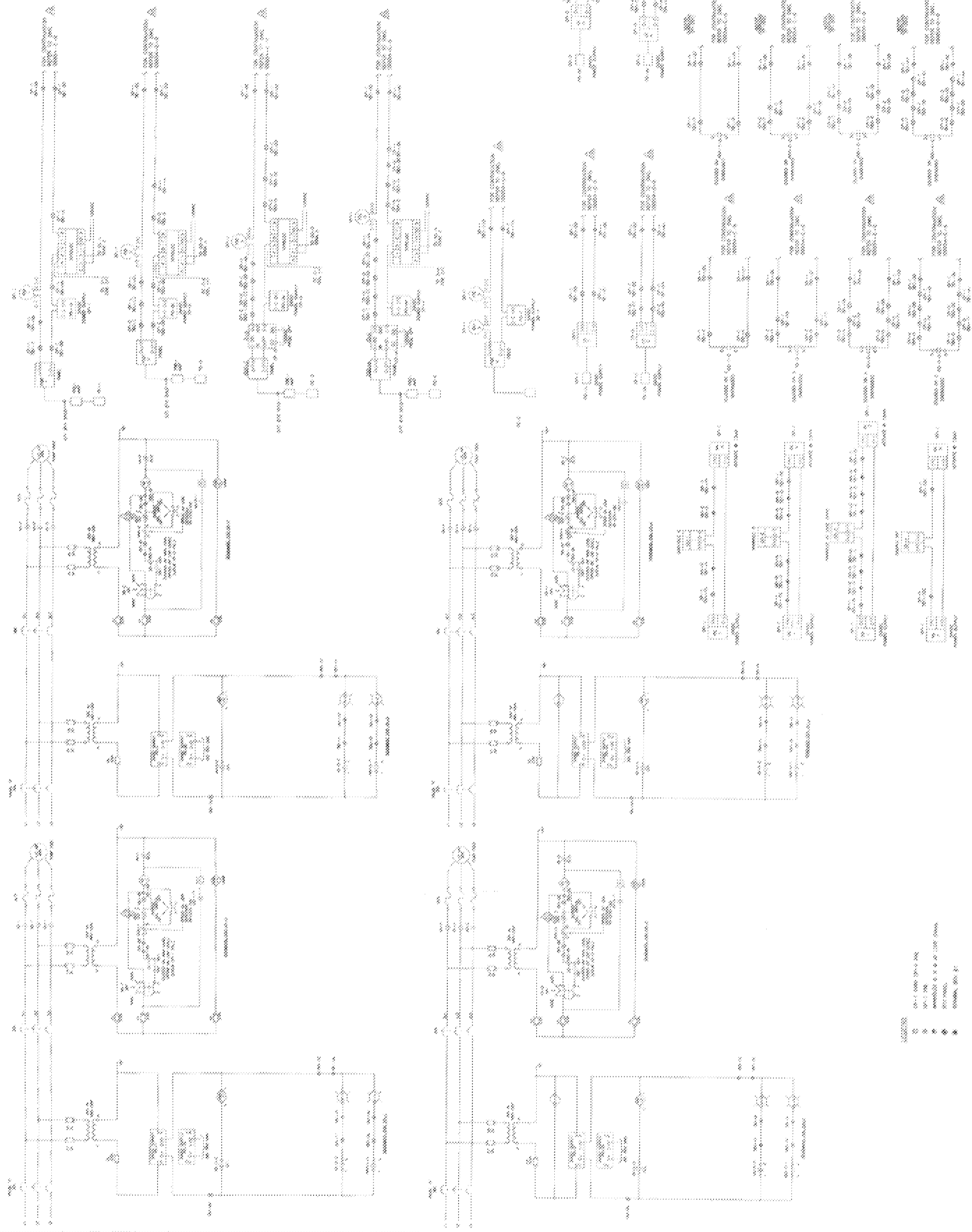
1. All electrical work shall be in accordance with the requirements of the National Electrical Code, National Fire Protection Association, and the applicable local codes.
2. All electrical work shall be done in accordance with the applicable local codes.
3. All electrical work shall be done in accordance with the applicable local codes.
4. All electrical work shall be done in accordance with the applicable local codes.



| NO. | DESCRIPTION      | QTY | UNIT | REMARKS |
|-----|------------------|-----|------|---------|
| 1   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 2   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 3   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 4   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 5   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 6   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 7   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 8   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 9   | 100V AC, 50/60Hz | 1   | PCB  |         |
| 10  | 100V AC, 50/60Hz | 1   | PCB  |         |

**FLUOR DANIEL**

OPERATOR - NATION BROS  
 6000 CREST LANE  
 BANGOR FALLS, NH 03026  
 TEL: 603-888-8888  
 FAX: 603-888-8888



- LEGEND
- 1/2" 100V 20A SW
  - 1/2" 10A
  - 1/2" 10A 100V 20A SW
  - 1/2" 10A 100V 20A SW
  - 1/2" 10A 100V 20A SW

| PROJECT INFORMATION  |             | DATE |      | DRAWING NO.                               |             | SHEET NO. |           |
|--|-------------|------|------|---|-------------|-----------|-----------|
| PROJECT NAME   | PROJECT NO. | DATE | DATE | DRAWING NO.                               | DRAWING NO. | SHEET NO. | SHEET NO. |
| <p><b>FLOOR PANEL</b></p> <p>THIS DRAWING IS THE PROPERTY OF THE ENGINEERING FIRM AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF THE ENGINEERING FIRM.</p> |             |      |      | <p>ENGINEERING FIRM</p> <p>1234567890</p> |             |           |           |













REPUBLIC OF IRAQ  
MINISTRY OF EDUCATION AND SCIENTIFIC RESEARCH  
UNIVERSITY OF AL-QADISIYAH  
COLLEGE OF EDUCATION  
DEPARTMENT OF EDUCATIONAL SCIENCES  
2017

**FLOOR PLAN 9**

DESIGNED BY: [Name]  
DRAWN BY: [Name]  
DATE: [Date]

PROJECT TITLE: [Title]  
CLIENT: [Client Name]  
LOCATION: [Location]

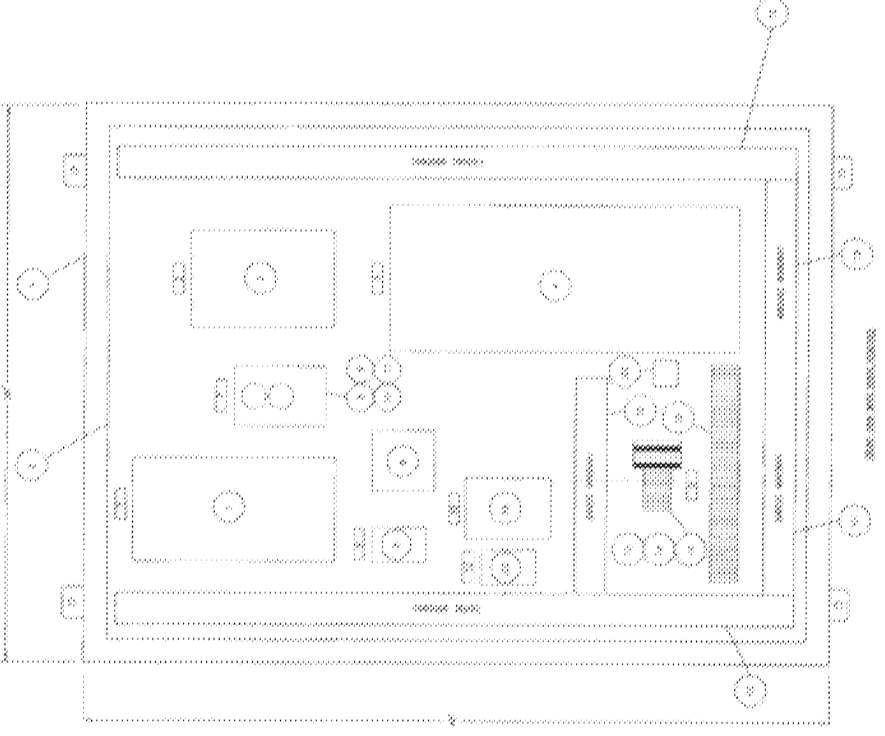
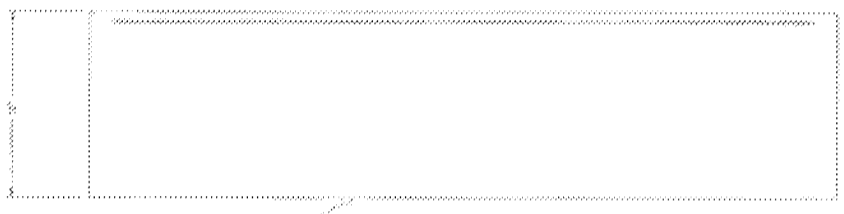
SCALE: 1:100  
DATE OF ISSUE: [Date]

APPROVED BY: [Signature]  
DATE: [Date]

PROJECT NO: [Number]  
SHEET NO: [Number]

- 1. 0.00
- 2. 0.00
- 3. 0.00
- 4. 0.00
- 5. 0.00
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- 8. 0.00
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- 11. 0.00
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- 13. 0.00
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- 17. 0.00
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- 32. 0.00
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- 35. 0.00
- 36. 0.00
- 37. 0.00
- 38. 0.00
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- 48. 0.00
- 49. 0.00
- 50. 0.00

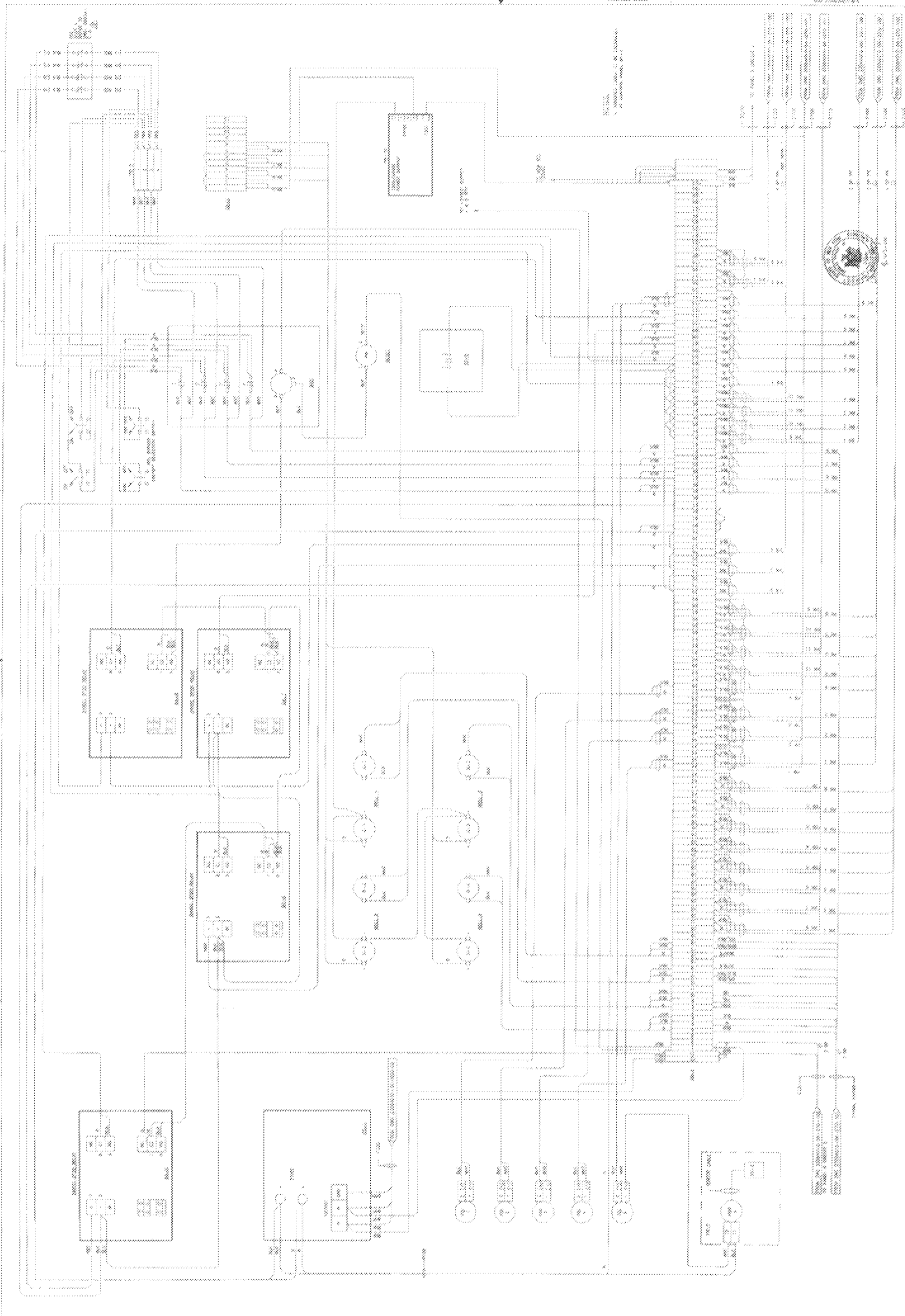
1. 0.00



| NO | DESCRIPTION | QTY | UNIT | REMARKS |
|----|-------------|-----|------|---------|
| 1  | ...         | ... | ...  | ...     |
| 2  | ...         | ... | ...  | ...     |
| 3  | ...         | ... | ...  | ...     |
| 4  | ...         | ... | ...  | ...     |
| 5  | ...         | ... | ...  | ...     |
| 6  | ...         | ... | ...  | ...     |
| 7  | ...         | ... | ...  | ...     |
| 8  | ...         | ... | ...  | ...     |
| 9  | ...         | ... | ...  | ...     |
| 10 | ...         | ... | ...  | ...     |
| 11 | ...         | ... | ...  | ...     |
| 12 | ...         | ... | ...  | ...     |
| 13 | ...         | ... | ...  | ...     |
| 14 | ...         | ... | ...  | ...     |
| 15 | ...         | ... | ...  | ...     |
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| 17 | ...         | ... | ...  | ...     |
| 18 | ...         | ... | ...  | ...     |
| 19 | ...         | ... | ...  | ...     |
| 20 | ...         | ... | ...  | ...     |
| 21 | ...         | ... | ...  | ...     |
| 22 | ...         | ... | ...  | ...     |
| 23 | ...         | ... | ...  | ...     |
| 24 | ...         | ... | ...  | ...     |
| 25 | ...         | ... | ...  | ...     |
| 26 | ...         | ... | ...  | ...     |
| 27 | ...         | ... | ...  | ...     |
| 28 | ...         | ... | ...  | ...     |
| 29 | ...         | ... | ...  | ...     |
| 30 | ...         | ... | ...  | ...     |
| 31 | ...         | ... | ...  | ...     |
| 32 | ...         | ... | ...  | ...     |
| 33 | ...         | ... | ...  | ...     |
| 34 | ...         | ... | ...  | ...     |
| 35 | ...         | ... | ...  | ...     |
| 36 | ...         | ... | ...  | ...     |
| 37 | ...         | ... | ...  | ...     |
| 38 | ...         | ... | ...  | ...     |
| 39 | ...         | ... | ...  | ...     |
| 40 | ...         | ... | ...  | ...     |
| 41 | ...         | ... | ...  | ...     |
| 42 | ...         | ... | ...  | ...     |
| 43 | ...         | ... | ...  | ...     |
| 44 | ...         | ... | ...  | ...     |
| 45 | ...         | ... | ...  | ...     |
| 46 | ...         | ... | ...  | ...     |
| 47 | ...         | ... | ...  | ...     |
| 48 | ...         | ... | ...  | ...     |
| 49 | ...         | ... | ...  | ...     |
| 50 | ...         | ... | ...  | ...     |

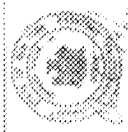
| NO | DESCRIPTION | QTY | UNIT | REMARKS |
|----|-------------|-----|------|---------|
| 1  | ...         | ... | ...  | ...     |
| 2  | ...         | ... | ...  | ...     |
| 3  | ...         | ... | ...  | ...     |
| 4  | ...         | ... | ...  | ...     |
| 5  | ...         | ... | ...  | ...     |
| 6  | ...         | ... | ...  | ...     |
| 7  | ...         | ... | ...  | ...     |
| 8  | ...         | ... | ...  | ...     |
| 9  | ...         | ... | ...  | ...     |
| 10 | ...         | ... | ...  | ...     |
| 11 | ...         | ... | ...  | ...     |
| 12 | ...         | ... | ...  | ...     |
| 13 | ...         | ... | ...  | ...     |
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| 15 | ...         | ... | ...  | ...     |
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| 17 | ...         | ... | ...  | ...     |
| 18 | ...         | ... | ...  | ...     |
| 19 | ...         | ... | ...  | ...     |
| 20 | ...         | ... | ...  | ...     |
| 21 | ...         | ... | ...  | ...     |
| 22 | ...         | ... | ...  | ...     |
| 23 | ...         | ... | ...  | ...     |
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| 25 | ...         | ... | ...  | ...     |
| 26 | ...         | ... | ...  | ...     |
| 27 | ...         | ... | ...  | ...     |
| 28 | ...         | ... | ...  | ...     |
| 29 | ...         | ... | ...  | ...     |
| 30 | ...         | ... | ...  | ...     |
| 31 | ...         | ... | ...  | ...     |
| 32 | ...         | ... | ...  | ...     |
| 33 | ...         | ... | ...  | ...     |
| 34 | ...         | ... | ...  | ...     |
| 35 | ...         | ... | ...  | ...     |
| 36 | ...         | ... | ...  | ...     |
| 37 | ...         | ... | ...  | ...     |
| 38 | ...         | ... | ...  | ...     |
| 39 | ...         | ... | ...  | ...     |
| 40 | ...         | ... | ...  | ...     |
| 41 | ...         | ... | ...  | ...     |
| 42 | ...         | ... | ...  | ...     |
| 43 | ...         | ... | ...  | ...     |
| 44 | ...         | ... | ...  | ...     |
| 45 | ...         | ... | ...  | ...     |
| 46 | ...         | ... | ...  | ...     |
| 47 | ...         | ... | ...  | ...     |
| 48 | ...         | ... | ...  | ...     |
| 49 | ...         | ... | ...  | ...     |
| 50 | ...         | ... | ...  | ...     |

Scale: 1:100



|  |  |  |  |
|--|--|--|--|
| PROJECT: CONTROL PANEL FOR MOTOR<br>SHEET: 1 OF 1<br>DATE: 10-1-58 |  | DRAWN BY: J. J. [unreadable]<br>CHECKED BY: [unreadable] |  |
| TITLE: CONTROL PANEL FOR MOTOR                                     |  | SCALE: AS SHOWN  |  |
| PROJECT NO.: [unreadable]  |  | SHEET NO.: 1 OF 1  |  |
| CONTRACTOR: [unreadable]   |  | APPROVED BY: [unreadable]                                |  |
| REVISIONS:   |  | NO. 1: [unreadable]                                      |  |
| NO. 2: [unreadable]  |  | NO. 3: [unreadable]                                      |  |
| NO. 4: [unreadable]  |  | NO. 5: [unreadable]                                      |  |
| NO. 6: [unreadable]  |  | NO. 7: [unreadable]                                      |  |
| NO. 8: [unreadable]  |  | NO. 9: [unreadable]                                      |  |
| NO. 10: [unreadable]   |  | NO. 11: [unreadable]                                     |  |
| NO. 12: [unreadable]   |  | NO. 13: [unreadable]                                     |  |
| NO. 14: [unreadable]   |  | NO. 15: [unreadable]                                     |  |
| NO. 16: [unreadable]   |  | NO. 17: [unreadable]                                     |  |
| NO. 18: [unreadable]   |  | NO. 19: [unreadable]                                     |  |
| NO. 20: [unreadable]   |  | NO. 21: [unreadable]                                     |  |
| NO. 22: [unreadable]   |  | NO. 23: [unreadable]                                     |  |
| NO. 24: [unreadable]   |  | NO. 25: [unreadable]                                     |  |
| NO. 26: [unreadable]   |  | NO. 27: [unreadable]                                     |  |
| NO. 28: [unreadable]   |  | NO. 29: [unreadable]                                     |  |
| NO. 30: [unreadable]   |  | NO. 31: [unreadable]                                     |  |
| NO. 32: [unreadable]   |  | NO. 33: [unreadable]                                     |  |
| NO. 34: [unreadable]   |  | NO. 35: [unreadable]                                     |  |
| NO. 36: [unreadable]   |  | NO. 37: [unreadable]                                     |  |
| NO. 38: [unreadable]   |  | NO. 39: [unreadable]                                     |  |
| NO. 40: [unreadable]   |  | NO. 41: [unreadable]                                     |  |
| NO. 42: [unreadable]   |  | NO. 43: [unreadable]                                     |  |
| NO. 44: [unreadable]   |  | NO. 45: [unreadable]                                     |  |
| NO. 46: [unreadable]   |  | NO. 47: [unreadable]                                     |  |
| NO. 48: [unreadable]   |  | NO. 49: [unreadable]                                     |  |
| NO. 50: [unreadable]   |  | NO. 51: [unreadable]                                     |  |
| NO. 52: [unreadable]   |  | NO. 53: [unreadable]                                     |  |
| NO. 54: [unreadable]   |  | NO. 55: [unreadable]                                     |  |
| NO. 56: [unreadable]   |  | NO. 57: [unreadable]                                     |  |
| NO. 58: [unreadable]   |  | NO. 59: [unreadable]                                     |  |
| NO. 60: [unreadable]   |  | NO. 61: [unreadable]                                     |  |
| NO. 62: [unreadable]   |  | NO. 63: [unreadable]                                     |  |
| NO. 64: [unreadable]   |  | NO. 65: [unreadable]                                     |  |
| NO. 66: [unreadable]   |  | NO. 67: [unreadable]                                     |  |
| NO. 68: [unreadable]   |  | NO. 69: [unreadable]                                     |  |
| NO. 70: [unreadable]   |  | NO. 71: [unreadable]                                     |  |
| NO. 72: [unreadable]   |  | NO. 73: [unreadable]                                     |  |
| NO. 74: [unreadable]   |  | NO. 75: [unreadable]                                     |  |
| NO. 76: [unreadable]   |  | NO. 77: [unreadable]                                     |  |
| NO. 78: [unreadable]   |  | NO. 79: [unreadable]                                     |  |
| NO. 80: [unreadable]   |  | NO. 81: [unreadable]                                     |  |
| NO. 82: [unreadable]   |  | NO. 83: [unreadable]                                     |  |
| NO. 84: [unreadable]   |  | NO. 85: [unreadable]                                     |  |
| NO. 86: [unreadable]   |  | NO. 87: [unreadable]                                     |  |
| NO. 88: [unreadable]   |  | NO. 89: [unreadable]                                     |  |
| NO. 90: [unreadable]   |  | NO. 91: [unreadable]                                     |  |
| NO. 92: [unreadable]   |  | NO. 93: [unreadable]                                     |  |
| NO. 94: [unreadable]   |  | NO. 95: [unreadable]                                     |  |
| NO. 96: [unreadable]   |  | NO. 97: [unreadable]                                     |  |
| NO. 98: [unreadable]   |  | NO. 99: [unreadable]                                     |  |
| NO. 100: [unreadable]  |  | NO. 101: [unreadable]                                    |  |





UNIVERSITY OF  
 ENGINEERING  
 MADRAS

**FLOOR PLAN**

DATE: / /

NAME: \_\_\_\_\_

REG. NO: \_\_\_\_\_

GROUP: \_\_\_\_\_

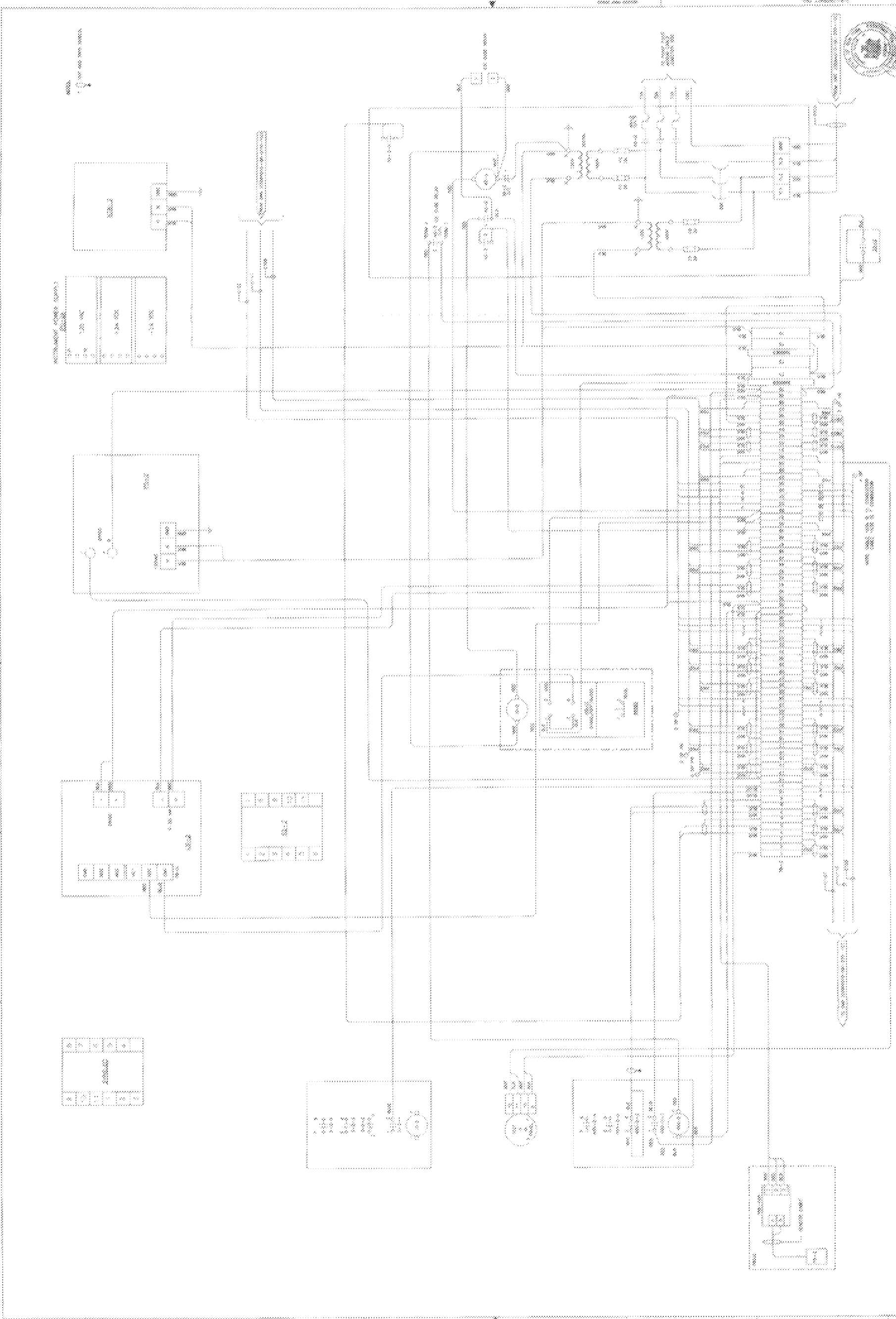
TOPIC: \_\_\_\_\_

DATE: / /

TIME: \_\_\_\_\_

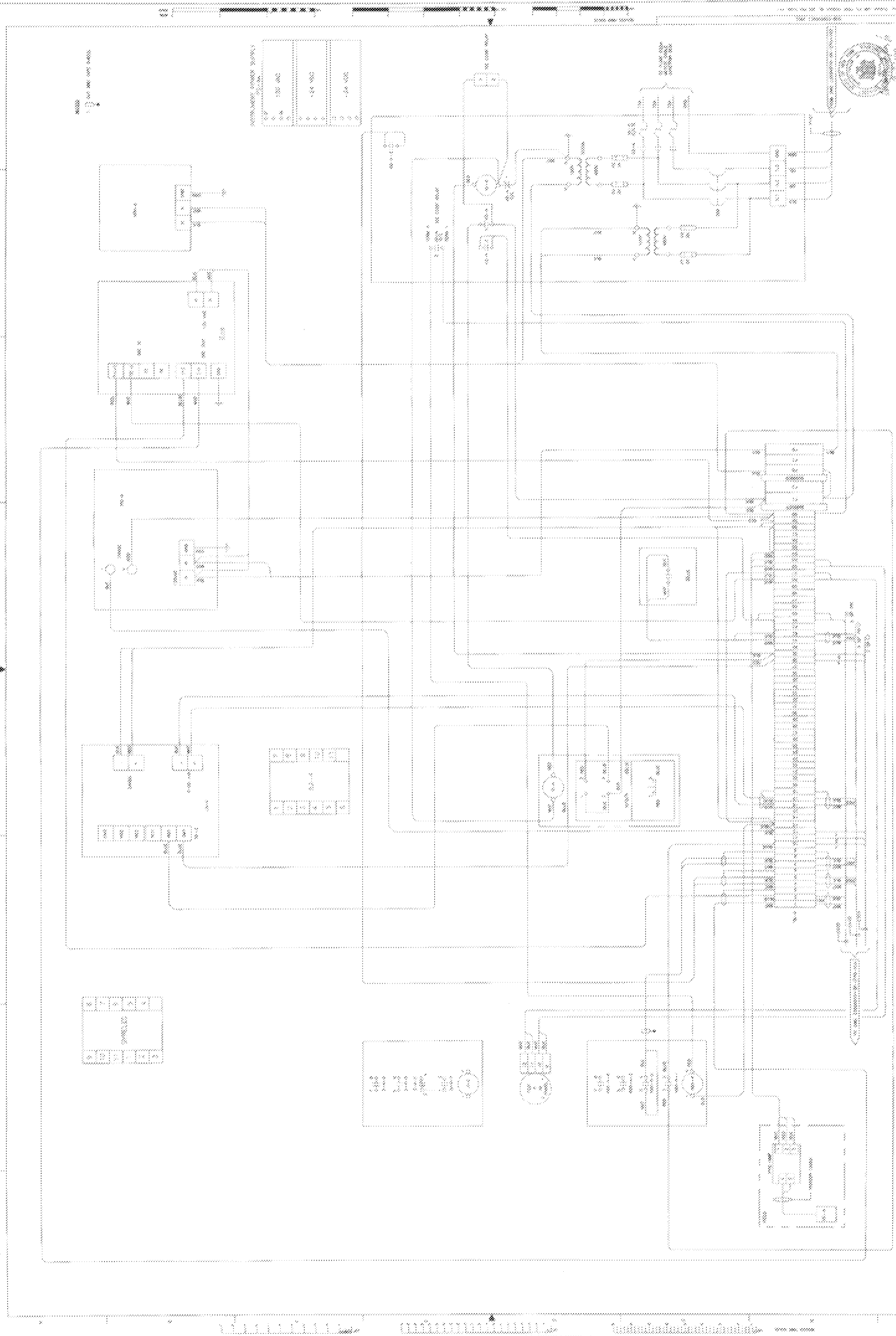
MARKS: \_\_\_\_\_

REMARKS: \_\_\_\_\_

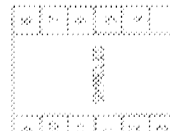
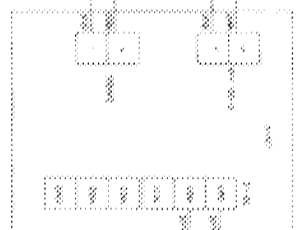
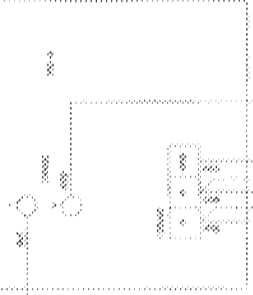
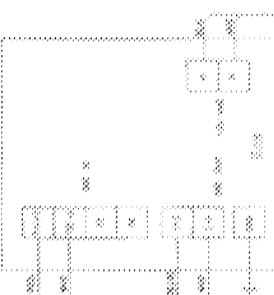
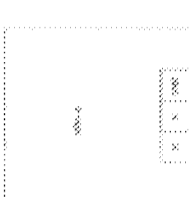


UNIVERSITY OF ENGINEERING MADRAS

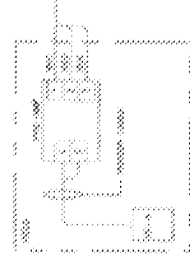
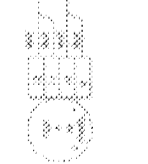
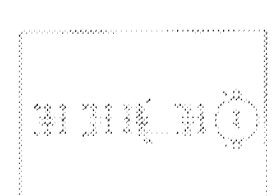




STOP



| NO. | DESCRIPTION | QUANTITY |
|-----|-------------|----------|
| 1   | 115V AC     | 1        |
| 2   | 115V AC     | 1        |
| 3   | 115V AC     | 1        |
| 4   | 115V AC     | 1        |



| NO. | DESCRIPTION | QUANTITY |
|-----|-------------|----------|
| 1   | 115V AC     | 1        |
| 2   | 115V AC     | 1        |
| 3   | 115V AC     | 1        |
| 4   | 115V AC     | 1        |
| 5   | 115V AC     | 1        |
| 6   | 115V AC     | 1        |
| 7   | 115V AC     | 1        |
| 8   | 115V AC     | 1        |
| 9   | 115V AC     | 1        |
| 10  | 115V AC     | 1        |
| 11  | 115V AC     | 1        |
| 12  | 115V AC     | 1        |
| 13  | 115V AC     | 1        |
| 14  | 115V AC     | 1        |
| 15  | 115V AC     | 1        |
| 16  | 115V AC     | 1        |
| 17  | 115V AC     | 1        |
| 18  | 115V AC     | 1        |
| 19  | 115V AC     | 1        |
| 20  | 115V AC     | 1        |
| 21  | 115V AC     | 1        |
| 22  | 115V AC     | 1        |
| 23  | 115V AC     | 1        |
| 24  | 115V AC     | 1        |
| 25  | 115V AC     | 1        |
| 26  | 115V AC     | 1        |
| 27  | 115V AC     | 1        |
| 28  | 115V AC     | 1        |
| 29  | 115V AC     | 1        |
| 30  | 115V AC     | 1        |
| 31  | 115V AC     | 1        |
| 32  | 115V AC     | 1        |
| 33  | 115V AC     | 1        |
| 34  | 115V AC     | 1        |
| 35  | 115V AC     | 1        |
| 36  | 115V AC     | 1        |
| 37  | 115V AC     | 1        |
| 38  | 115V AC     | 1        |
| 39  | 115V AC     | 1        |
| 40  | 115V AC     | 1        |
| 41  | 115V AC     | 1        |
| 42  | 115V AC     | 1        |
| 43  | 115V AC     | 1        |
| 44  | 115V AC     | 1        |
| 45  | 115V AC     | 1        |
| 46  | 115V AC     | 1        |
| 47  | 115V AC     | 1        |
| 48  | 115V AC     | 1        |
| 49  | 115V AC     | 1        |
| 50  | 115V AC     | 1        |

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115V AC

115V AC

115V AC

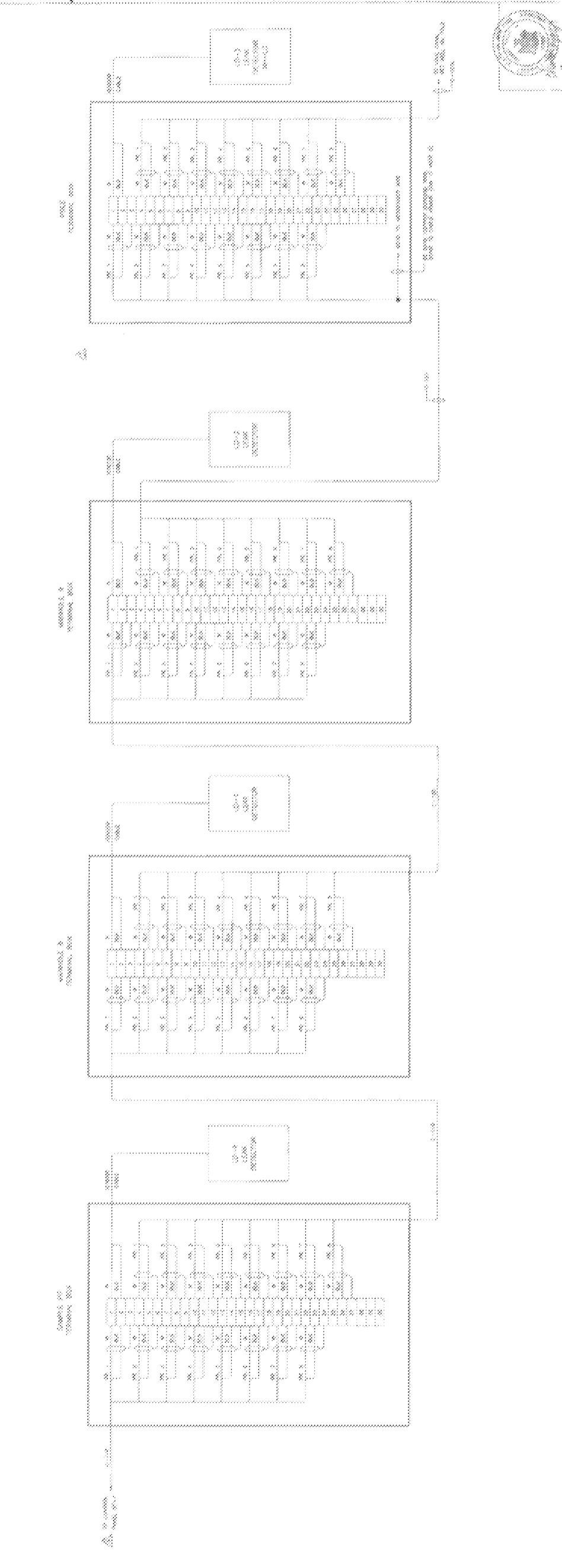
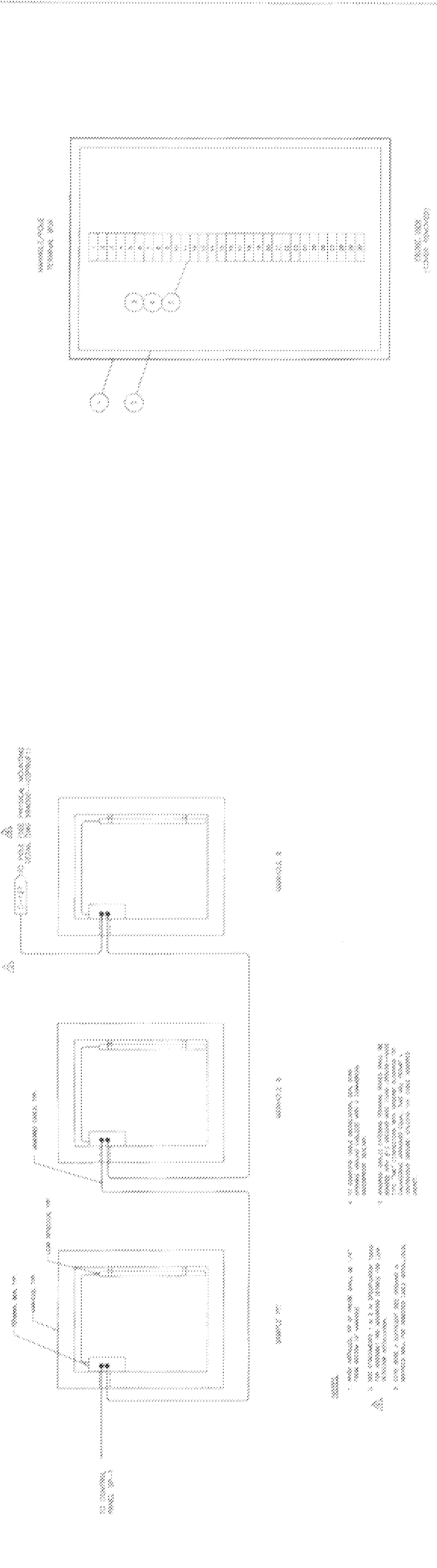
115V AC

115V AC

115V AC

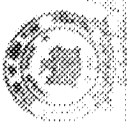
115V AC

|                     |   |
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| PROYECTO            | RECONSTRUCCION DE LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES DE LA CIUDAD DE BUENOS AIRES |
| CLIENTE             | SECRETARIA DE AGUAS Y SANEAMIENTO   |
| FECHA               | 15/05/2012  |
| ESCALA              | 1:100   |
| PROYECTANTE         | ING. DANIEL FERRER  |
| REVISOR             | ING. DANIEL FERRER  |
| APROBADO            | ING. DANIEL FERRER  |
| FECHA DE APROBACION | 15/05/2012  |
| PROYECTO            | RECONSTRUCCION DE LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES DE LA CIUDAD DE BUENOS AIRES |
| CLIENTE             | SECRETARIA DE AGUAS Y SANEAMIENTO   |
| FECHA               | 15/05/2012  |
| ESCALA              | 1:100   |
| PROYECTANTE         | ING. DANIEL FERRER  |
| REVISOR             | ING. DANIEL FERRER  |
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| FECHA DE APROBACION | 15/05/2012  |



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| PROYECTO            | RECONSTRUCCION DE LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES DE LA CIUDAD DE BUENOS AIRES |
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| FECHA               | 15/05/2012  |
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| PROYECTANTE         | ING. DANIEL FERRER  |
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| CLIENTE             | SECRETARIA DE AGUAS Y SANEAMIENTO   |
| FECHA               | 15/05/2012  |
| ESCALA              | 1:100   |
| PROYECTANTE         | ING. DANIEL FERRER  |
| REVISOR             | ING. DANIEL FERRER  |
| APROBADO            | ING. DANIEL FERRER  |
| FECHA DE APROBACION | 15/05/2012  |





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NAME: \_\_\_\_\_  
 ID: \_\_\_\_\_

**NAME: DANIEL**  
 ID: \_\_\_\_\_

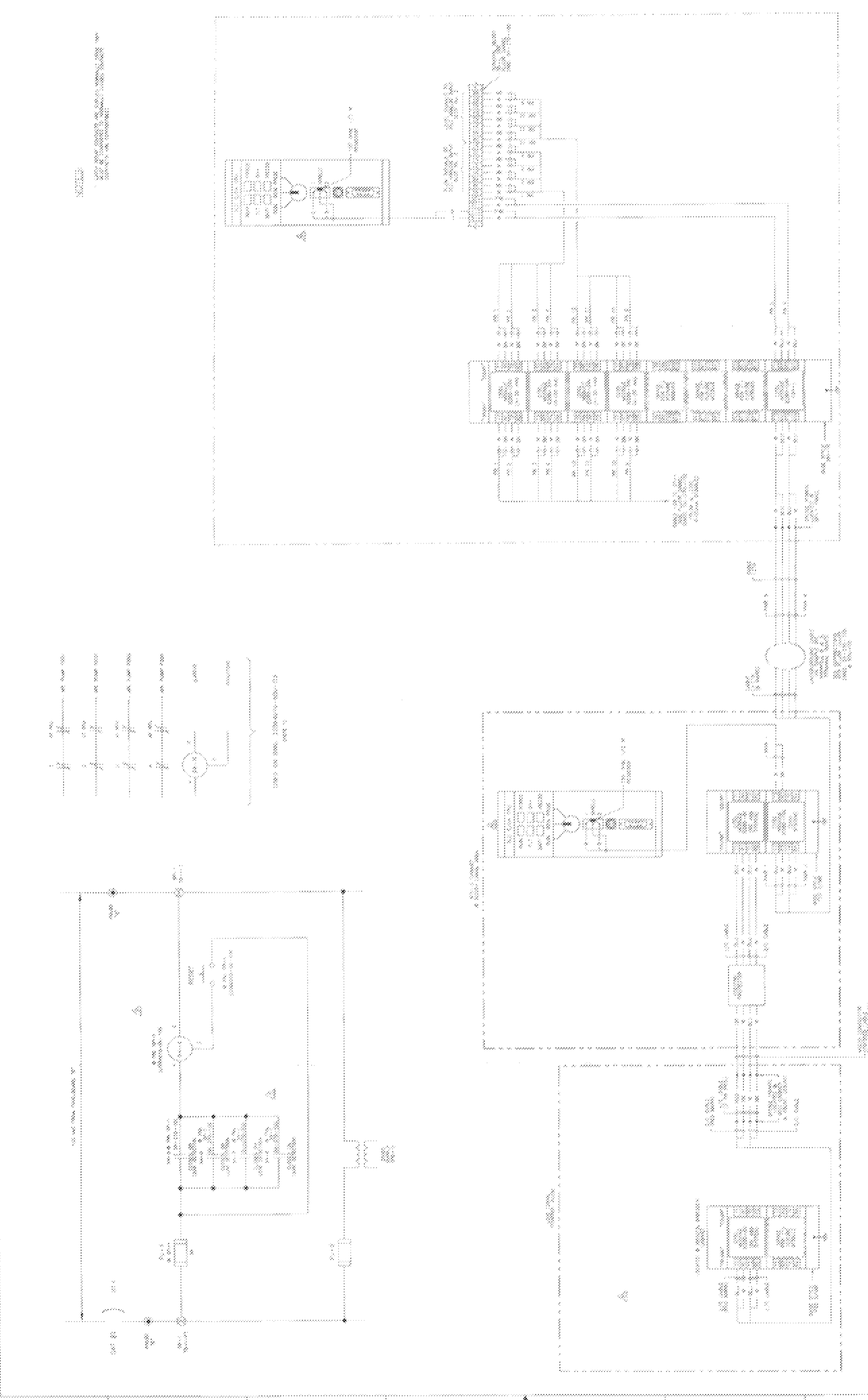
DATE: \_\_\_\_\_  
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QUESTION: \_\_\_\_\_

ANSWER: \_\_\_\_\_

MARKS: \_\_\_\_\_

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QUESTION: \_\_\_\_\_

