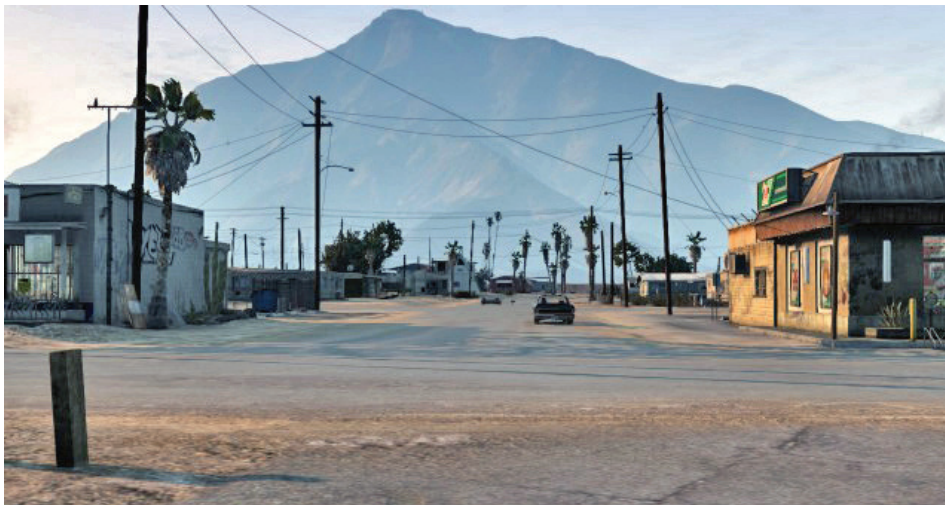
JANUARY 2017

COUNTY OF IMPERIAL

NILAND COUNTY SERVICE AREA #1

SERVICE AREA PLAN (SAP)



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SECTION 1 - EXECUTIVE SUMMARY

1.1 INTRODUCTION

This Service Area Plan (SAP) outlines the County Service Area (CSA) No. 1 known as Niland. This SAP outlines Niland's existing public services and facilities as they relate to the streetlights, estimates the current and future anticipated demand for such facilities and services, and describes how necessary facilities and services will or may be developed and extended to meet demands.

1.2 PUBLIC SERVICES & FACILITIES

Streetlight Facilities

The streetlights in the Niland Street Lighting District, County Service Area 1, are maintained by the Imperial County Department of Public Works. Imperial Irrigation District supplies the electrical power for the streetlights and the town site and maintains all existing electric transmission lines and the existing IID Substation located north of Beal Road.

Mitigation

Mitigation will be the actual construction and maintenance of the streetlights at the time adjacent development occurs.

Current Funding

The Imperial County Board of Supervisors reauthorized the dwelling unit assessment in the amount of $14 for the Niland CSA streetlights in 2016, as it has every year since 1989.[1] The total revenue generated by the unit fee varies from year to year. The County's budgets for fiscal years 2014–2015, 2015–2016, and 2016–2017 indicate assessment revenues of $13,200, $19,000 (actual, estimated) and $16,000 (recommended), respectively. Since the dwelling unit fee is constant and applied to the property tax bill of every parcel in the CSA, the variability must be due to delinquencies in any one year followed by payment in subsequent years of the taxes and assessments that are in arrears. Based on the average assessment revenues, the number of taxable parcels in the CSA is approximately 1,150. If 10% of the property owners are delinquent in any year, the delinquency would account for a $1,600 shortfall in that year.

Cost Avoidance Opportunities

The general condition of the streetlights needs improvement and the streetlights would benefit from an increased level of maintenance. The CSA's revenue versus expense net surplus of $11,600 this year, $6,100 last year, and $9,400 the year prior indicate that the maintenance level could be enhanced and still remain within the CSA's budget. The County currently pays the Imperial Irrigation District (IID), the owner of the streetlights, to maintain the system. With the goal of improving the overall level of maintenance, the County should explore the possibility of negotiating a service agreement with IID that would establish performance and monitoring

[1] County Board of Supervisor's Resolution 2016-105

standards. The enhanced maintenance could be funded by the apparent surplus. Consideration should also be given to a program of changing out fixtures to LED to save on replacements and electric bills.

Recommended Funding
No specific recommendations for further funding.

1.3 FINANCING SUMMARY

Existing Revenue Sources

The Niland Lighting District (Niland County Service Area [CSA] No.1) receives revenues primarily from the annual "unit fee" assessment authorized and established each year by the Imperial County Board of Supervisors. The unit fee of $14 per parcel was established by resolution on September 27, 2016.[2] The unit fee has not changed since the last increase in 1989. Total revenue generated varies. The County's budgets for fiscal years 2014–2015 (actual) and 2015–2016 (actual estimated) indicate assessment revenues of $13,200 and $19,000, respectively. The recommended revenue for FY 2016-2017 is $16,000[3]

Future Revenue Sources

Under the current structure of the Niland CSA, the unit fee assessment at $14 per parcel is the only option that does not require a vote of the property owners. The current fee is grandfathered under Proposition 218 (passed in 1996). Street lighting is a special benefit and not considered a "property-related" service under Article XIII(D) of the California Constitution. Since 1996, a Proposition 218 special assessment process is required to increase the unit fee.

Existing Financing Mechanisms

Over the two most recent fiscal years, the revenues and expenditures of the CSA show a surplus. This surplus, presumably with previous annual surpluses, has resulted in a fund asset balance of $172,000.[4] Therefore the opportunity exists for the Niland CSA to self-finance improvements to the streetlights by using the fund balance directly or borrowing from the County General Fund.

Future Financing Mechanism

As discussed above, limited financing of future improvements is possible through the use of the fund balance as collateral and future reimbursement for a loan from the County General Fund. A somewhat less likely option would be the restructuring of Niland CSA No. 1 along the lines of a Lighting and Landscape Maintenance District so that additional funds could be generated and used to enhance the level of service and improve maintenance. The obvious difficulty with this option is the voter-approval requirement and the fact that fund balances from previous years may need to be factored in the annual levy (establishment of a minimum reserve for capital would

[2] County Board of Supervisor's Resolution 2016-105,
[3] County of Imperial final adopted budget for FY 2016-2017
[4] Niland CSA No.1 Balance Sheet FY 2016–2017.

solve this). However, therein lies the benefit for the voter—that the potential exists for the unit fee to decrease if cost avoidance practices are implemented.

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SECTION 2 – INTRODUCTION

2.1 Background

The County of Imperial encompasses 4,284 square miles and is home to over 180,000 residents and over 62,000 jobs. The Niland County Service Area (CSA) No. 1 is located in the northern half of the Imperial Valley, east of the Salton Sea on State Highway 111. The unincorporated area is bounded on the west by Nieto Road, on the north by the Union Pacific Railroad tracks, and (approximately 1,000 feet north of Beal Road), on the east by extensions of Cuff Road and Memphis Avenue, and on the south by Noffsinger and Alcott Roads.

2.2 Purpose of the Service Area Plan

This SAP has been prepared for the County of Imperial in accordance with the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000, which requires that a plan identifying the existing and projected demand for public facilities and services be prepared by all incorporated cities and special districts within the State. This legislation is implemented by Imperial County Local Agency Formation Commission (LAFCO), whose policy states that a city or county within the jurisdiction of Imperial County LAFCO must update an SAP in order to demonstrate a county's ability and intent to provide adequate services within its jurisdictional boundaries.

The Niland Service Area Plan includes the Special District known as a County Service Area (CSA). California Government Code 56036 (a) defines a Special District or CSA as "an agency of the state, formed pursuant to general law or special act, for the local performance of governmental or proprietary functions within limited boundaries. 'District' or 'special district' includes a county service area". This CSA was enacted to enable the County to localize the provision and financing of expanded services, in an area which needed a higher level of public service. By establishing CSAs, the County of Imperial can identify which areas require a higher level of specific service than those already uniformly provided within the entire county. These extended services are financed by the taxpayers of the CSA. By isolating the extra services provided within the CSA, the County can insure that the additional services are paid for by those who will receive them.

2.3 Organization and Use of the Service Area Plan

This SAP outlines the Niland CSA existing streetlight facilities, estimates the current and future anticipated demand for such facilities and services, and describes how necessary facilities and services will or may be developed and extended to meet demands. The SAP is intended to demonstrate the County's intent and ability to provide adequate services to the CSA. An approximately 10-year planning horizon is used to forecast growth, and the estimated demands and provision to meet demands. The population projections used in this document was provided by the Southern California Association of Governments (SCAG). Projected population growth was placed into the structure and policies of the land use plan presented in the General Plan.

The document is organized into the following six chapters that satisfy the requirements set forth in the LAFCO guidelines:

Chapter 1.0 EXECUTIVE SUMMARY: Provides a brief summary of the SAP, highlighting key information regarding demand and financing.

Chapter 2.0 INTRODUCTION: Outlines the purpose and intent of the SAP and presents its layout to help the reader use the document. This chapter also provides background information on the CSA and of the planning documents that enabled the preparation of the SAP.

Chapter 3.0 GROWTH PROJECTIONS: Provides general information about projected population, current and future land use trends in the Niland town site, and the implications of these trends for the development of Niland's streetlight services and facilities.

Chapter 4.0 STREETLIGHT FACILITIES: Details the current and planned streetlight facilities and services, their current and projected adequacy, measures to ensure adequacy, and how such measures will be achieved and financed. Analysis for streetlight facilities in the SAP is based on the standards developed by LAFCO. Although LAFCO Guidelines typically require evaluation of administration, fire, law enforcement, library, parks & recreation, and circulation, Niland is a CSA and does not propose annexation into an adjacent municipality; therefore, the SAP will only analyze streetlight facilities, which are the only specific public services provided by the County. Each subchapter of Chapter 4 contains the following four sections:

- **Performance Standard:** A description of any standards or goals that have been adopted by the CSA to the review of the adequacy of service within the existing and future timeframes.

- **Facility Planning and Adequacy Analysis:** An inventory of the existing streetlight facilities, the adequacy of the facilities when compared to existing demands, the anticipated demand for facilities pursuant to growth of the CSA, and the phasing of the demand for facilities.

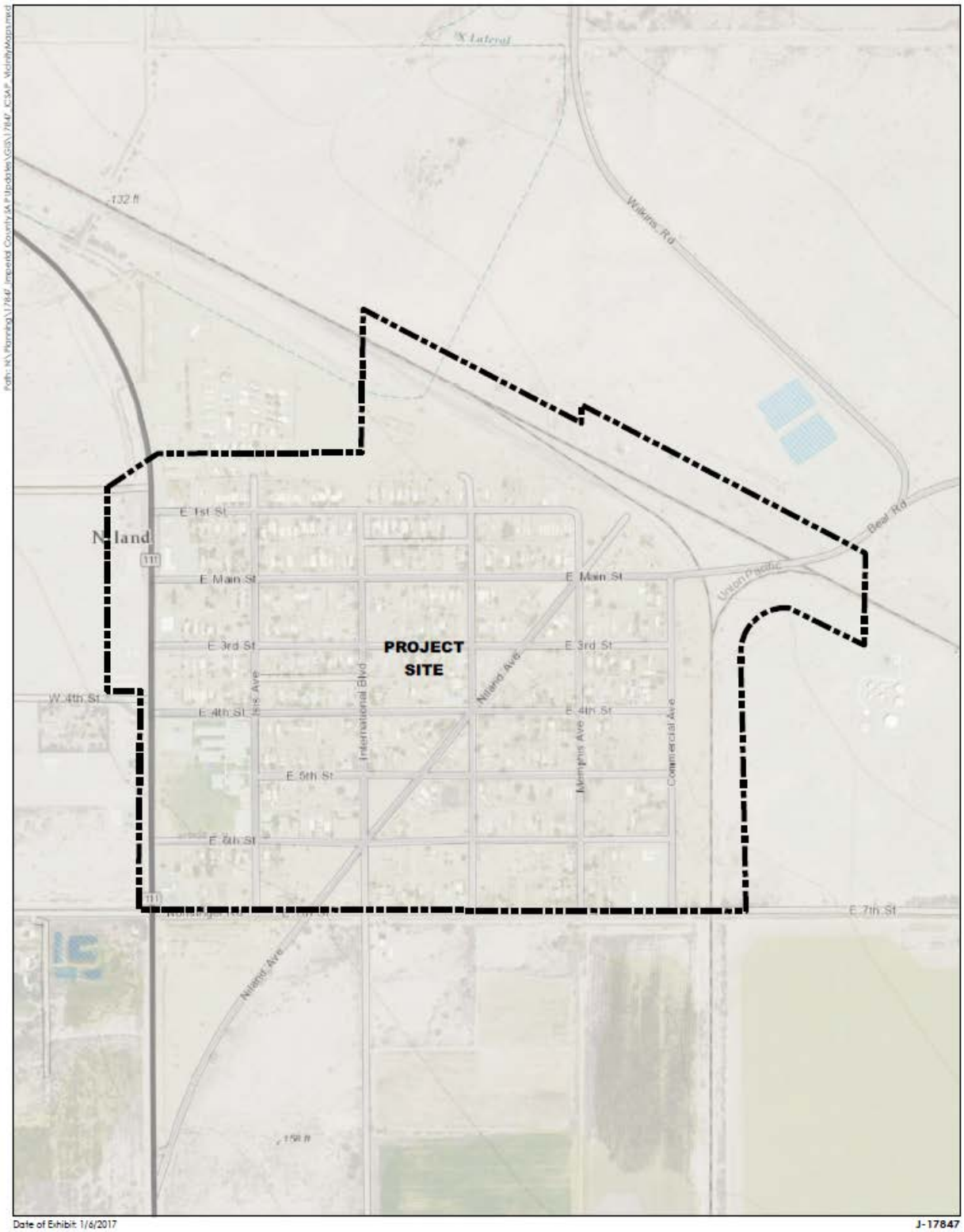
- **Financing:** An explanation and identification of how streetlight facilities are currently being funded, including a per capita cost where available and applicable and how future services and facilities may be funded.

- **Mitigation:** A series of recommendations to ensure that adequate streetlight facilities will be provided and proper levels of service will be maintained.

Figures are often provided within the various sections of Chapter 4 that show CSA maps and the relationship of existing and planned facilities to anticipated growth within Niland CSA boundaries. Figures for each service and facilities area are presented at the end of each section.

Chapter 5.0 FINANCING: Identifies all of the potential funding mechanisms for public services and facilities provision that are available to the County. This section presents potential funding sources and then identifies how streetlight facilities are currently funded and appropriate future funding opportunities, as well as cost saving opportunities.

Figure 2-1, Project Vicinity Map



SECTION 3 – GROWTH AND PHASING PROJECTIONS

3.1 Existing Land Use

The existing land uses consist primarily of single family homes which include a significant number of mobile homes on individual lots. Most of the commercial uses are along the west and east side of State Highway 111 in what is known as "new town." Other commerce and commercial property is located along Niland Avenue and light industrial property is located to the north and south of the Union Pacific Railroad tracks. Industrial uses are located to the east of the town site and consist of the Southern Pacific Tank Farm and associated pipe lines which parallel the railroad right-of-way. Agricultural activities surrounding the town site continues to be the dominate land uses in the area.

3.2 Planned Land Use

Land use designations and zoning are not expected to change.

3.3 Projected Population Increase

According to the US Census, the population of the Niland was 681 in 1970, 1,042 in 1980, 1,183 in 1990, and 1,143 in 2000. In 2010, the population of Niland decreased to 1,006, a drop of nearly 12 percent.

Due to the population decrease, projecting any growth is a challenge, particularly when the current economic and environmental factors are considered. In the absence of a major development or economic growth opportunity (i.e. large-scale restoration of the Salton Sea, new detention facility, new geothermal power plant, etc.), the estimated population in 2025 will be based on the rate of decrease from 2000 to 2010, a year-to-year average loss of 13.7 persons. Based on that projected yearly loss of 13.7 persons, the projected population for 2025 is 800.

Table 3-1, Population

Year	**Population**
1970	681
1980	1,042
1990	1,183
2000	1,143
2010	1,006
2025	**800**

3.4 Theoretical Buildout Projections

Unlike a forecast, the theoretical build-out scenario does not have a time horizon, nor does it include transportation, demographic, existing land use, or economic assumptions typically used by a forecasted model to provide more realistic land use planning data. Therefore, due to regulatory constraints, environmental constraints from the nearby Salton Sea, population decrease, and foreseeable market conditions, realization of this scenario for the foreseeable

future is highly unlikely.

Figure 3-1, Niland Photo

Abandoned structure and vacant lots on E 1st Street, facing north west.

SECTION 4 – STREETLIGHT FACILITIES

I. Performance Standard

The existing street light standard by Imperial County Publics Works Department (Appendix A) includes details for a pole with fixture, pole base, pole foundation, and conduit trench. The standard specifies a 30 foot high minimum steel pole with 15 foot long arm and 250 watt high pressure sodium fixtures for intersections and 100 watt high pressure sodium fixtures at other locations.

Mounting heights in excess of 25 feet are not recommended for most residential roadway applications. Location guidelines for the lights are not indicated.

Specific design standards include the following:

- Minimum of one light shall be installed at each roadway intersection and at the end of cul-de-sac. Provide two at each intersection with roadway exceeding 40 feet wide.
- Use 70-watt, high pressure sodium fixture mounted at a maximum mounting height of 25 feet for residential local roadways.
- Use 100-watt high pressure sodium fixture mounted at a maximum mounting height of 25 feet for residential collector roadways.
- Use 250 watt high pressure sodium fixture mounted at a maximum mounting height of 30 feet for intermediate collector roadway and business highway.
- Fixture head shall be a Cobrahead type with full cutoff Type II distribution. Fixtures shall have separate filtered optic compartment equal to GE Lighting M-250A2 luminaire with photocell control.
- Arm shall be 12 feet for 25 feet high mounting height and 15 feet for 30 feet high mounting. The orientation shall be perpendicular to the major flow roadway.
- Allow the use of existing wood utility poles for new street lighting where feasible.

II. Facility Planning and Adequacy Analysis

Inventory of Existing and Approved Facilities

Highway 111

Highway 111 lights are 250 watt, high pressure sodium, Cobrahead type fixtures, mounted at approximately 25 feet high on wood poles with a few exceptions. The lights between 1st Street and Main Street, in front of active business properties are mounted on steel poles at approximately 30 feet high. Arm orientation is perpendicular to the roadway; light spacing in one per intersection. Intersection spacing is approximately 400 feet. The lights for the active business area are spaced at approximately 200 feet. All lights are operational and appear to be in good condition. These lights are maintained by Caltrans.

Niland Avenue

Niland Avenue lights are 100 watt, high pressure sodium, Cobrahead type fixtures, mounted at approximately 25 feet high on wood poles. Arm orientation is perpendicular to the roadway; light spacing is primarily two per intersection (one on either side of the intersecting roadway), except for a few intersections that have only one light. Niland Avenue runs diagonally at approximately 50 degrees relative to the other streets and the resulting intersection spacing is approximately 500 feet. Most of the lights are very dirty or have broken diffusers.

Main Street

Main Street lights are 100 watt, high pressure sodium, Cobrahead type fixtures, mounted at approximately 25 feet high on wood poles. Arm orientation is at 45 degrees to the roadway (pointing from comer towards center of intersection); light spacing is primarily one per intersection. Intersection spacing is approximately 400 feet. Most of the lights are very dirty or have broken diffusers.

Remaining Residential Streets

The rest of the street lights are mostly 70 watt, high pressure sodium, acorn or Cobrahead type fixtures, mounted at approximately 25 feet high on wood poles. Arm orientation is at 45 degrees to the roadway (pointing from comer towards center of intersection); light spacing is primarily one per intersection. Intersection spacing is approximately 400 feet north-south, and 650 feet east-west. Most of the lights are very dirty or have broken diffusers.

Figure 4-1, Streetlight Photo

Existing streetlight located along Main Street

Figure 4-2, Streetlight Photo 2

Existing streetlight located on Highway 111

Adequacy of Existing Facilities

The existing lighting along Highway 111 is in good condition and appears to provide adequate illumination.

The rest of the system has several deficiencies. Most of the existing lights have dirt buildup on the inside of the diffuser, a broken diffuser, or are non-operational.

The dirty condition is likely due to inadequate maintenance or inadequate fixture specification for the dusty environment at Niland. The fixtures can be cleaned periodically as a remedy; however, if the fixture requires cleaning more often than re-lamping, this may not be an economical solution. Another potential solution is to replace the fixture with one that has filtered optics.

The broken diffuser conditions are likely the result of vandalism. All of the existing fixtures have non-cutoff optics and produces a high level of glare and light trespass on residences. We believe glare conditions contribute to vandalism tendencies.

The acorn style fixtures are typically located at intersections and are mounted at 45 degrees to the roadway direction. Although this is a good mounting and direction for the acorn style

fixture, since its light distribution pattern is round, the fixtures are by nature "glare bombs". Several installations of Cobrahead fixtures are also installed on 45 degree mounting arms. The Cobrahead fixture is better applied mounted at 90 degrees to the roadway direction since its light distribution pattern is rectangular. Mounting these fixtures at 45 degrees produces a significant amount of light trespass onto residences.

The glare problem, and possibly the vandalism potential could be reduced by replacing the existing fixtures with full cutoff distribution fixtures. The replacement fixtures should be mounted on arms that are oriented 90 degrees to the roadway direction.

As of January 2017, the Public Works Department is drafting a Request for Proposals to assess the entire lighting system to make recommendations and provide a rate study for a release in the summer of 2017. The goal is to determine a new rate to implement and maintain any recommended upgrades for review by the County Board of Supervisors.

Future Demand for Facilities

With no planned development for the town site and a decreasing population, any future demand should be based on any new plans for development.

Opportunities for Shared Facilities

There are currently no opportunities for shared facilities.

Phasing

Street lights will be constructed as frontage improvements for developments along the major streets occur. Given the decrease in population, this scenario is unlikely.

Repairs to existing deficient streetlight infrastructure should be prioritized on major-traveled corridors such as Highway 111 and Main Street.

III. Mitigation

The existing standard is deficient and needs to be updated. The recommended revisions include the following:

- Minimum of one light shall be installed at each roadway intersection and at the end of cul-de-sac. Provide two at each intersection with roadway exceeding 40 feet wide.
- Use 70-watt, high pressure sodium fixture mounted at a maximum mounting height of 25 feet for residential local roadways.
- Use 100-watt high pressure sodium fixture mounted at a maximum mounting height of 25 feet for residential collector roadways.
- Use 250 watt high pressure sodium fixture mounted at a maximum mounting height of 30 feet for intermediate collector roadway and business highway.

- Fixture head shall be a Cobrahead type with full cutoff Type II distribution. Fixtures shall have separate filtered optic compartment equal to GE Lighting M-250A2 luminaire with photocell control.
- Arm shall be 12 feet for 25 feet high mounting height and 15 feet for 30 feet high mounting. The orientation shall be perpendicular to the major flow roadway.
- Allow the use of existing wood utility poles for new street lighting where feasible.

The existing fixtures are in poor shape due to dirt accumulation and vandalism. It is recommended that the fixtures be replaced with full-cutoff distribution cobrahead fixtures per the proposed revised standard. In addition, a new pole and light should be installed at the intersection of 6th and Commercial.

IV. Financing

Current Funding

The Imperial County Board of Supervisors reauthorized the unit assessment in the amount of $14 for the Niland CSA streetlights in 2016, as it has every year since 1989.[5] The total revenue generated by the unit fee varies from year to year. The County's budgets for fiscal years 2014–2015, 2015–2016, and 2016–2017 indicate assessment revenues of $13,200, $19,000 (actual, estimated) and $16,000 (recommended), respectively. Since the unit fee is constant and applied to the property tax bill of every parcel in the CSA, the variability must be due to delinquencies in any one year followed by payment in subsequent years of the taxes and assessments that are in arrears. Based on the average assessment revenues, the number of taxable parcels in the CSA is approximately 1,150. If 10% of the property owners are delinquent in any year, the delinquency would account for a $1,600 shortfall in that year.

Cost Avoidance Opportunities

As indicated above in subsection II, Facility Planning and Adequacy Analysis, the general condition of the streetlights needs improvement and the streetlights would benefit from an increased level of maintenance. The CSA's revenue versus expense net surplus of $11,600 this year, $6,100 last year, and $9,400 the year prior indicate that the maintenance level could be enhanced and still remain within the CSA's budget. The County currently pays the Imperial Irrigation District (IID), the owner of the streetlights, to maintain the system. With the goal of improving the overall level of maintenance, the County should explore the possibility of negotiating a service agreement with IID that would establish performance and monitoring standards. The enhanced maintenance could be funded by the apparent surplus. Consideration should also be given to a program of changing out fixtures to LED to save on replacements and electric bills. This would also have the added affected of decreasing light trespass and reducing costs to the County from vandalism and improving public safety.

Recommended Funding

No specific recommendations for further funding.

[5] County Board of Supervisor's Resolution 2016-105

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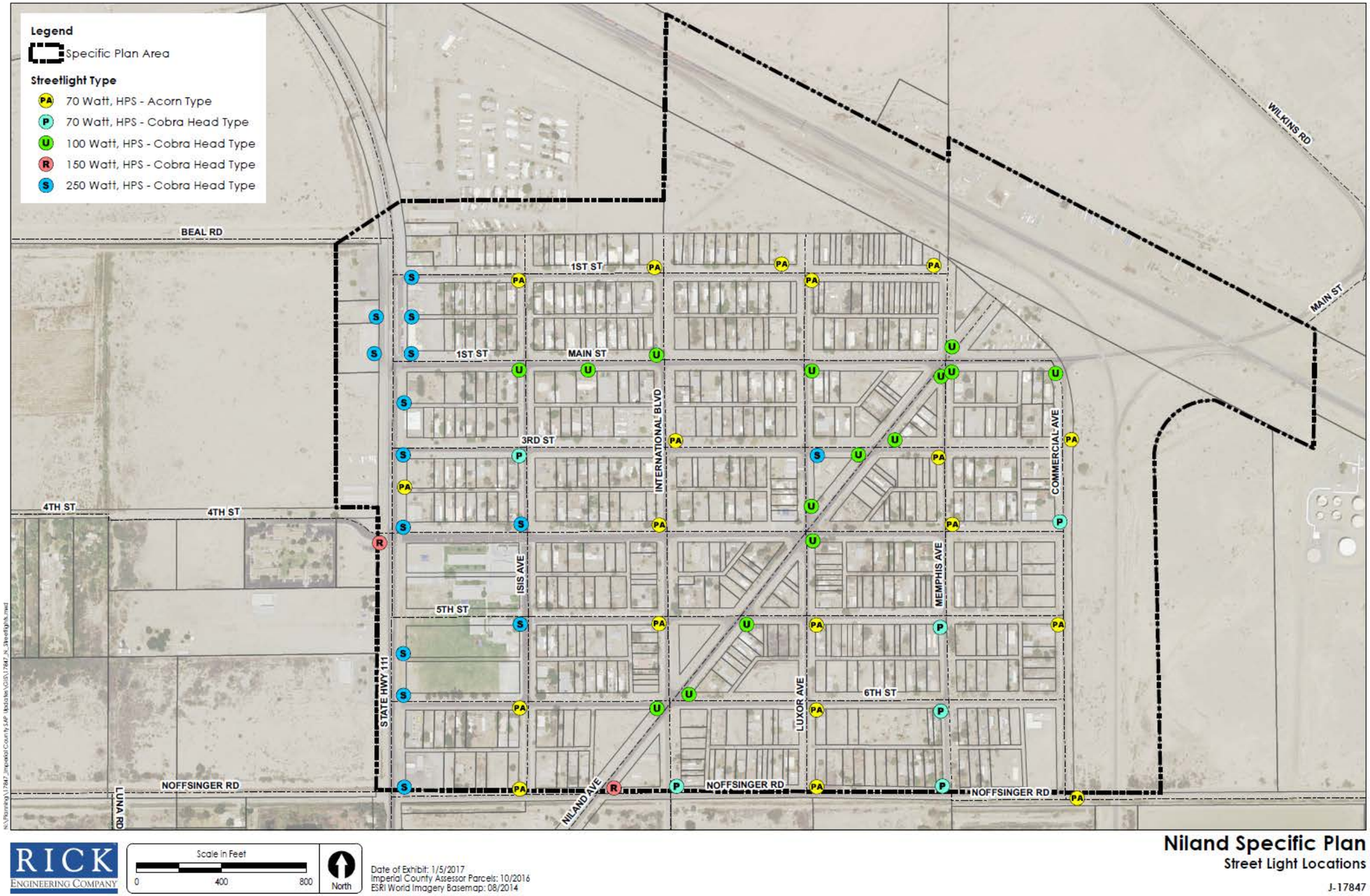
Figure 4-3, Streetlight Location Map



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SECTION 5 – FINANCING

5.1 Introduction

This section of the Service Area Plan discusses various financing mechanisms available to the Niland CSA for maintenance and operation of the streetlights.

5.2 Existing Revenue Sources

The unit fee assessment discussed above is the only revenue source in the Niland CSA applicable to streetlight installation, maintenance, and operations.

5.3 Future Revenue Sources

Updated Unit Fees

As discussed under the Financing Summary subheading, a property owner vote is the only means of updating the current unit fee. An increase in the unit fee is not automatic even with a vote for approval, since the assessment levy may not exceed the actual cost of providing the service in any year.

5.4 Existing Financing Mechanism

No financing is currently used by the Niland CSA No. 1.

5.5 Future Financing Mechanisms

If the recent net surpluses of the Niland street lighting operations are typical, there is the potential for some of the surplus to be used as debt service for loans from the County General Fund or through the Imperial County Community and Economic Development Department, which works with communities to secure financing for street improvements and public services, among other projects.

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Appendix A – Niland Streetlight Master Plan (May 2006)

Niland County Service Area

Street Light Master Plan

Prepared for

County of Imperial Public Works

May 2006

DRAFT

ECB012000 02

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EXECUTIVE SUMMARY - DRAFT

This Master Plan document analyzes the street light infrastructure within the Niland County Service Area (CSA). The study provides the following:

A. Review of the existing street lighting standards.
B. Summary of existing roadway conditions.
C. Inventory and photos of the existing installed street lights.
D. Illumination level readings at sample locations.
E. Evaluation of existing street lights.
F. Recommendations for upgrades to the existing street light installations.
G. Recommendations for upgrades to the existing street lighting standards.
H. Cost data for potential upgrades.
I. Lighting calculations.

With the exception of Highway 111, which is maintained by Caltrans, our study finds that the lighting in the township of Niland does not meet the current criteria for roadway illumination established by the Illuminating Engineering Society of North America (IESNA). This is due mainly to the following:

- Insignificant number of lighting fixtures
- Dirty and/or broken diffuser
- Incorrect diffuser style
- Incorrect arm location
- Non-operational bulb
- Large amounts of glare

In our research, we found that the existing street light standard by Imperial County Public Works Department is deficient in that it does not specify the type of fixture head and light distribution pattern, and does not provide for applications that are better served with mounting heights below 30 feet. We have made the following recommendations in order to update the current standard:

A. A minimum of one light shall be installed at each roadway intersection and at the end of cul-de-sac. Provide two at each intersection with roadway exceeding 40 feet wide.
B. Use 70 watt, high pressure sodium fixture mounted at a maximum mounting height of 25 feet for residential local roadways
C. Use 100 watt high pressure sodium fixture mounted at a maximum mounting height of 25 feet for residential collector roadways.
D. Use 250 watt high pressure sodium fixture mounted at a maximum mounting height of 30 feet for intermediate collector roadway and business highway.
E. Fixture head shall be a Cobrahead type with full cutoff Type II distribution. Fixtures shall have separate filtered optic compartment equal to GE Lighting M-250A2 luminaire with photocell control.
F. Arm shall be 12 feet for 25 feet high mounting height and 15 feet for 30 feet high mounting. The orientation shall be perpendicular to the major flow roadway.

G. Allow the use of existing wood utility poles for new street lighting where feasible.

The existing fixtures are in poor shape due to dirt accumulation and vandalism. We recommend the fixtures be replaced with full-cutoff distribution cobrahead fixtures per the proposed revised standard. In addition, a new pole and light should be installed at the intersection of 6th and Commercial. A regular maintenance schedule should also be created.

By updating and implementing the proposed revised standard the township of Niland will meet the IESNA criteria for roadway illumination. The following benefits will occur in the township of Niland:

- Create a more pleasurable lighting environment
- Improved safety at the intersection of 6th and Commercial
- Reduce crime
- Significantly reduce glare
    - Decrease light pollution (especially into people's homes)
    - Improve driving conditions
    - Decrease vandalism

INTRODUCTION

This purpose of this study is to provide supporting data in the preparation of a Master Plan document for the street light infrastructure within the Niland County Service Area (CSA). The study provides the following:

A. Review of the existing street lighting standards.
B. Summary of existing roadway conditions.
C. Inventory and photos of the existing installed street lights.
D. Illumination level readings at sample locations.
E. Evaluation of existing street lights.
F. Recommendations for upgrades to the existing street light installations.
G. Recommendations for upgrades to the existing street lighting standards.
H. Cost data for potential upgrades.
I. Lighting calculations.

The paragraphs that follow summarize the subject matter. Tables, photos, maps, calculations, and cost data are included in the appendices.

EXISTING STANDARDS

The existing street light standard by Imperial County Publics Works Department (Appendix A) includes details for a pole with fixture, pole base, pole foundation, and conduit trench. The standard specifies a 30 foot high minimum steel pole with 15 foot long arm and 250 watt high pressure sodium fixtures for intersections and 100 watt high pressure sodium fixtures at other locations. The standard is deficient in that it does not specify the type of fixture head and light distribution pattern, and does not provide for applications that are better served with mounting heights below 30 feet. Mounting heights in excess of 25 feet are not recommended for most residential roadway applications. Location guidelines for the lights are not indicated.

Recommendations for updates to the standards are addressed further ahead in this study.

EXISTING ROADWAY CONDITIONS

The existing roadways within the Niland CSA include: a two-lane highway, State Highway 111, two "main" streets, Niland Avenue & Main Street, and several residential block local streets.

A. State Highway 111 is approximately 60 feet wide. Street lighting along the highway is maintained by Caltrans.
B. Niland Avenue is approximately 40 feet wide, with commercial and residential properties on either side. Main Street is approximately 30 feet wide with residential properties on both sides. Both of these streets will be considered as "residential collector" roadways for illumination criteria.
C. Residential block streets are approximately 30 feet wide. These streets will be considered as "residential local" roadways for illumination criteria.
D. Typical street spacing (block size) is approximately 650 feet x 400 feet.

EXISTING STREET LIGHT INVENTORY

Highway 111

Highway 111 lights are 250 watt, high pressure sodium, cobrahead style fixtures, mounted at approximately 25 feet high on wood poles with a few exceptions. The lights between 1st Street & Main Street, in front of active business properties are mounted on steel poles at approximately 30 feet high. Arm orientation is perpendicular to the roadway; light spacing is one per intersection. Intersection spacing is approximately 400 feet. The lights for the active business area are spaced at approximately 200 feet.

All lights are operational and appear to be in good condition. These lights are maintained by Caltrans.

Niland Avenue

Niland Avenue lights are 100 watt, high pressure sodium, cobrahead style fixtures, mounted at approximately 25 feet high on wood poles. Arm orientation is perpendicular to the roadway; light spacing is primarily two per intersection (one on either side of the intersecting roadway), except for a few intersections that have only one light. Niland Avenue runs diagonally at approximately 50 degrees relative to the other streets and the resulting intersection spacing is approximately 500 feet.

Most of the lights are very dirty or have broken diffusers.

Main Street

Main Street lights are 100 watt, high pressure sodium, cobrahead style fixtures, mounted at approximately 25 feet high on wood poles. Arm orientation is at 45 degrees to the roadway (pointing from corner towards center of intersection); light spacing is primarily one per intersection. Intersection spacing is approximately 400 feet.

Most of the lights are very dirty or have broken diffusers.

Remaining Residential Streets

The rest of the street lights are mostly 70 watt, high pressure sodium, acorn or cobrahead style fixtures, mounted at approximately 25 feet high on wood poles. Arm orientation is at 45 degrees to the roadway (pointing from corner towards center of intersection); light spacing is primarily one per intersection. Intersection spacing is approximately 400 feet north-south, and 650 feet east-west.

Most of the lights are very dirty or have broken diffusers.

Appendix B includes a spreadsheet showing the types, locations, and conditions of the existing street lights. Also included in Appendix C, is a map indicating the pole locations; and in Appendix D are photographs of the existing lights.

EXISTING ILLUMINATION LEVELS

The criteria for roadway illumination established by the IESNA (Illuminating Engineering

Society of North America are 0.4 footcandles average with 6:1 uniformity for residential local streets and 0.6 footcandles average with 4:1 uniformity for residential collector streets.

The existing illumination levels at four sample locations were recorded for comparison with the criteria. Sample locations were selected with the intent to provide a typical condition for each of the following existing fixture types:

A. Type "PA", 70 watt high pressure sodium, acorn style, mounted at approximately 25 feet, oriented at 45 degrees.
B. Type "P", 70 watt high pressure sodium, cobrahead style, mounted at approximately 25 feet, oriented at 45 degrees.
C. Type "U", 100 watt high pressure sodium, cobrahead style, mounted at approximately 25 feet, oriented at 45 degrees.
D. Type "S", 250 watt high pressure sodium, cobrahead style, mounted at approximately 25 feet, oriented at 90 degrees.

The light level measurements are recorded in Appendix E.

The results of the measurements indicate the illumination levels are below the IESNA standard. We also noted in the field that there was a high level of glare radiating from the fixtures and a significant amount of light trespass onto private residences. Both the existing cobrahead fixtures and the acorn style fixtures are non-cutoff type with prismatic diffuser. These fixtures have a high glare factor and may contribute to the apparent high rate of street light vandalism.

EVALUATION OF EXISTING SYSTEM

The existing lighting along Highway 111 is in good condition and appears to provide adequate illumination. No major problems were apparent.

The rest of the system has several deficiencies. Most of the existing lights have dirt buildup on the inside of the diffuser, a broken diffuser, or are non-operational.

The dirty condition is probably due to inadequate maintenance or inadequate fixture specification for the dusty environment at Niland. The fixtures can be cleaned periodically as a remedy; however, if the fixture requires cleaning more often than relamping, this may not be an economical solution. Another potential solution is to replace the fixture with one that has filtered optics.

The broken diffuser conditions are likely the result of vandalism. All of the existing fixtures have non-cutoff optics and produces a high level of glare and light trespass on residences. We believe glare conditions contribute to vandalism tendencies.

The acorn style fixtures are typically located at intersections and are mounted at 45 degrees to the roadway direction. Although this is a good mounting arm direction for the acorn style fixture, since its light distribution pattern is round, the fixtures are by nature "glare bombs". Several installations of cobrahead fixtures are also installed on 45 degree mounting arms. The cobrahead fixture is better applied mounted at 90 degrees to the roadway direction since its light

distribution pattern is rectangular. Mounting these fixtures at 45 degrees produces a significant amount of light trespass onto residences.

The glare problem, and possibly the vandalism potential could be reduced by replacing the existing fixtures with full cutoff distribution fixtures. The replacement fixtures should be mounted on arms oriented 90 degrees.

SUMMARY AND RECOMMENDATIONS

The existing standard is deficient and needs to be updated. We recommend revisions to indicate the following:

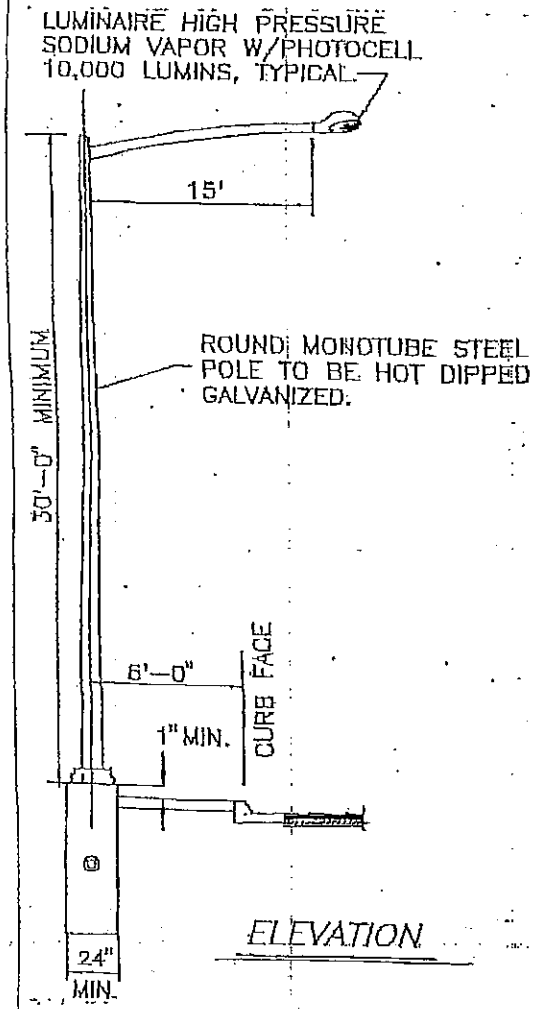
A. A minimum of one light shall be installed at each roadway intersection and at the end of cul-de-sac. Provide two at each intersection with roadway exceeding 40 feet wide.
B. Use 70 watt, high pressure sodium fixture mounted at a maximum mounting height of 25 feet for residential local roadways
C. Use 100 watt high pressure sodium fixture mounted at a maximum mounting height of 25 feet for residential collector roadways.
D. Use 250 watt high pressure sodium fixture mounted at a maximum mounting height of 30 feet for intermediate collector roadway and business highway.
E. Fixture head shall be a Cobrahead type with full cutoff Type II distribution. Fixtures shall have separate filtered optic compartment equal to GE Lighting M-250A2 luminaire with photocell control.
F. Arm shall be 12 feet for 25 feet high mounting height and 15 feet for 30 feet high mounting. The orientation shall be perpendicular to the major flow roadway.
G. Allow the use of existing wood utility poles for new street lighting where feasible.

The existing fixtures are in poor shape due to dirt accumulation and vandalism. We recommend the fixtures be replaced with full-cutoff distribution cobrahead fixtures per the proposed revised standard. In addition, a new pole and light should be installed at the intersection of 6th and Commercial.

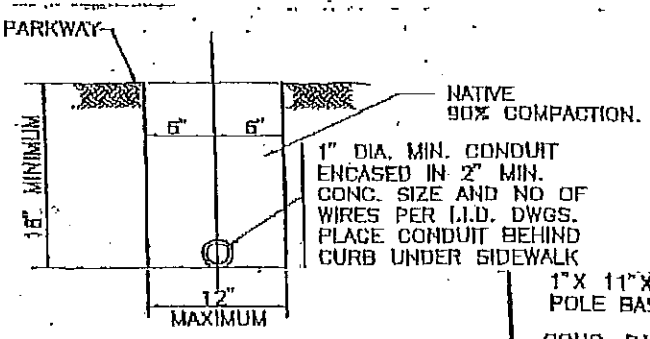
Expansion of the CSA should be installed per the proposed revised standard.

APPENDIX A

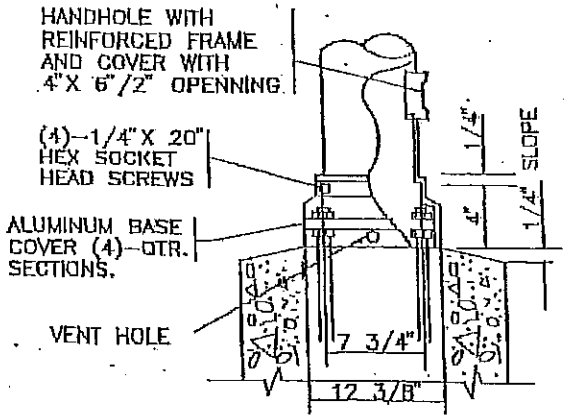
Existing Street Light Standard Detail



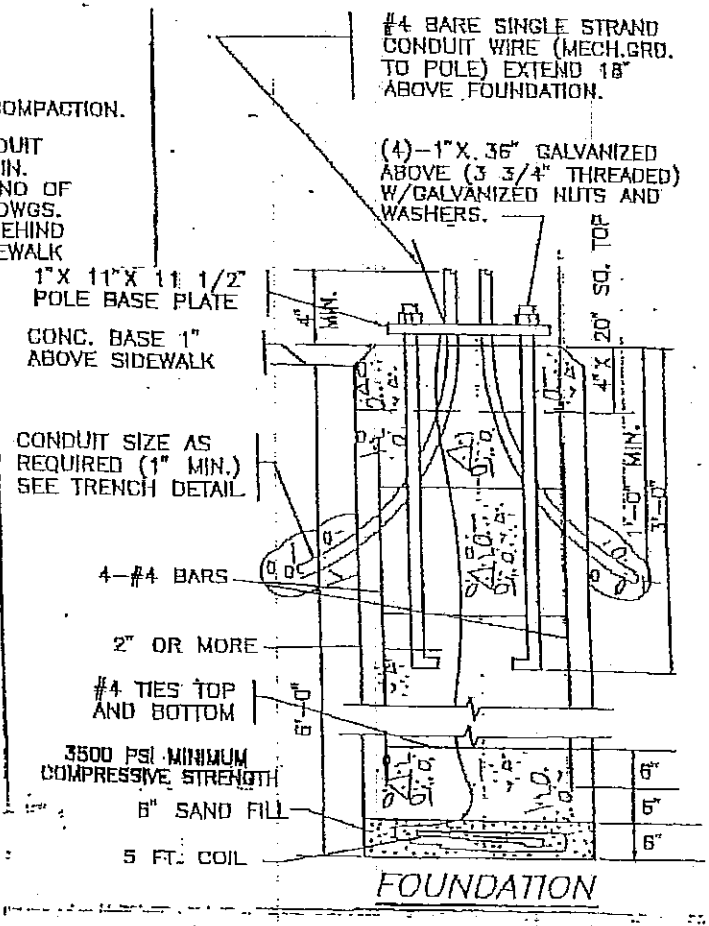
ELEVATION



TRENCH



BASE DETAIL



FOUNDATION

NOTES:

1. 250 WATTS LUMINARIE @ STREET INTERSECTIONS OR IN FRONT OF INTERSECTION & 100 WATTS @ OTHER LOCATIONS
2. #-4 TIES TO BE @ 12" MIN. SEPARATION FROM TOP TO BOTTOM. SIDEWALL REBAR TO BE 2" OR MORE FROM EXCAVATION WALLS AND BOTTOM.
3. THIS DETAIL IS SUBJECT TO APPROVAL BY APPROPRIATE UTILITY AGENCY.

IMPERIAL COUNTY

PUBLIC WORKS DEPARTMENT

EL CENTRO, CALIFORNIA

STREET LIGHT

NOT TO SCALE

DATE: 08/02/04

DRAWN: J. GARCIA

CHECKED: F. FIORENZA

DWG No. COUNTY-610

APPENDIX B

Existing Street Light Inventory

Niland CSA Existing Street Light Inventory

Pole # (reference)	Location	Light Fixture Data							Pole Data		Per County Standard	Remarks
		Style	Lamp Type	Lamp Wattage	Distribution Type II, III, or V	Orientation Angle	Approx Mounting Height	Approx Arm Length	Type	Utilization		
1	Niland Avenue (North of Noffsinger Street)	Cobrahead	HPS	150	II or III	45	25	12	Wood	Street Light Only	No	Very dirty diffuser
2	Niland Avenue (South of 6th Street	Cobrahead	HPS	100	II or III	90	25	12	Wood	Street Light Only	No	Very dirty diffuser
3	Niland Avenue (North of 6th Street	Cobrahead	HPS	100	II or III	90	25	12	Wood	Street Light Only	No	Very dirty diffuser
4	Niland Avenue (South of 5th Street	Cobrahead	HPS	100	II or III	90	25	12	Wood	Utility & Street Ligh	No	Broken diffuser
5	Niland Avenue (South of 4th Street	Cobrahead	HPS	100	II or III	90	25	12	Wood	Utility & Street Ligh	No	Very dirty diffuser
6	Niland Avenue (North of 4th Street	Cobrahead	HPS	100	II or III	90	25	12	Wood	Utility & Street Ligh	No	Broken diffuser
7	Niland Avenue (South of 3rd Street	Cobrahead	HPS	100	II or III	90	25	12	Wood	Utility & Street Ligh	No	Broken diffuser
8	Niland Avenue (North of 3rd Street	Cobrahead	HPS	100	II or III	90	25	12	Wood	Utility & Street Ligh	No	Very dirty diffuser
9	Niland Avenue (South of Main Street	Cobrahead	HPS	100	II or III	90	25	12	Wood	Street Light Only	No	Very dirty diffuser
10	Highway 111 (North of Noffsinger Street)	Cobrahead	HPS	250	II or III	90	25	12	Wood	Street Light Only	No	
11	Highway 111 (North of 6th Street	Cobrahead	HPS	250	II or III	90	25	12	Wood	Street Light Only	No	
12	Highway 111 (Between 4th & 6th Streets	Cobrahead	HPS	250	II or III	90	25	12	Wood	Utility & Street Ligh	No	
13	Highway 111 (South of 4th Street	Cobrahead	HPS	150	II or III	90	30	15	Steel	Street Light Only	Yes	
14	Highway 111 (North of 4th Street	Cobrahead	HPS	250	II or III	90	25	12	Wood	Street Light Only	No	
15	Highway 111 (North of 3rd Street)	Cobrahead	HPS	250	II or III	90	25	12	Wood	Street Light Only	No	
16	Highway 111 (Between Main & 3rd Streets	Cobrahead	HPS	250	II or III	90	25	12	Wood	Street Light Only	No	
17	Highway 111 (North of Main Street - West)	Cobrahead	HPS	250	II or III	90	30	15	Steel	Street Light Only	Yes	
18	Highway 111 (North of Main Street - East	Cobrahead	HPS	250	II or III	90	30	15	Steel	Street Light Only	Yes	
19	Highway 111 (Between 1st & Main Streets - East	Cobrahead	HPS	250	II or III	90	30	15	Steel	Street Light Only	Yes	
20	Highway 111 (Between 1st & Main Streets - West	Cobrahead	HPS	250	II or III	90	30	15	Steel	Street Light Only	Yes	
21	Highway 111 (South of 1st Street	Cobrahead	HPS	250	II or III	90	30	15	Steel	Street Light Only	Yes	
22	1st Street & Isis Avenue	Acorn	HPS	70	V	45	25	12	Wood	Street Light Only	No	
23	1st Street & International Avenue	Acorn	HPS	70	V	45	25	12	Wood	Street Light Only	No	
24	1st Street (Between International & Luxor Avenues	Cobrahead	HPS	100	II or III	90	25	12	Wood	Street Light Only	No	In front of sherrif office
25	1st Street & Luxor Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	Broken diffuser
26	1st Street & Memphis Avenue	Acorn	HPS	70	V	90	25	12	Wood	Street Light Only	No	
27	Main Street & Isis Avenue	Cobrahead	HPS	100	II or III	45	25	12	Wood	Street Light Only	No	
28	Main Street (Between Isis & International Avenues	Cobrahead	HPS	100	II or III	90	25	12	Wood	Utility & Street Ligh	No	
29	Main Street & International Avenue	Cobrahead	HPS	100	II or III	45	25	12	Wood	Street Light Only	No	Very dirty diffuser
30	Main Street & Luxor Avenue	Cobrahead	HPS	100	II or III	45	25	12	Wood	Street Light Only	No	

Niland CSA Existing Street Light Inventory

Pole # (reference)	Location	Light Fixture Data							Pole Data		Per County Standard	Remarks
		Style	Lamp Type	Lamp Wattage	Distribution Type II, III, or V	Orientation Angle	Approx Mounting Height	Approx Arm Length	Type	Utilization		
31	Main Street & Memphis Avenue - Nortl	Cobrahead	HPS	100	II or III	45	25	12	Wood	Utility & Street Ligh	No	Very dirty diffuser
32	Main Street & Memphis Avenue - Soutl	Cobrahead	HPS	100	II or III	45	25	12	Wood	Utility & Street Ligh	No	Very dirty diffuser
33	Main Street & Commercial Avenue	Cobrahead	HPS	100	II or III	45	25	12	Wood	Street Light Only	No	Small holes in diffuser
34	3rd Street & Isis Avenue	Cobrahead	HPS	70	II or III	45	25	12	Wood	Utility & Street Ligh	No	
35	3rd Street & International Avenue	Acorn	HPS	70	V	45	25	12	Wood	Street Light Only	No	Broken diffuser
36	3rd Street & Luxor Avenue	Cobrahead	HPS	250	II or III	90	25	12	Wood	Utility & Street Ligh	No	
37	3rd Street & Memphis Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	Broken diffuser
38	3rd Street & Commercial Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	Broken diffuser
39	4th Street (West of Highway 111)	Cobrahead	HPS	100	II or III	90	30	15	Steel	Street Light Only	Yes	Very dirty diffuser
40	4th Street (West of Highway 111)	Cobrahead	HPS	70	II or III	90	30	15	Steel	Street Light Only	Yes	
41	4th Street (West of Highway 111)	Cobrahead	HPS	70	II or III	90	30	15	Steel	Street Light Only	Yes	
42	4th Street & Isis Avenue	Cobrahead	HPS	250	II or III	45	25	12	Wood	Utility & Street Ligh	No	
43	4th Street & International Avenue	Acorn	HPS	70	V	45	25	12	Wood	Street Light Only	No	
44	4th Street & Memphis Avenue	Acorn	HPS	70	V	45	25	12	Wood	Street Light Only	No	Very dirty diffuser
45	4th Street & Commercial Avenue	Cobrahead	HPS	70	II or III	90	25	12	Wood	Utility & Street Ligh	No	
46	5th Street & Isis Avenue	Cobrahead	HPS	250	II or III	90	25	12	Wood	Utility & Street Ligh	No	
47	5th Street & International Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	
48	5th Street & Luxor Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	Broken diffuser
49	5th Street & Memphis Avenue	Cobrahead	HPS	70	II or III	45	25	12	Wood	Utility & Street Ligh	No	Broken diffuser
50	5th Street & Commercial Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	
51	6th Street & Isis Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	
52	6th Street & Luxor Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	
53	6th Street & Memphis Avenue	Cobrahead	HPS	70	II or III	45	25	12	Wood	Utility & Street Ligh	No	
54	Noffsinger Street & Isis Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	
55	Noffsinger Street & International Avenue	Cobrahead	HPS	70	II or III	45	25	12	Wood	Utility & Street Ligh	No	Very dirty diffuser
56	Noffsinger Street & Luxor Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	Broken diffuser
57	Noffsinger Street & Memphis	Cobrahead	HPS	70	II or III	45	25	12	Wood	Utility & Street Ligh	No	
58	Noffsinger Street & Commercial Avenue	Acorn	HPS	70	V	45	25	12	Wood	Utility & Street Ligh	No	Broken diffuser, no lamp
59	Highway 111 (Between 3rd & 4th Streets	Acorn	HPS	70	V	90	25	3	Wood	Street Light Only	No	Not used to light roadway, used for a parking lc
60												

APPENDIX C

Existing Street Light Map

LEGEND

STREET LIGHT

24 — POLE NUMBER (REFERENCE)

FIXTURE TYPE

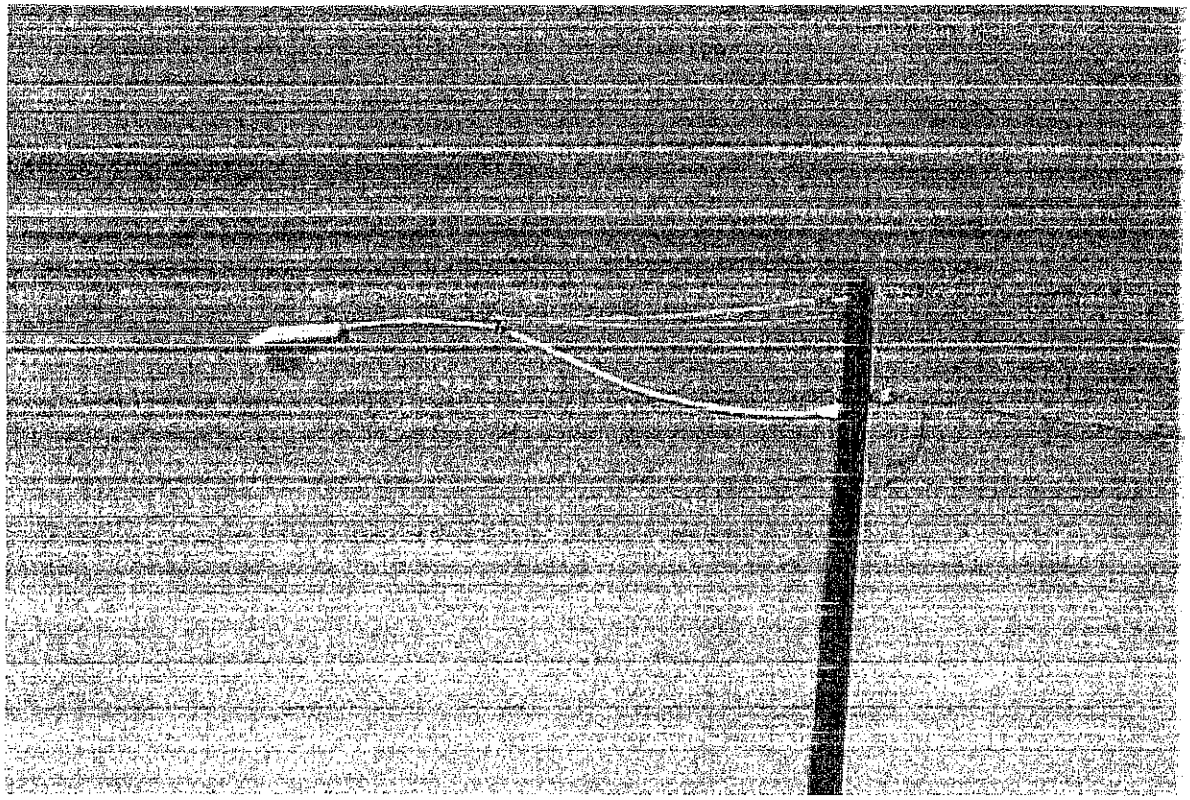
- (PA) 70 WATT, HPS – ACORN TYPE
- (P) 70 WATT, HPS – COBRA HEAD TYPE
- (R) 150 WATT, HPS – COBRA HEAD TYPE
- (S) 250 WATT, HPS – COBRA HEAD TYPE
- (U) 100 WATT, HPS – COBRA HEAD TYPE

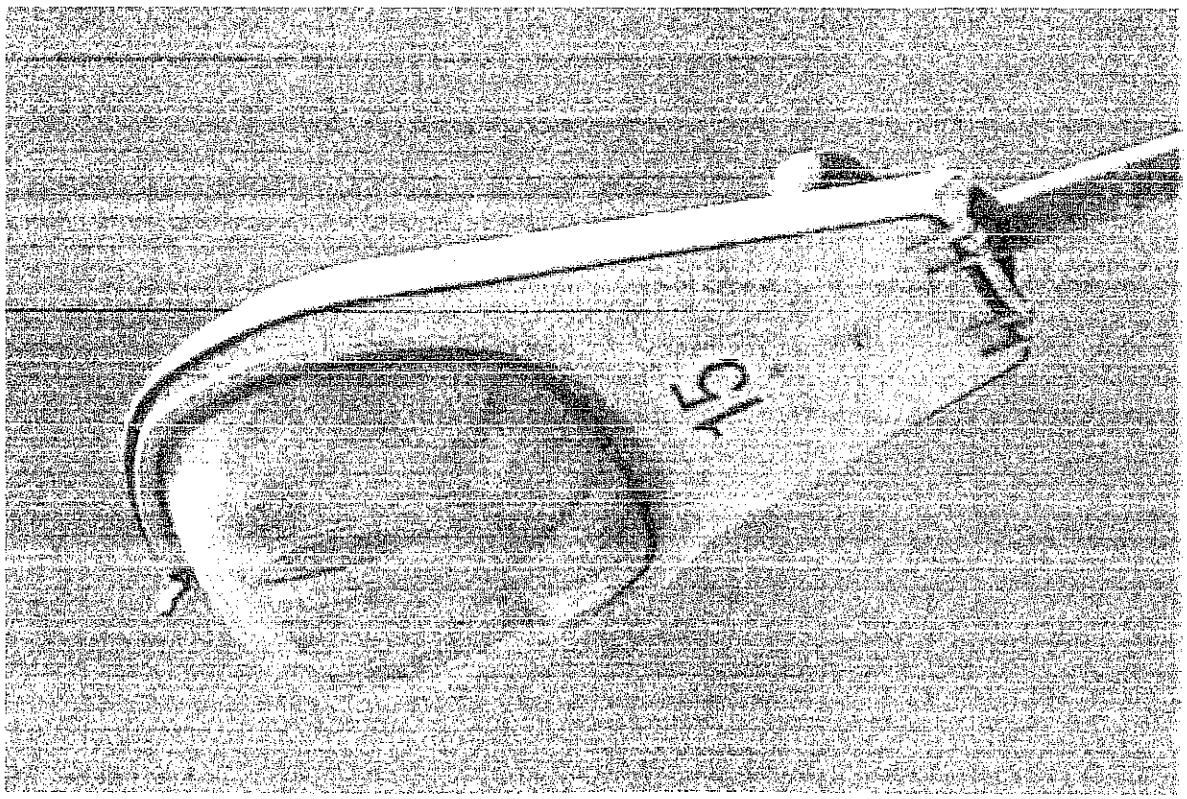
EXISTING STREET LIGHT LOCATION MAP

SCALE: 1" = 400'

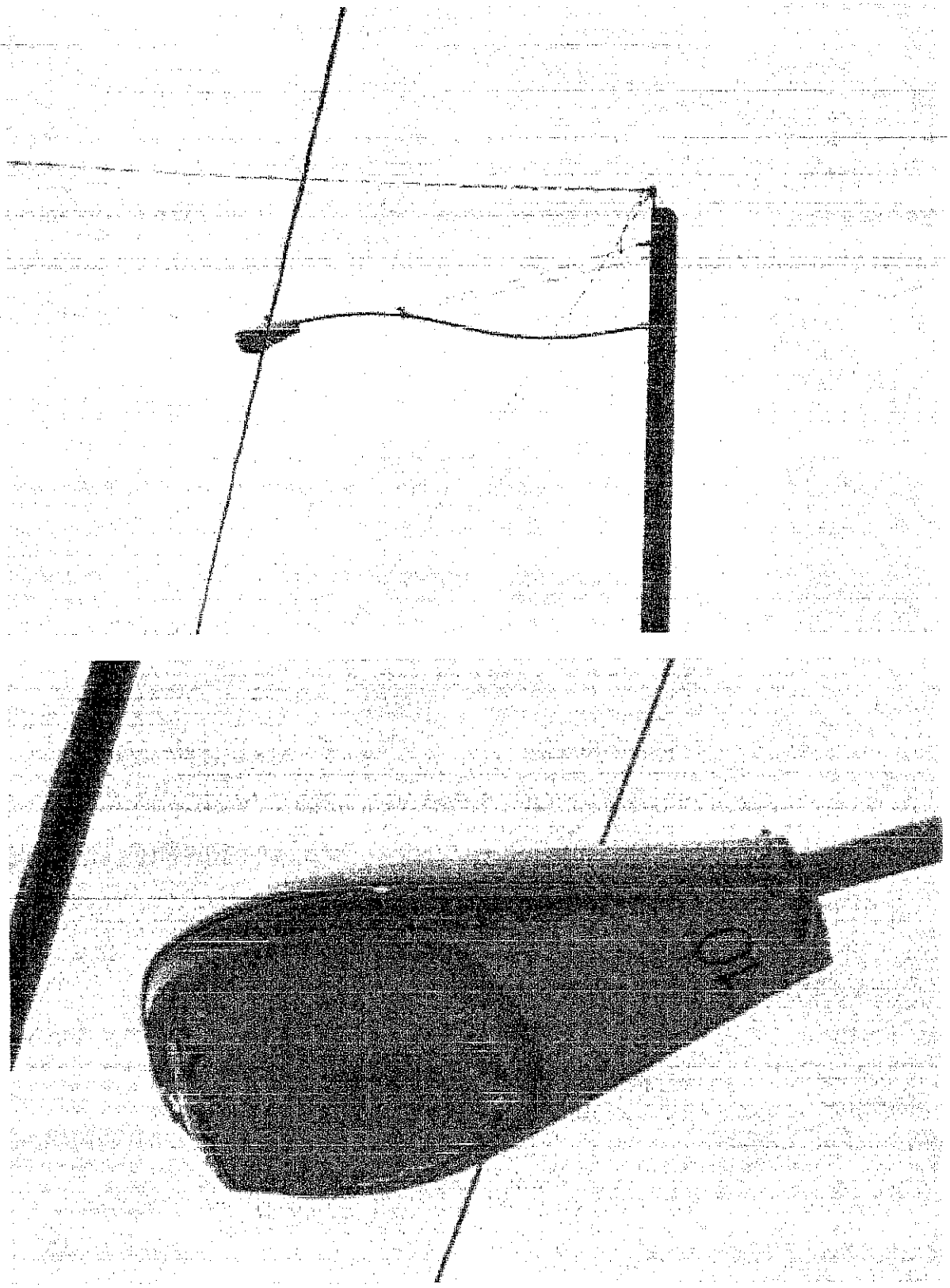
APPENDIX D

Existing Street Light Photographs

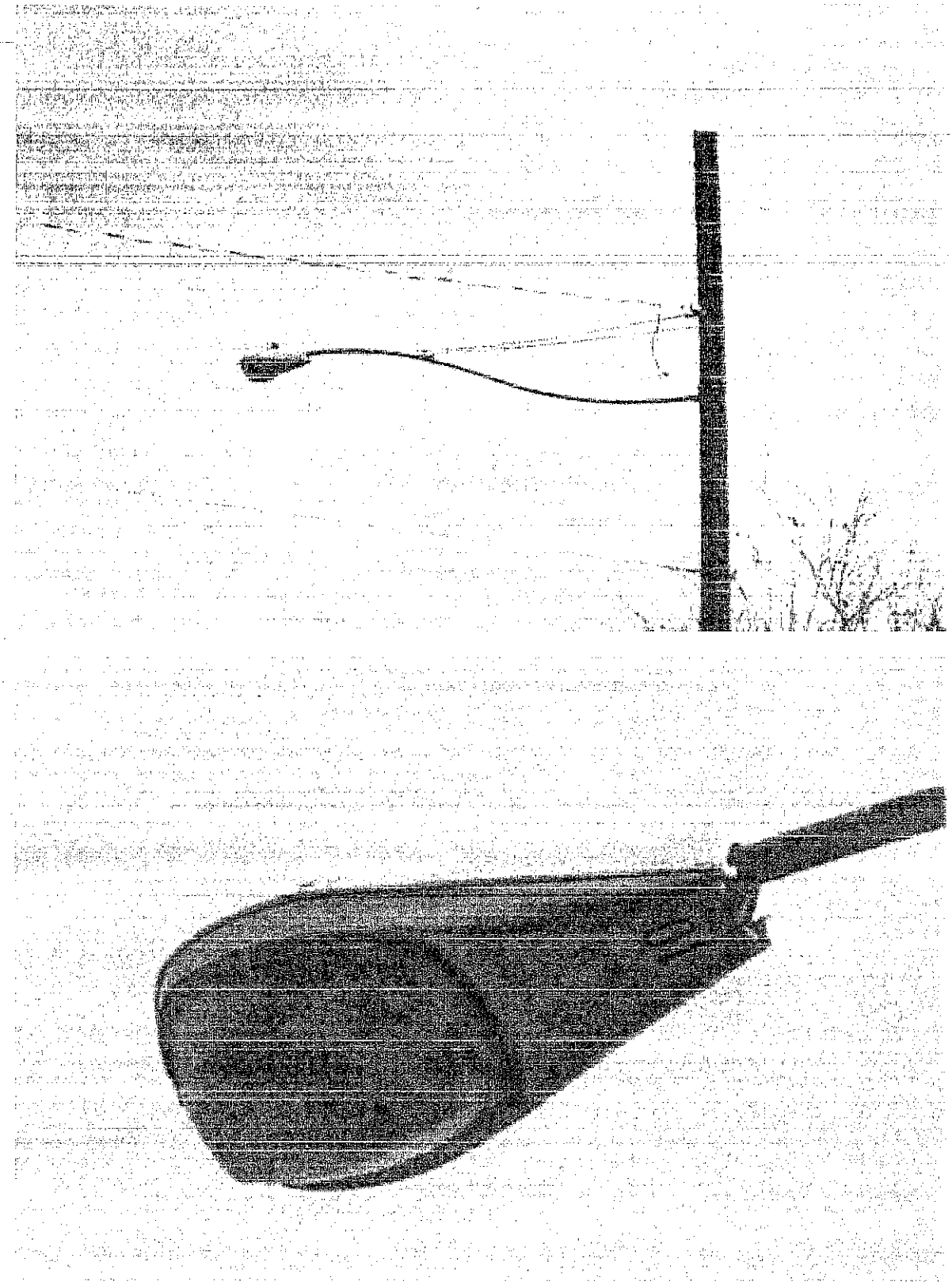




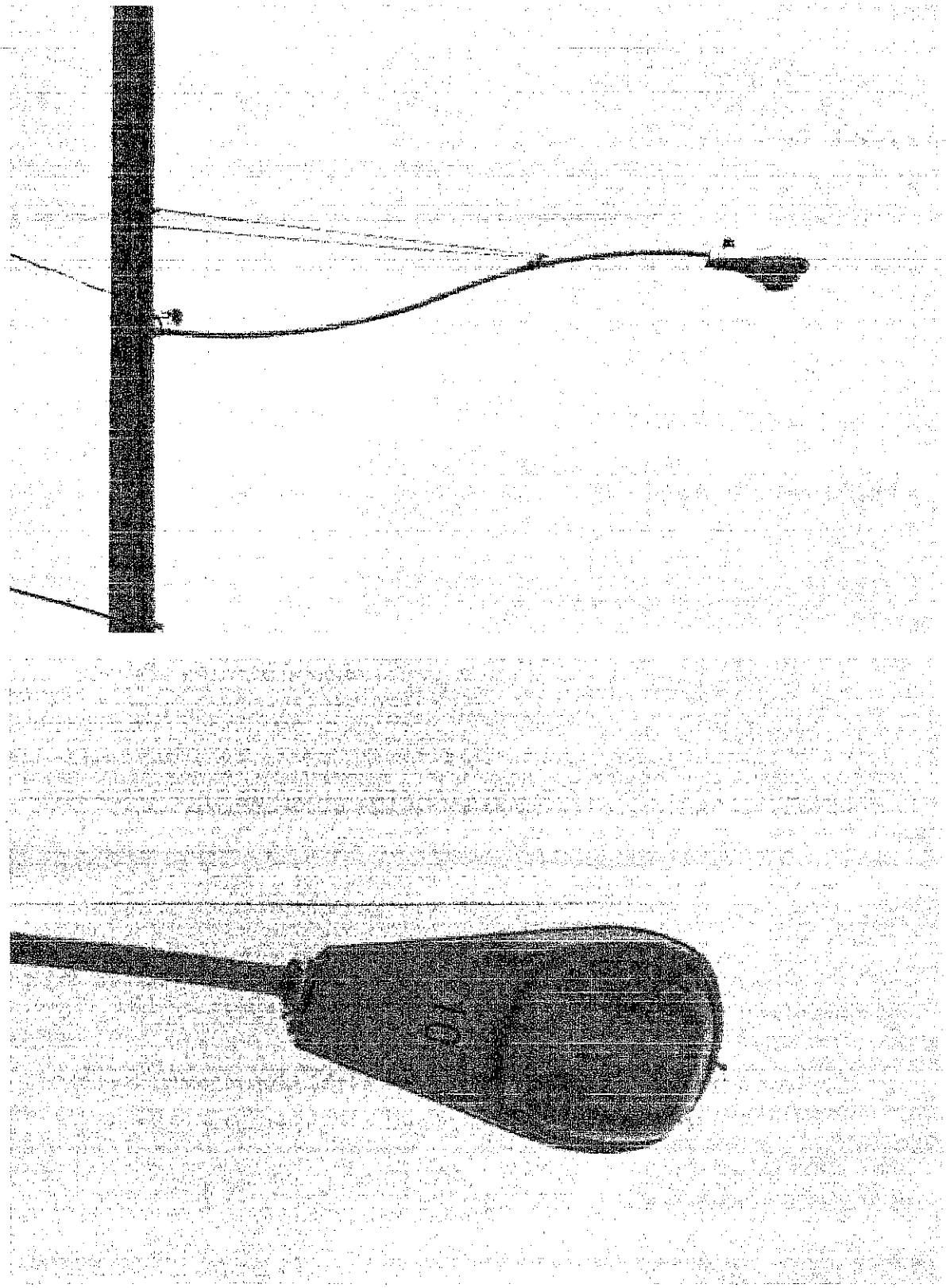
Pole #1 Niland Avenue (North of Noffsinger Street)



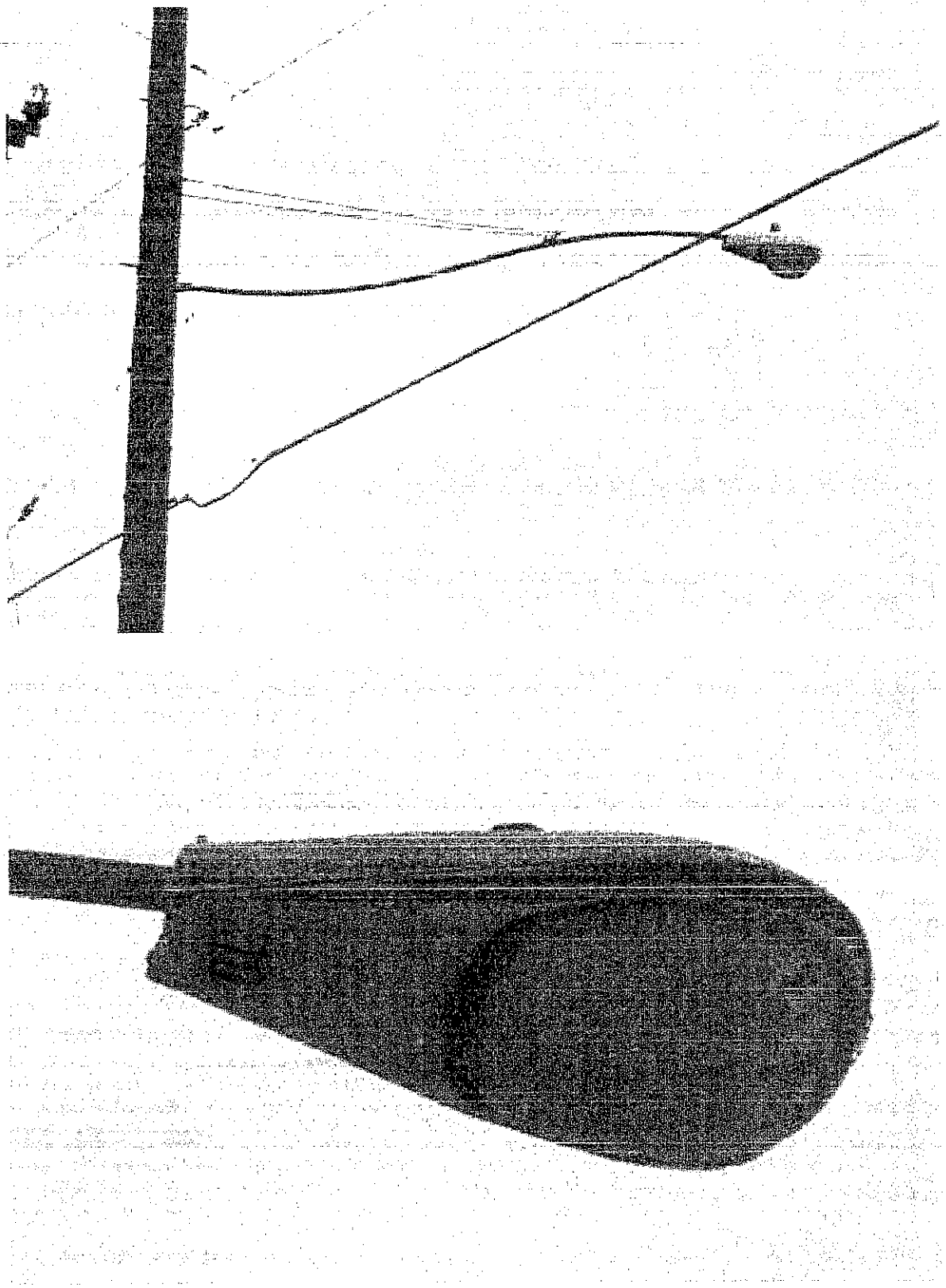
Pole #2 Niland Avenue (South of 6th Street)



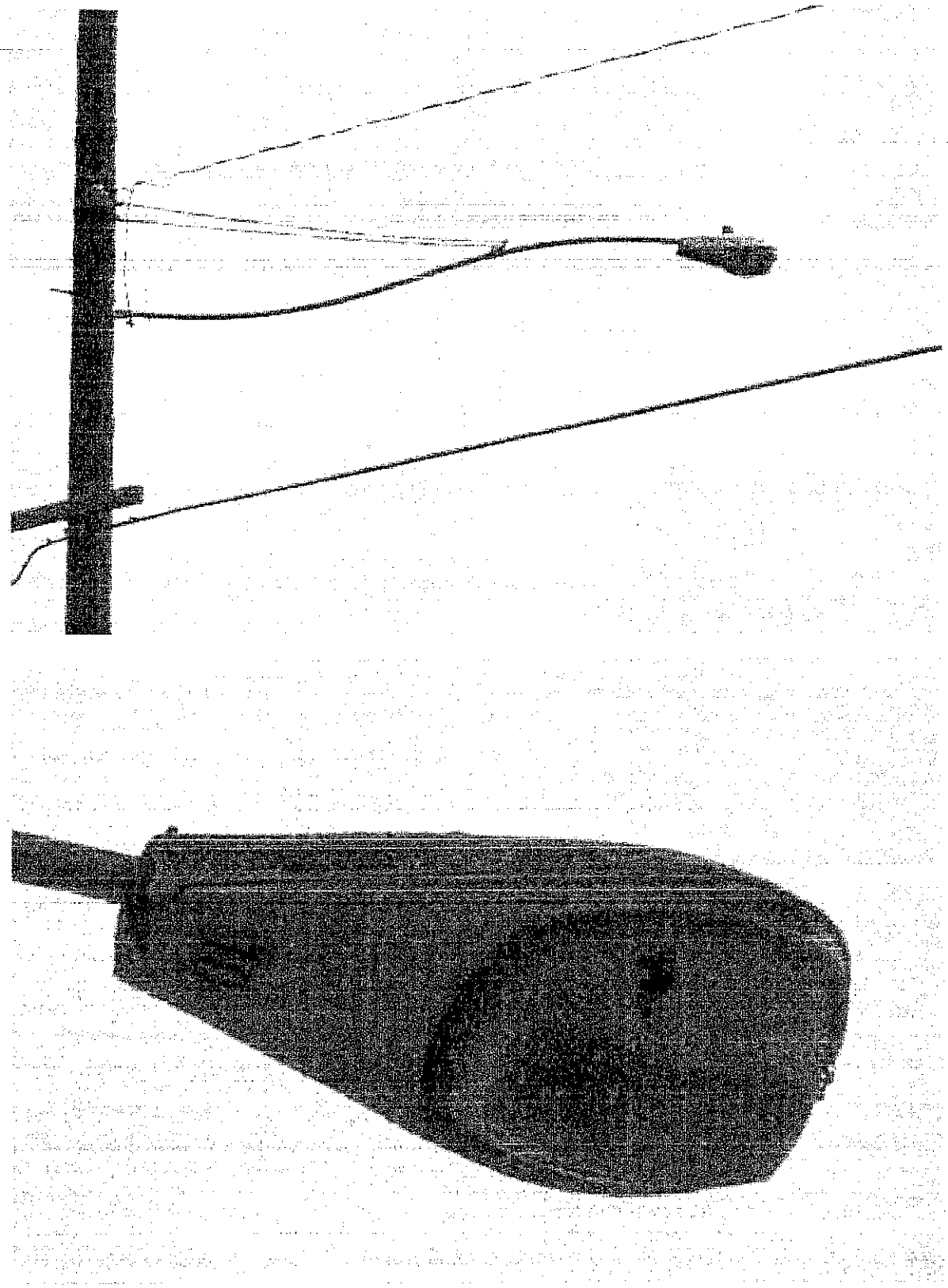
Pole #3 Niland Avenue (North of 6th Street)



Pole #4 Niland Avenue (South of 5th Street)



Pole #5 Niland Avenue (South of 4th Street)



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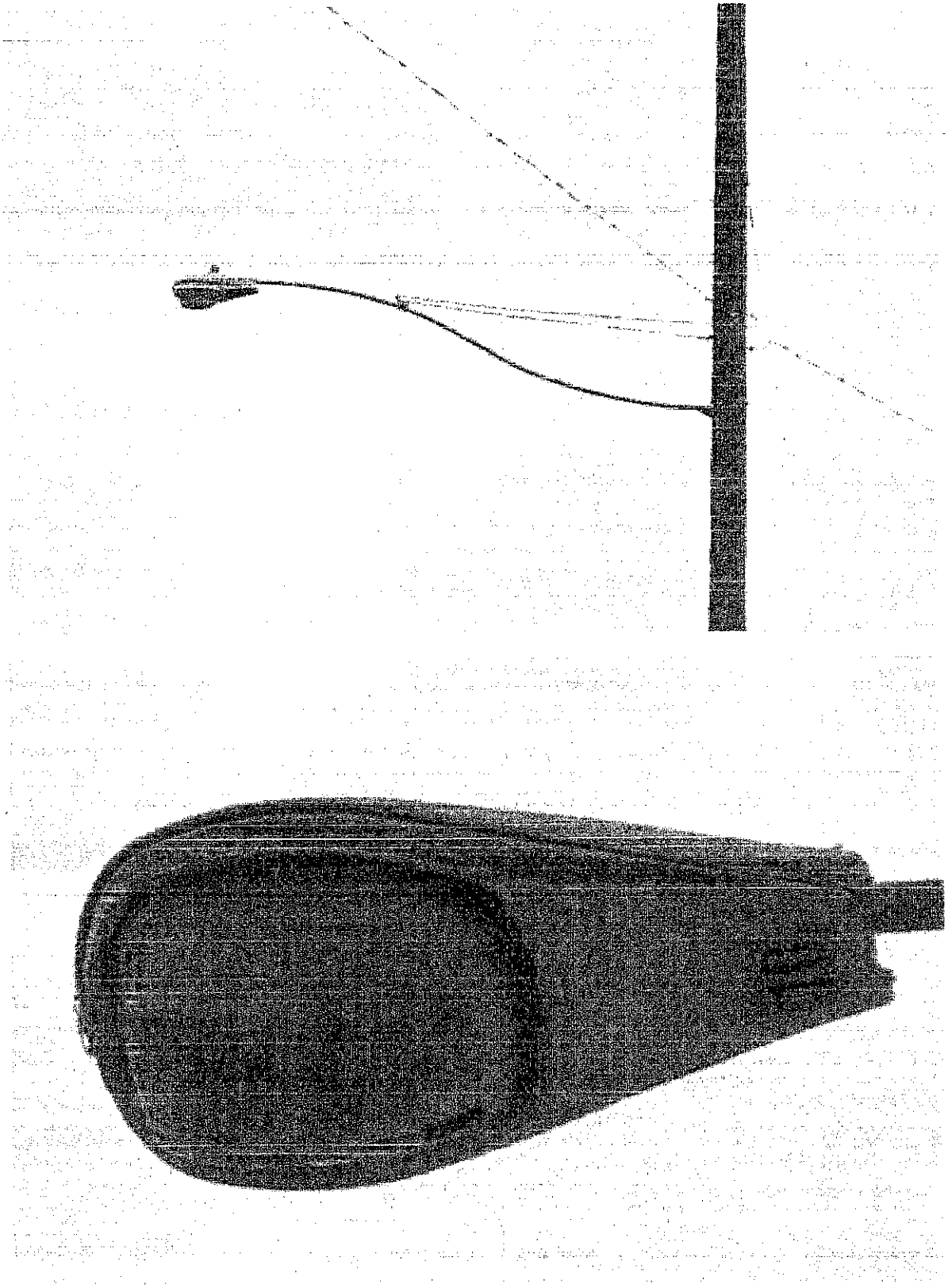
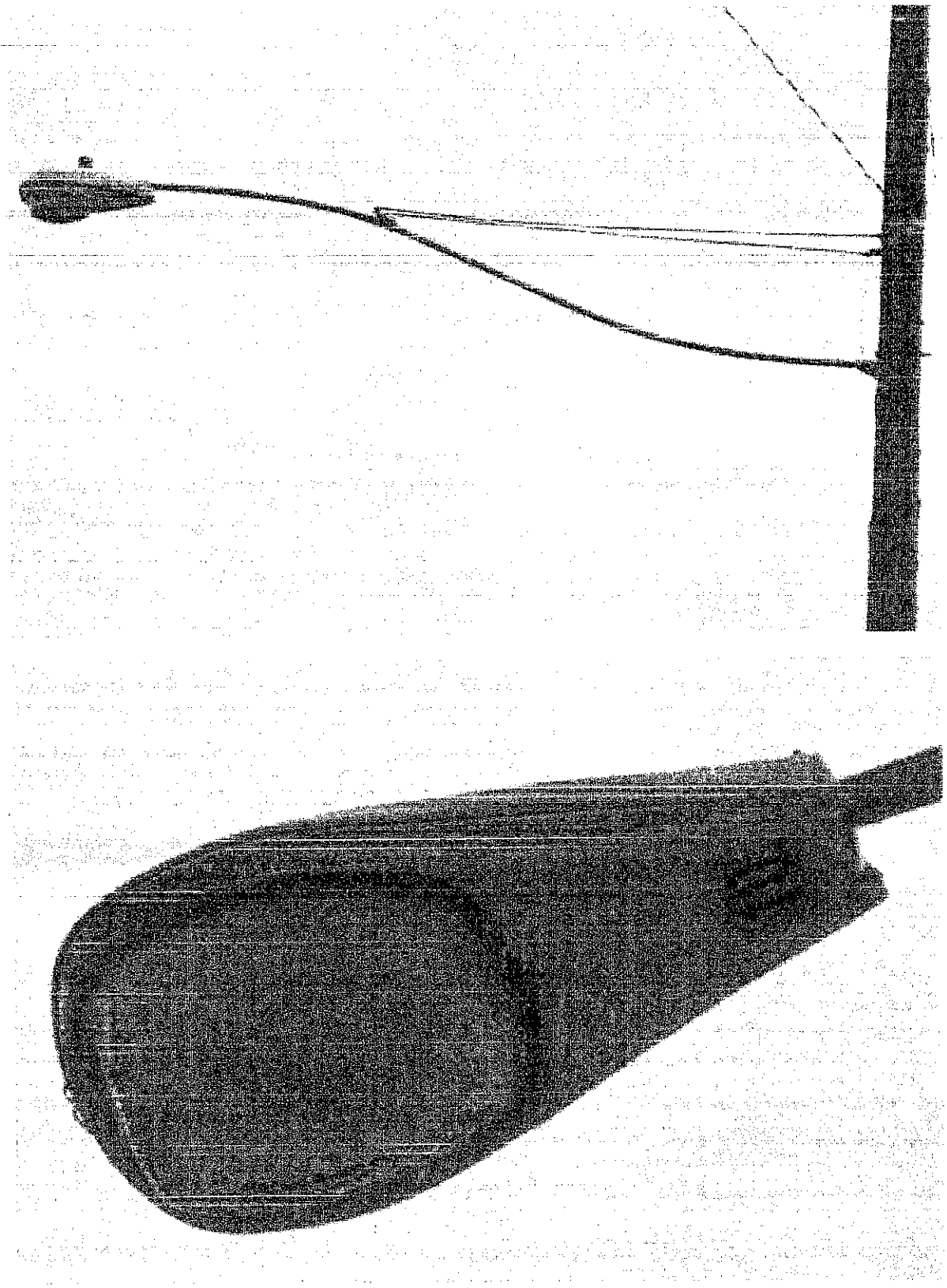
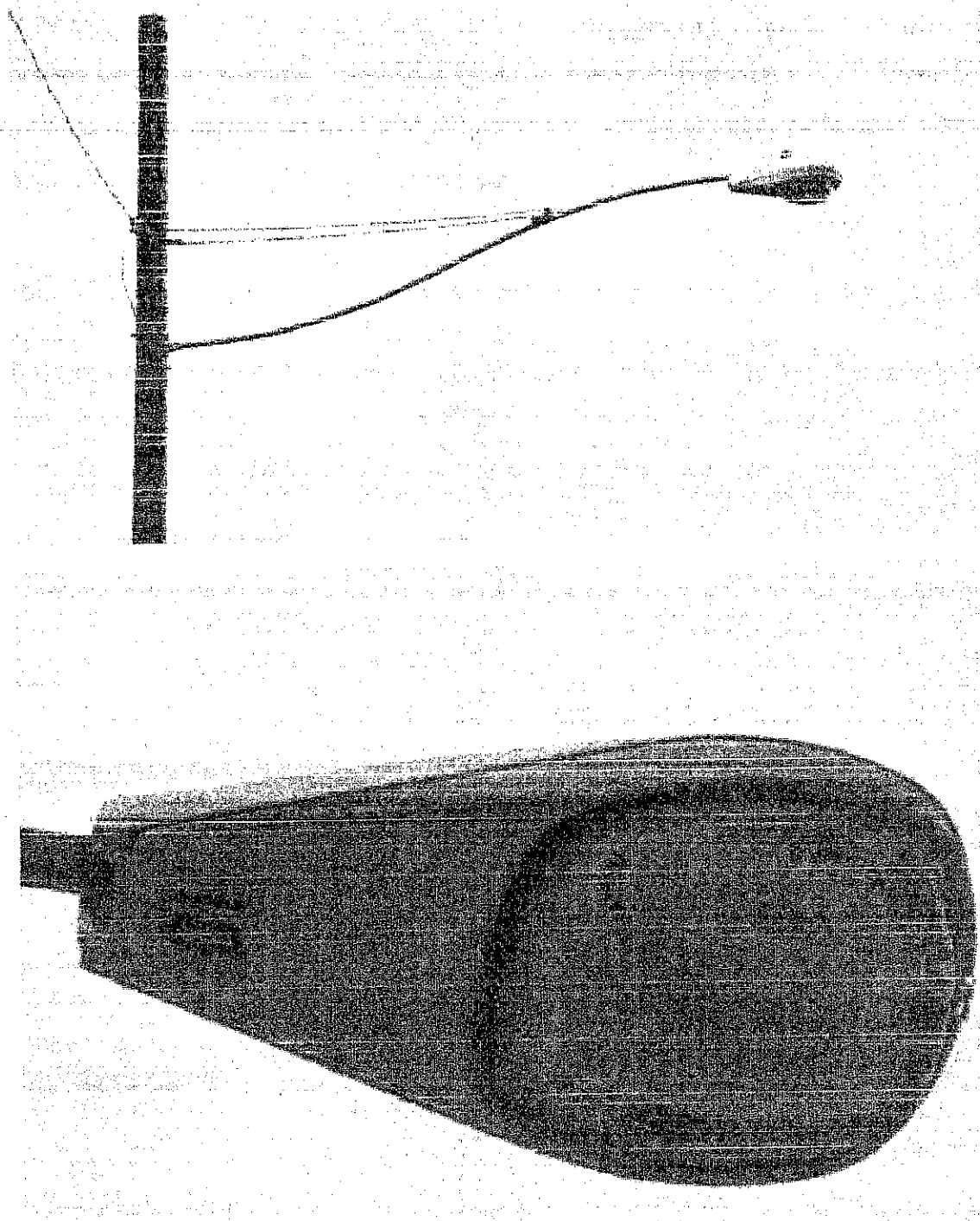


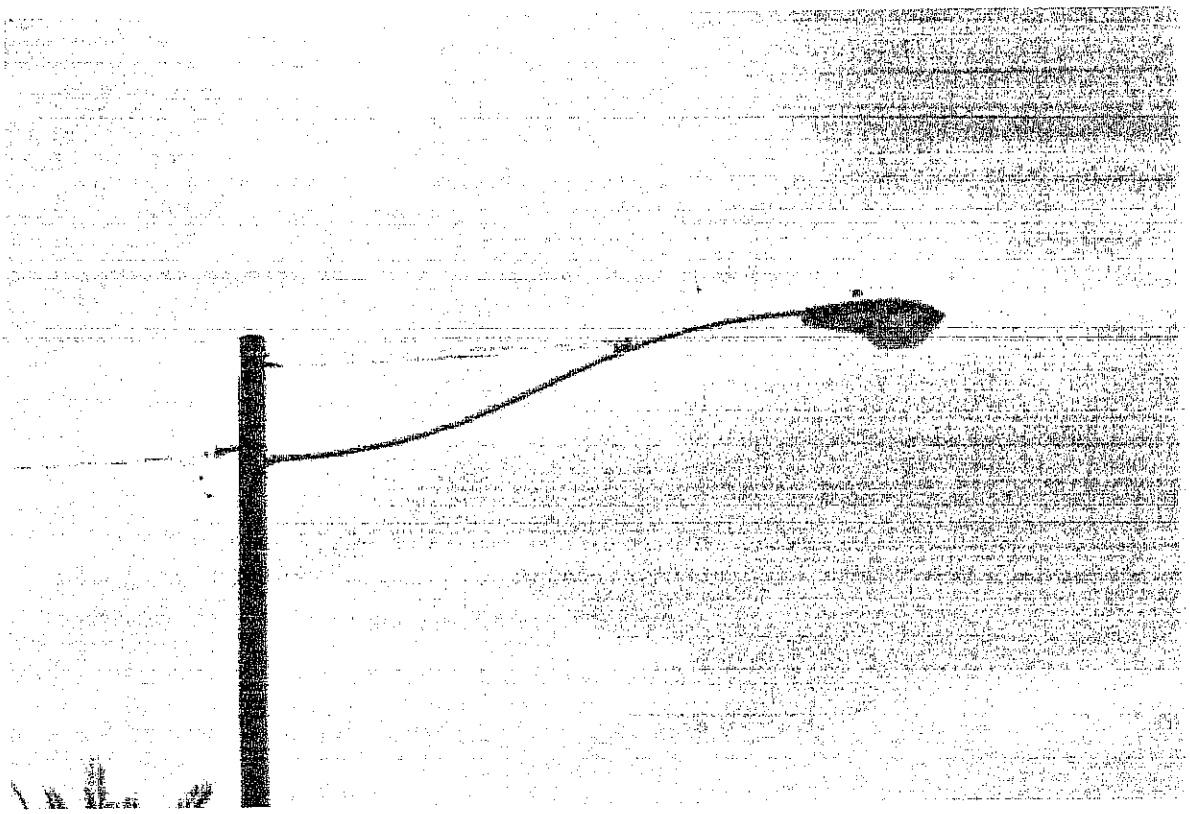
Pole #7 Niland Avenue (South of 3rd. Street)

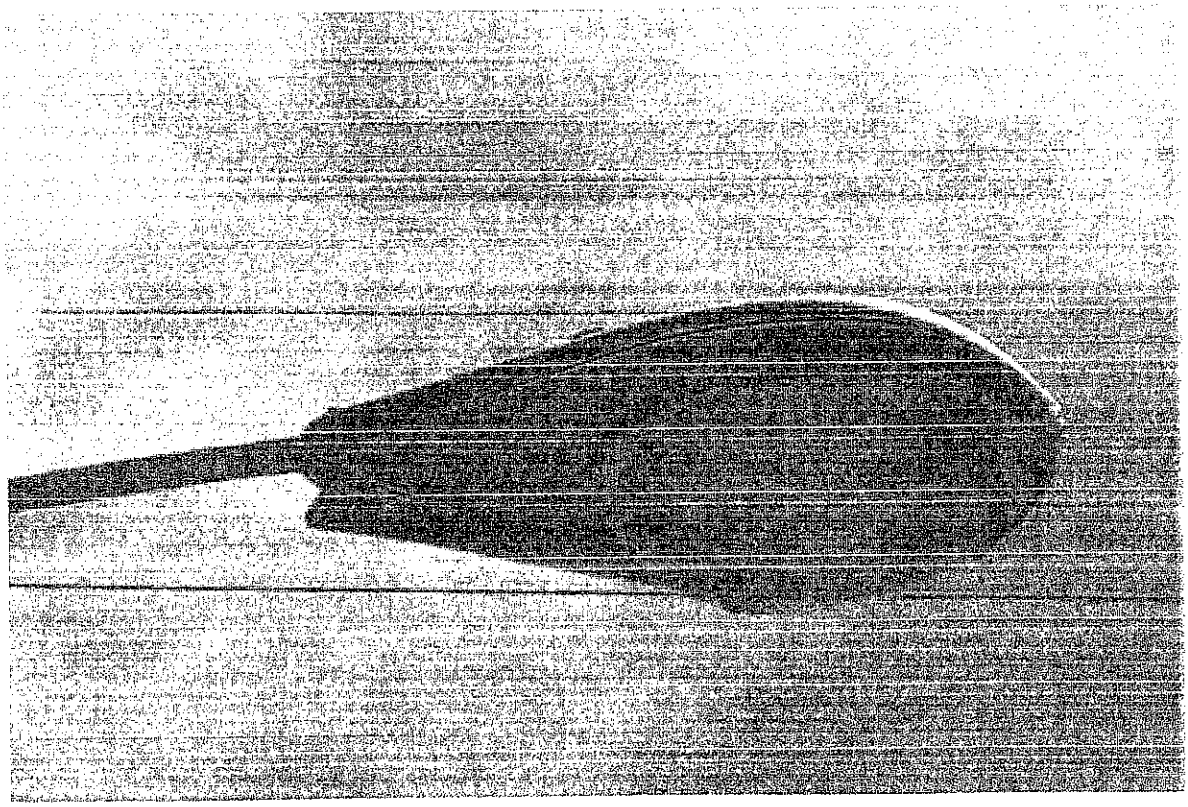


Pole #8 Niland Avenue (North of 3rd. Street)

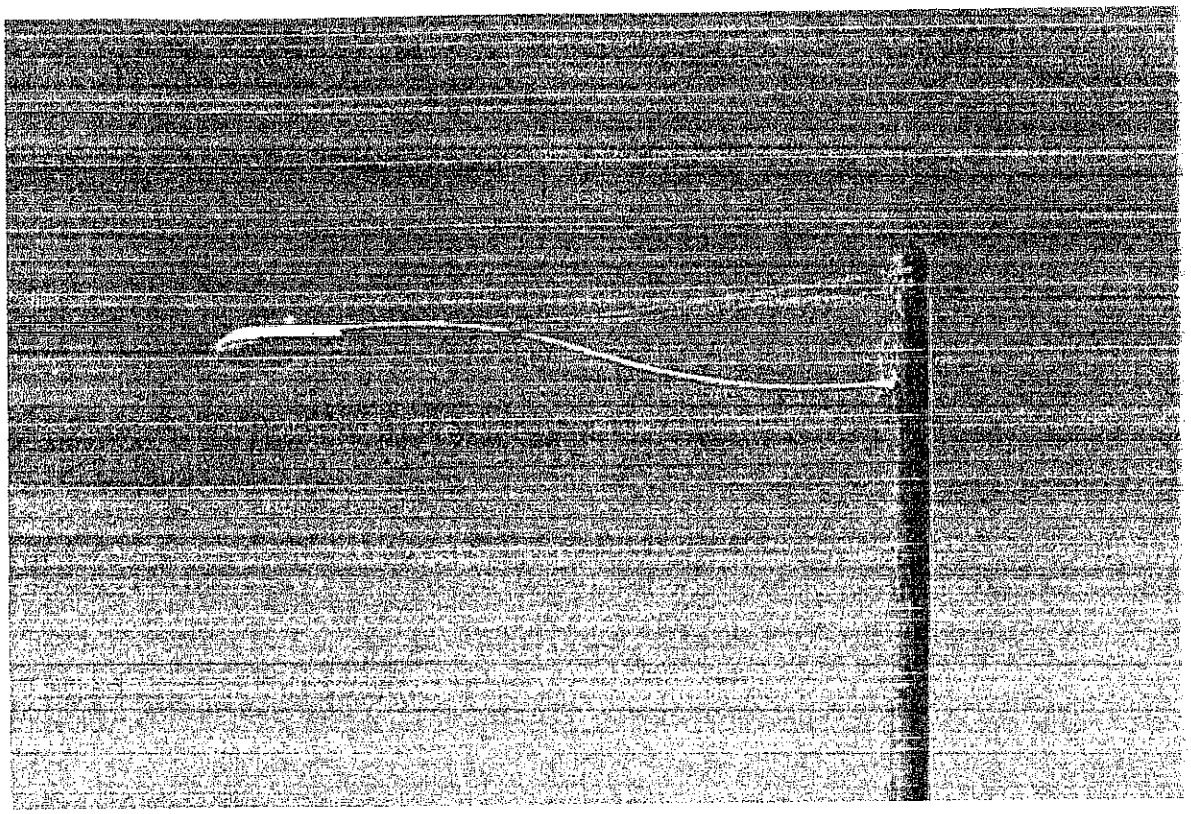


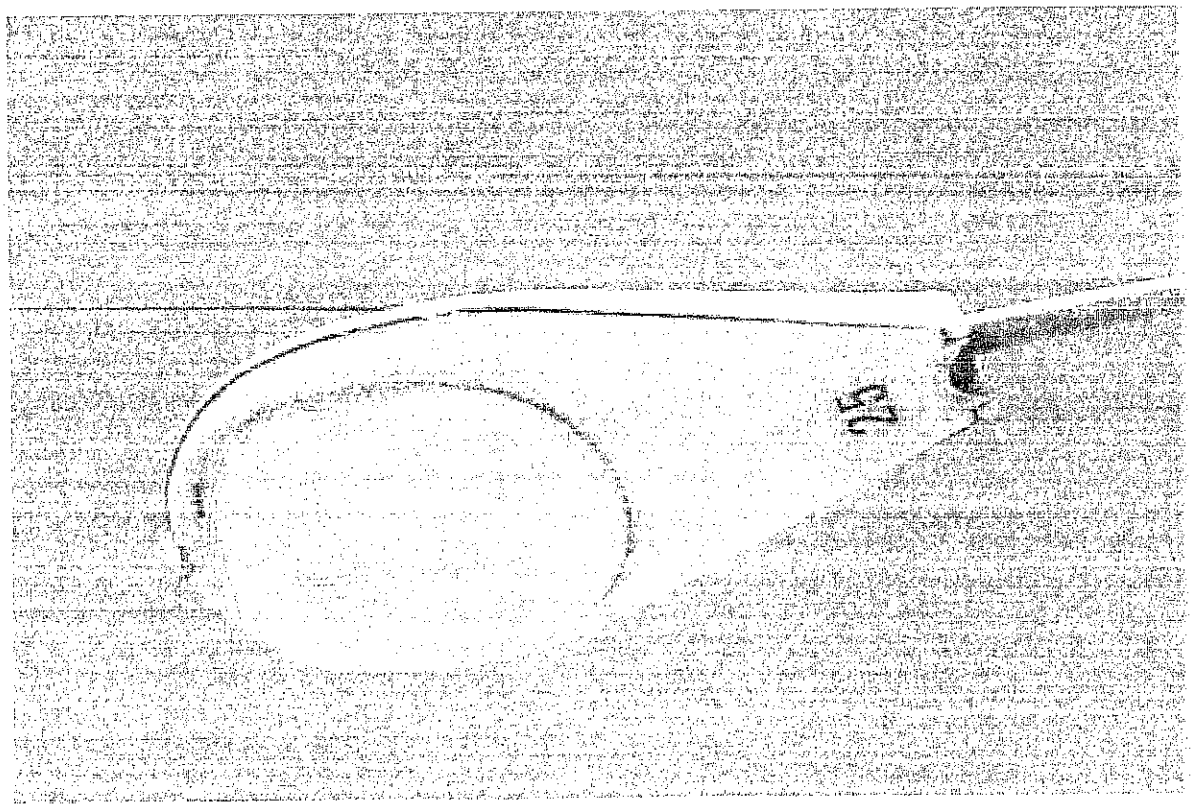
Pole #9 Niland Avenue (South of Main Street)



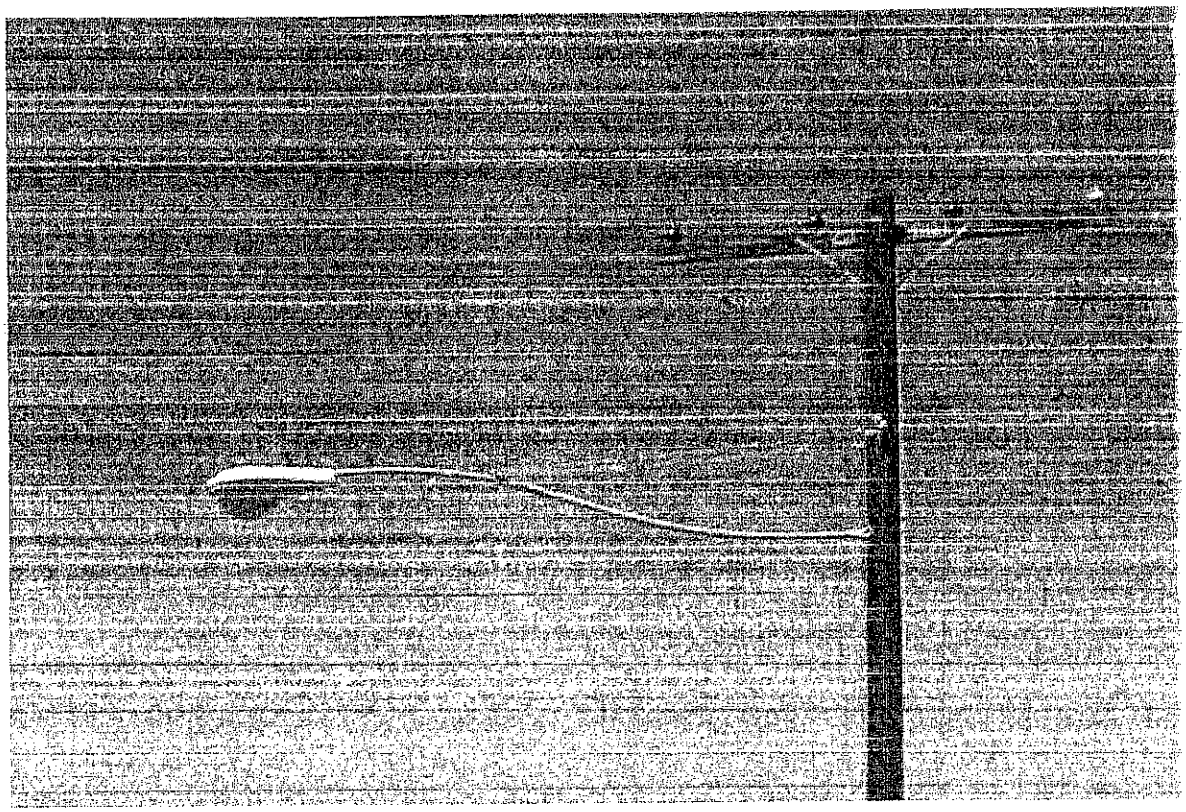


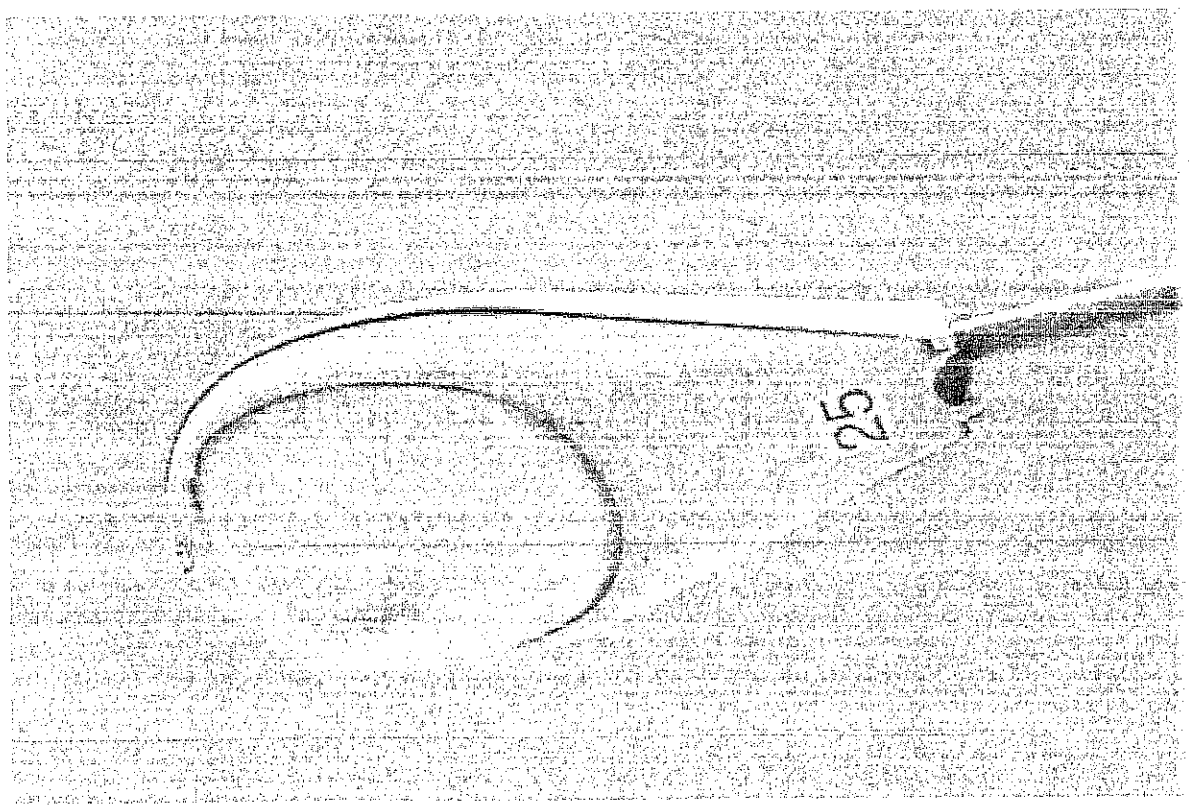
Pole #10 Highway 111 (North of Noffsinger Street)



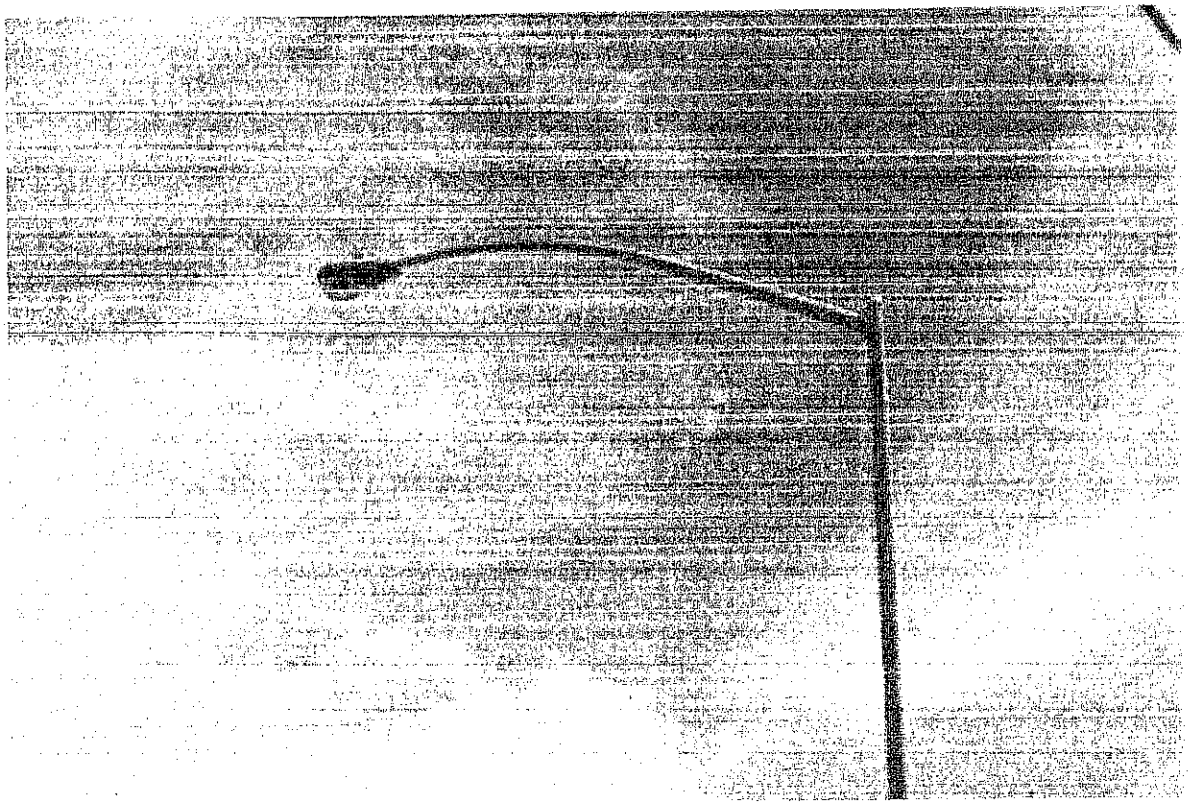


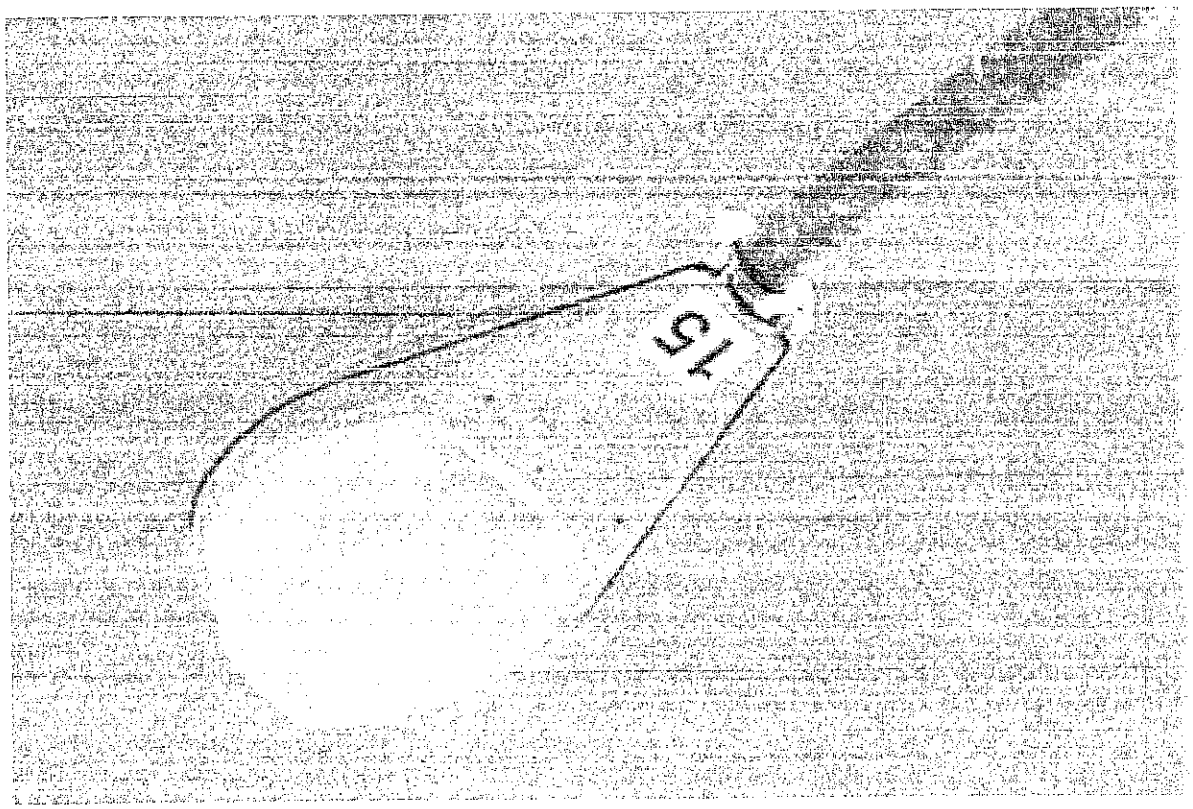
Pole #11 Highway 111 (North of 6th. Street)



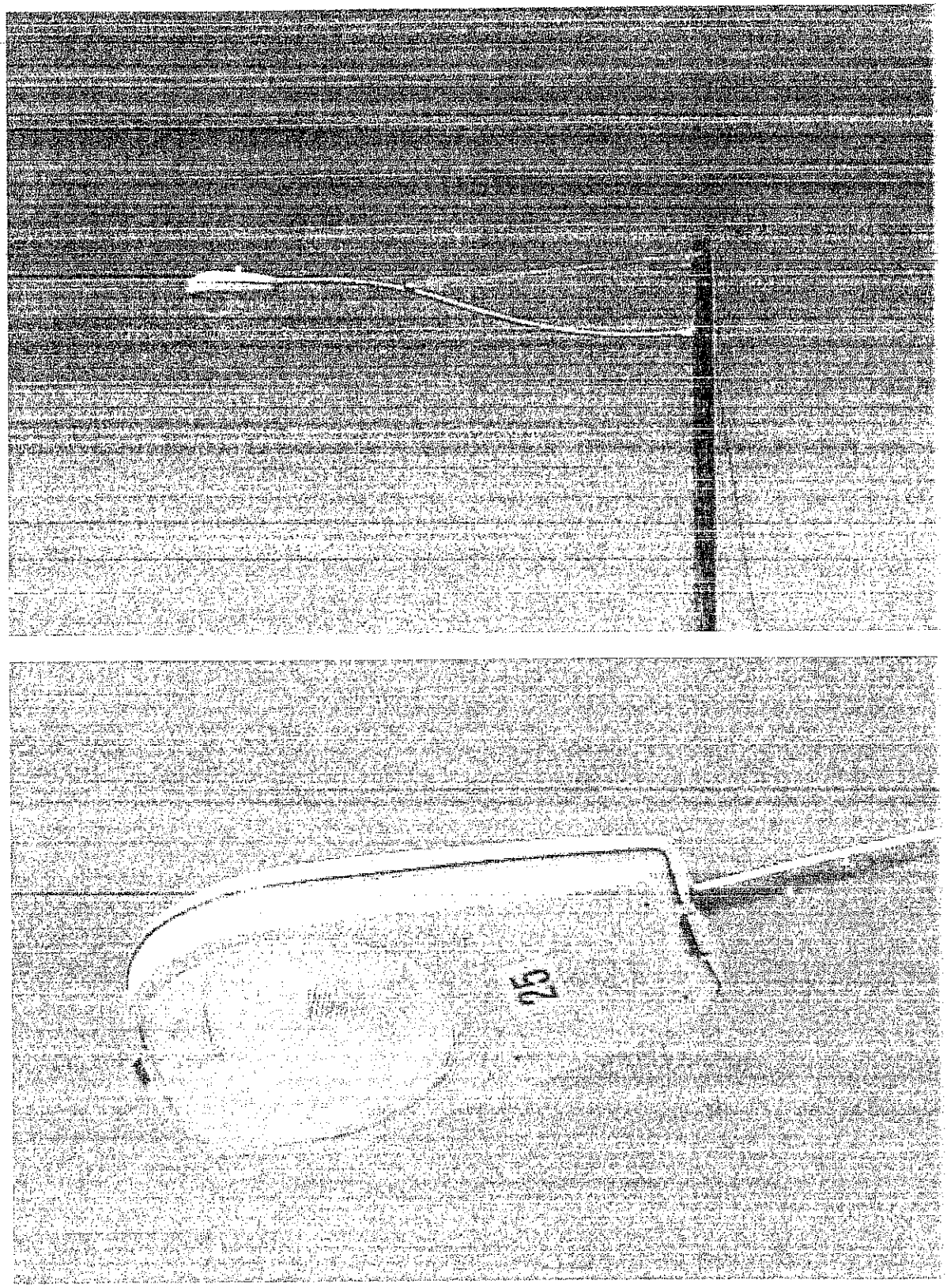


Pole #12 Highway 111 (Between 4th. & 6th. Street)

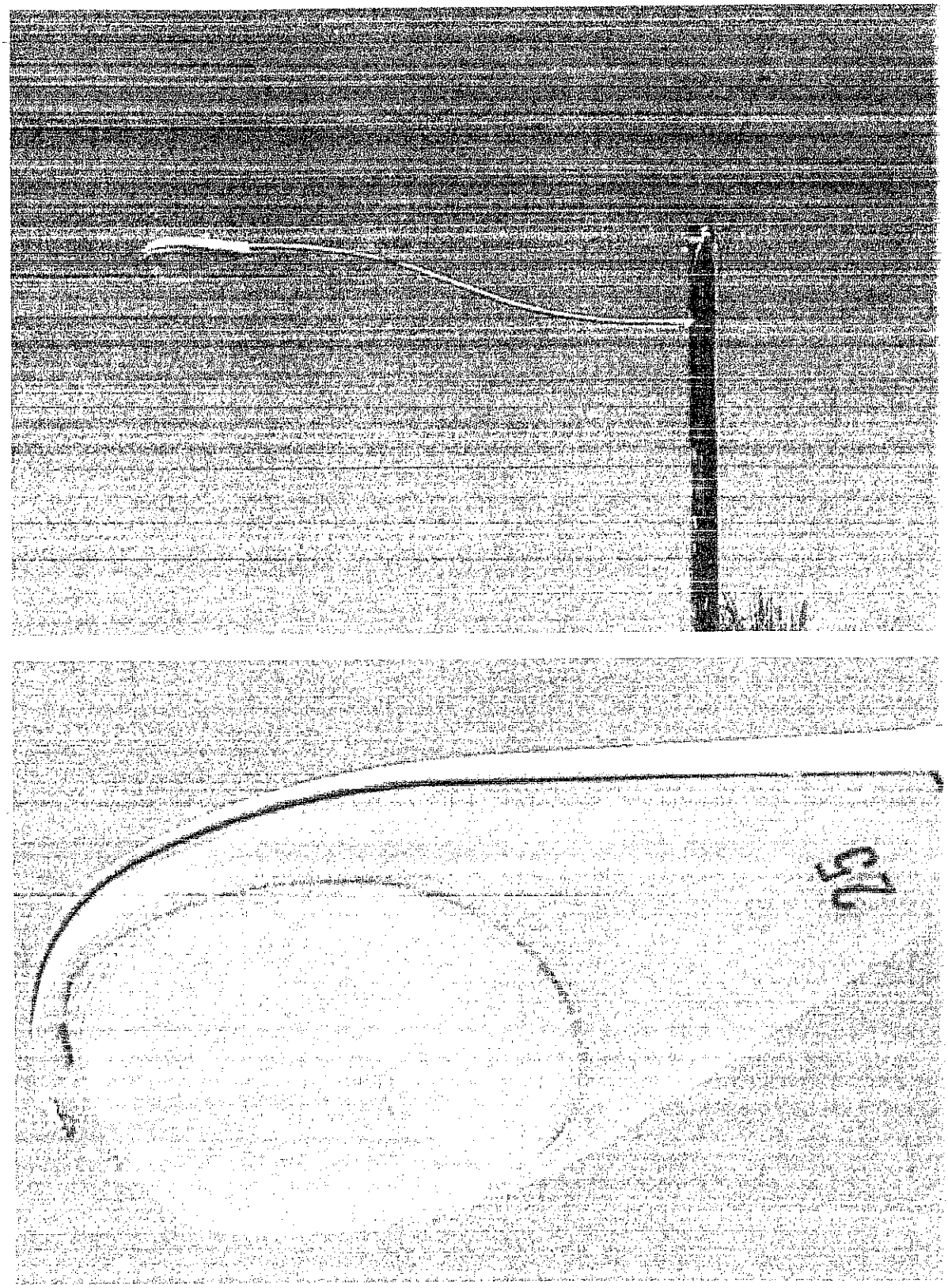




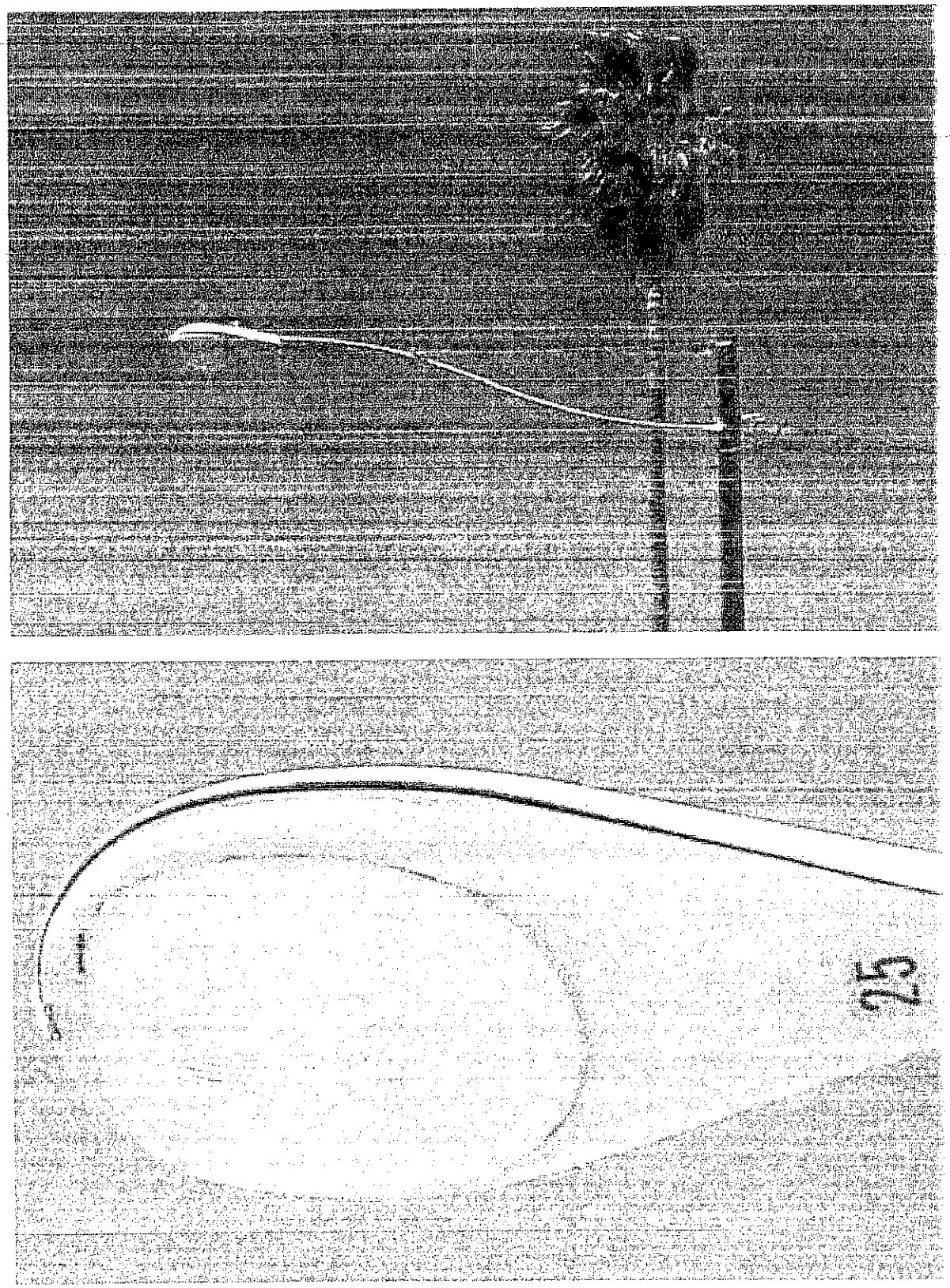
Pole #13 Highway 111 (South of 4th. Street)



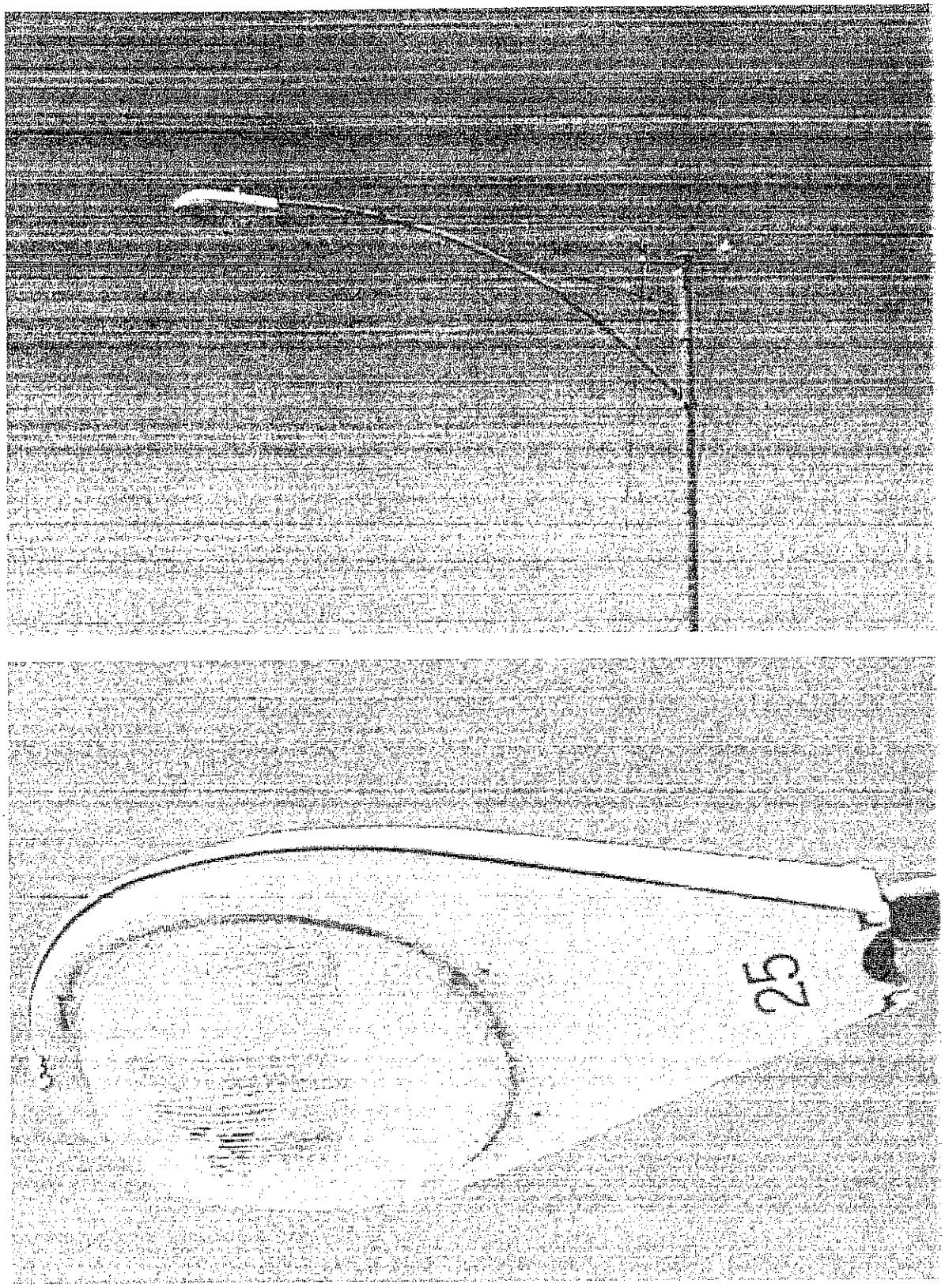
Pole #14 Highway 111 (North of 4th. Street)



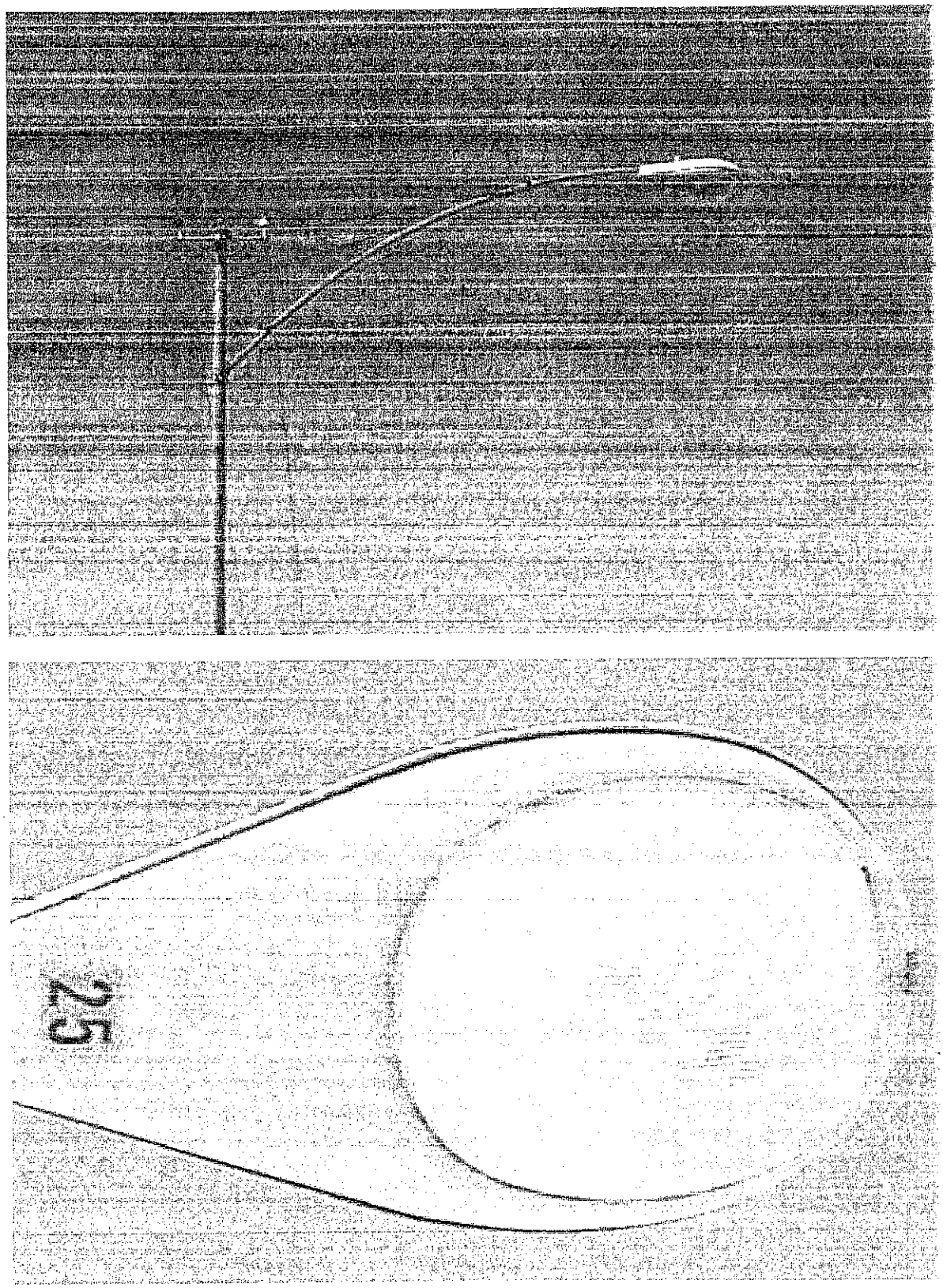
Pole #15 Highway 111 (North of 3rd. Street)



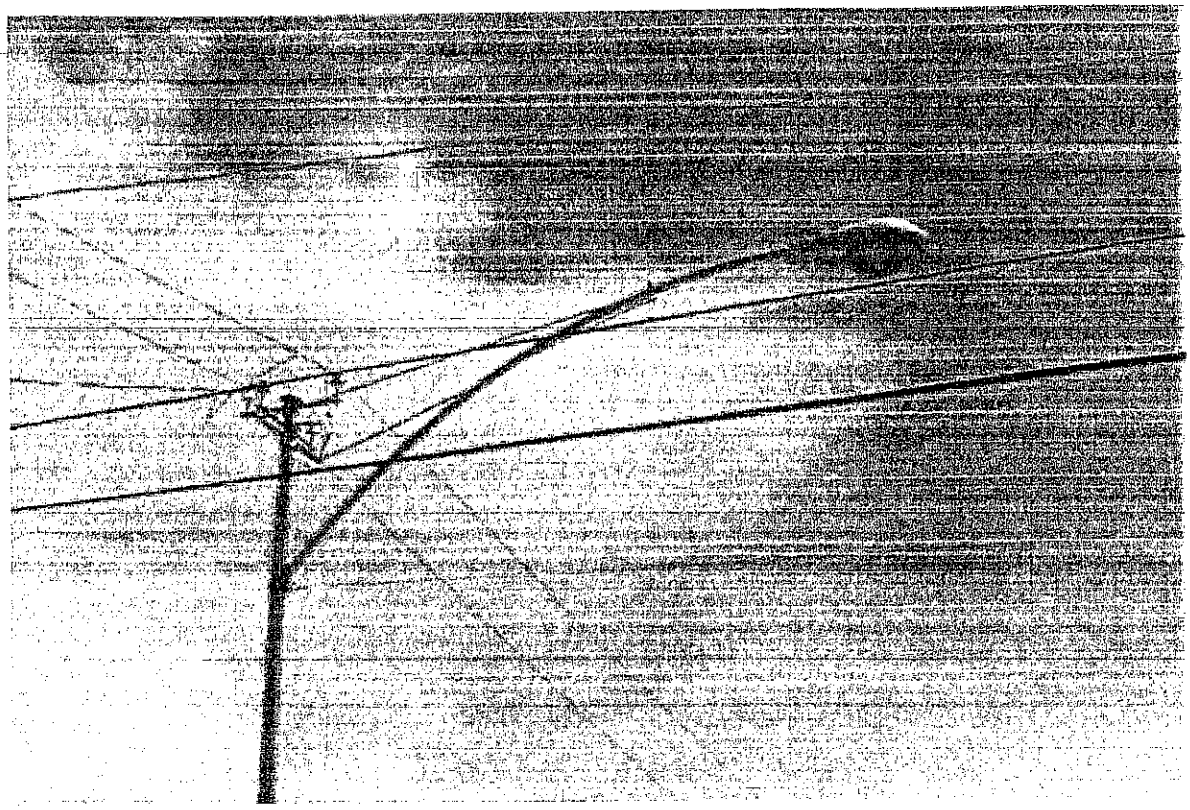
Pole #16 Highway 111 (Between Main & 3rd. Streets)

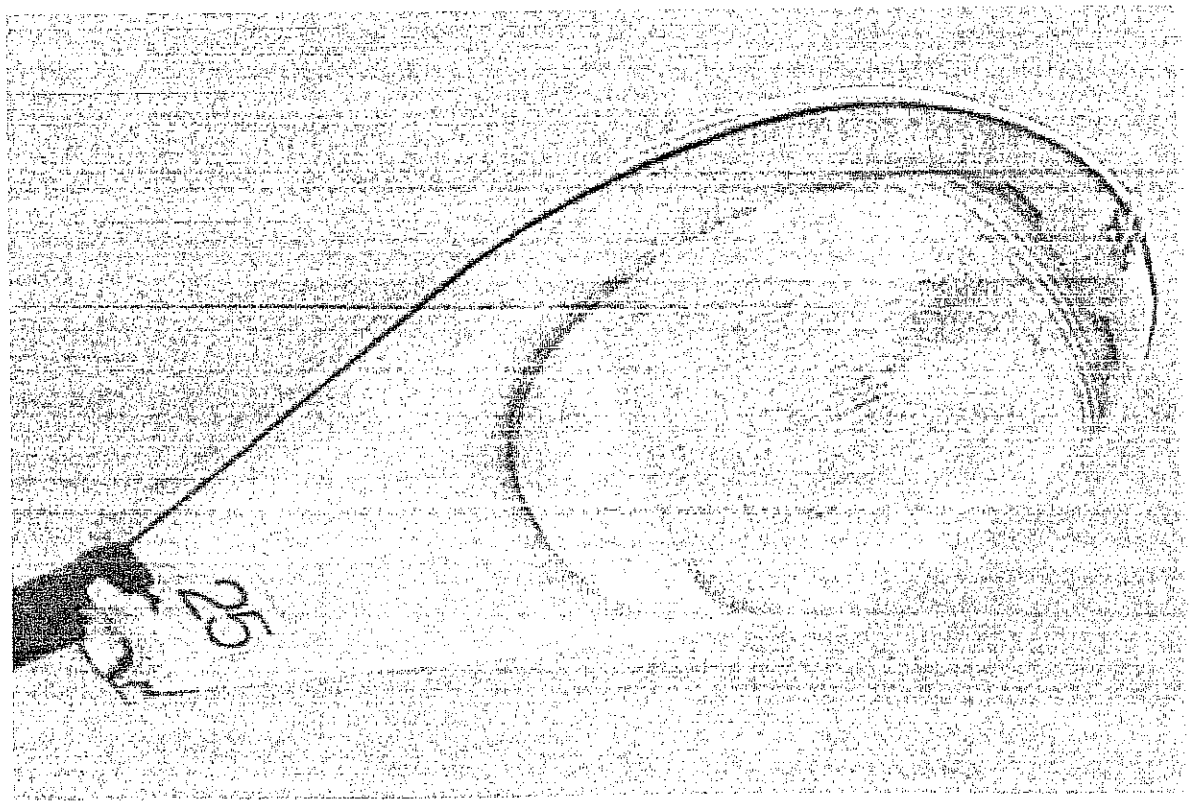


Pole #17 Highway 111 (North of Main Street – West)

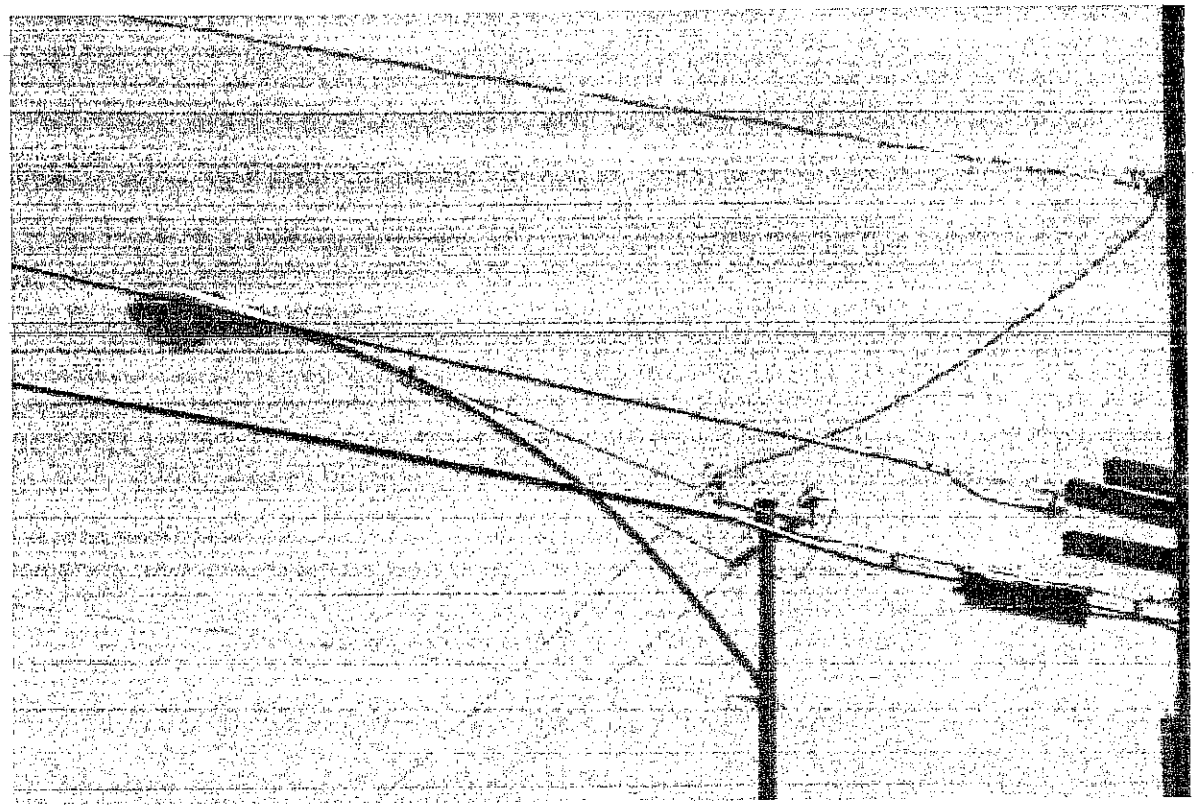


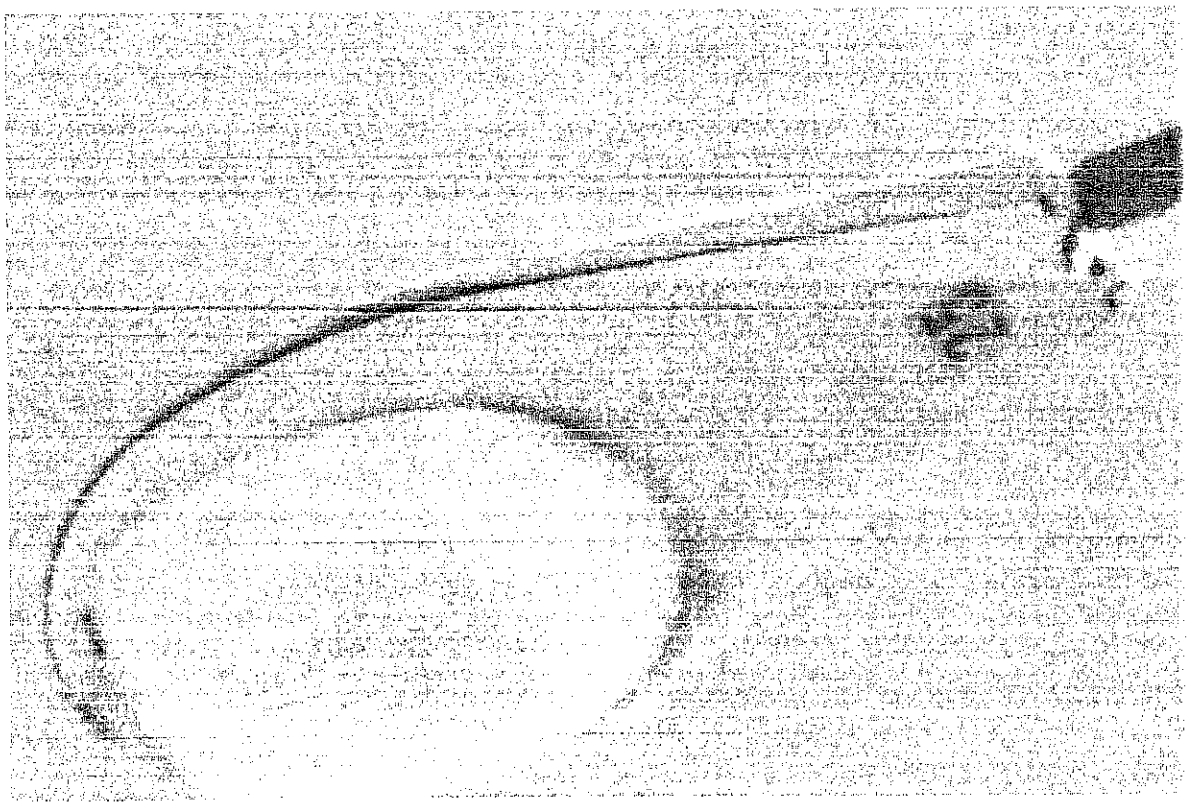
Pole #18 Highway 111 (North of Main Street – East)



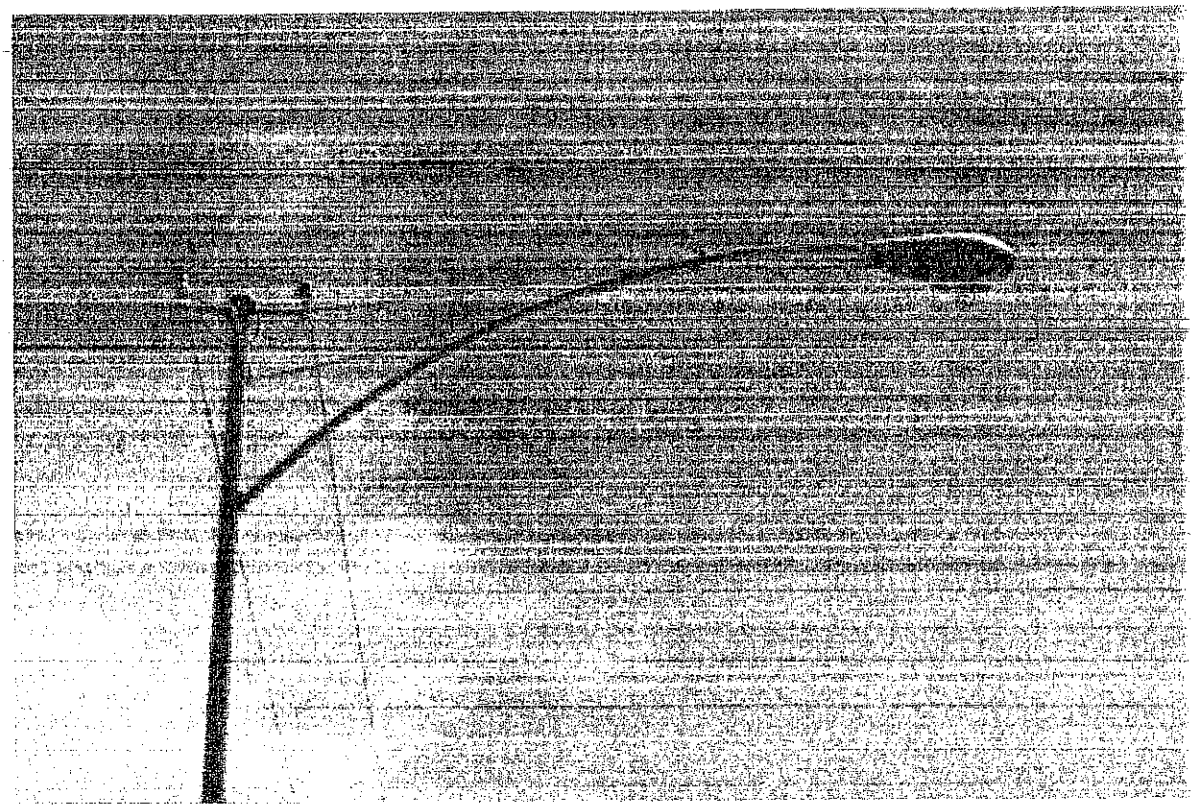


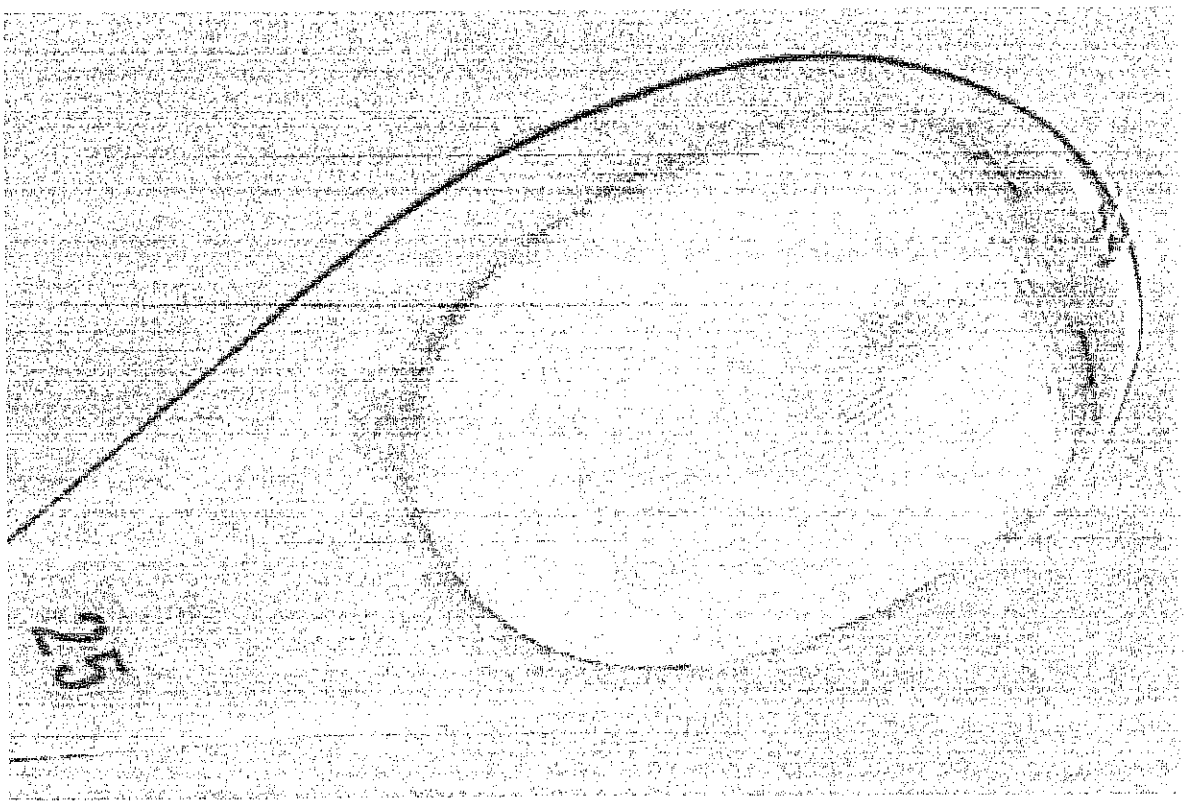
Pole #19 Highway 111 (Between 1st. & Main Streets – East)



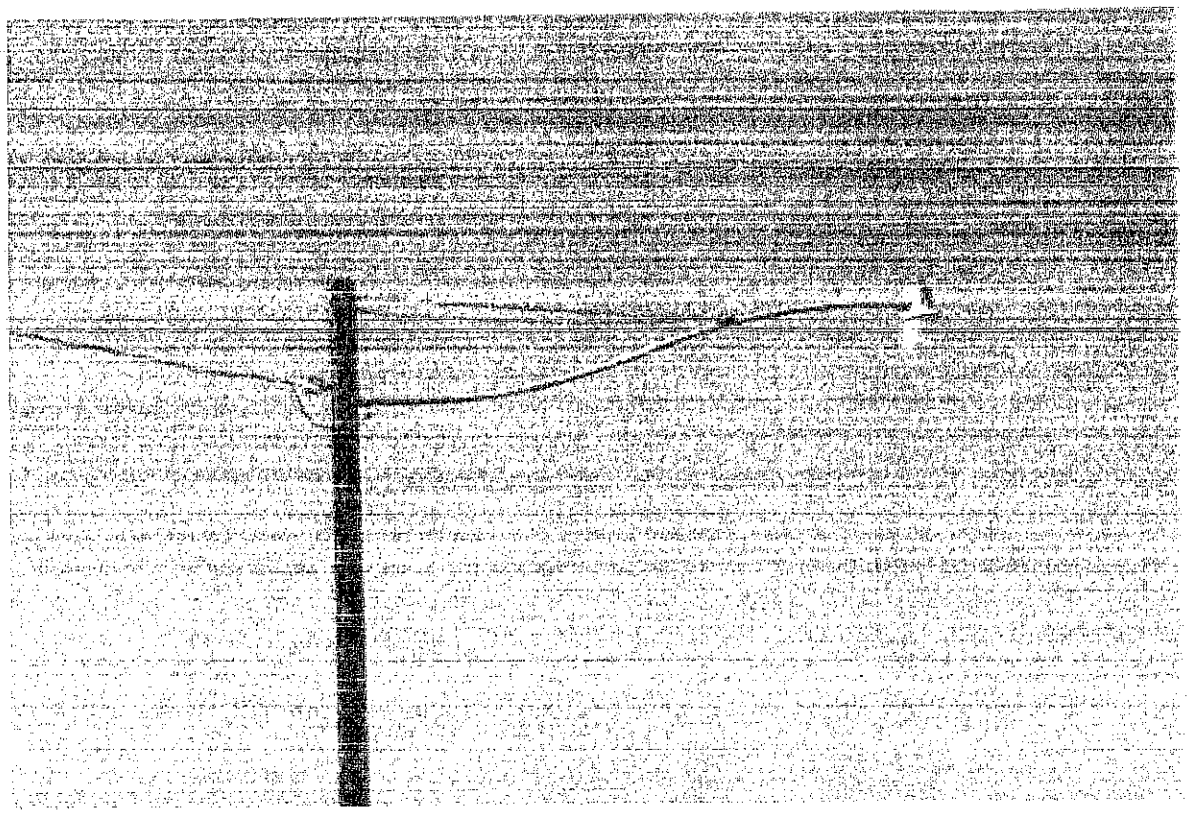


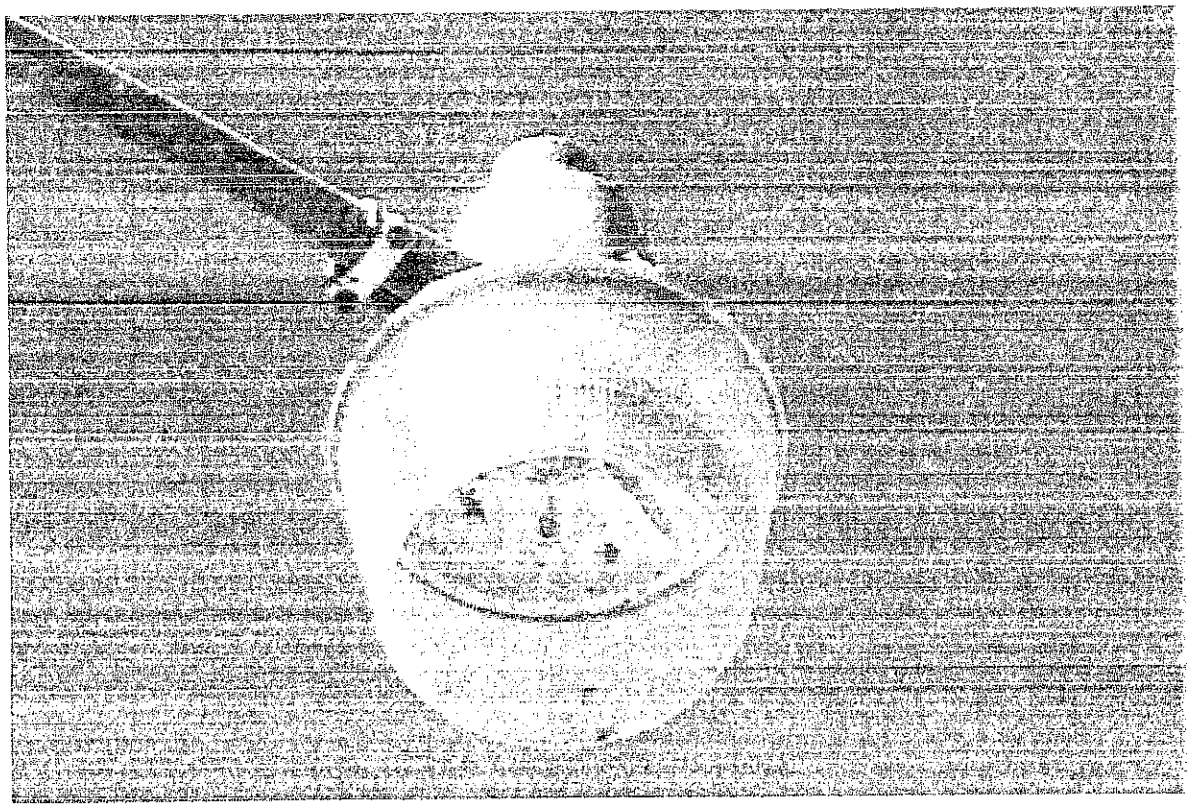
Pole #20 Highway 111 (Between 1st. & Main Streets -- West)



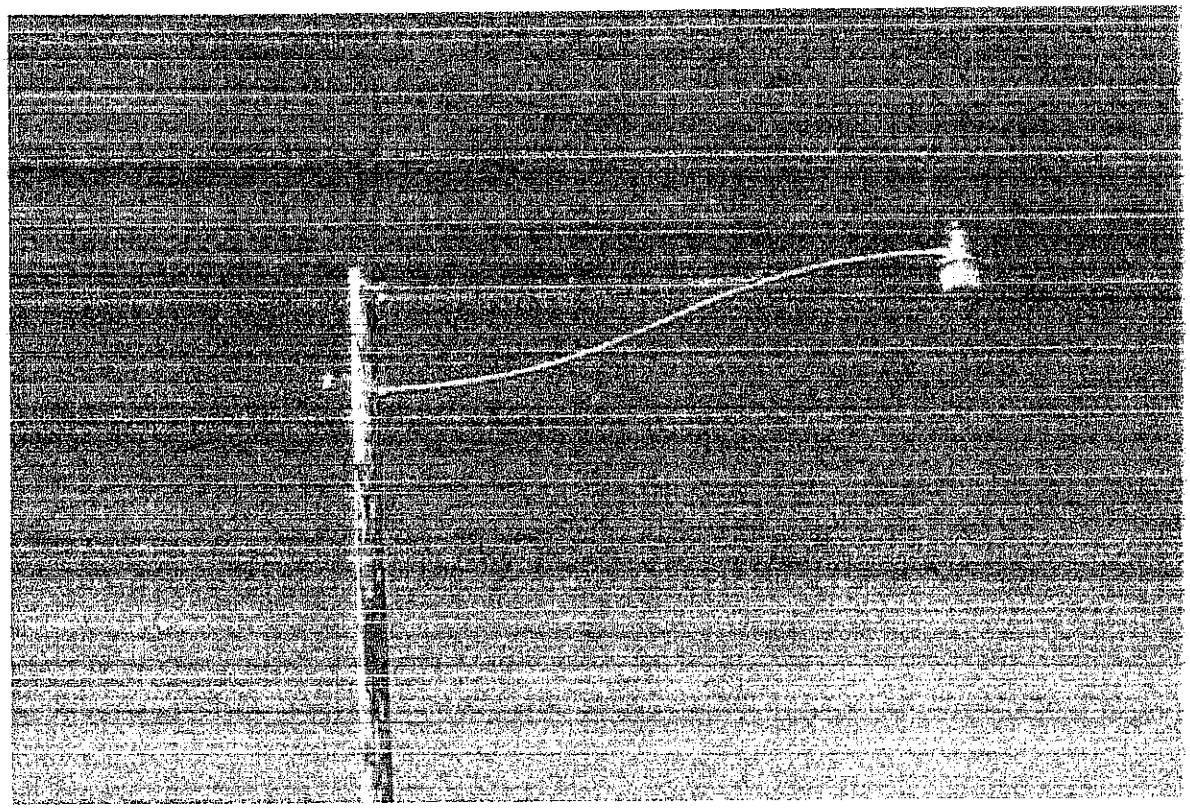


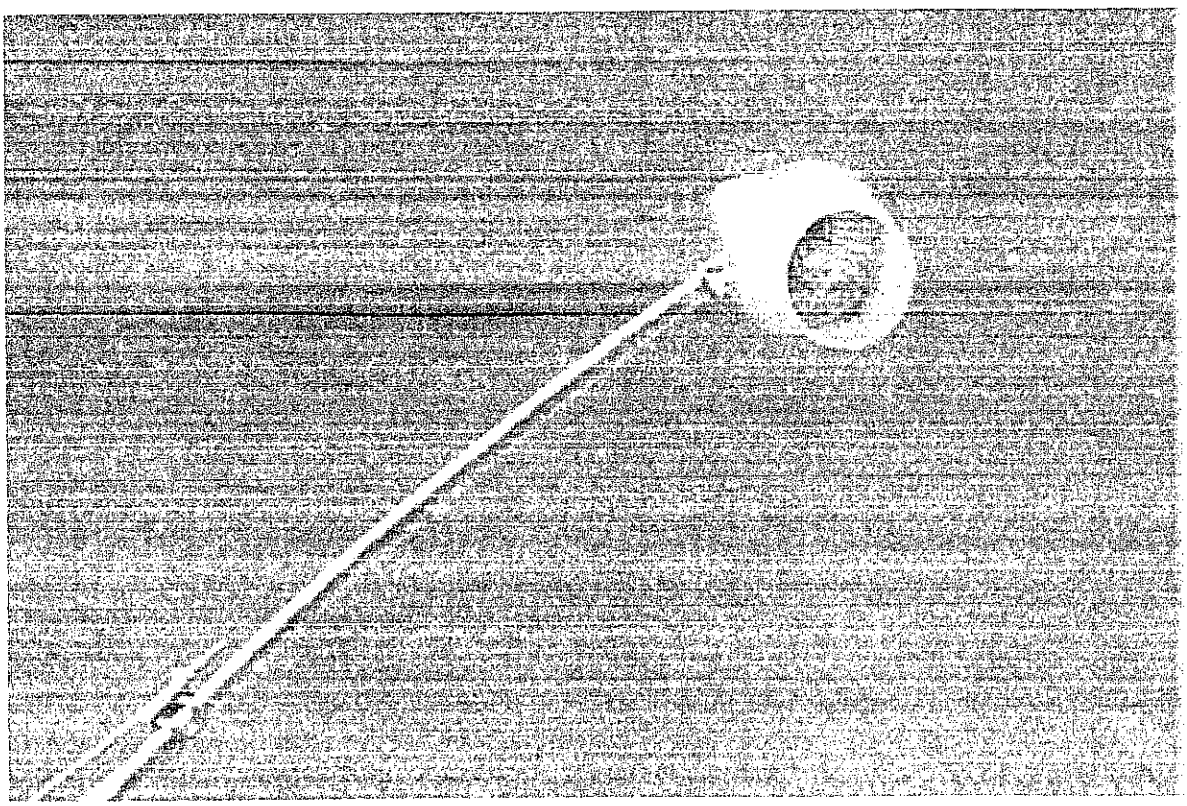
Pole #21 Highway 111 (South of 1st. Street)



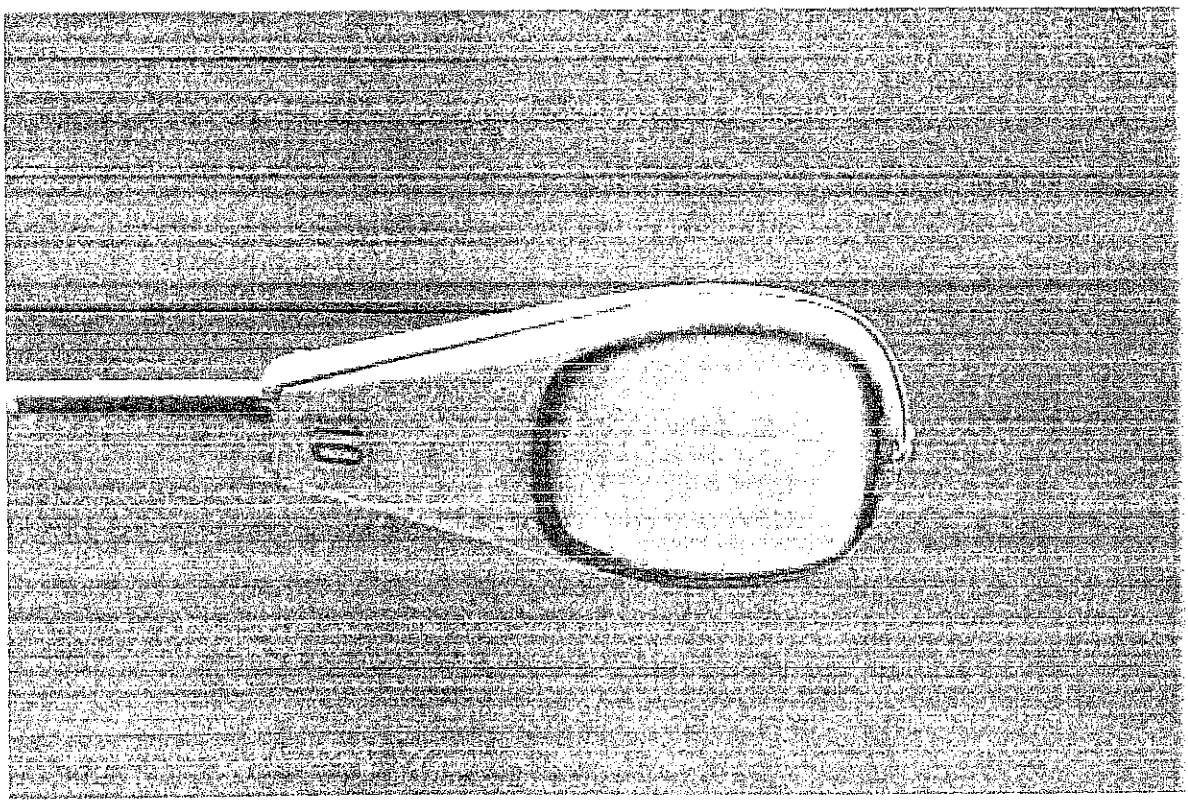


Pole #22 1st. Street & Isis Avenue

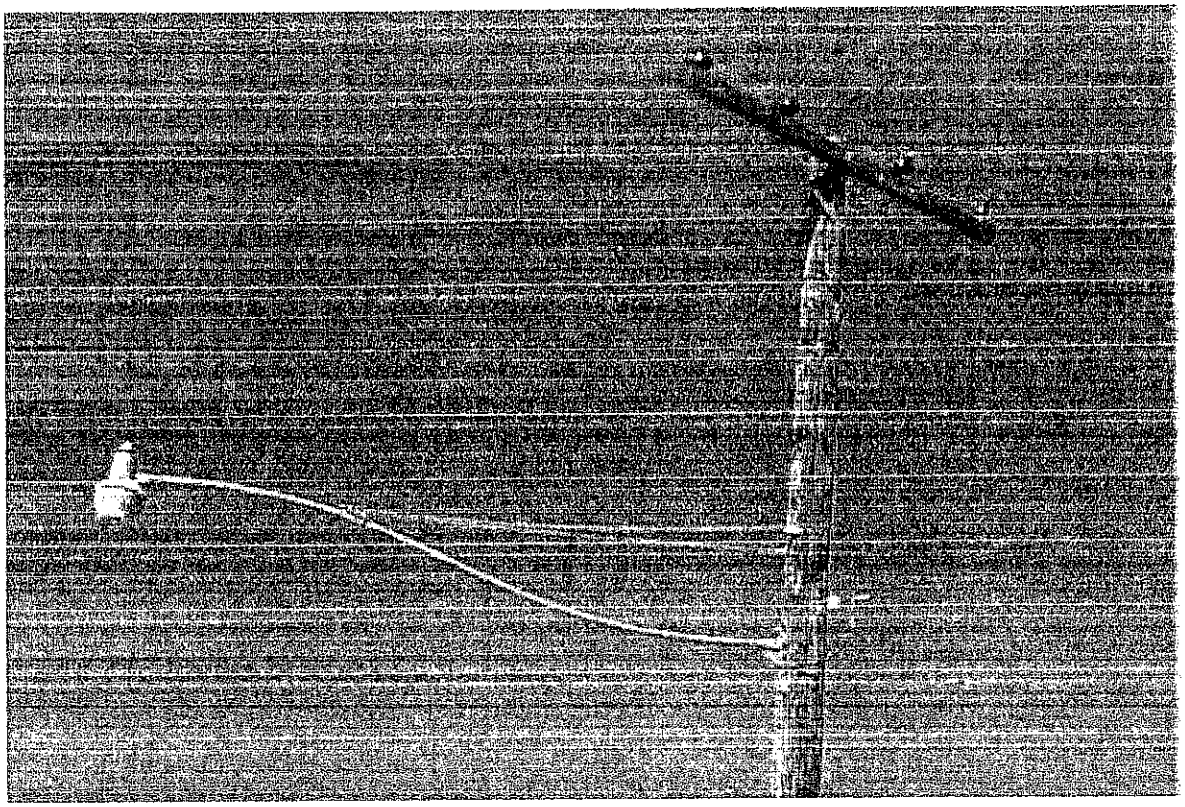


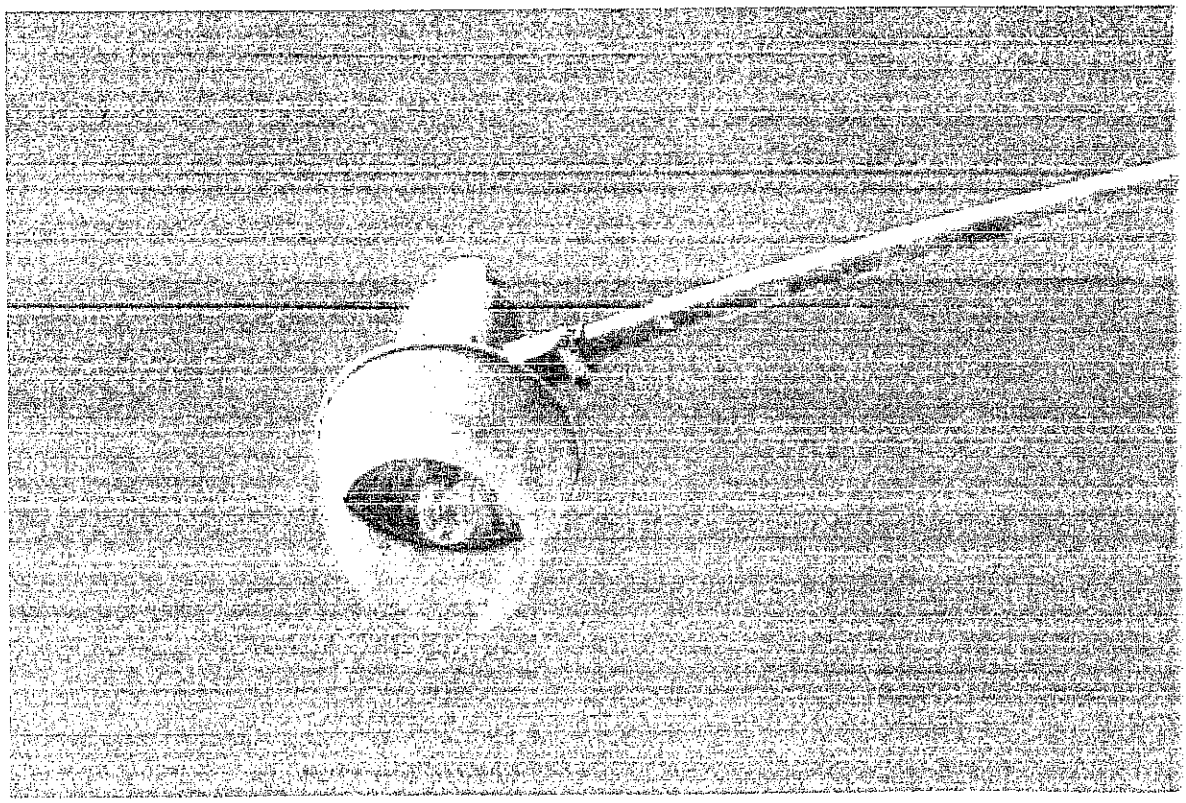


Pole #23 1st. Street and International Avenue

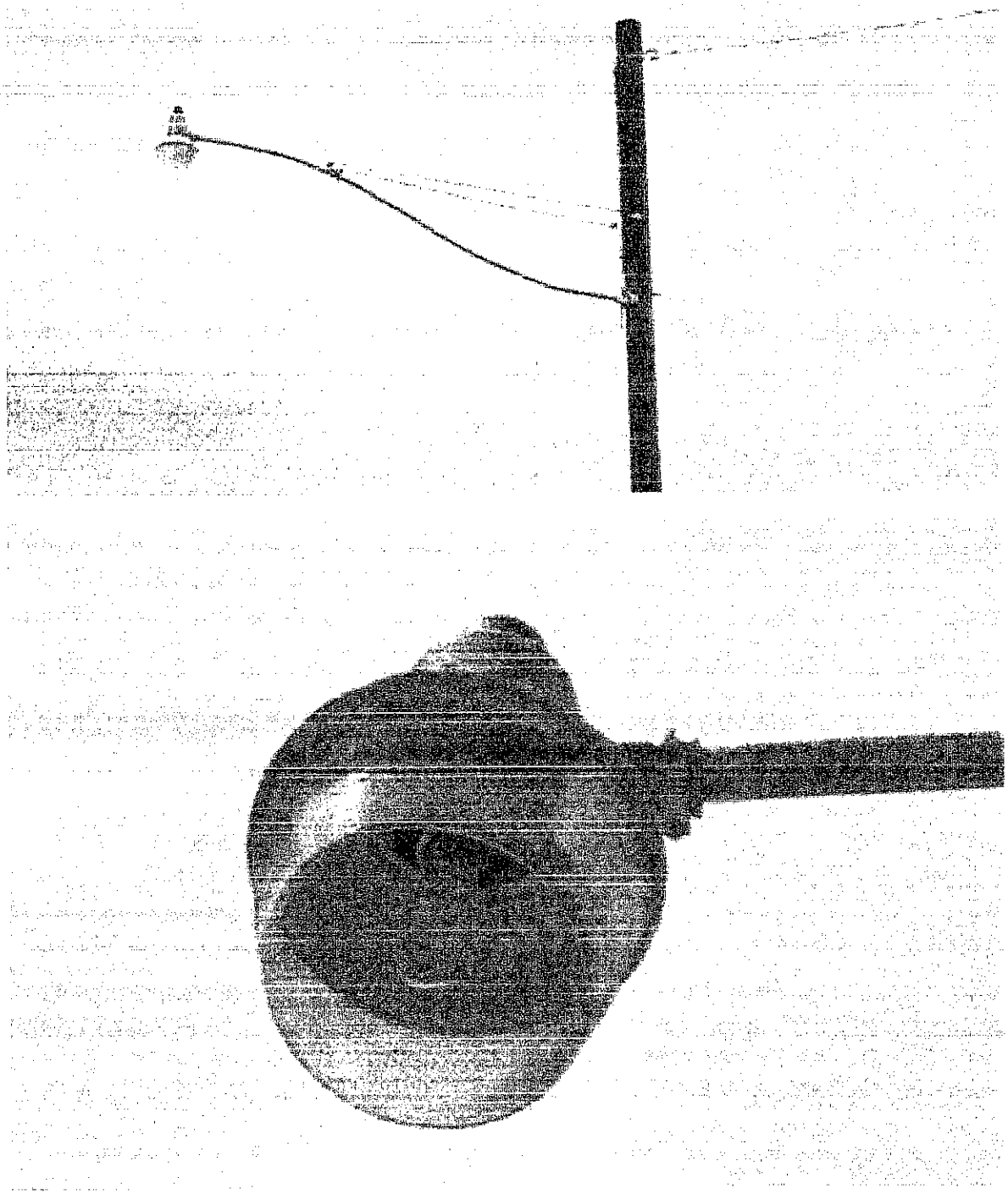


Pole #24 1st. Street & (Between International & Luxor Avenues)

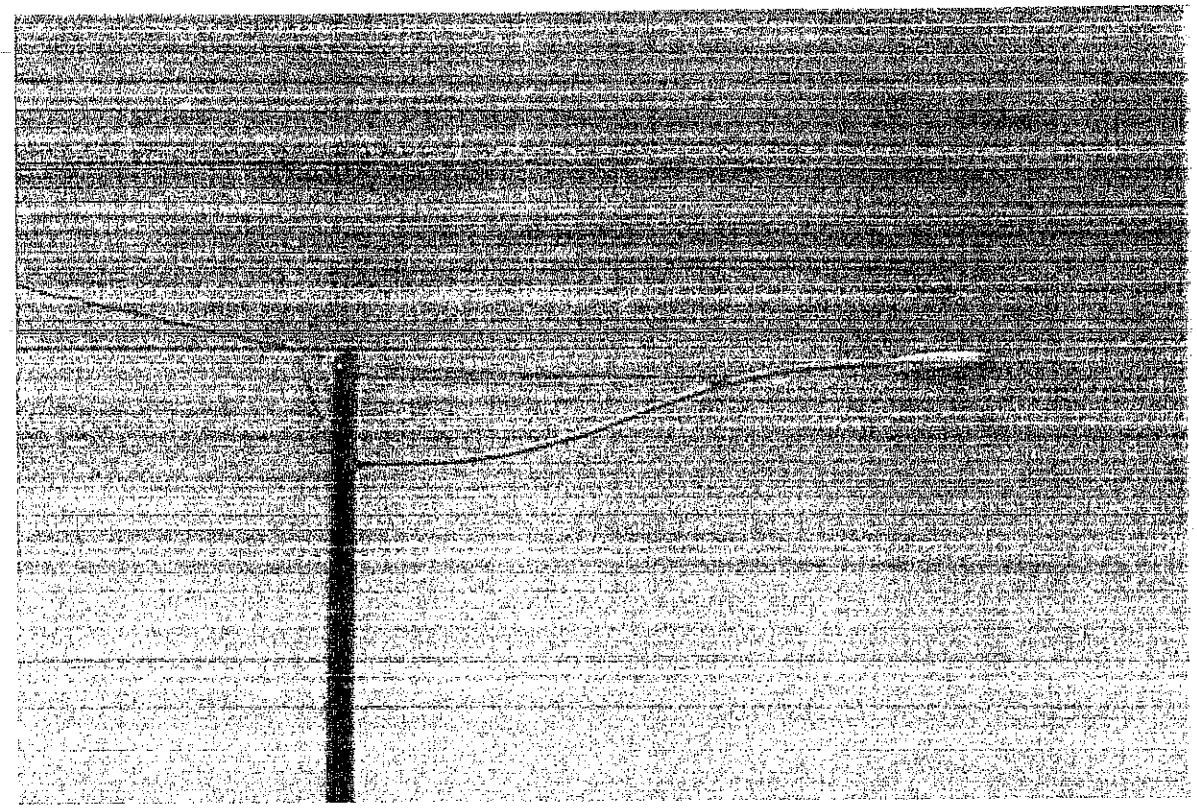


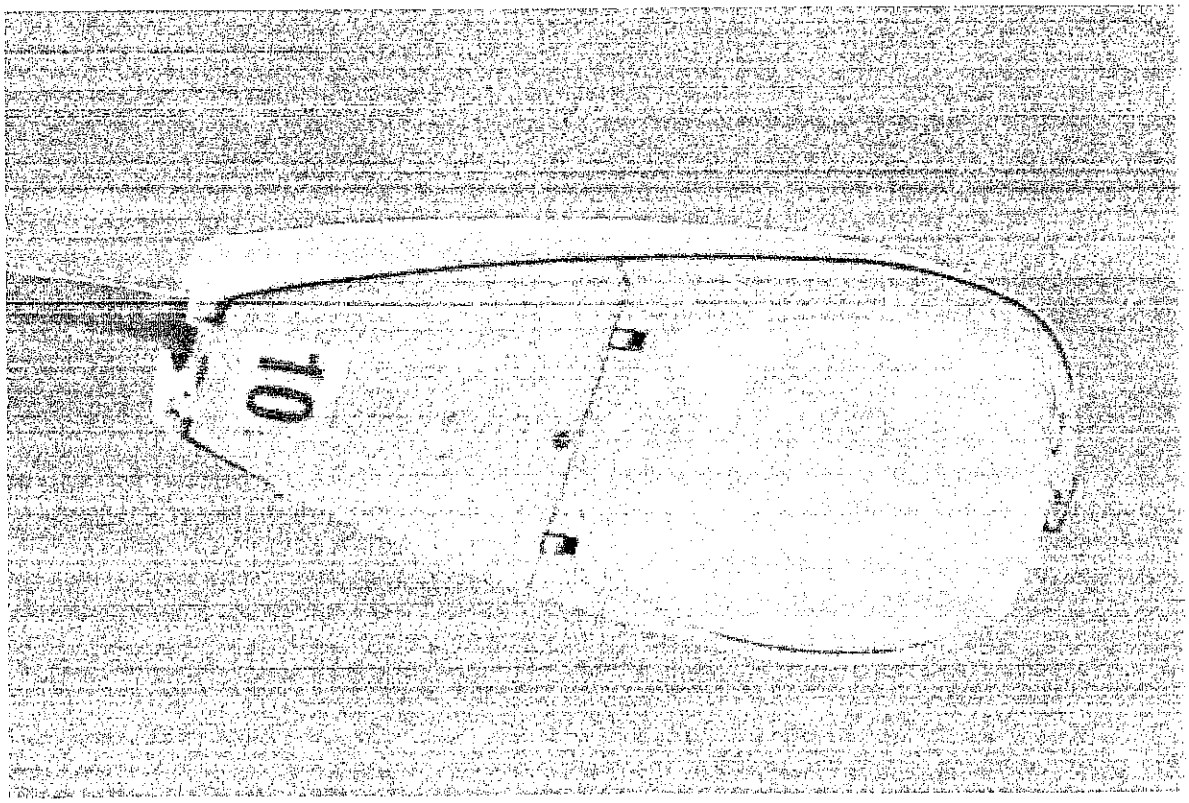


Pole #25 1st. Street & Luxor Avenue



Pole #26 1st. Street & Memphis Avenue



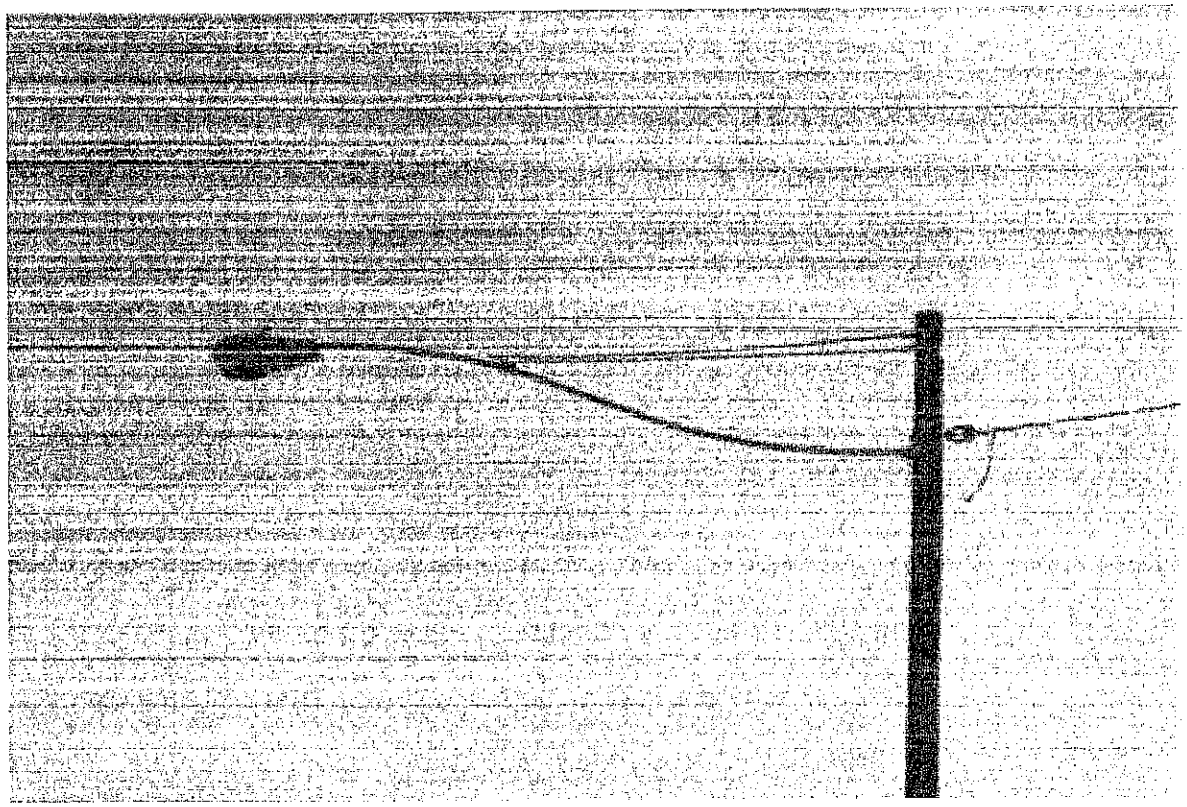


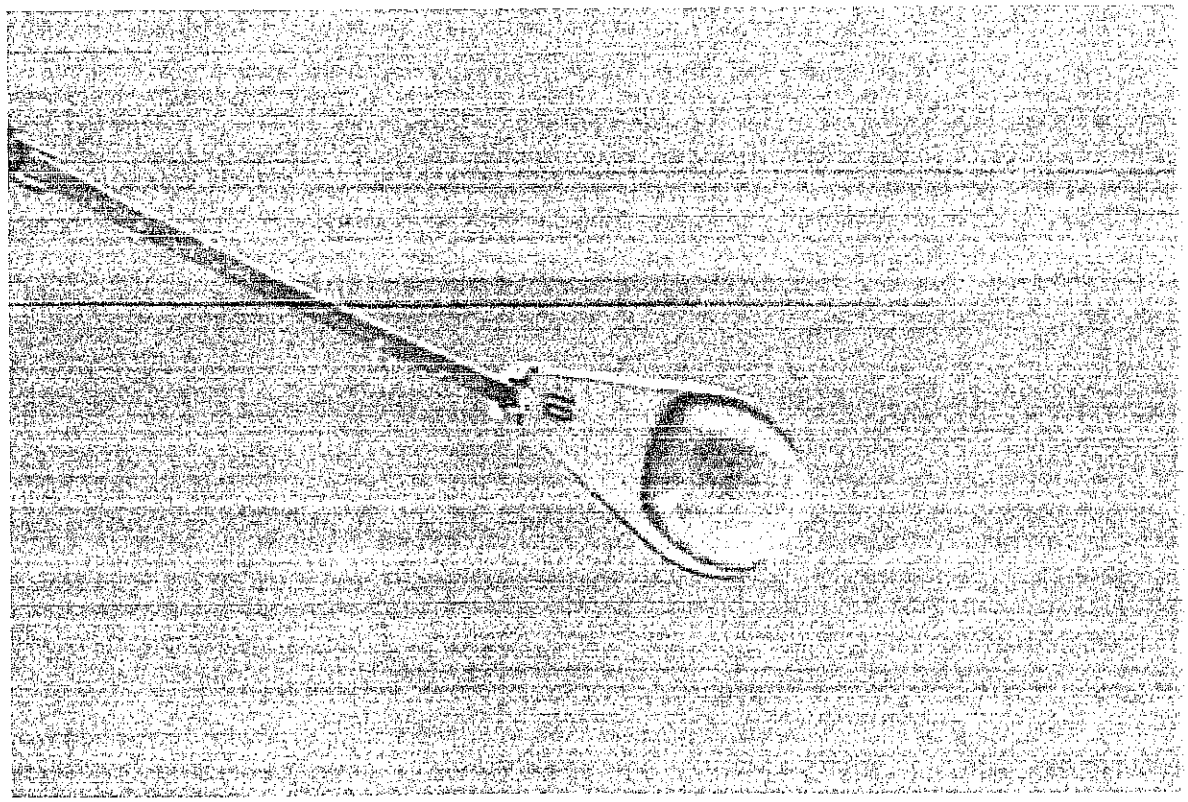
Pole #27 Main Street & Isis Avenue

PHOTOGRAPH NOT AVAILABLE

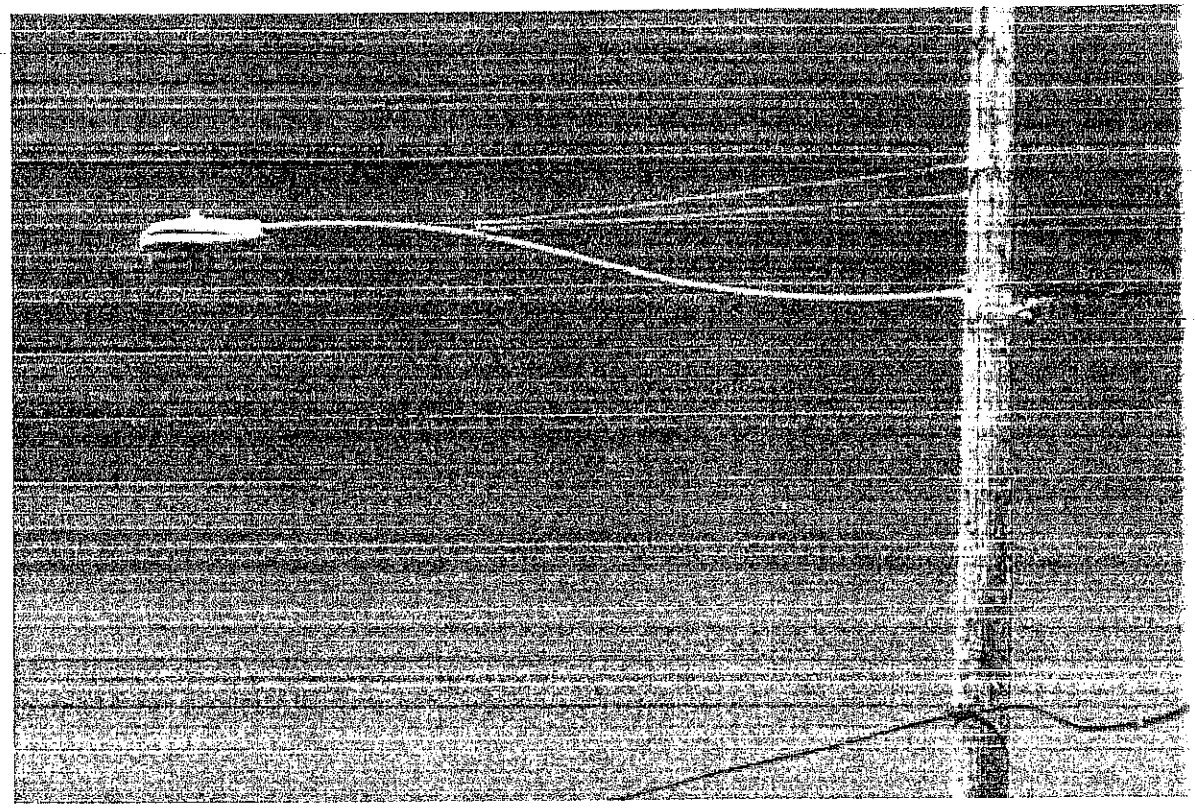
PHOTOGRAPH NOT AVAILABLE

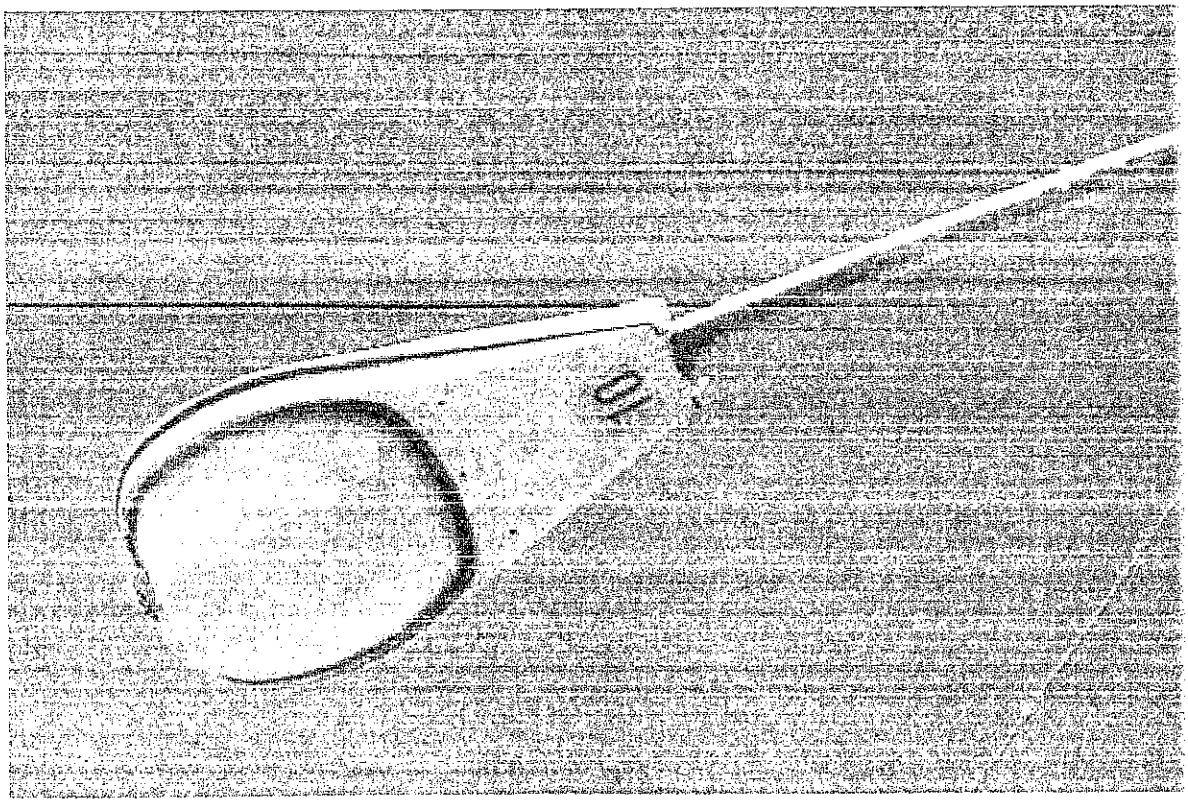
Pole #28 Main Street (Between Isis & International Avenues)



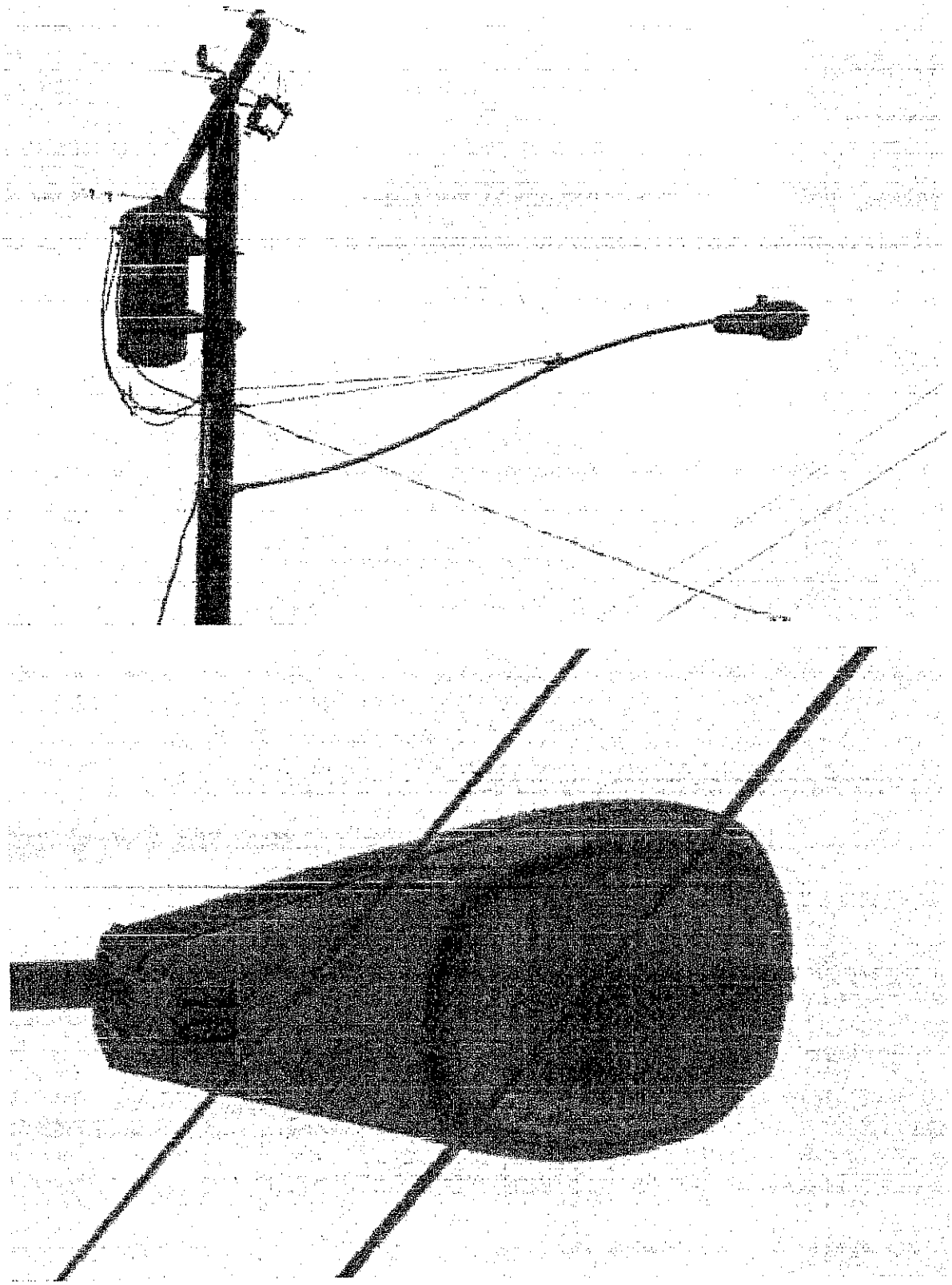


Pole #29 Main Street & International

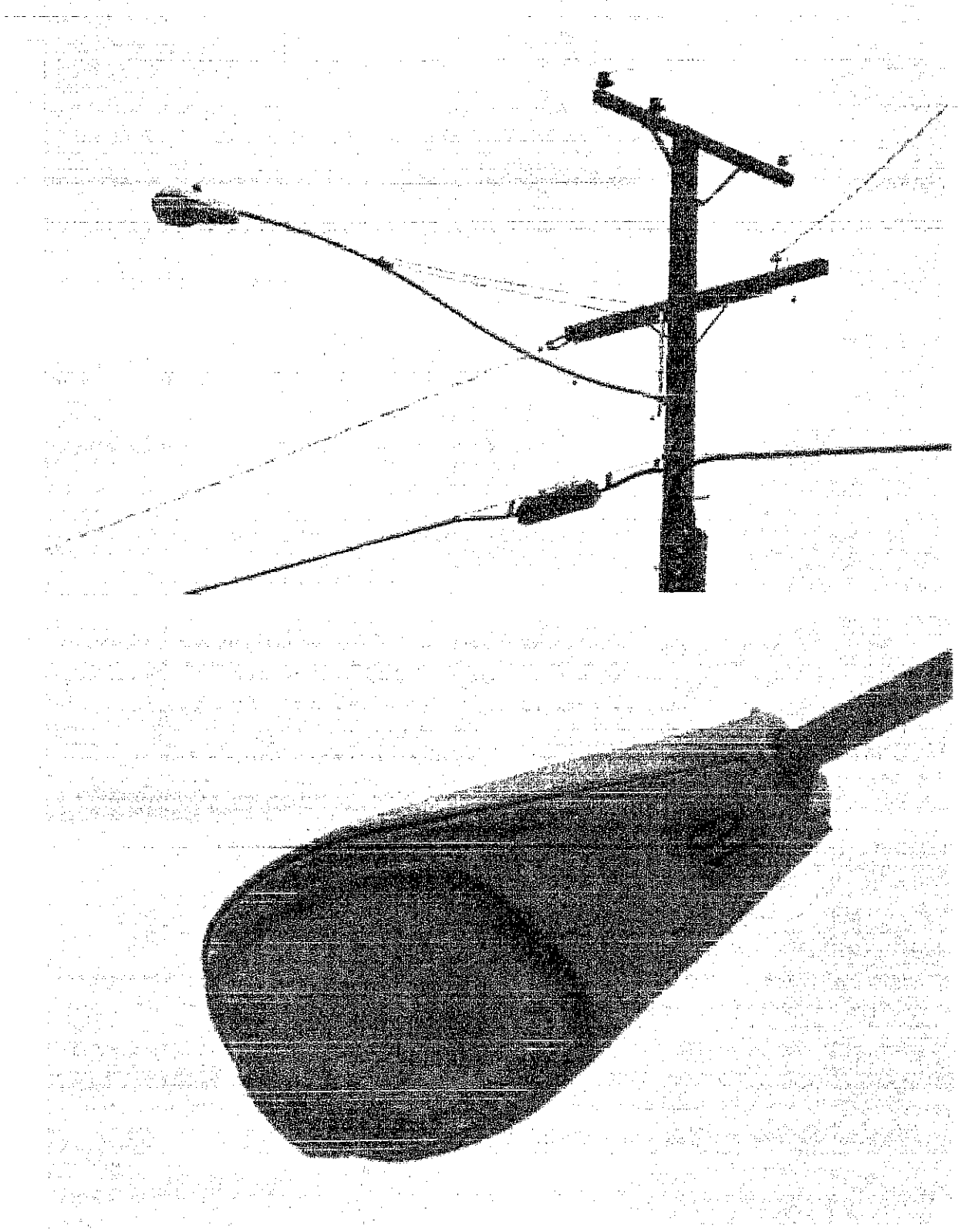




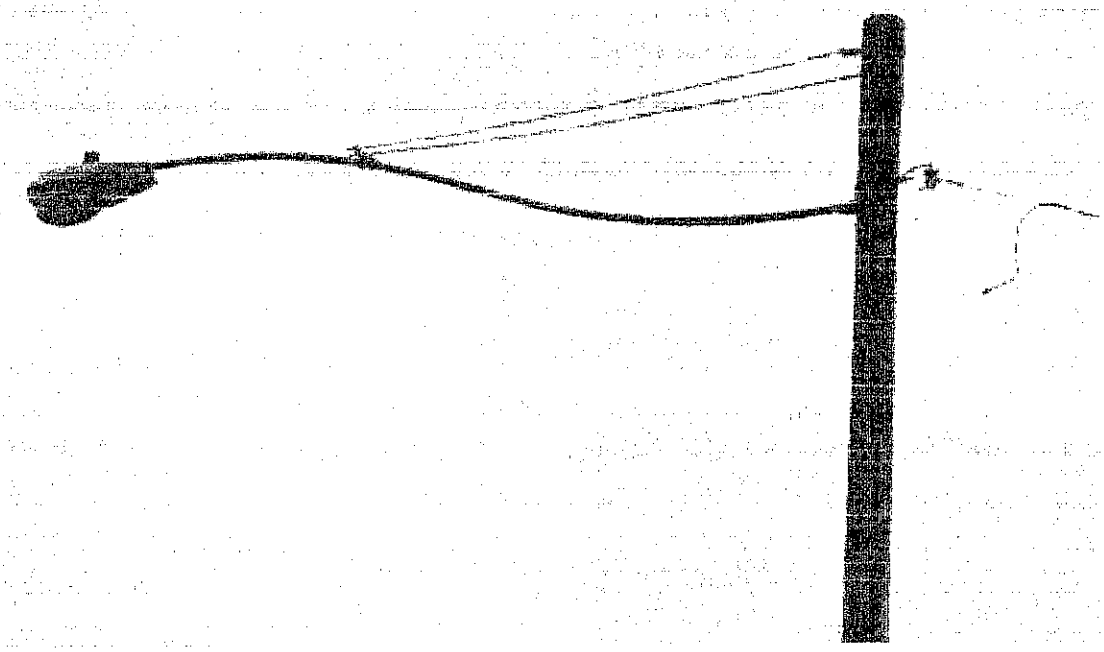
Pole #30 Main Street & Luxor Avenue

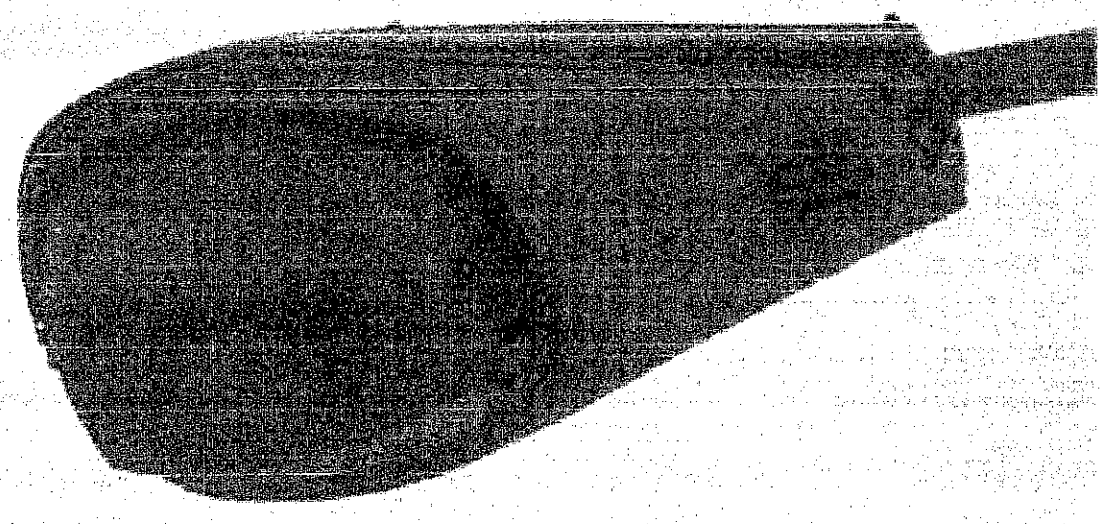


Pole #31 Main Street & Memphis Avenue - North

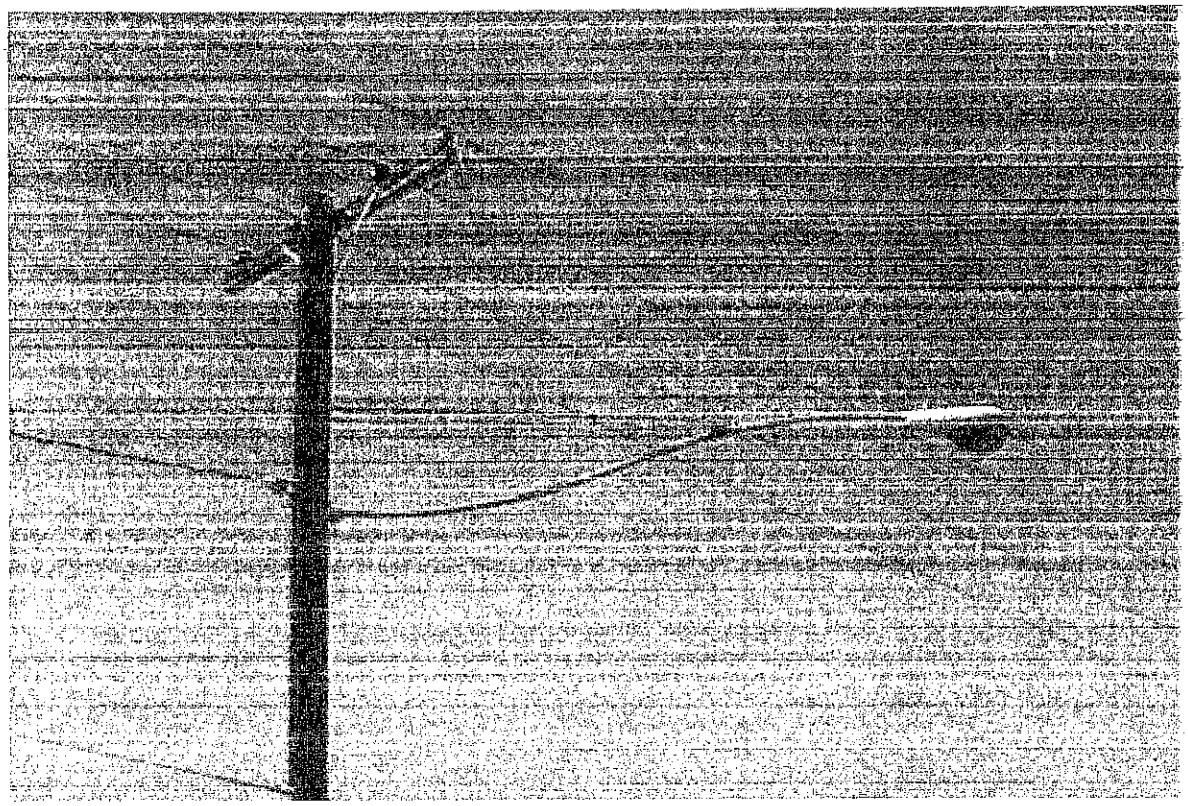


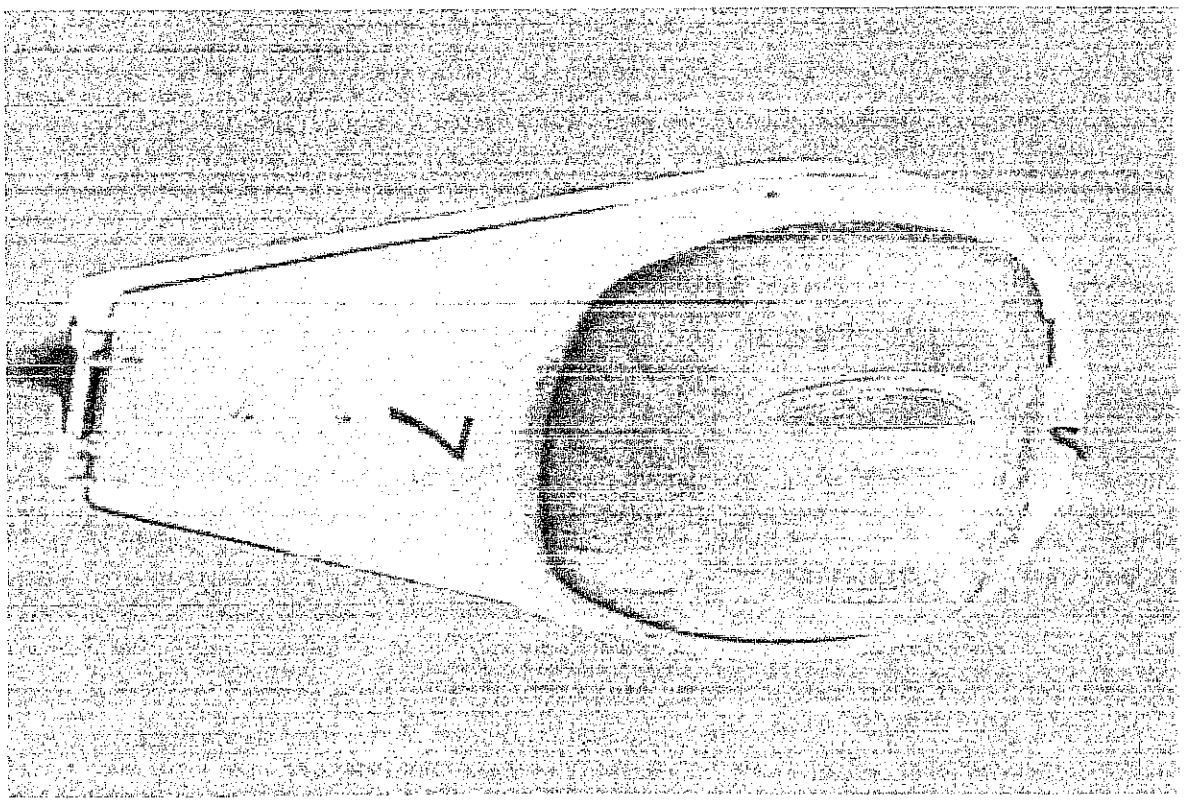
Pole #32 Main Street & Memphis Avenue - South



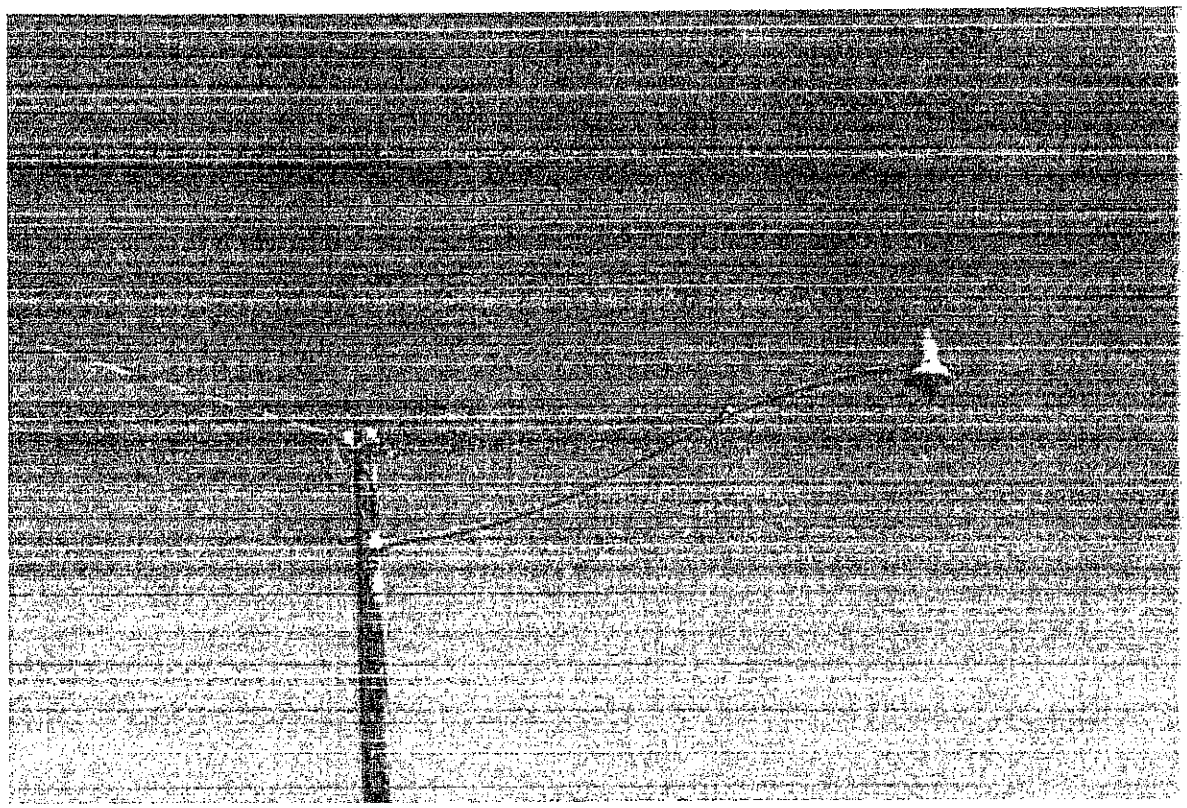


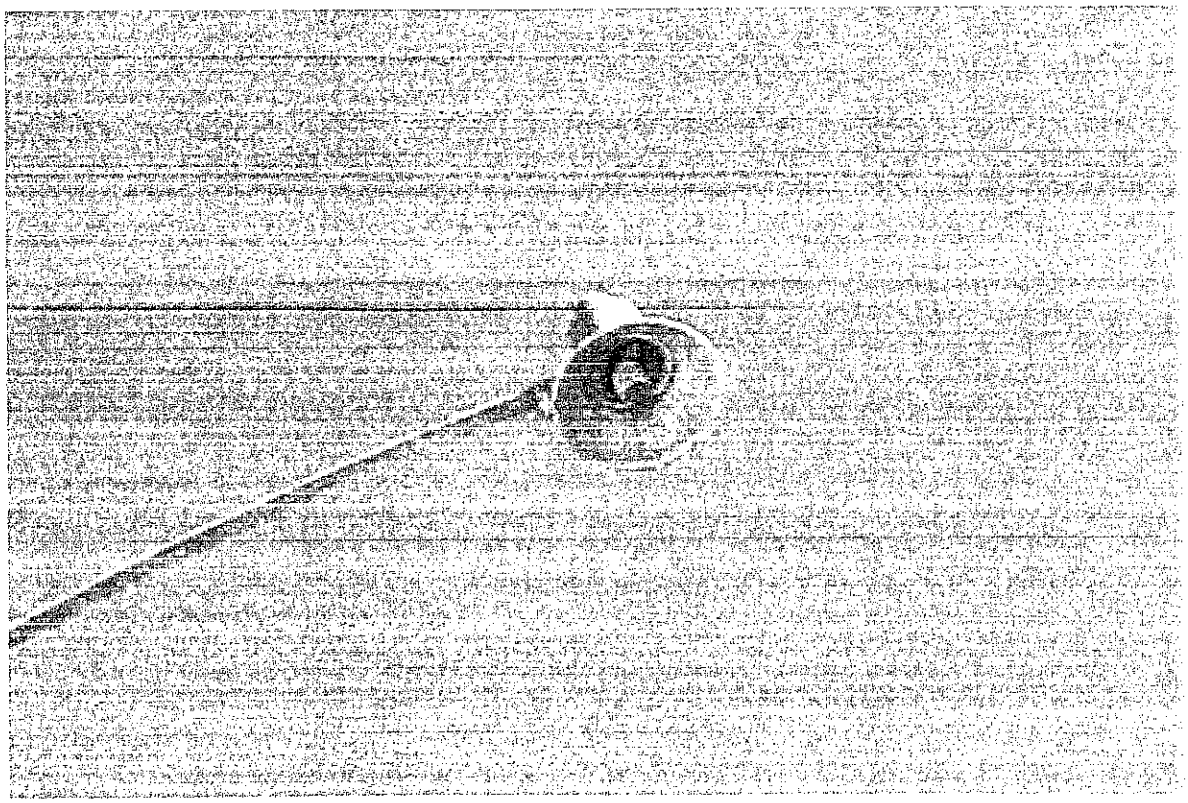
Pole #33 Main Street & Commercial Avenue



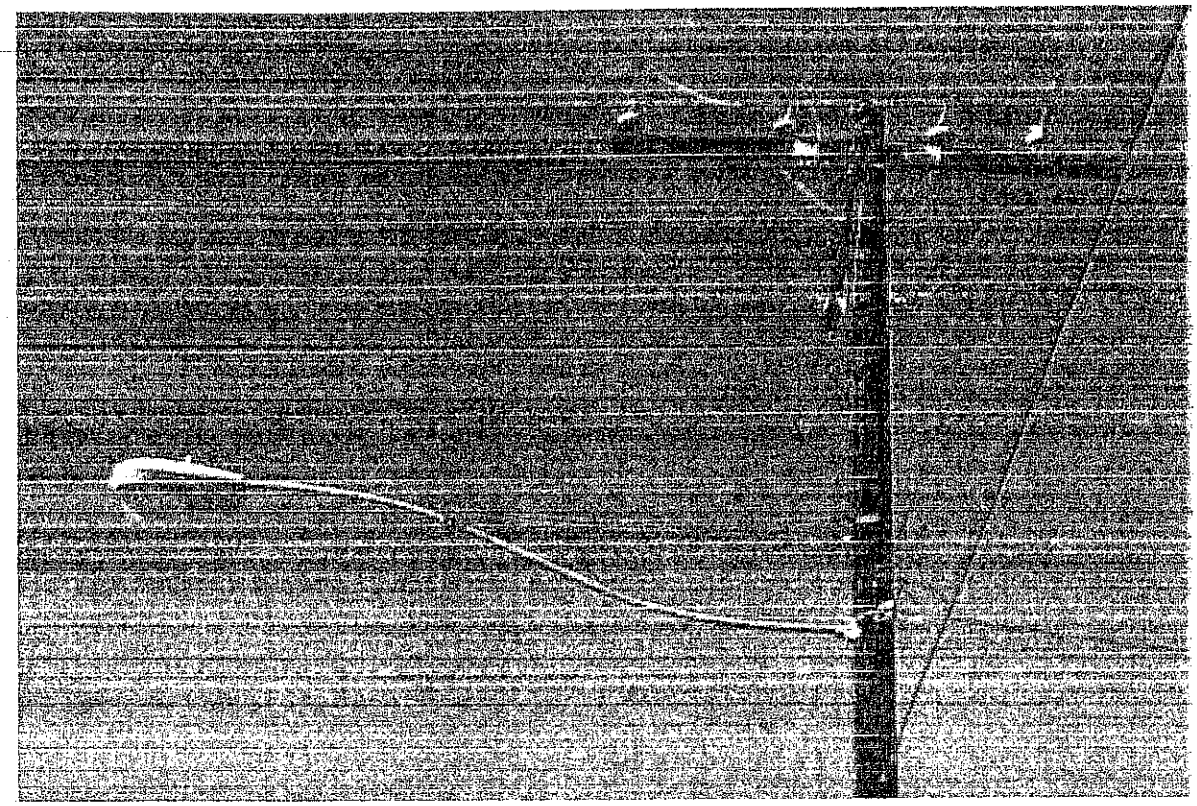


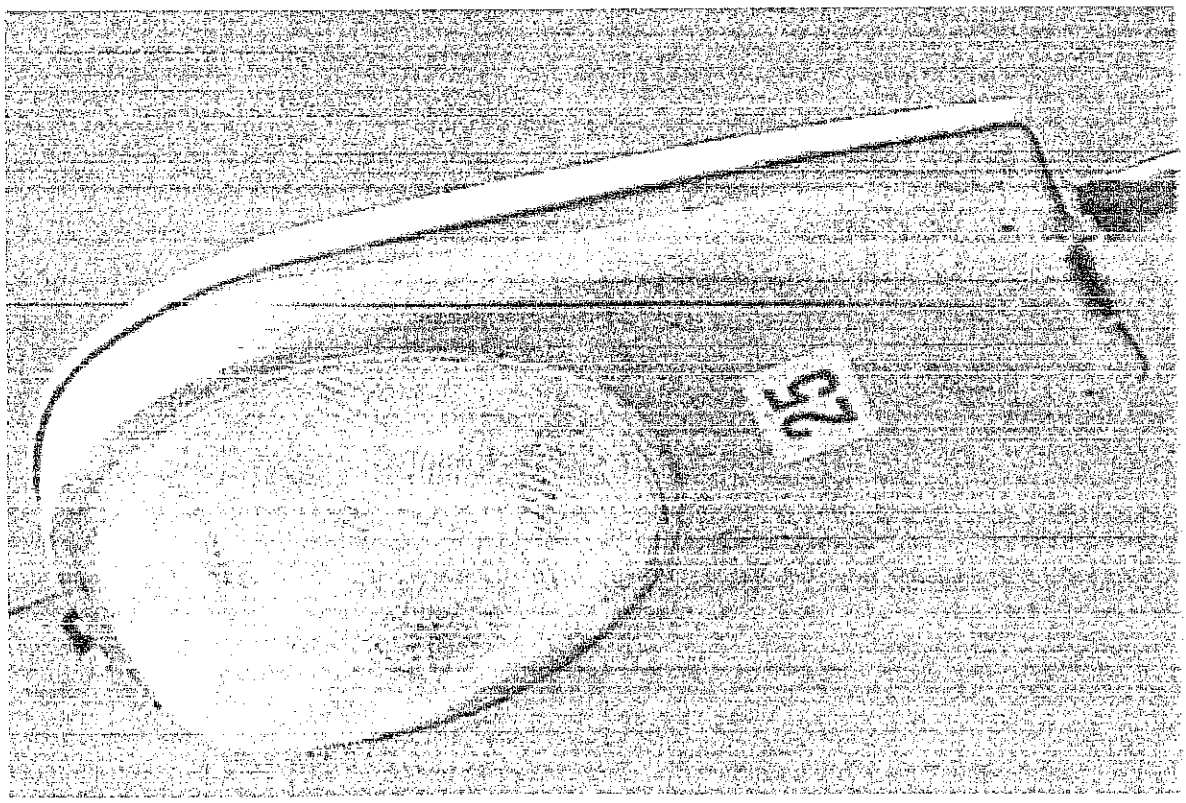
Pole #34 3rd. Street & Iris Avenue



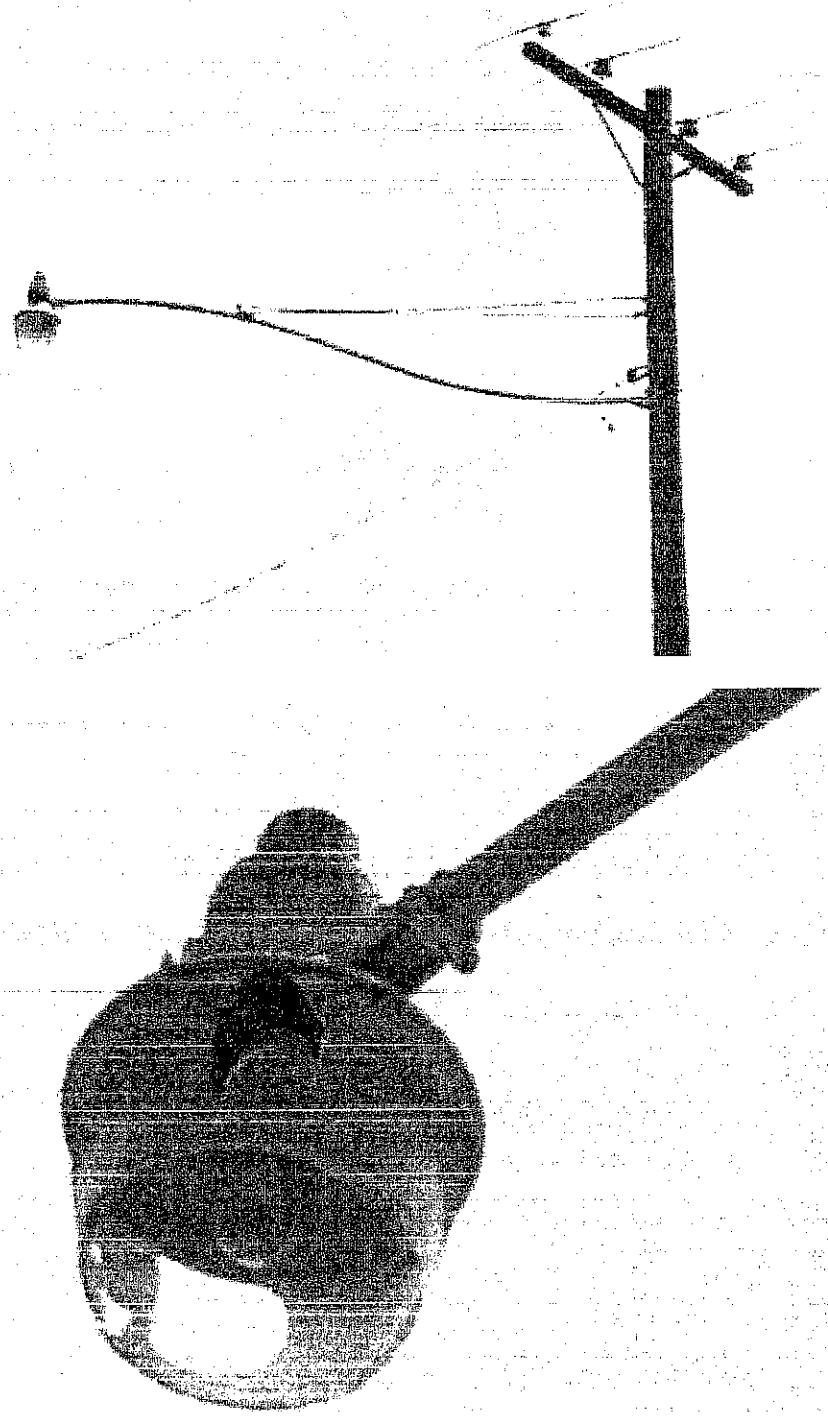


Pole #35 3rd. Street & International Avenue

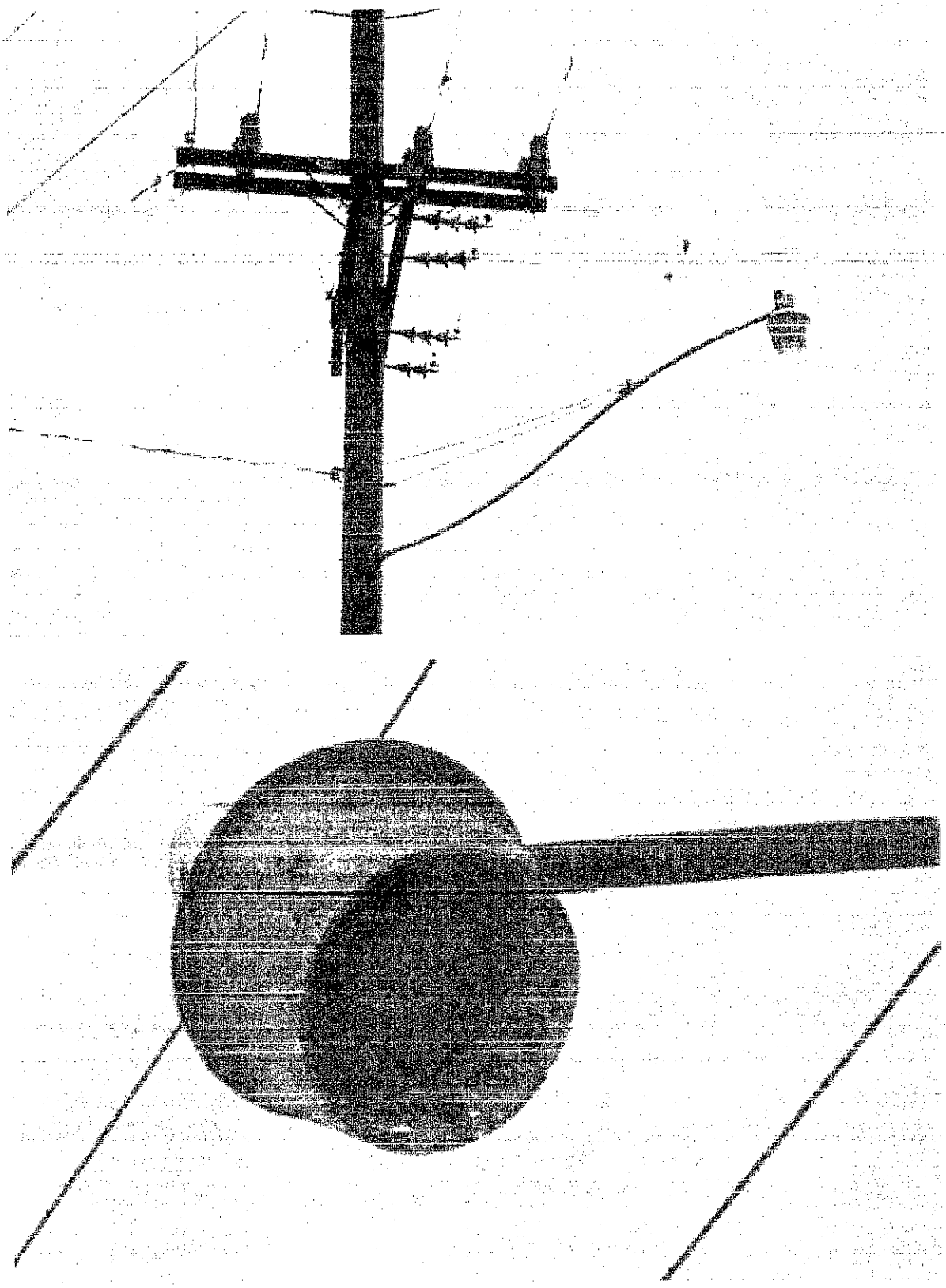




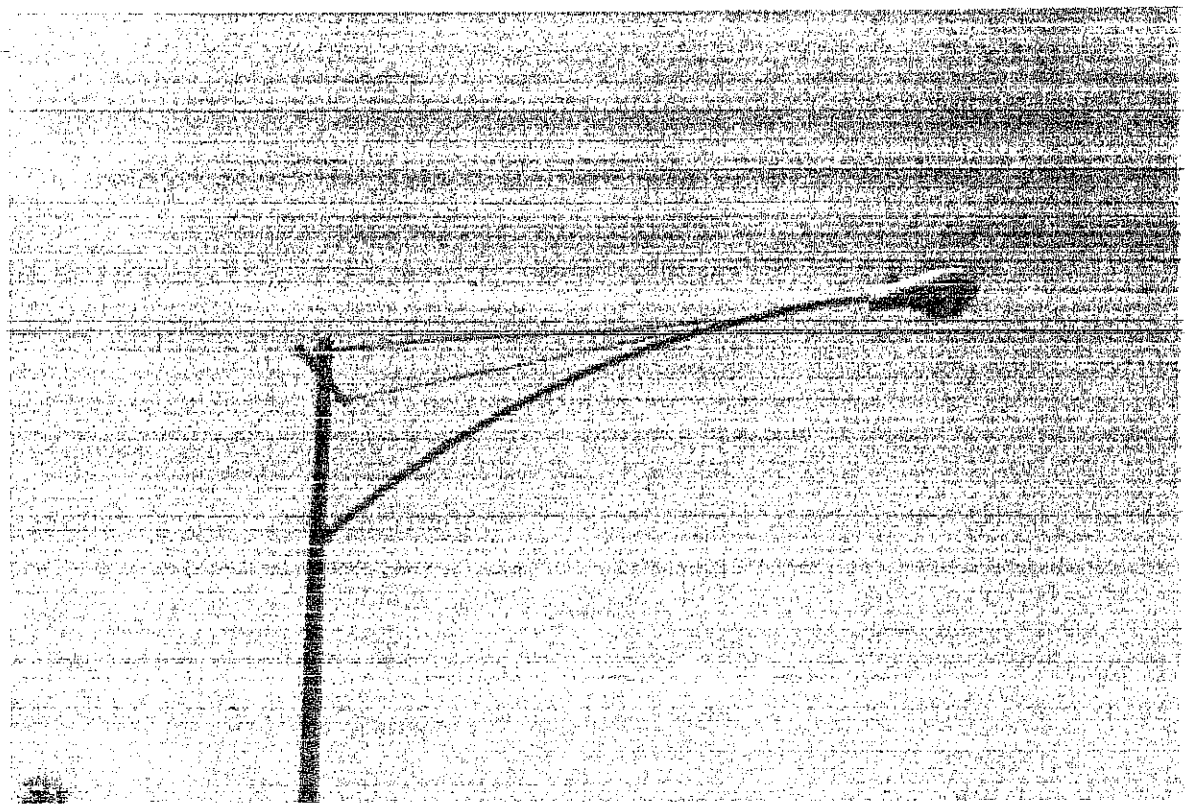
Pole #36 3rd. Street & Luxor Avenue

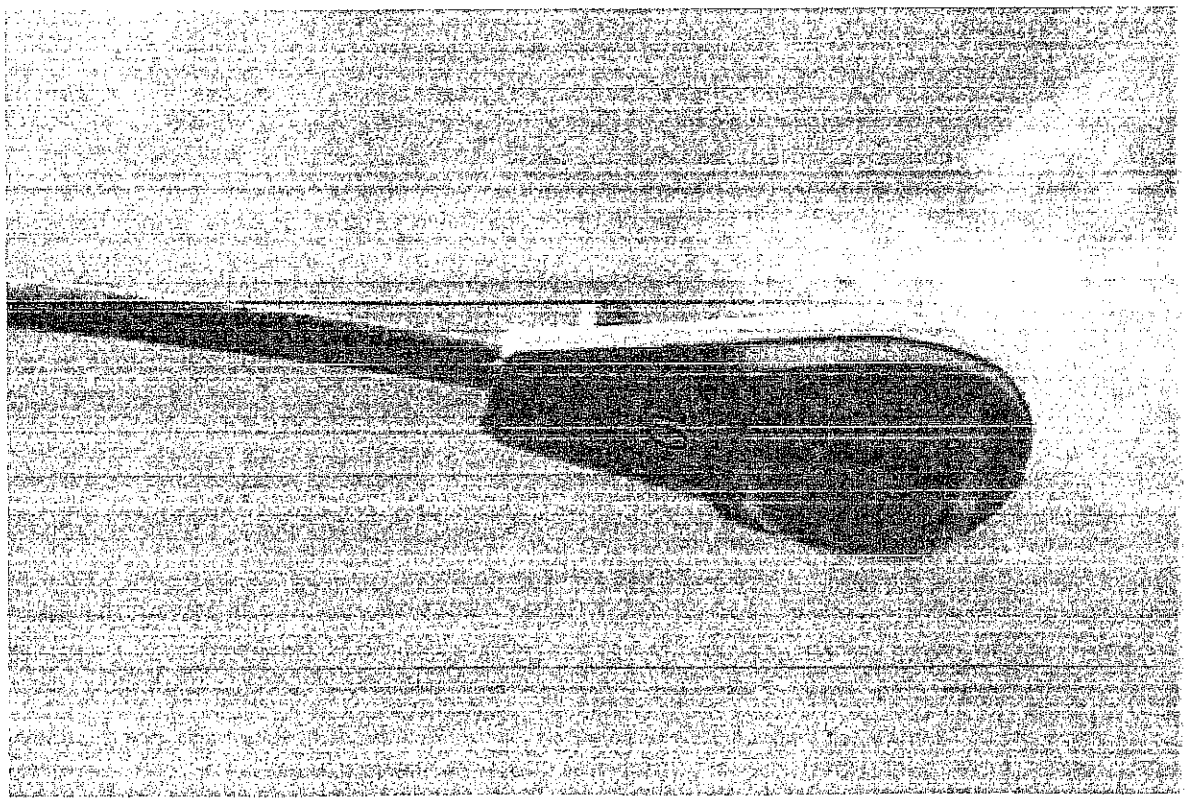


Pole #37 3rd. Street & Memphis Avenue

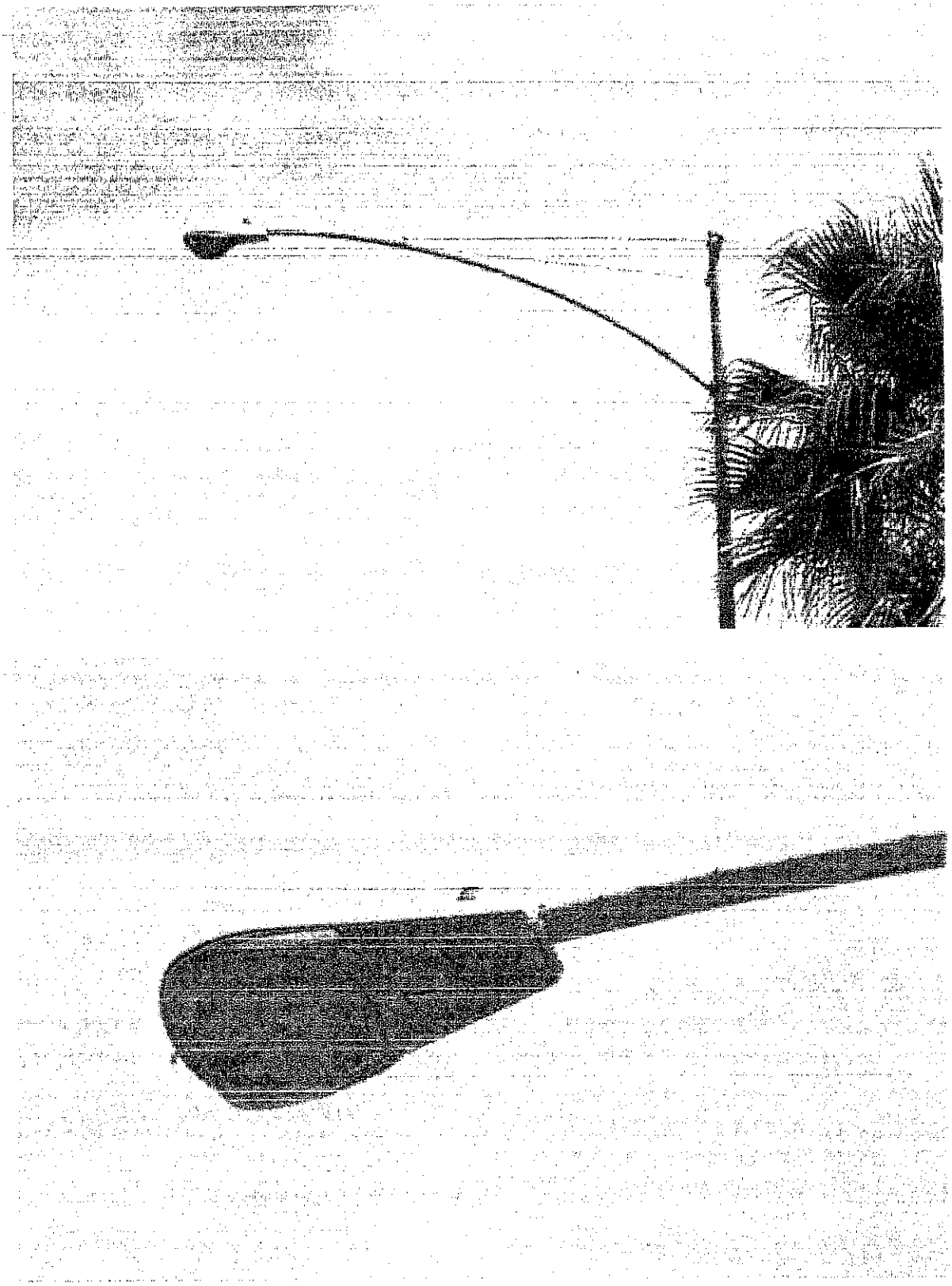


Pole #38 3rd. Street & Commercial Avenue

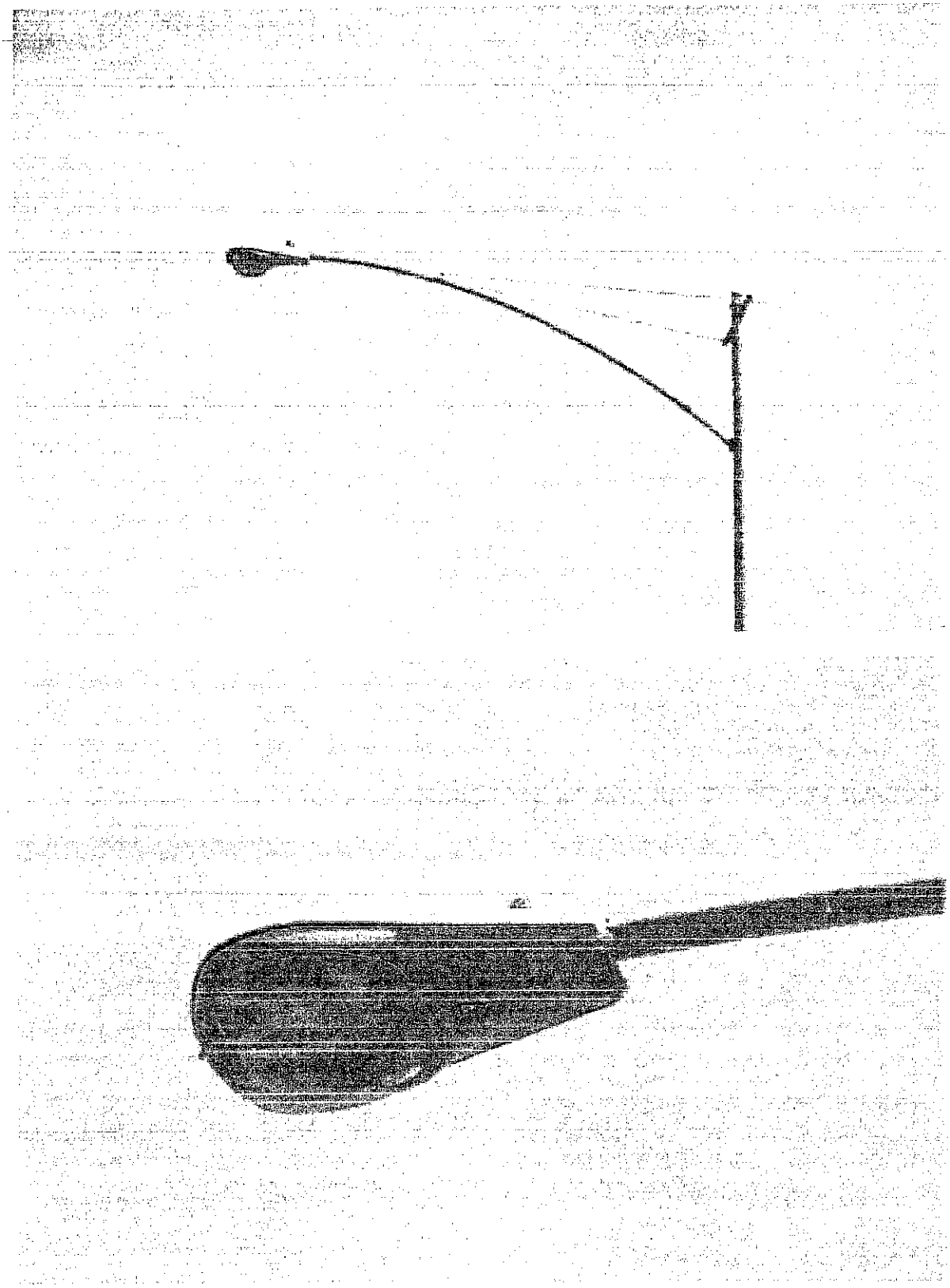




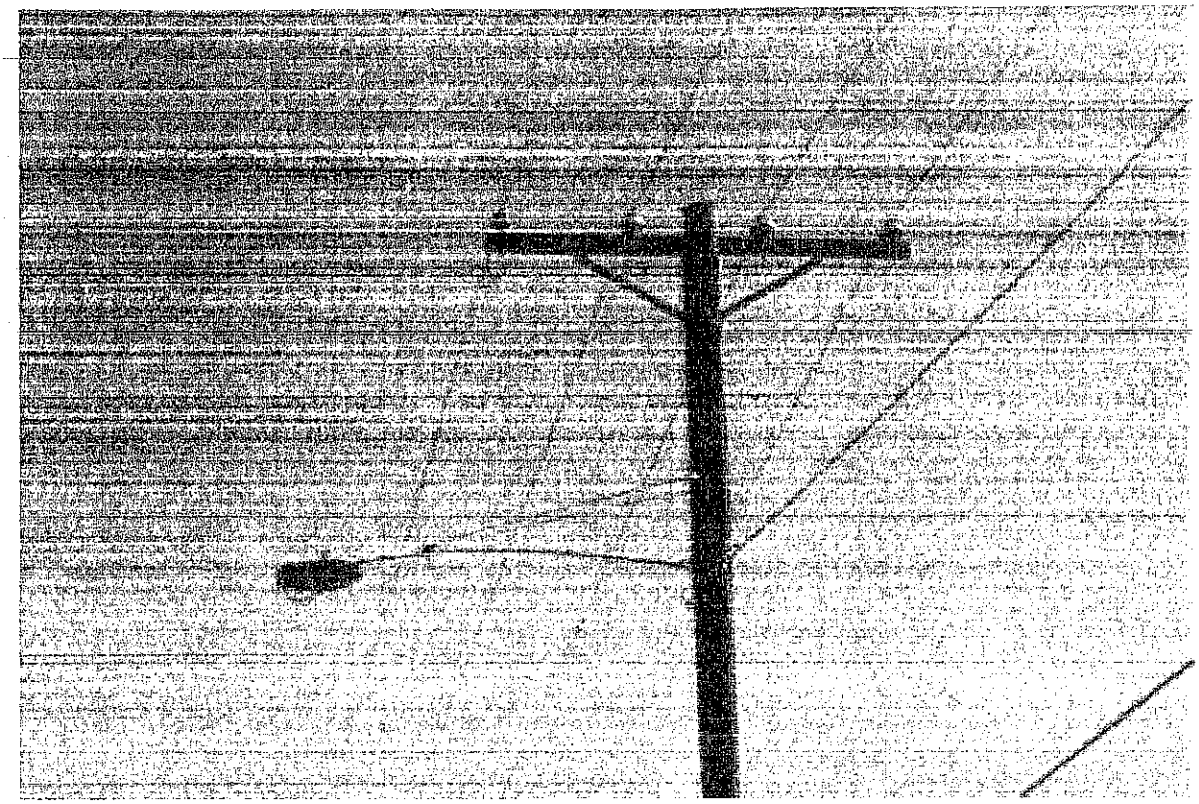
Pole #39 4th. Street (West of Highway 111)

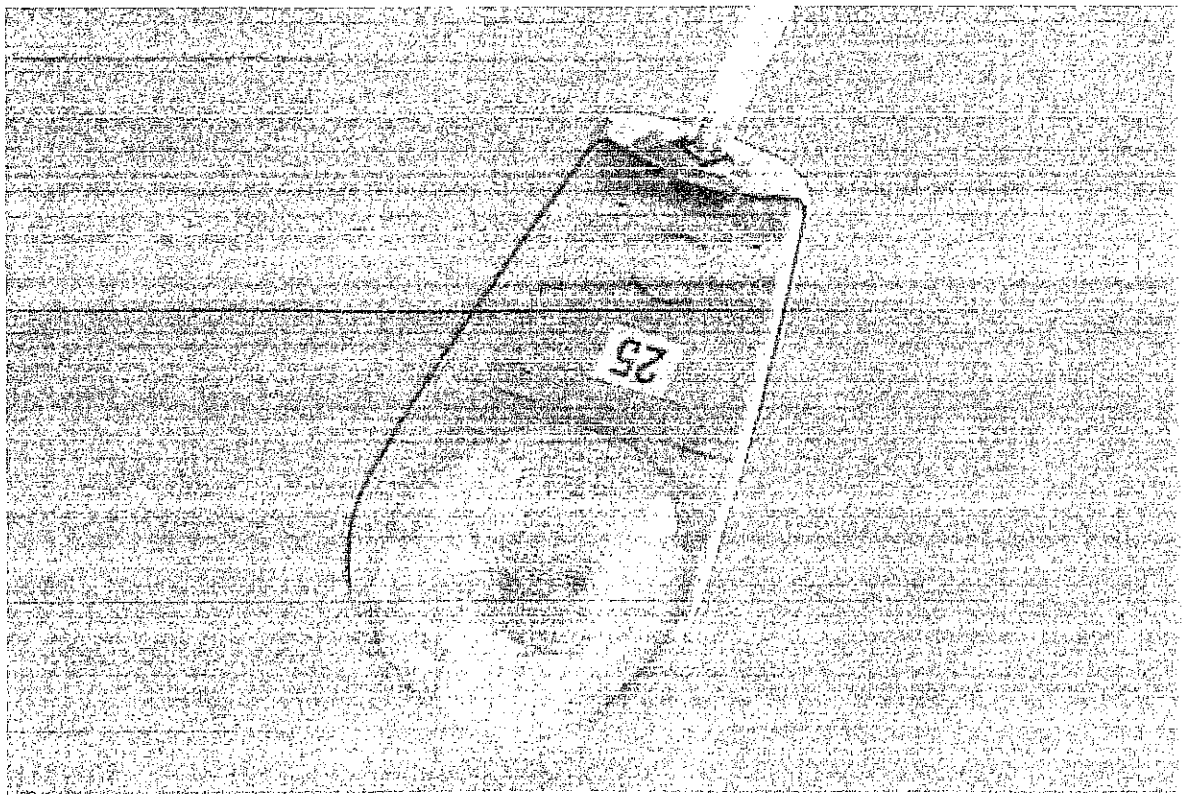


Pole #40 4th Street (West of Highway 111)

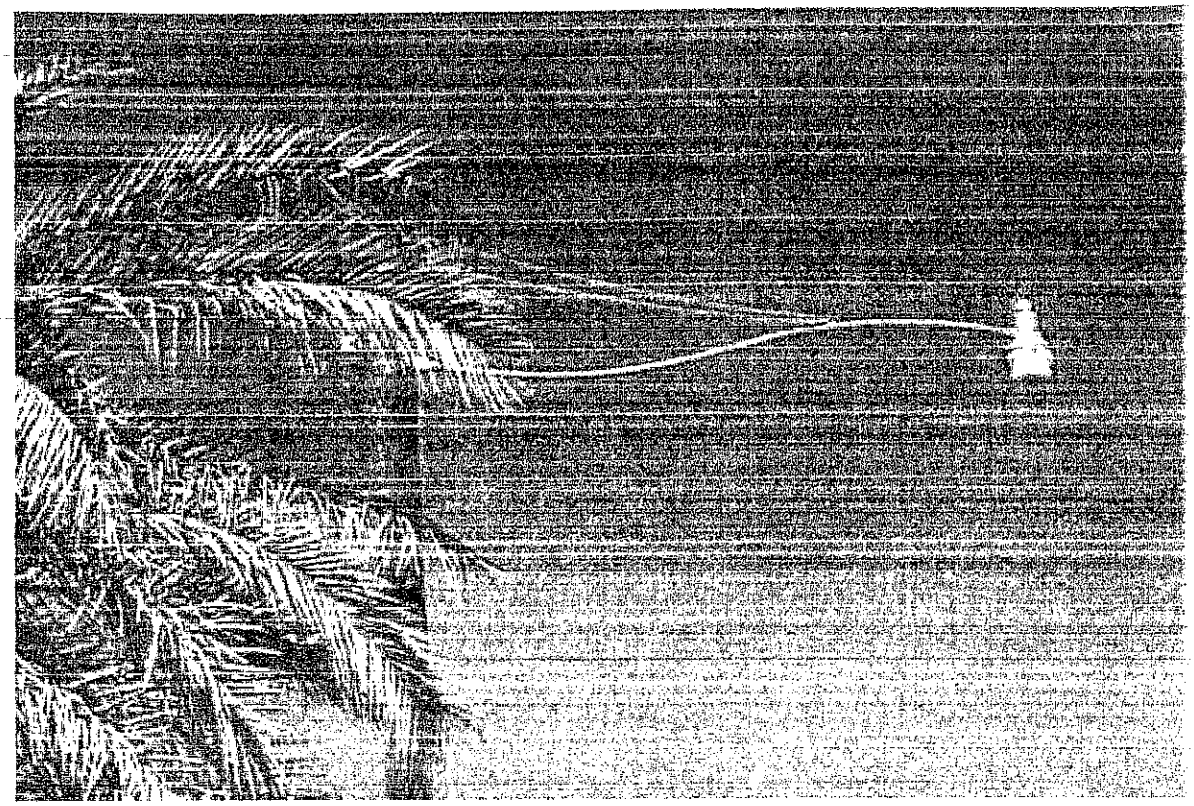


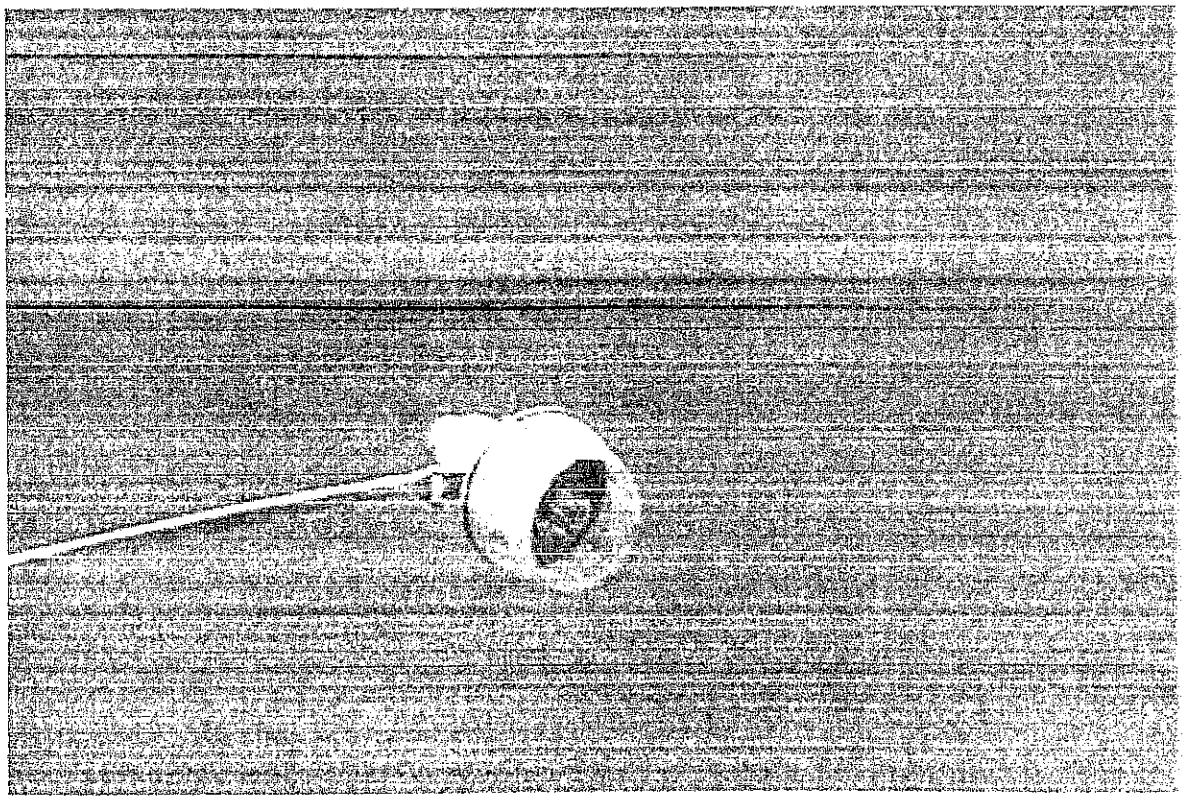
Pole #41 4th. Street (West of Highway 111)



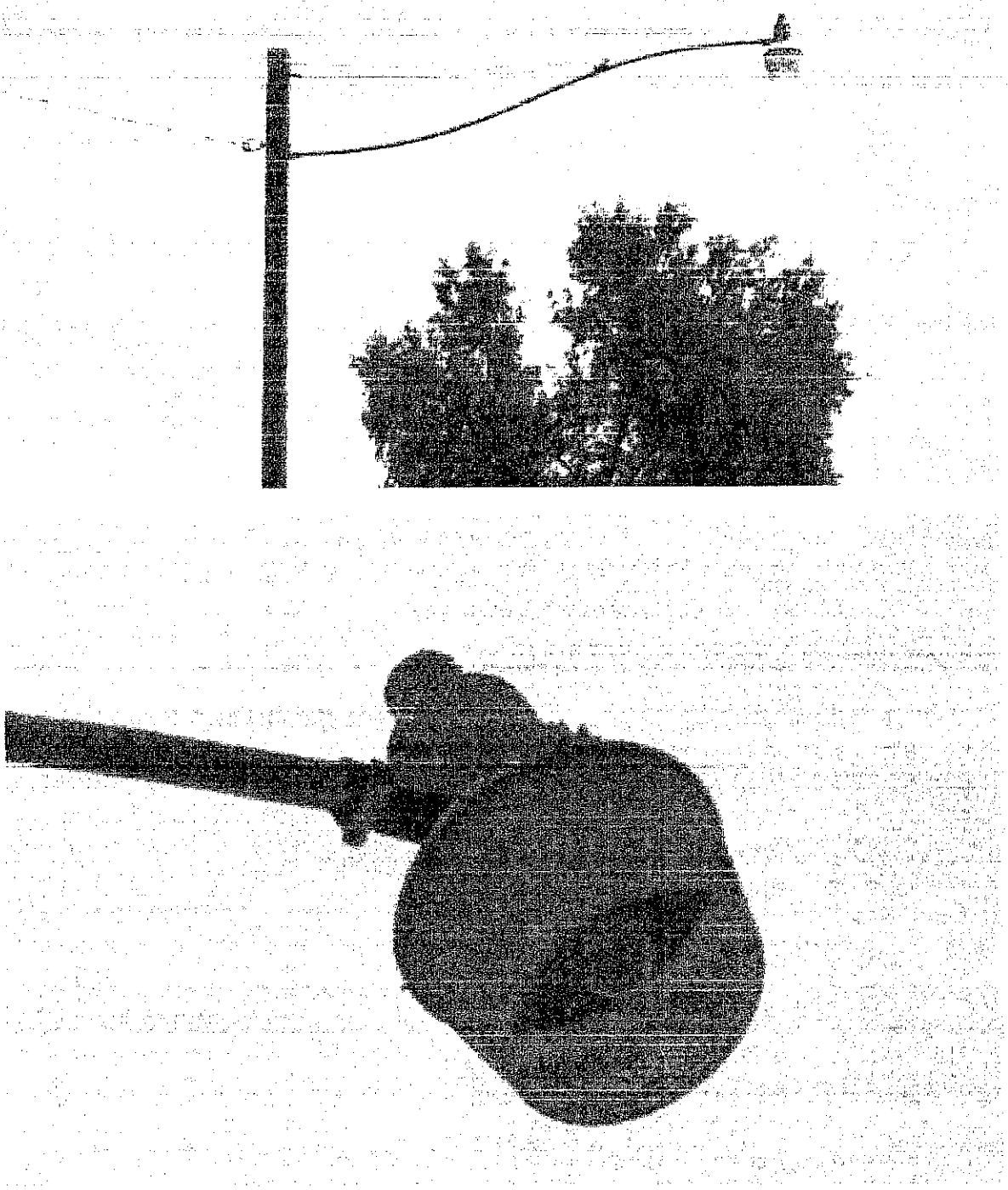


Pole #42 4th. Street & Isis Avenue

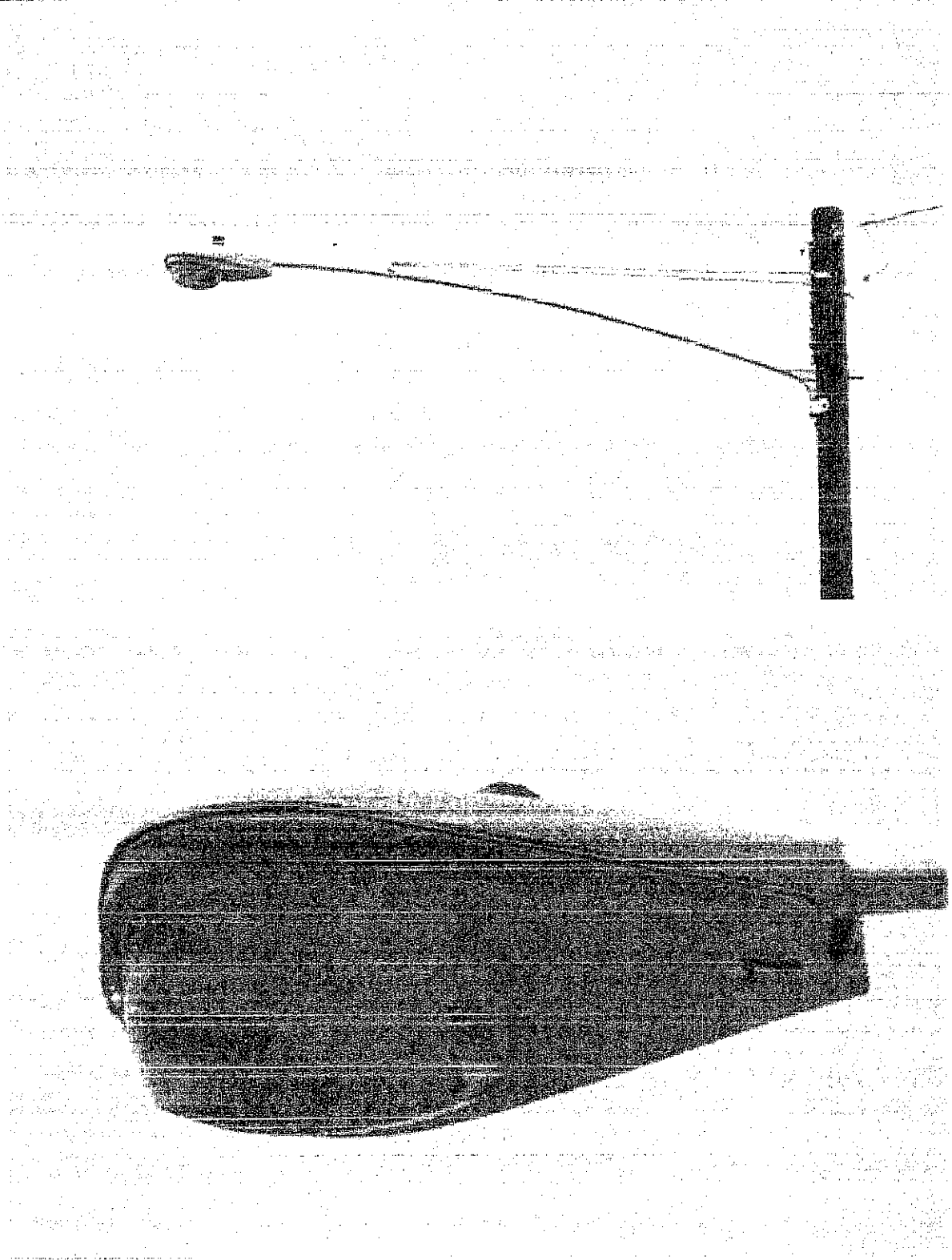




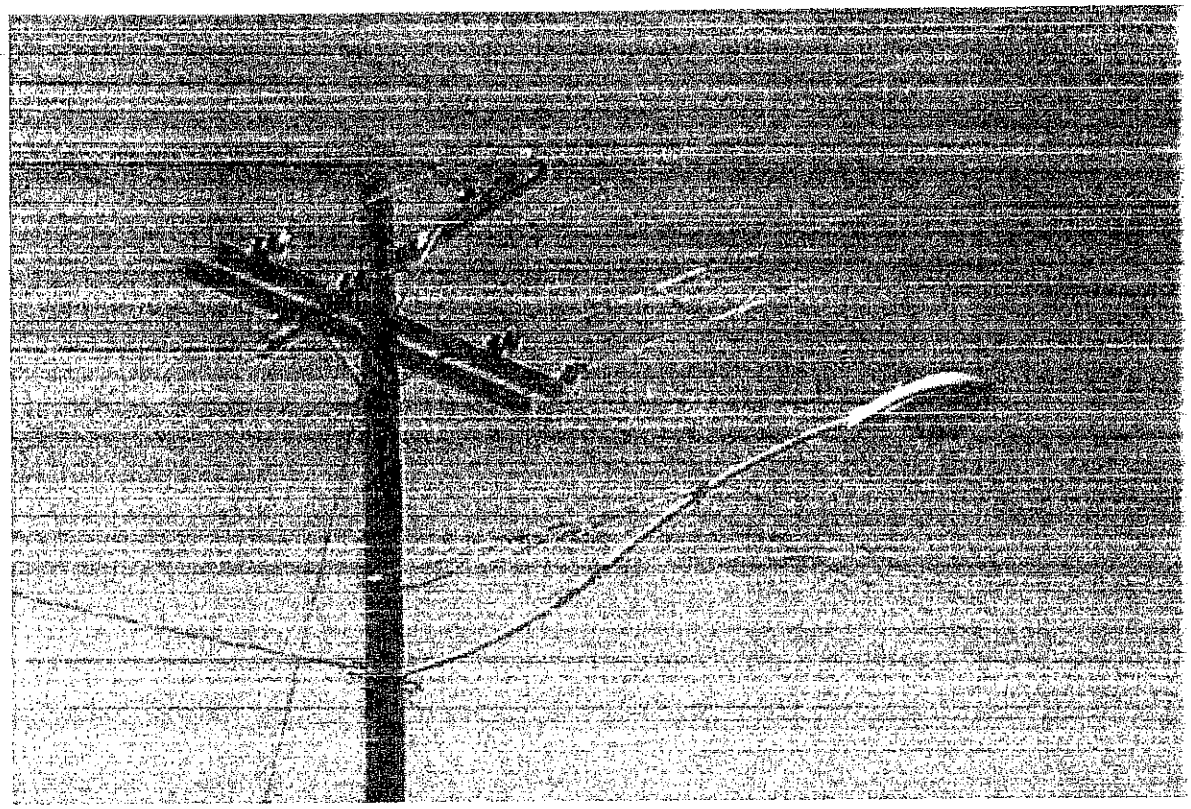
Pole #43 4th. Street & International Avenue

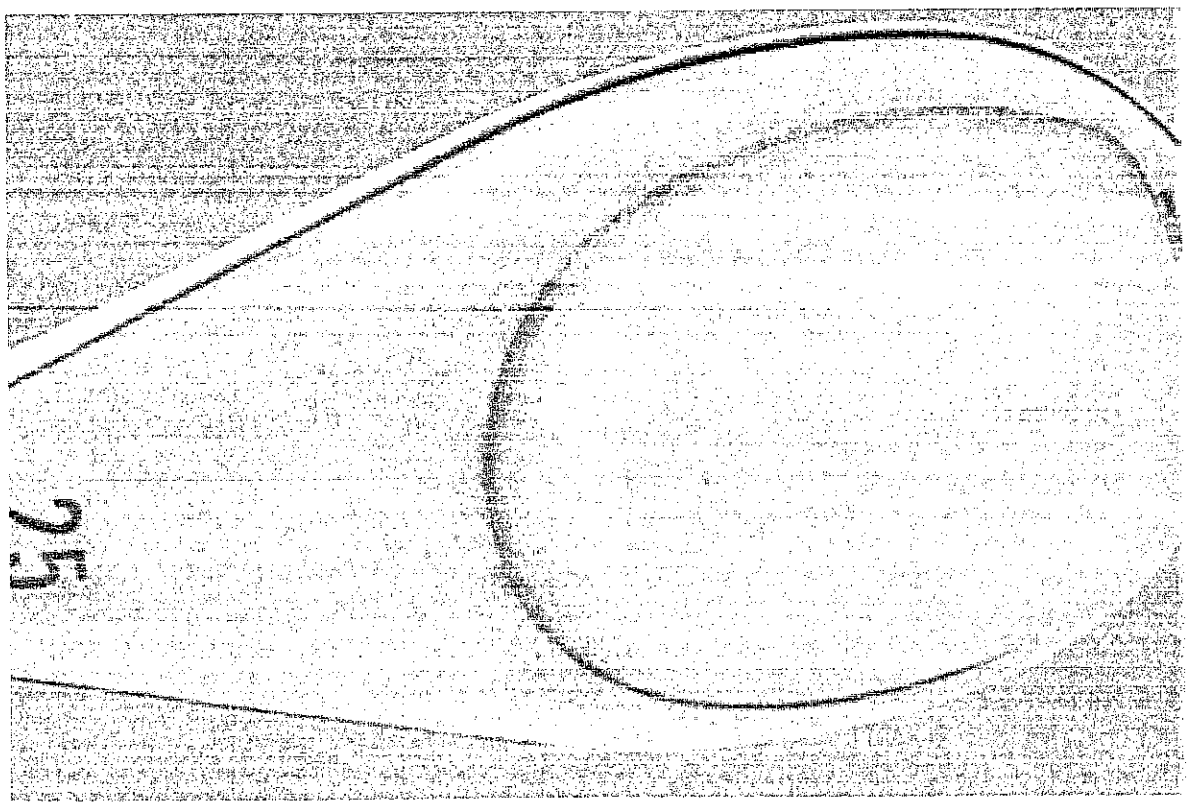


Pole #44 4th. Street & Memphis Avenue

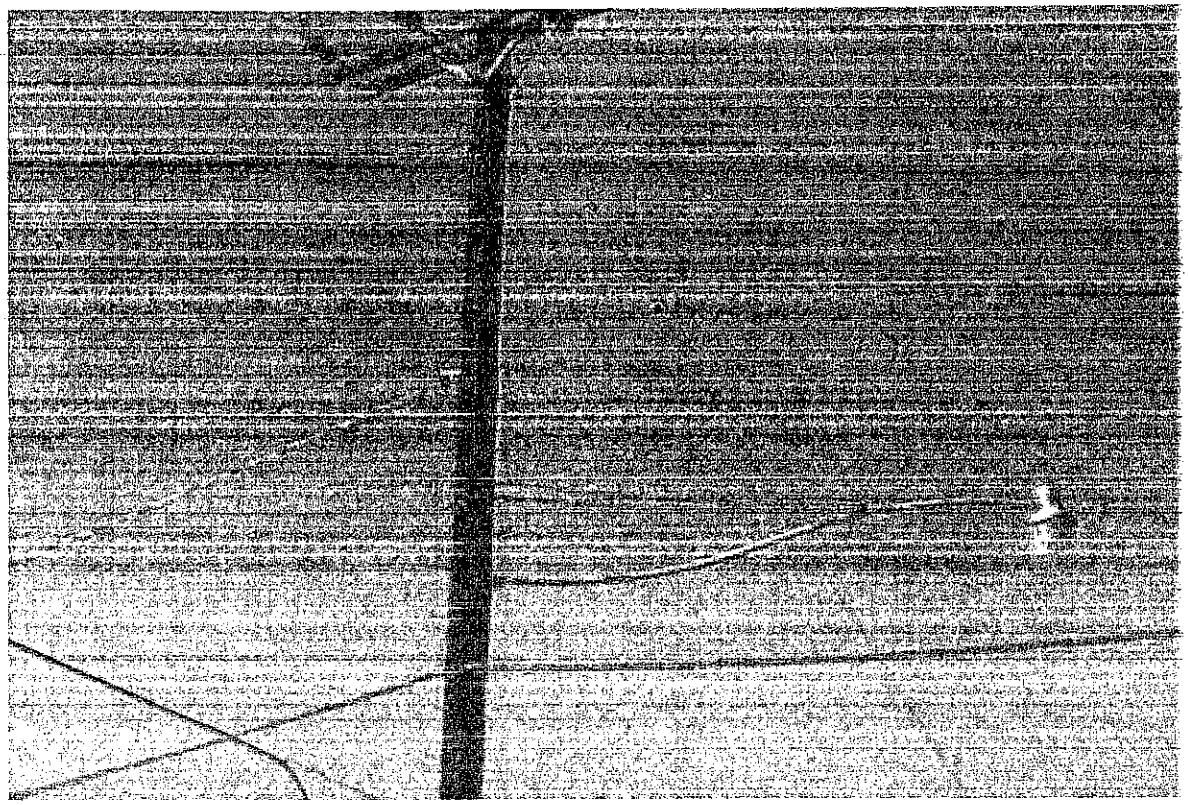


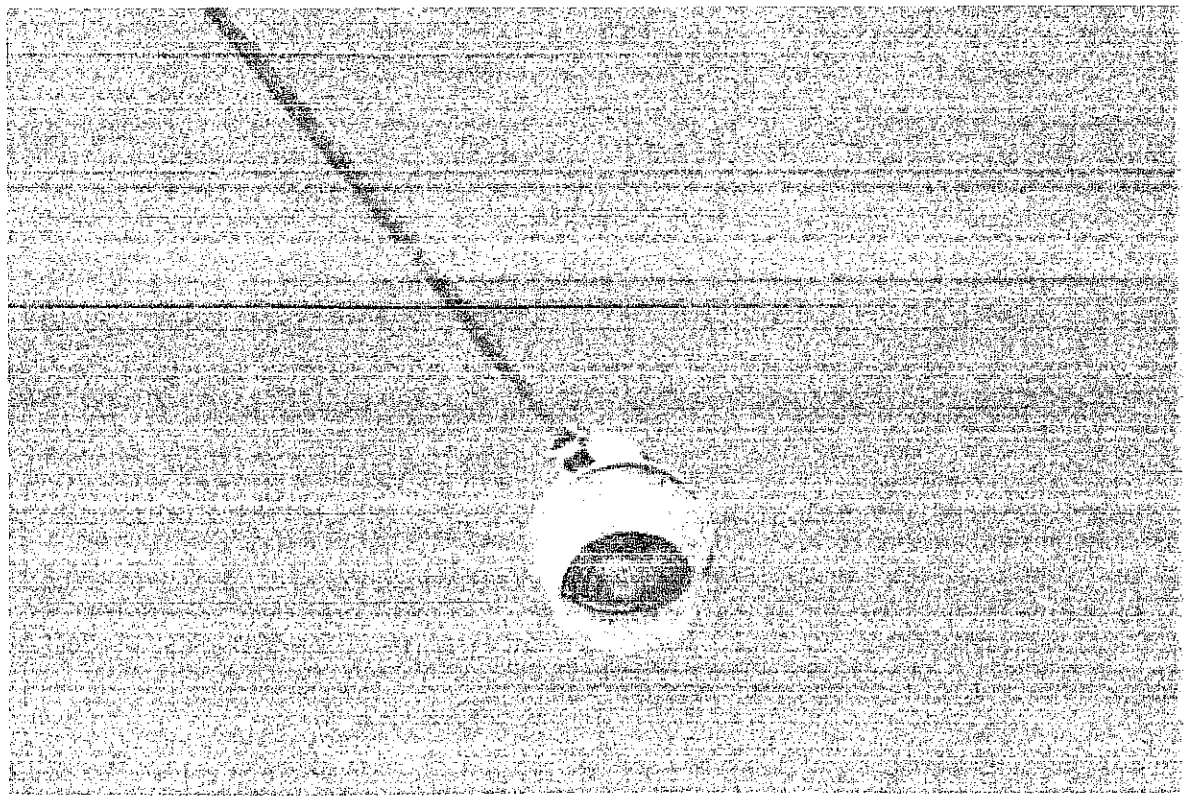
Pole #45 4th. Street & Commercial Avenue



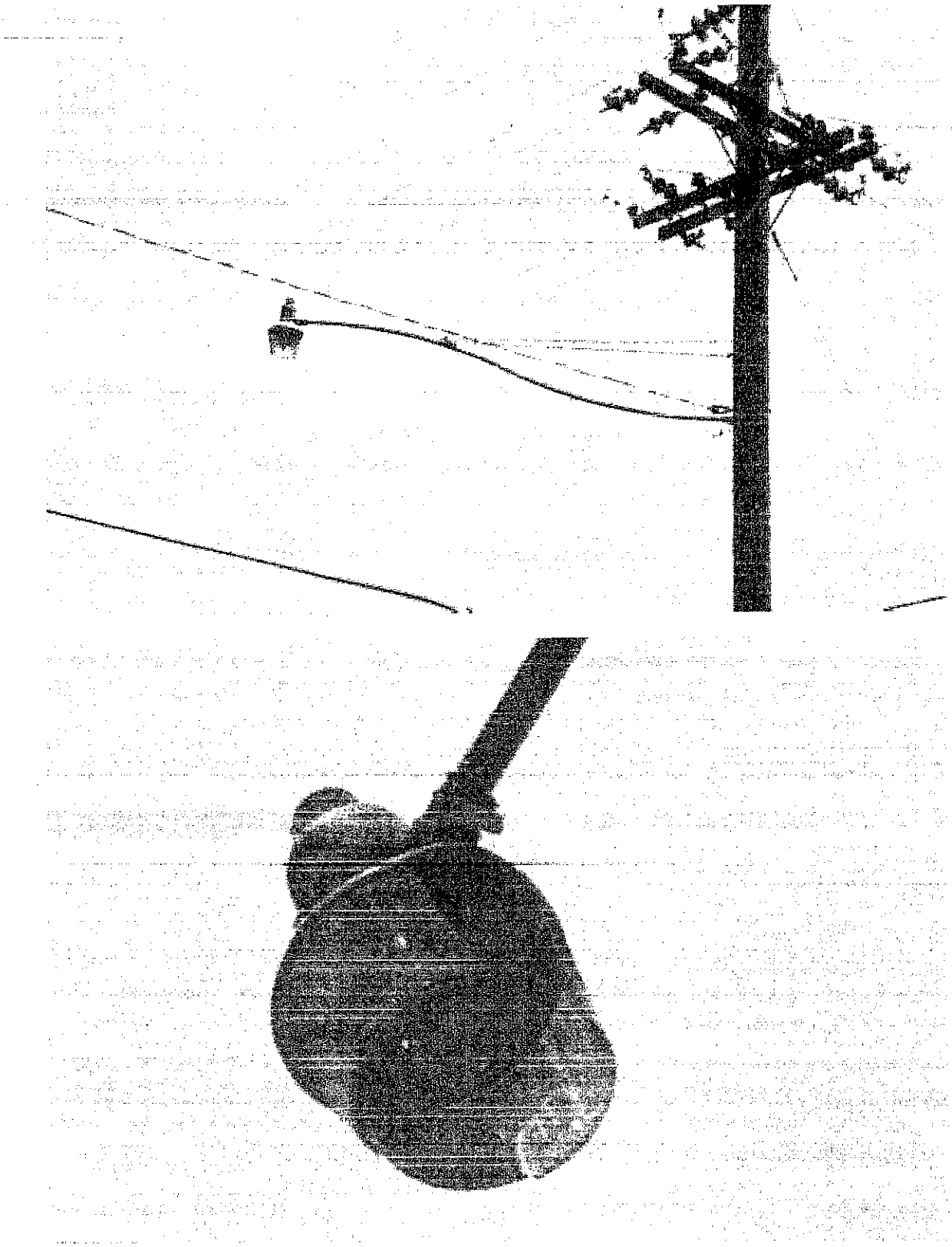


Pole #46 5th. Street & Isis Avenue

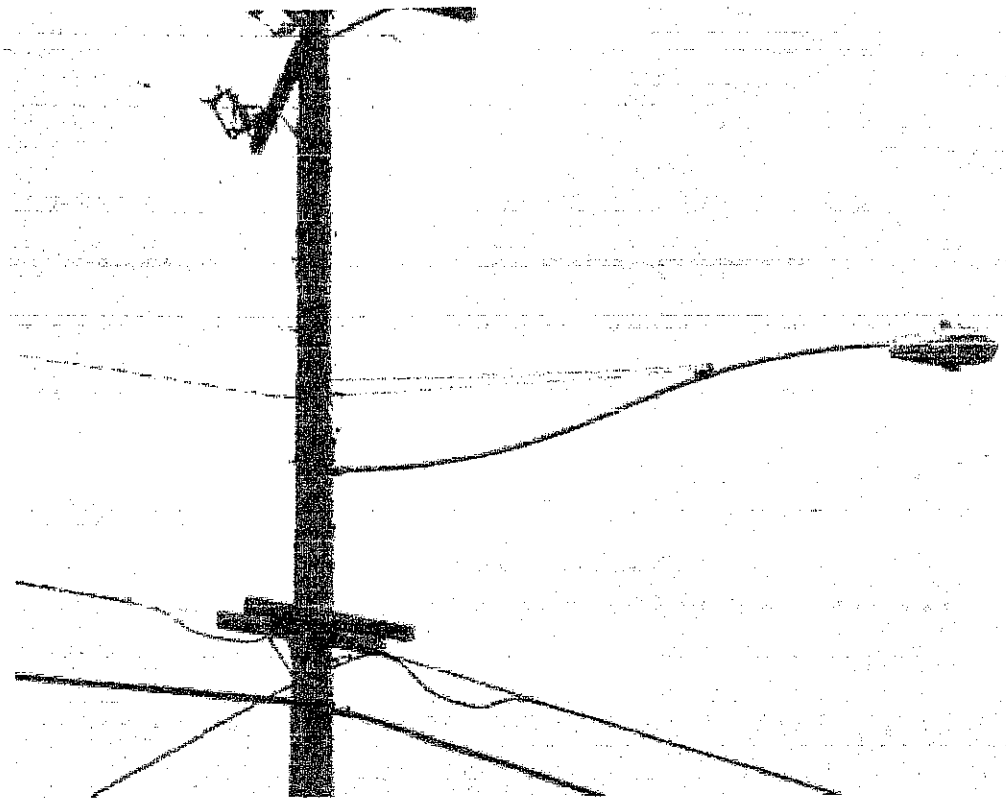


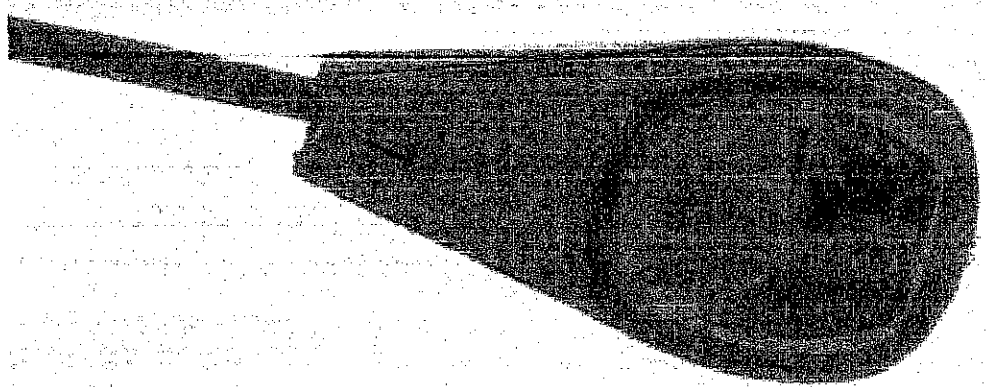


Pole #47 5th. Street & International Avenue

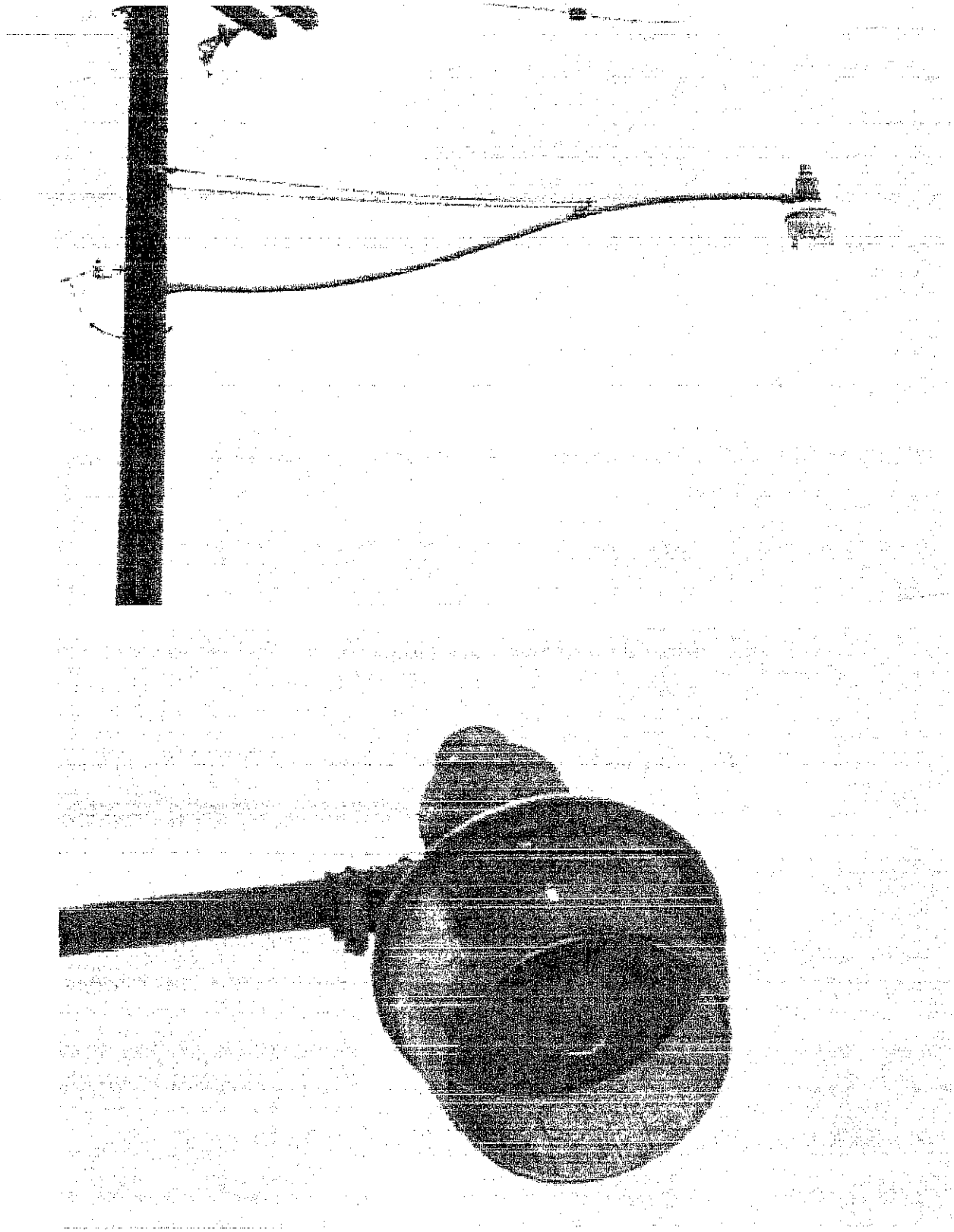


Pole #48 5th. Street & Luxor Avenue

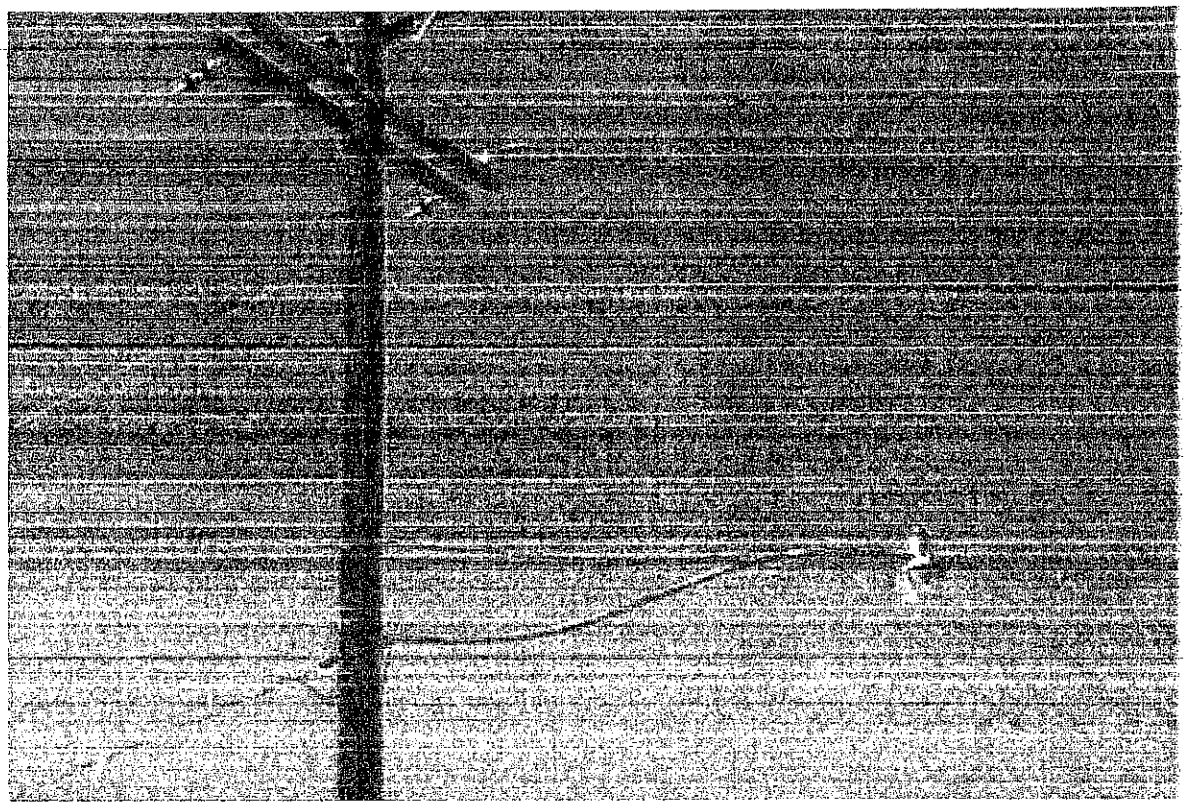


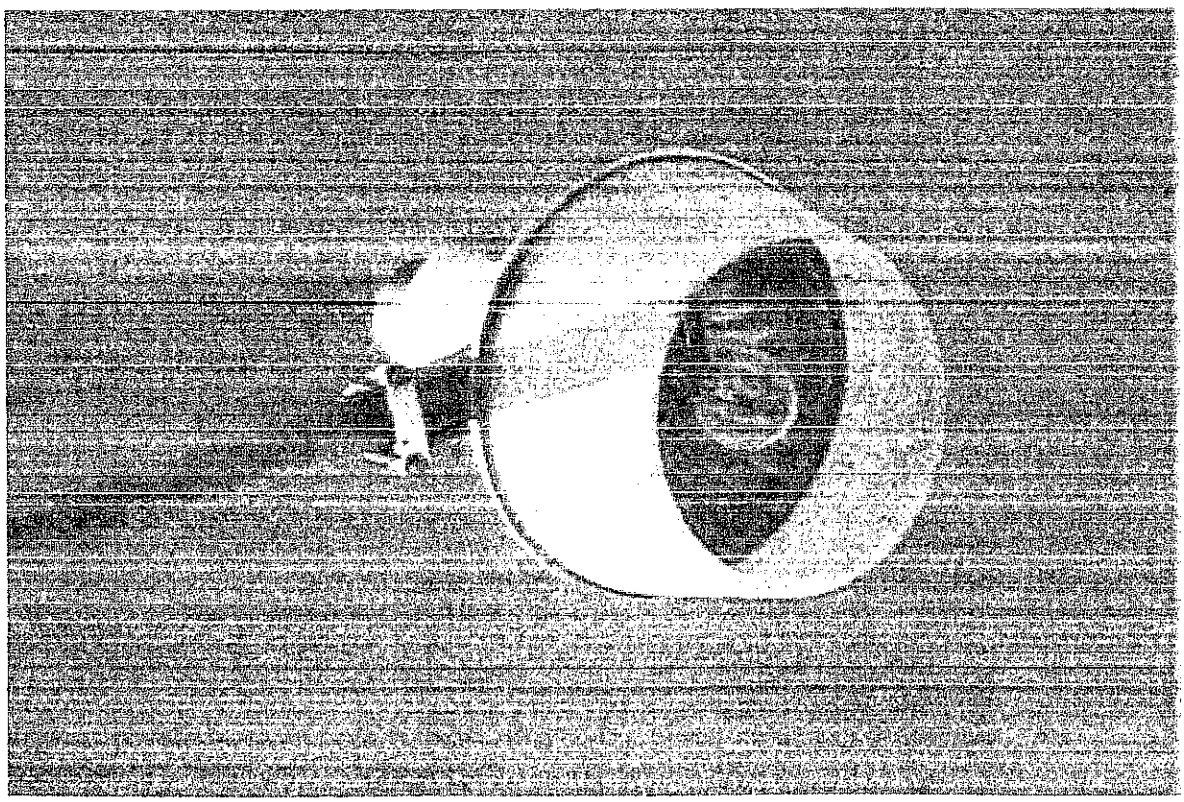


Pole #49 5th. Street & Memphis Avenue

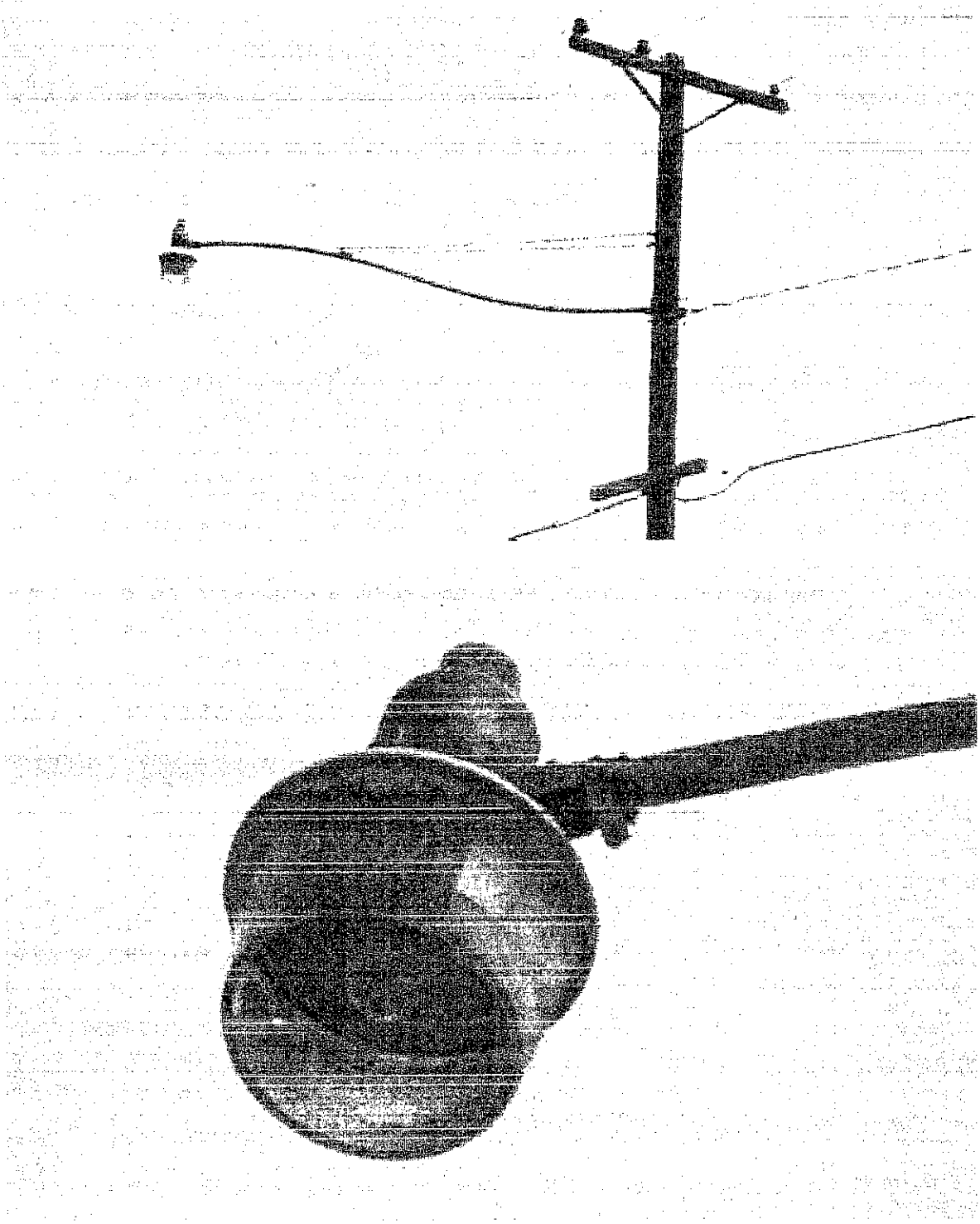


Pole #50 5th. Street & Commercial Avenue

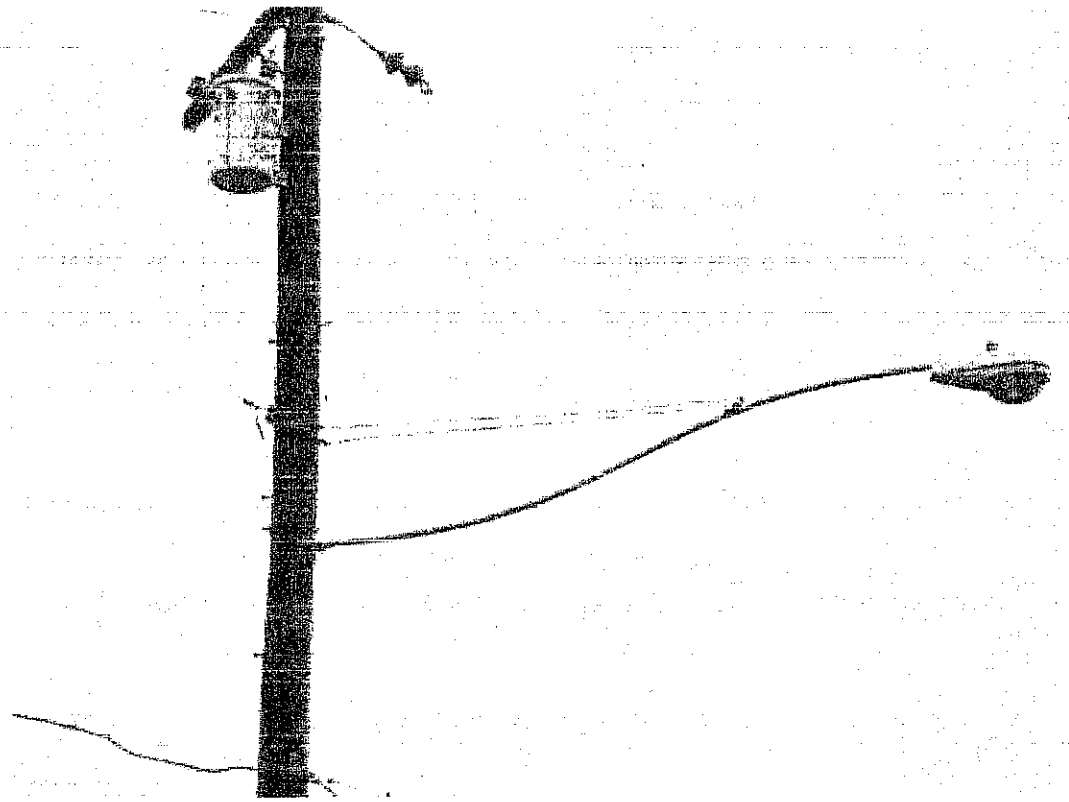


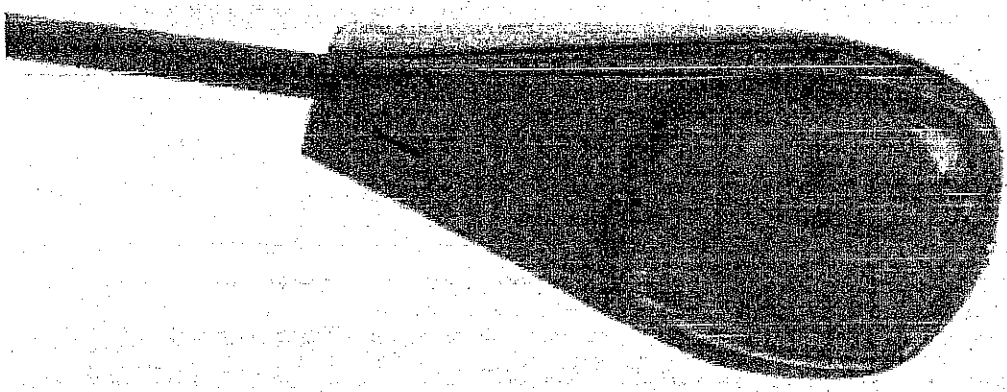


Pole #51 6th. Street & Isis Avenue

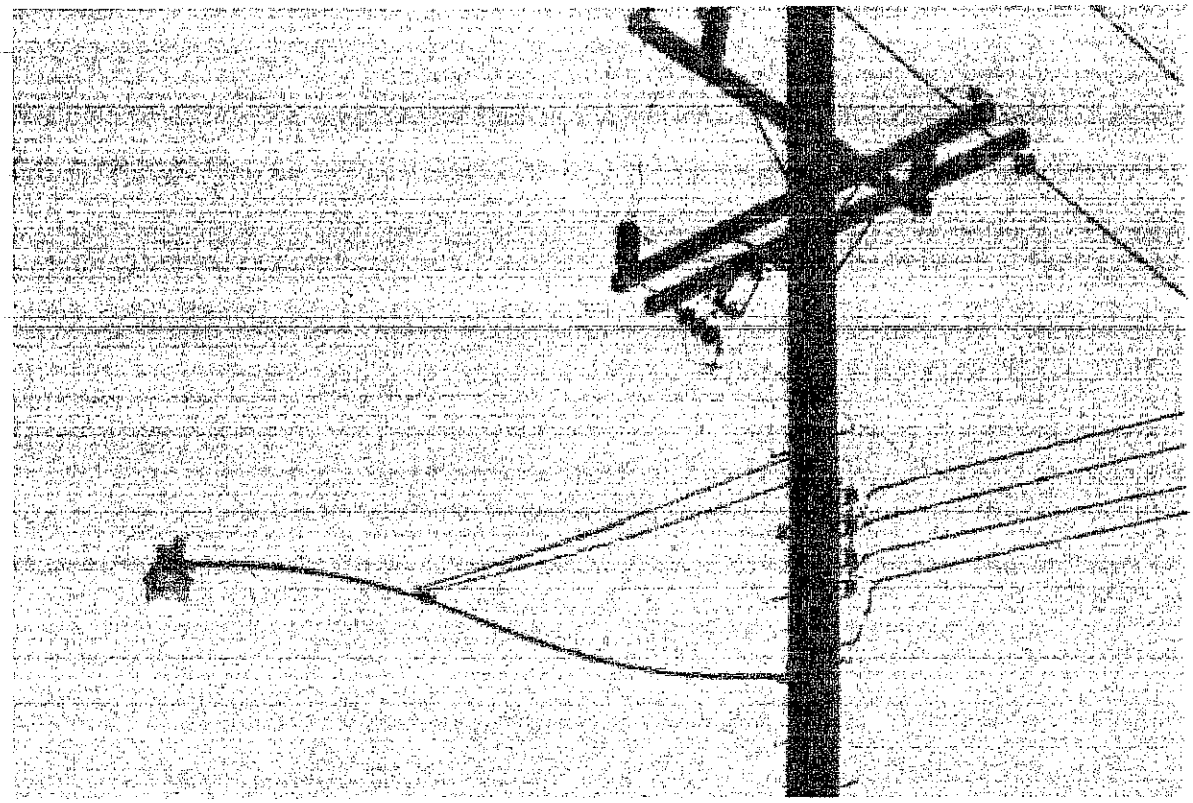


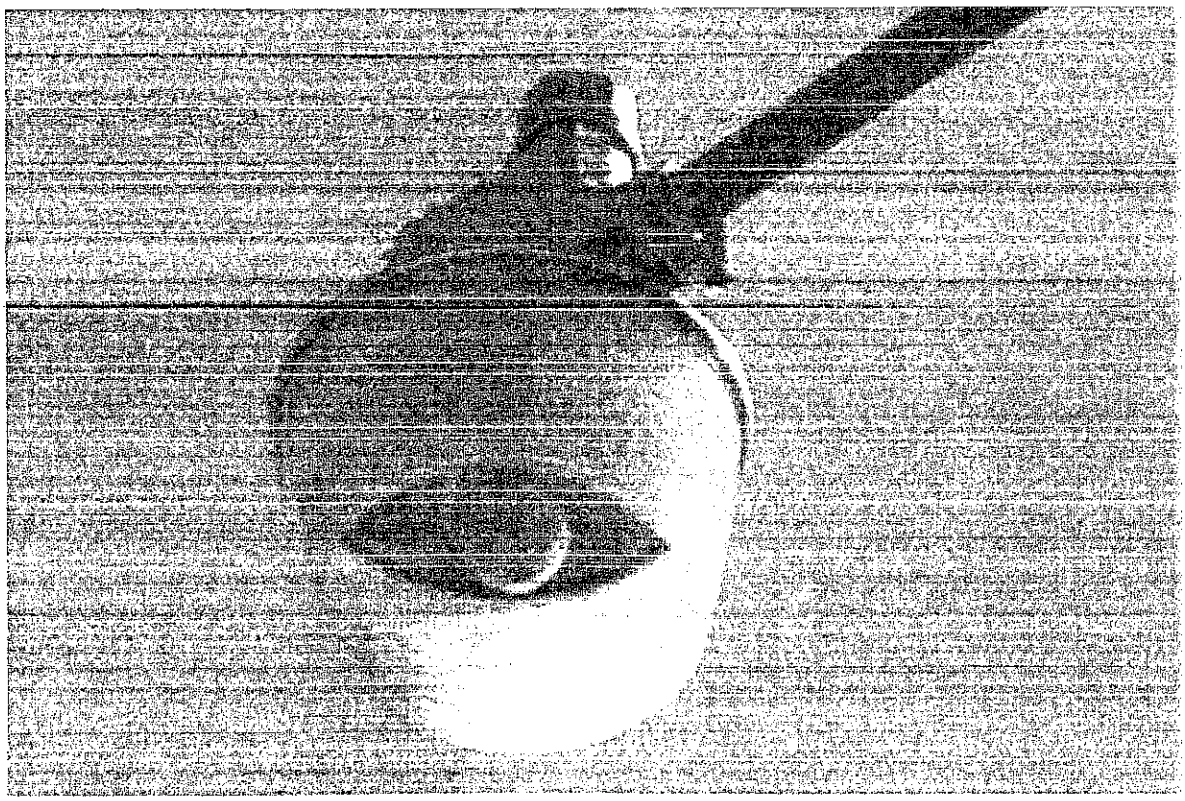
Pole #52 6th. Street & Luxor Avenue



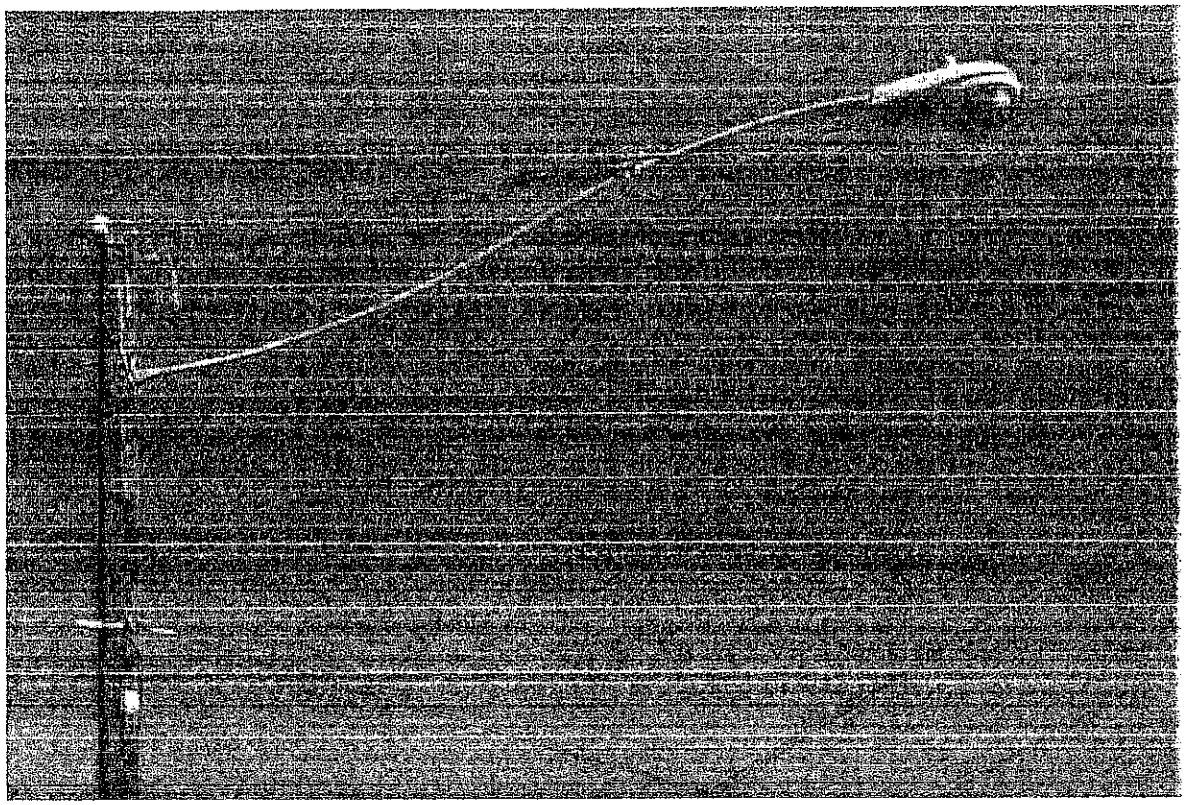


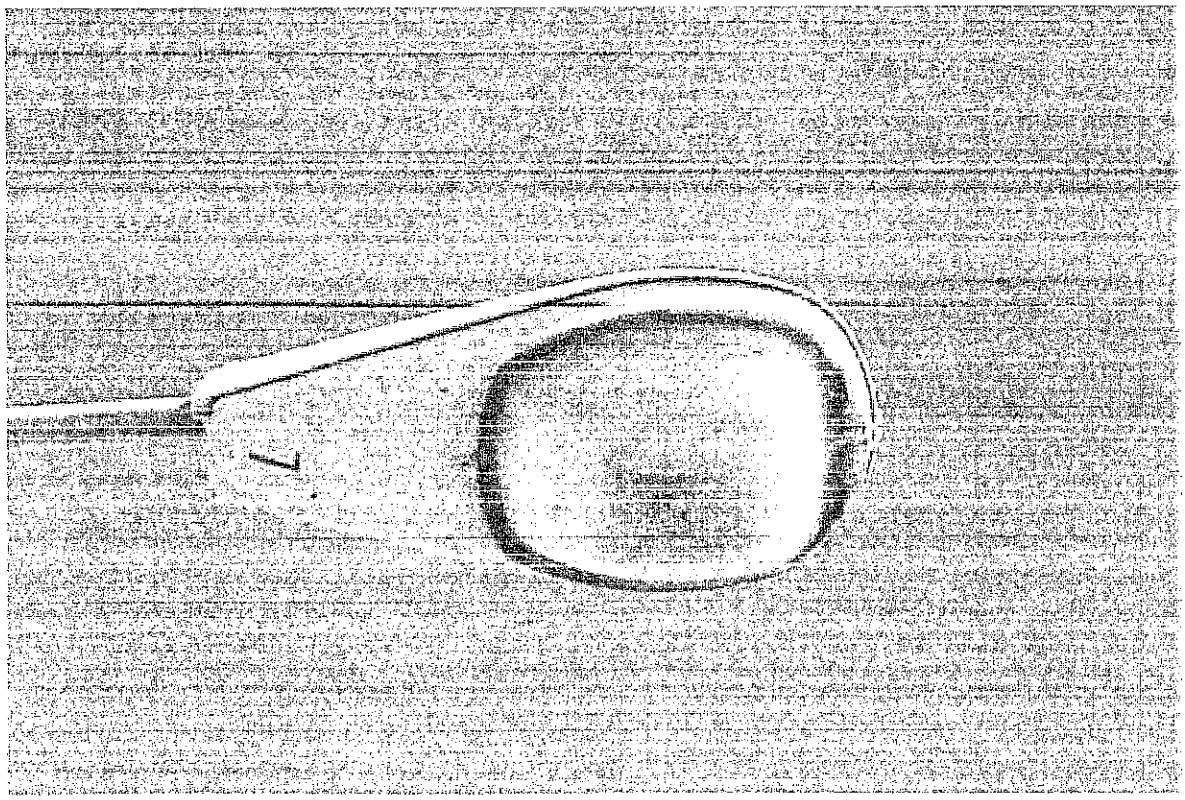
Pole #53 6th. Street & Memphis Avenue



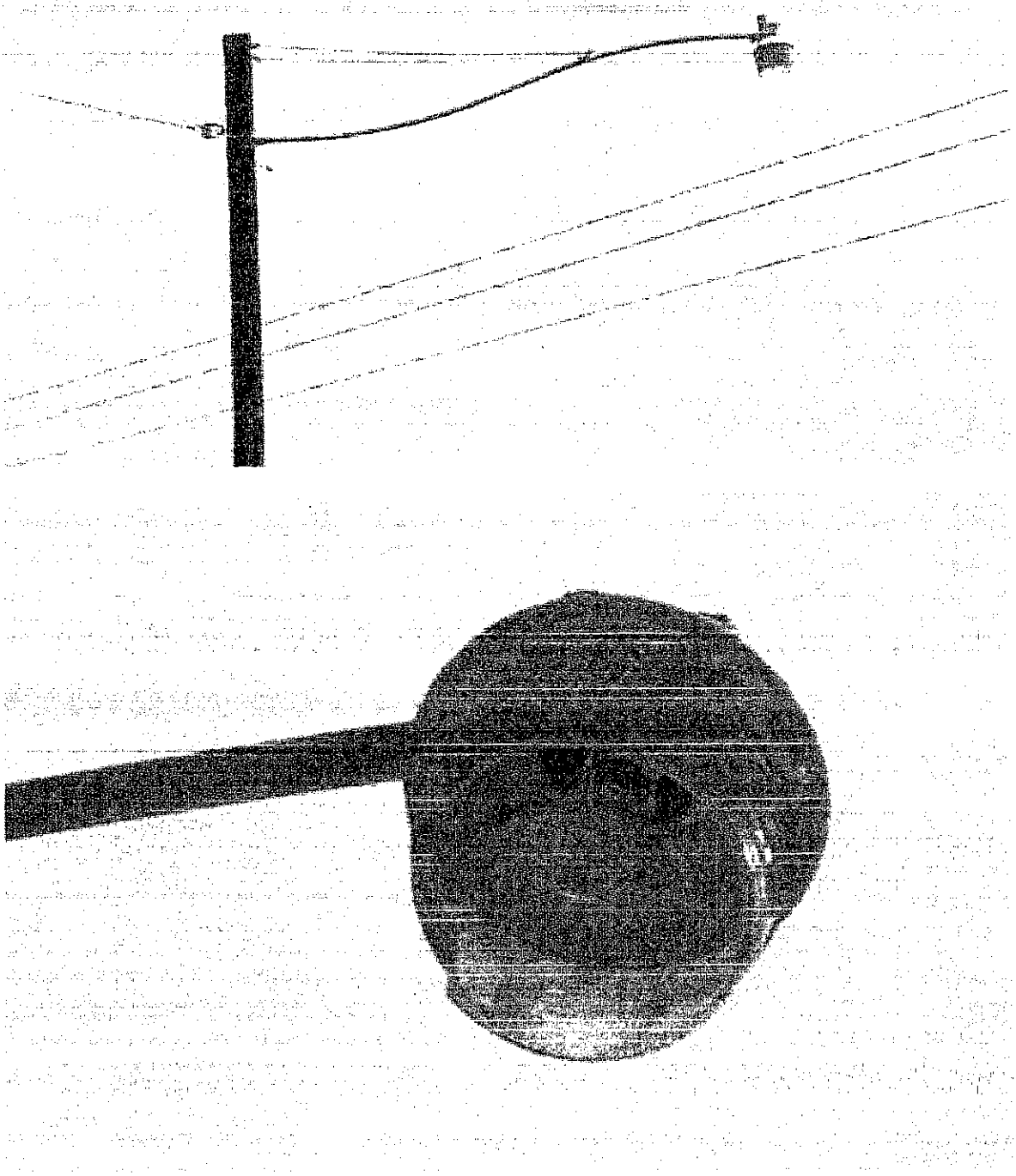


Pole #54 Noffsinger Street & Isis Avenue

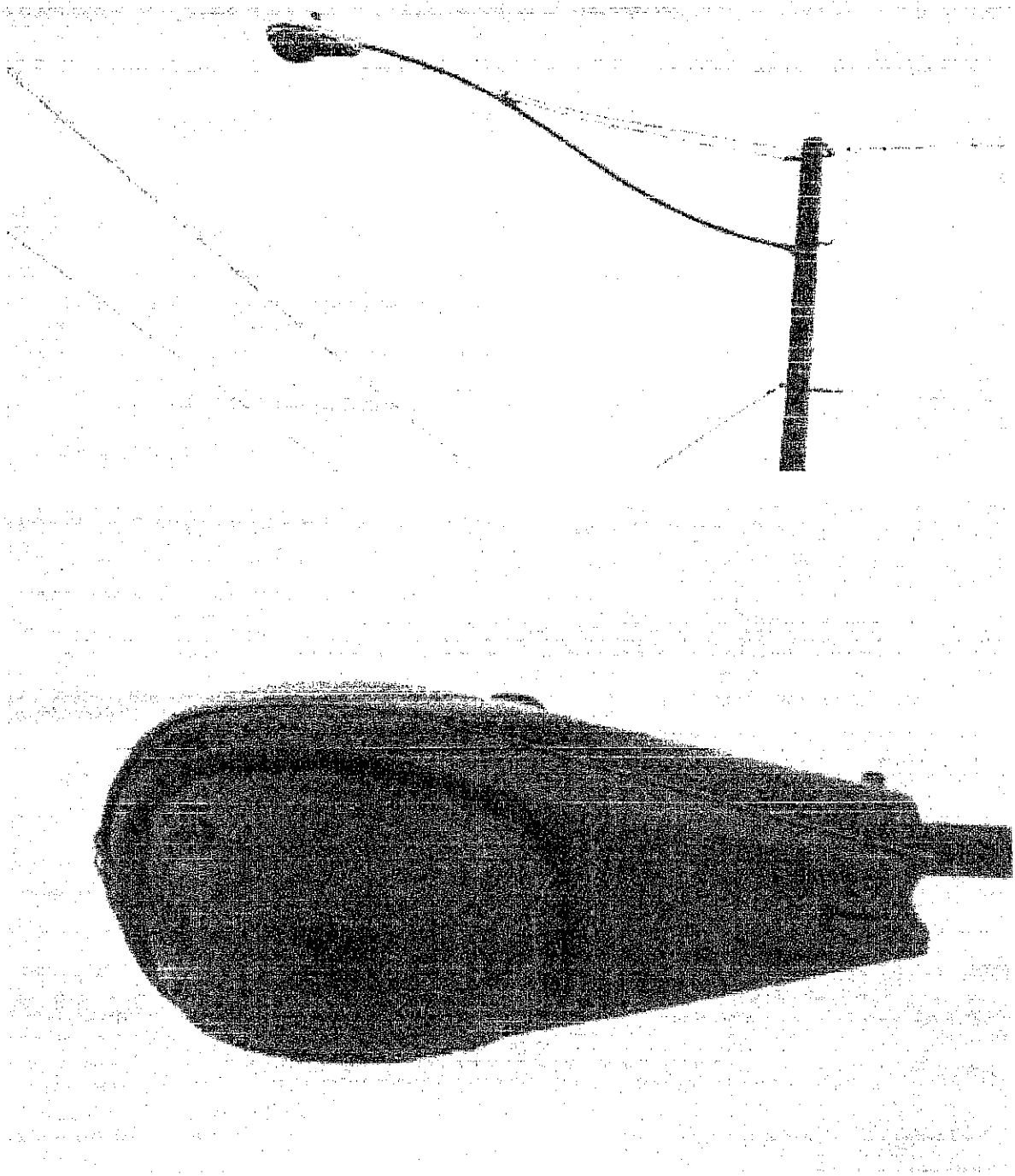




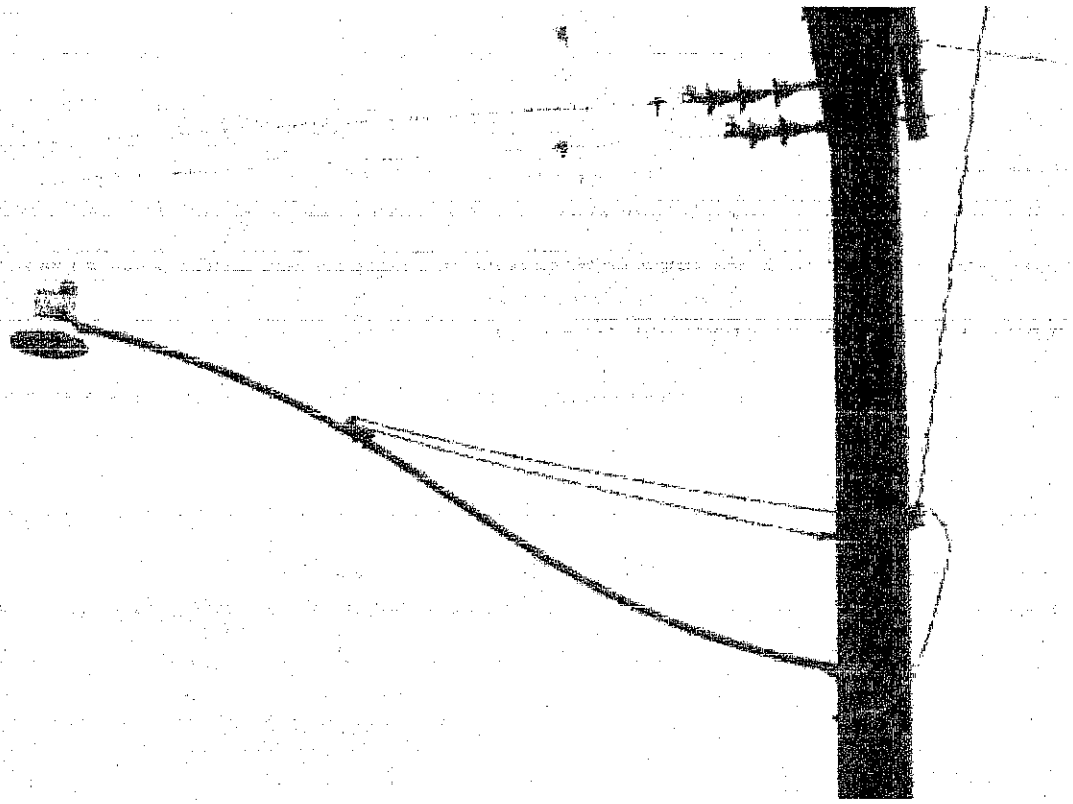
Pole #55 Noffsinger Street & International Avenue

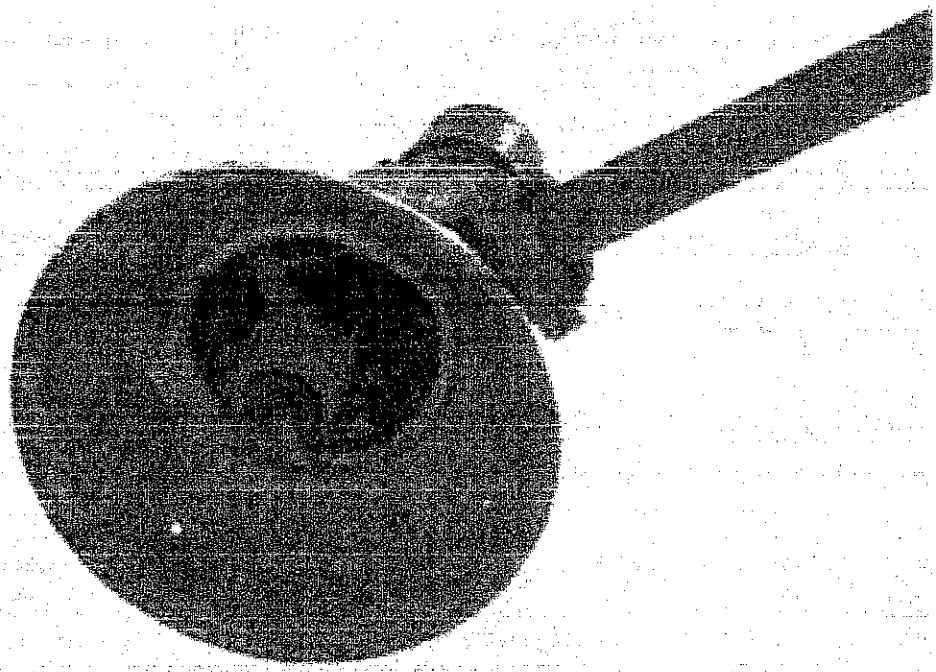


Pole #56 Noffsinger Street & Luxor Avenue

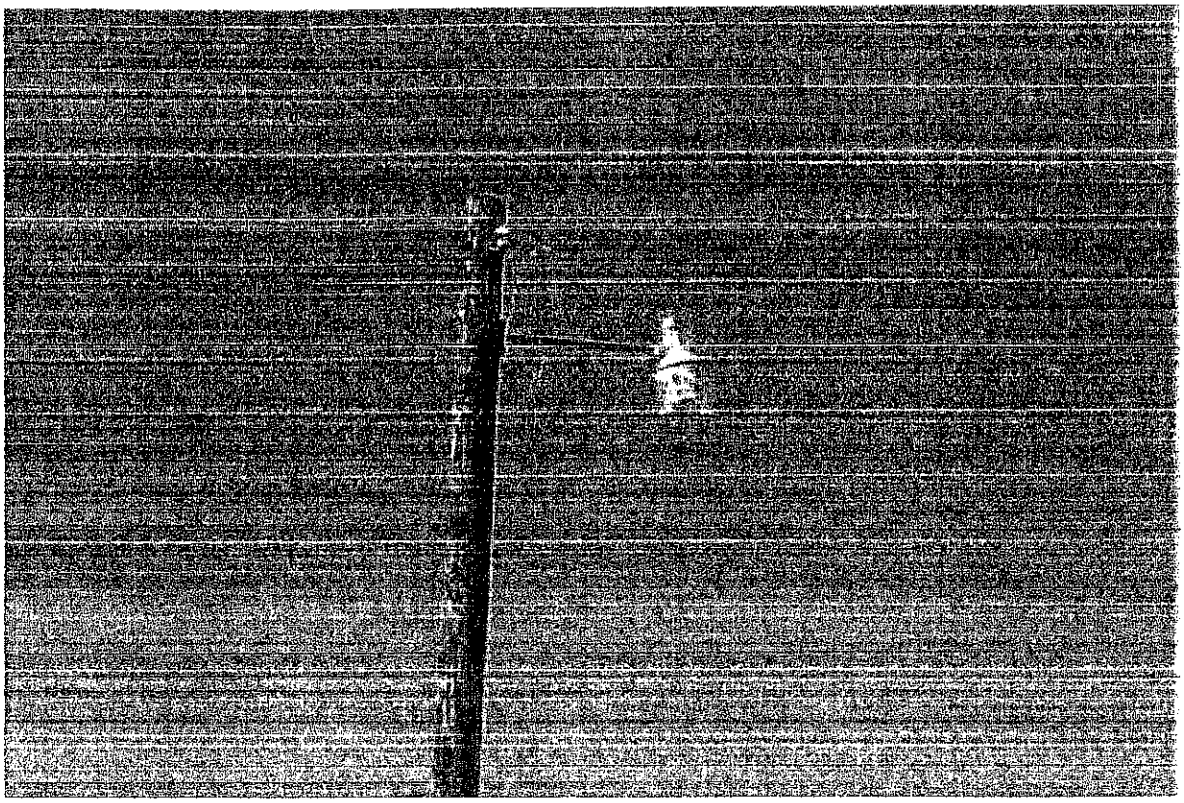


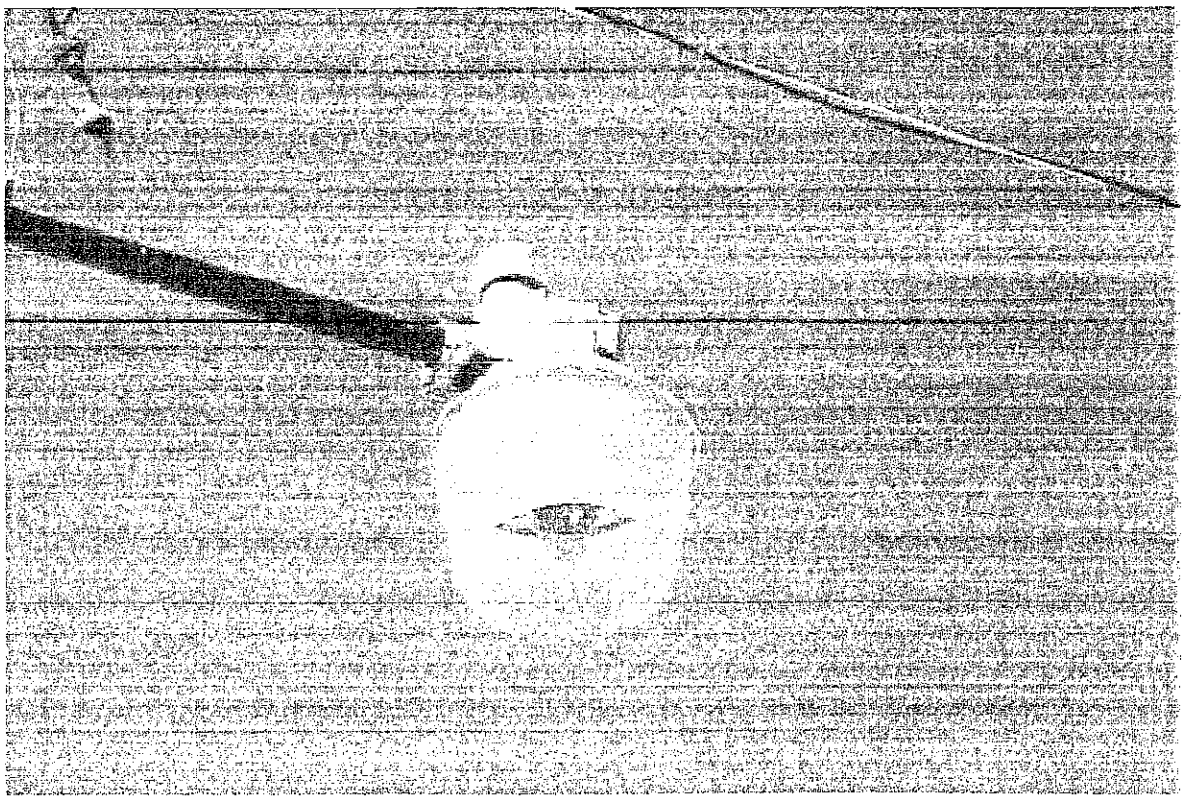
Pole #57 Noffsinger Street & Memphis





Pole #58 Noffsinger & Commercial Avenue

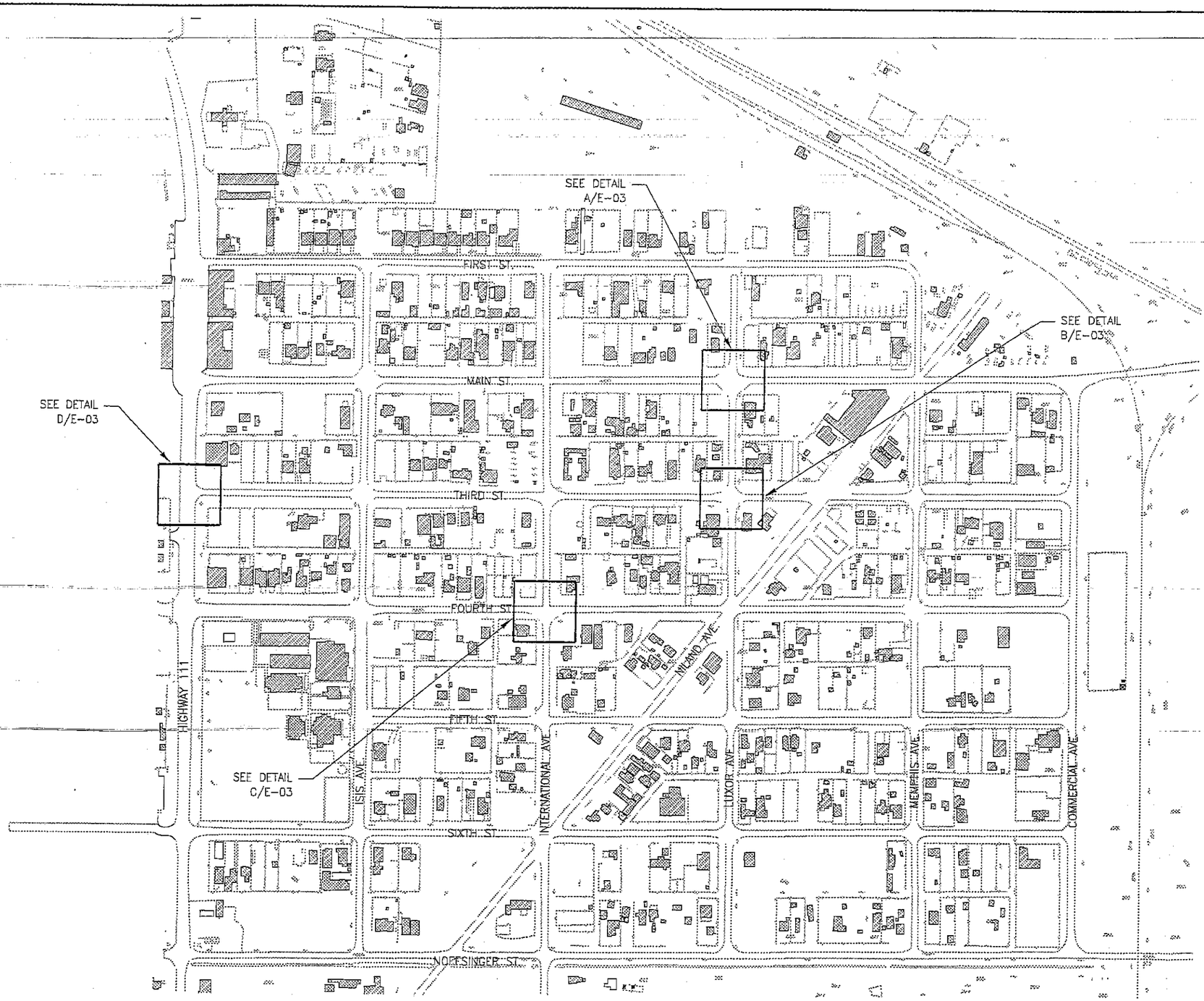




Pole #59 Highway 111 (Between 3rd. & 4th. Streets)

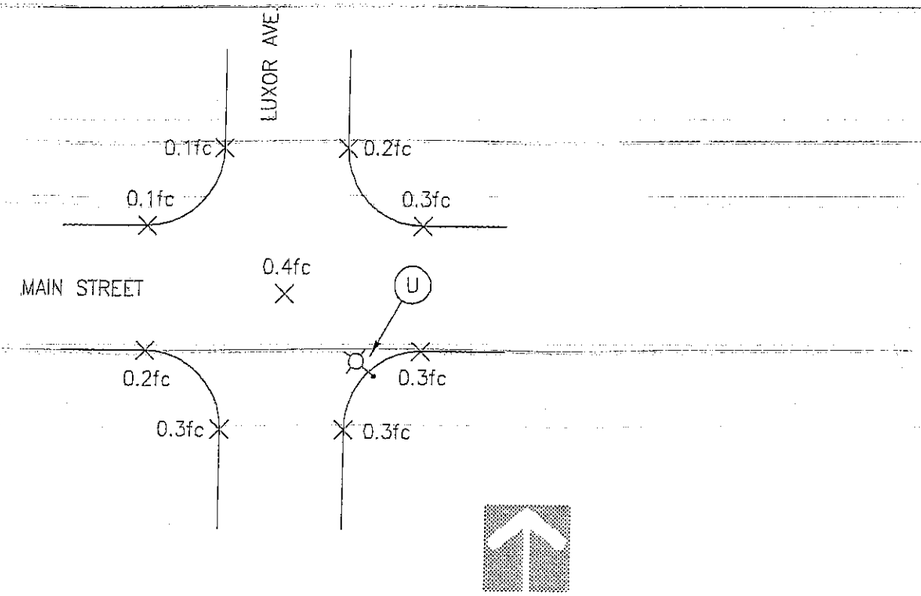
APPENDIX E

Existing Street Light Illumination Level
Sample Readings

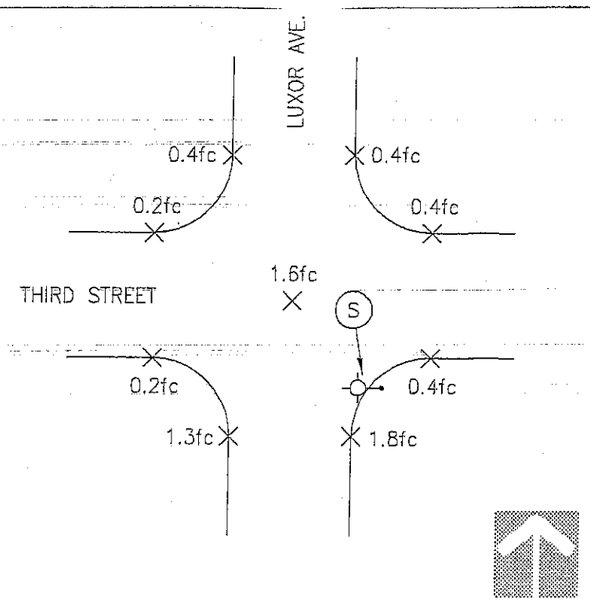


STREET LIGHT ILLUMINATION LEVEL READING LOCATION MAP

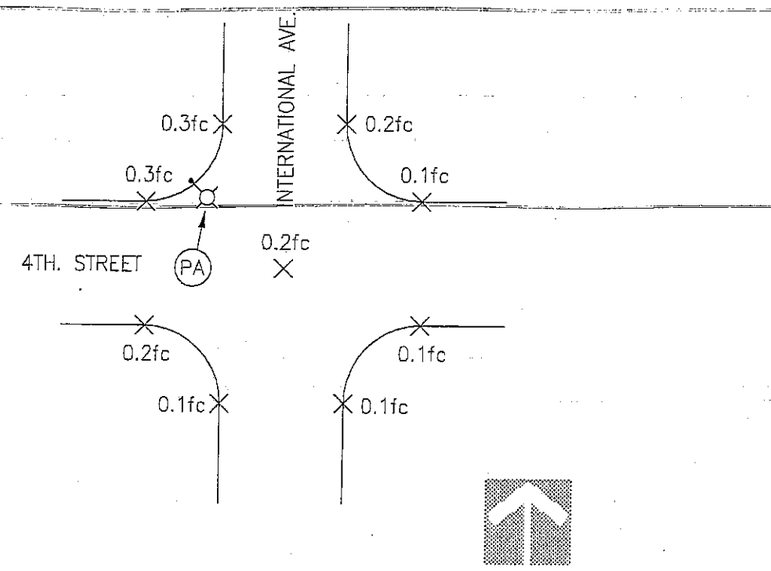
SCALE: 1" = 400'



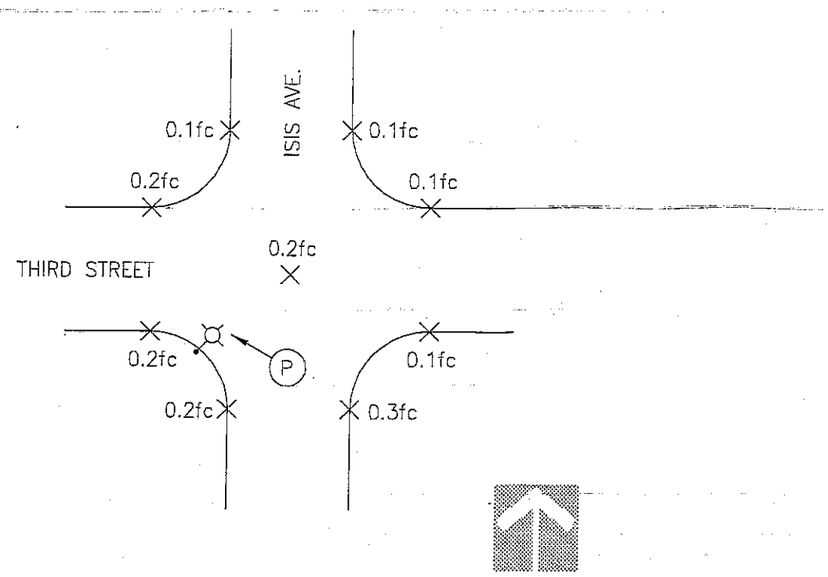
ILLUMINATION LEVEL READING AT MAIN & LUXOR
(TYP. LIGHTING FIXTURE TYPE "U" - 100 WATT HPS COBRAHEAD) (A)
NOT TO SCALE



ILLUMINATION LEVEL READING AT THIRD & LUXOR
(TYP. LIGHTING FIXTURE TYPE "S" - 250 WATT HPS COBRAHEAD) (B)
NOT TO SCALE



ILLUMINATION LEVEL READING AT 4TH & INTERNATIONAL
(TYP. LIGHTING FIXTURE TYPE "PA" - 70 WATT HPS ACORN) (C)
NOT TO SCALE



ILLUMINATION LEVEL READING AT 3RD & ISIS
(TYP. LIGHTING FIXTURE TYPE "P" - 70 WATT HPS COBRAHEAD) (D)
NOT TO SCALE

APPENDIX F

Lighting Calculations

LitePro 1.05 Point-By-Point Results

PROJECT: Niland Street Lighting Infrastructure/05-NA-02 AREA: 70W-AC-5 GRID: 70W-AC-5
PREPARED BY: G4 Engineering
JES ARE FC, SCALE: 1 IN= 20.0FT, HORZ GRID (U), HORZ CALC, Z= 0.0

Computed in accordance with IES recommendations

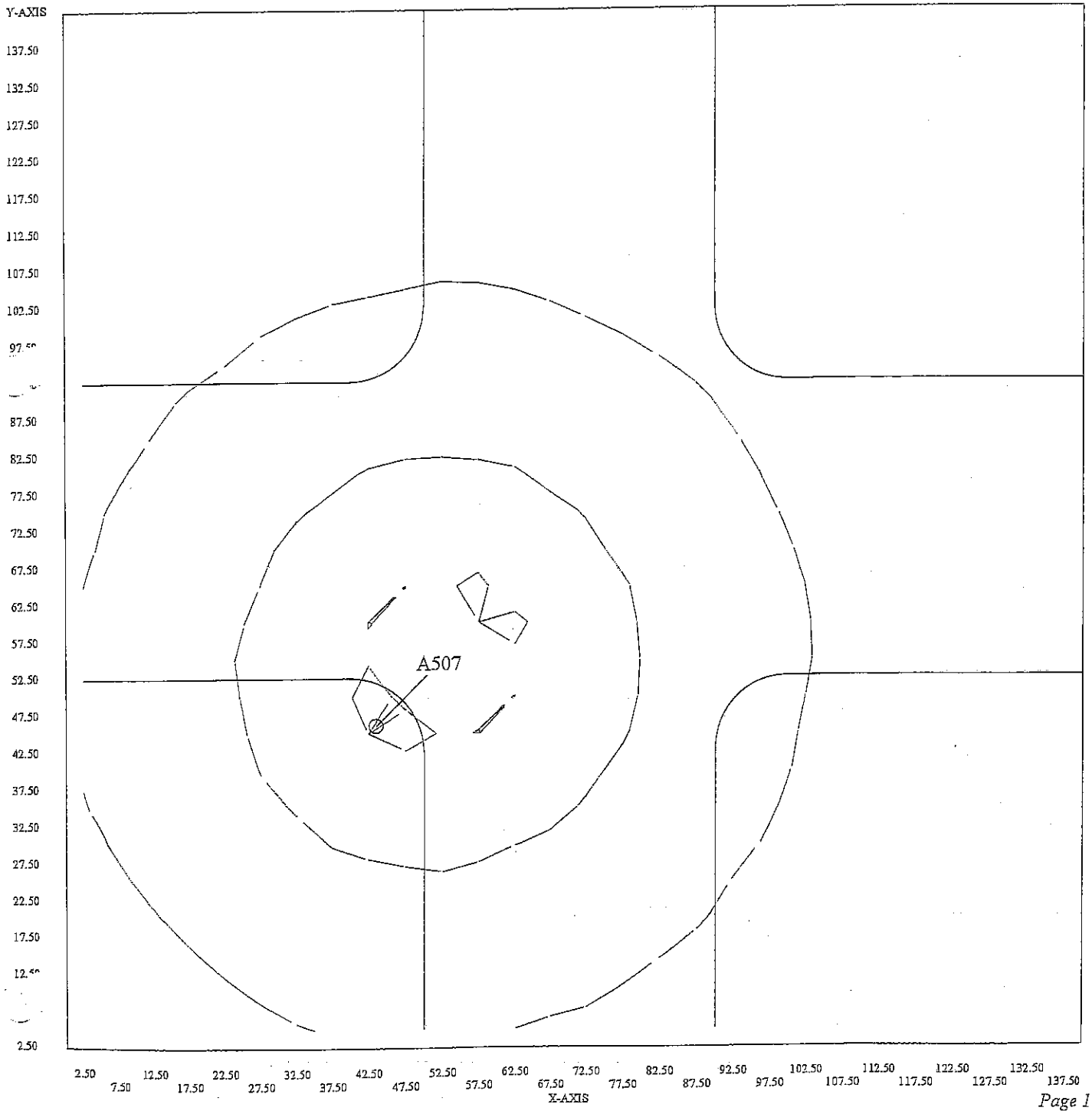
Statistics

GROUP	MIN	MAX	AVE	AVE/MIN	MAX/MIN
+	0.11	0.52	0.30	2.77	4.87
#	0.01	0.52	0.11	11.78	54.93

CONTOUR LEVELS: - = 3.00 -- = 1.00 .. = 0.50 -. = 0.30 -.. = 0.10

Typical 40' Residential Local Intersection.

Existing 70 watt HPS, non-cutoff, Type V distribution, acorn-head fixture mounted at 25' with 12' arm, 45 degree orientation.



LitePro 1.05 Point-By-Point Results

PROJECT: Niland Street Lighting Infrastructure/05-NA-02 AREA: 70W-AC-5 GRID: 70W-AC-5
PREPARED BY: G4 Engineering
UNITS ARE FC, SCALE: 1 IN= 20.0FT, HORZ GRID (U), HORZ CALC, Z= 0.0

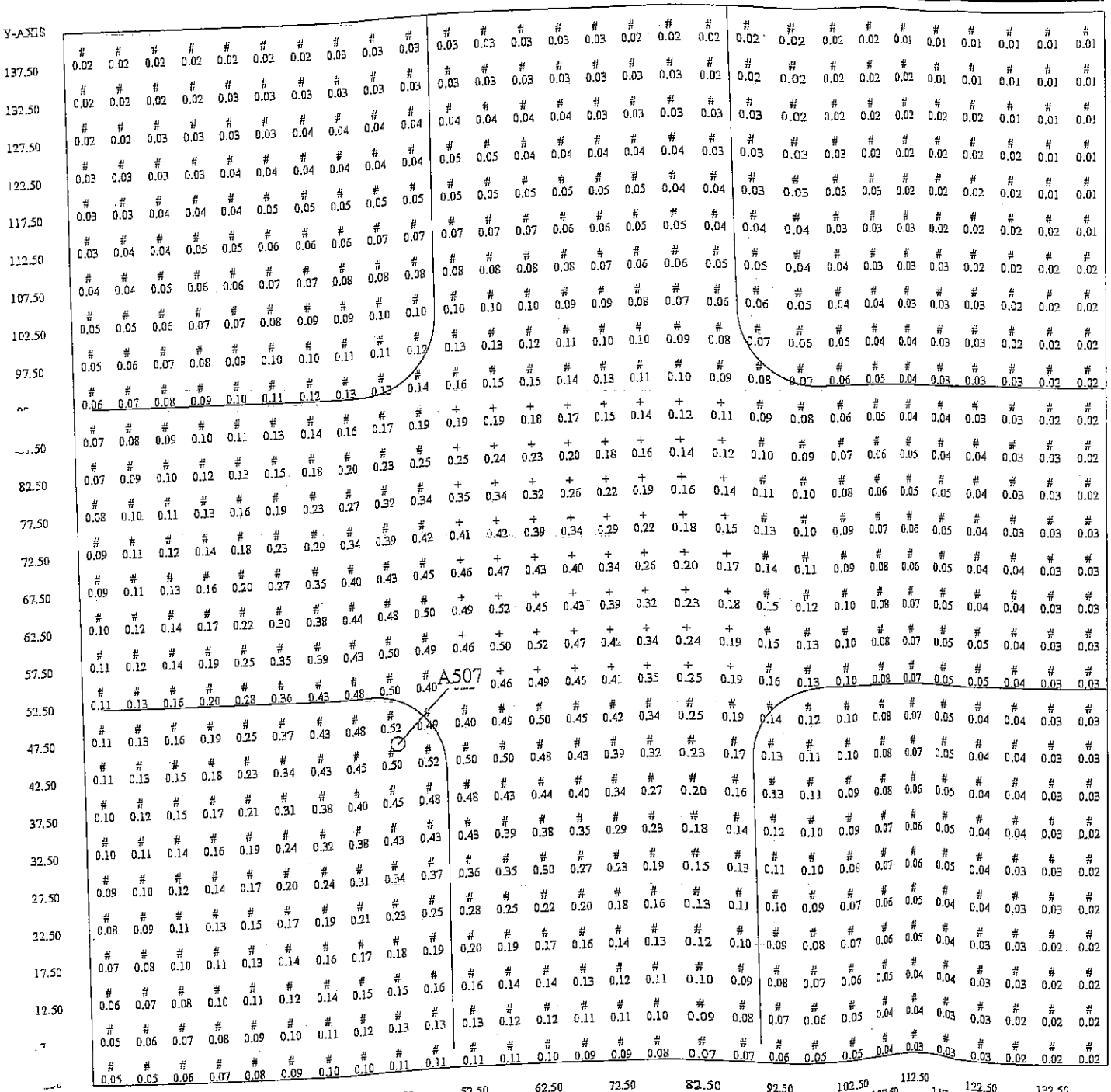
Computed in accordance with IES recommendations

Statistics

GROUP	MIN	MAX	AVE	AVE/MIN	MAX/MIN
+	0.11	0.52	0.30	2.77	4.87
#	0.01	0.52	0.11	11.78	54.93

Typical 40' Residential Local Intersection.

Existing 70 watt HPS, non-cutoff, Type V distribution, acorn-head fixture mounted at 25' with 12' arm, 45 degree orientation.



LitePro 1.05 Point-By-Point Results

PROJECT: Niland Street Lighting Infrastructure/05-NA-02 AREA: 70W-XCH-2 GRID: 70W-XCH-2
PREPARED BY: G4 Engineering
IES ARE EC, SCALE: 1 IN= 20.0FT, HORZ GRID (U), HORZ CALC, Z= 0.0

Computed in accordance with IES recommendations

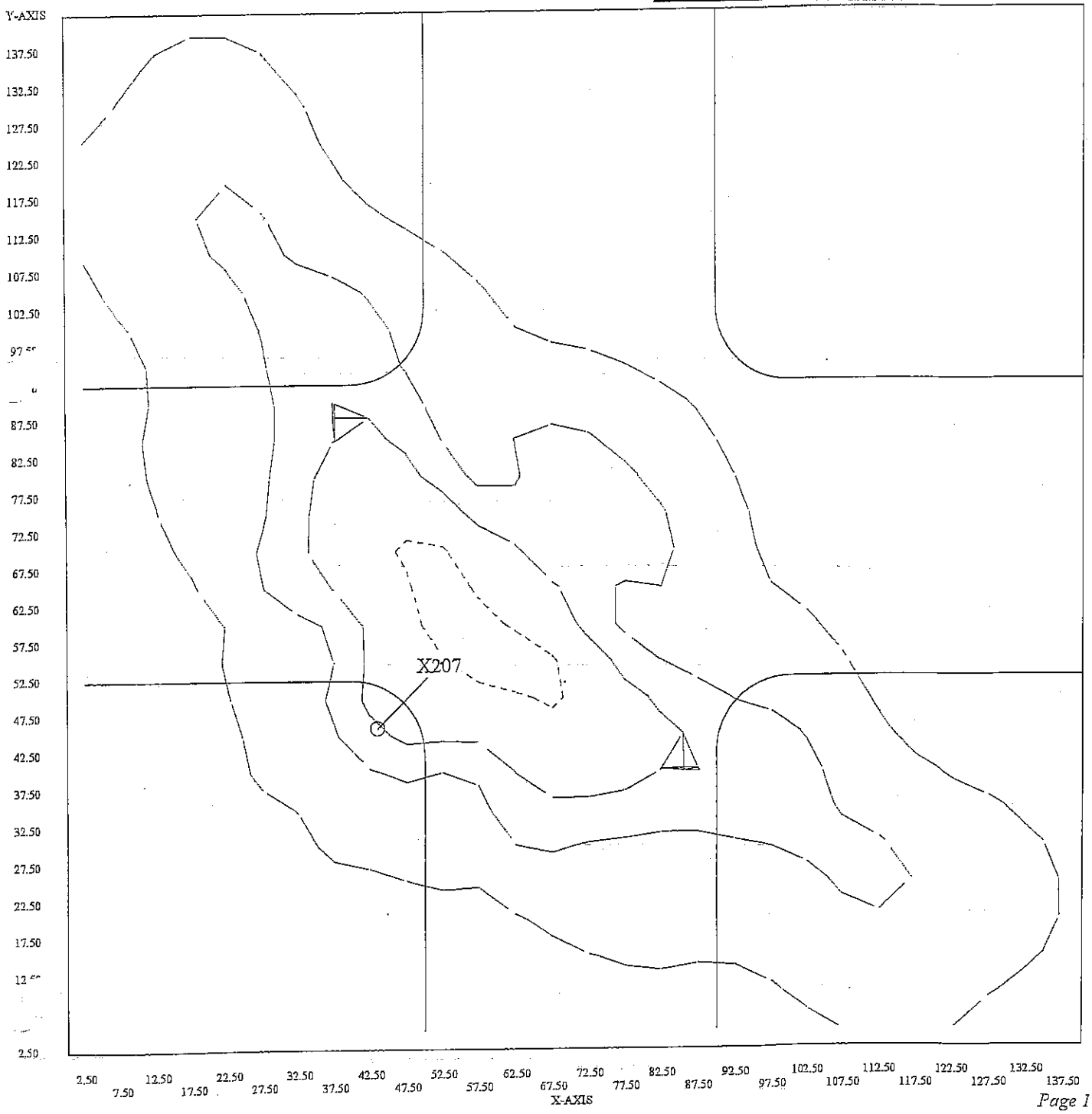
Statistics

GROUP	MIN	MAX	AVE	AVE/MIN	MAX/MIN
+	0.09	1.34	0.45	4.89	14.50
#	0.00	1.07	0.14	54.18	425.76

CONTOUR LEVELS: - = 3.00 -- = 1.00 .. = 0.50 -. = 0.30 -.. = 0.10

Typical 40' Residential Local Intersection.

Existing 70 watt HPS, non-cutoff, Type V distribution, acorn-head fixture mounted at 25' with 12' arm, 45 degree orientation.



LitePro 1.05 Point-By-Point Results

Apr 28, 2006

PROJECT: Niland Street Lighting Infrastructure/05-NA-02 AREA: 70W-XCH-2 GRID: 70W-XCH-2

PREPARED BY: G4 Engineering

JES ARE FC, SCALE: 1 IN= 20.0FT, HORZ GRID (U), HORZ CALC, Z= 0.0

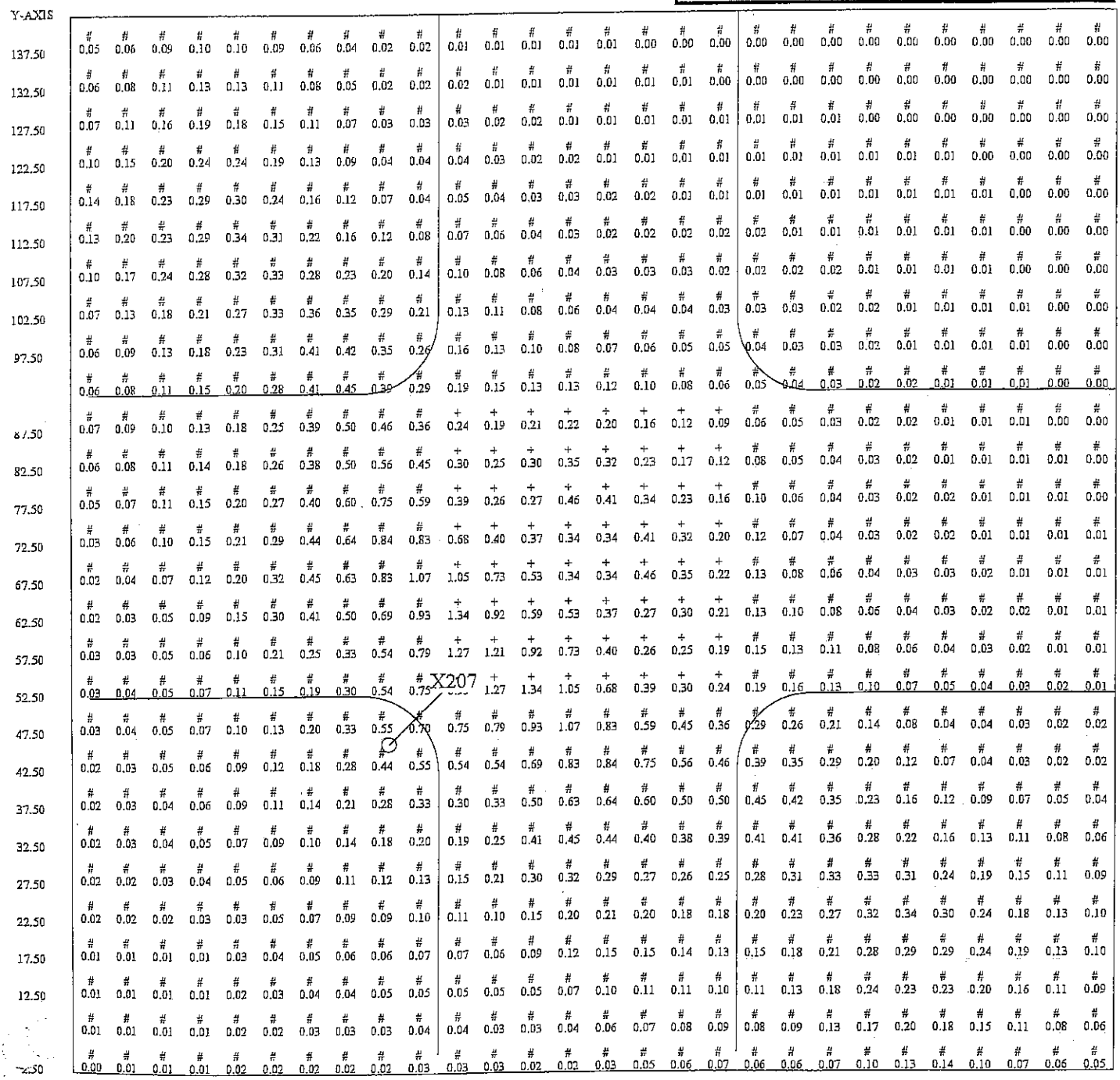
Computed in accordance with IES recommendations

Statistics

GROUP	MIN	MAX	AVE	AVE/MIN	MAX/MIN
+	0.09	1.34	0.45	4.89	14.50
#	0.00	1.07	0.14	54.18	425.76

Typical 40' Residential Local Intersection.

Existing 70 watt HPS, non-cutoff, Type V distribution, acorn-head fixture mounted at 25' with 12' arm, 45 degree orientation.



LitePro 1.05 Point-By-Point Results Apr 28, 2006

PROJECT: Niland Street Lighting Infrastructure/05-NA-02 AREA: 70W-CH-2 GRID: 70W-CH-2
PREPARED BY: G4 Engineering
ES ARE FC, SCALE: 1 IN= 20.0FT, HORZ GRID (U), HORZ CALC, Z= 0.0

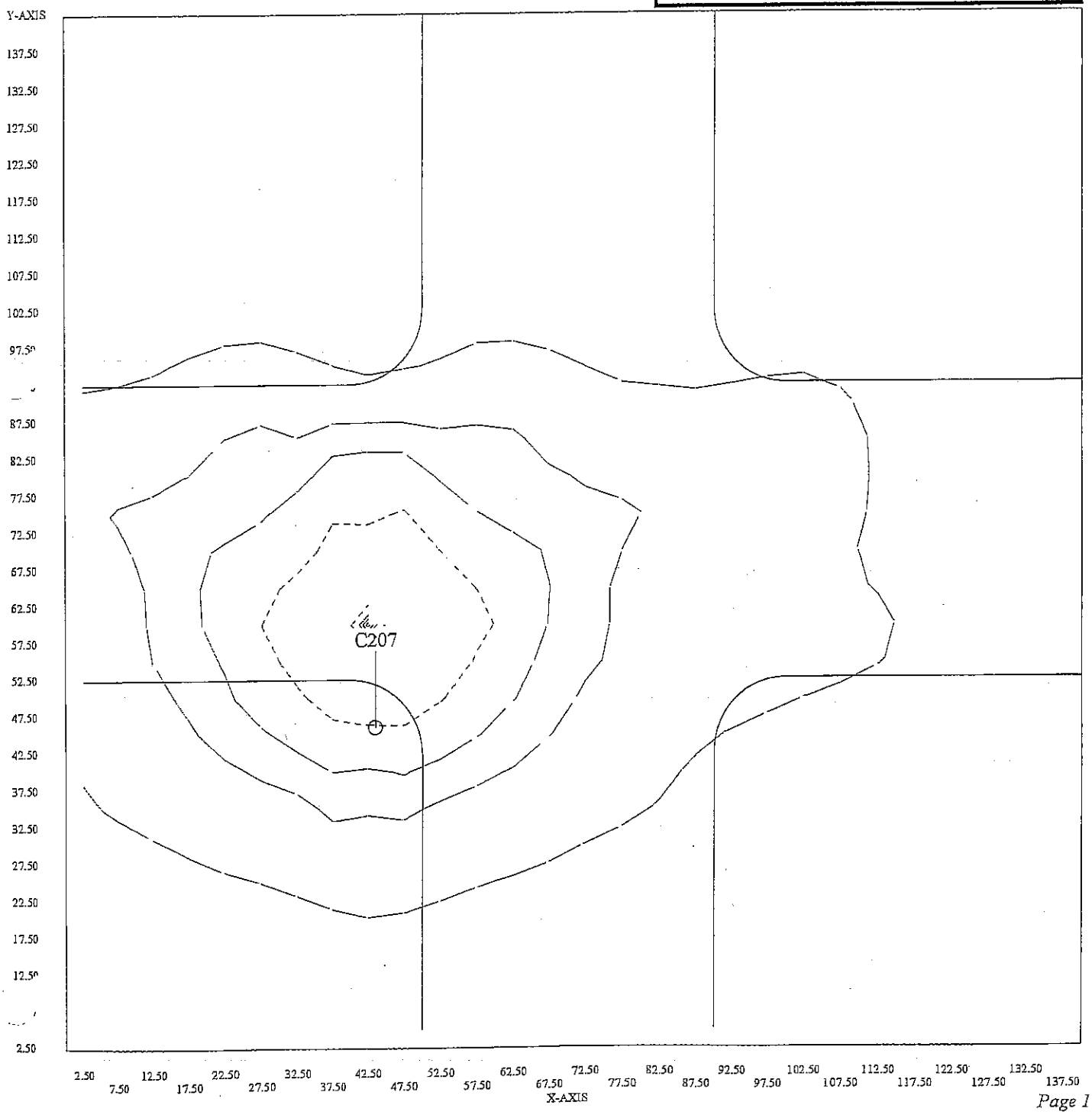
Computed in accordance with IES recommendations
Statistics

GROUP	MIN	MAX	AVE	AVE/MIN	MAX/MIN
+	0.12	1.78	0.40	3.46	15.45
#	0.00	2.11	0.13	N/A	N/A

CONTOUR LEVELS: - = 3.00 -- = 1.00 .. = 0.50 -. = 0.30 -.. = 0.10

Typical 40' Residential Local Intersection.

Existing 70 watt HPS, non-cutoff, Type V distribution, acorn-head fixture mounted at 25' with 12' arm, 45 degree orientation.



LitePro 1.05 Point-By-Point Results

PROJECT: Niland Street Lighting Infrastructure/05-NA-02 AREA: 70W-CH-2 GRID: 70W-CH-2
PREPARED BY: G4 Engineering
IES ARE FC, SCALE: 1 IN= 20.0FT, HORZ GRID (U), HORZ CALC, Z= 0.0

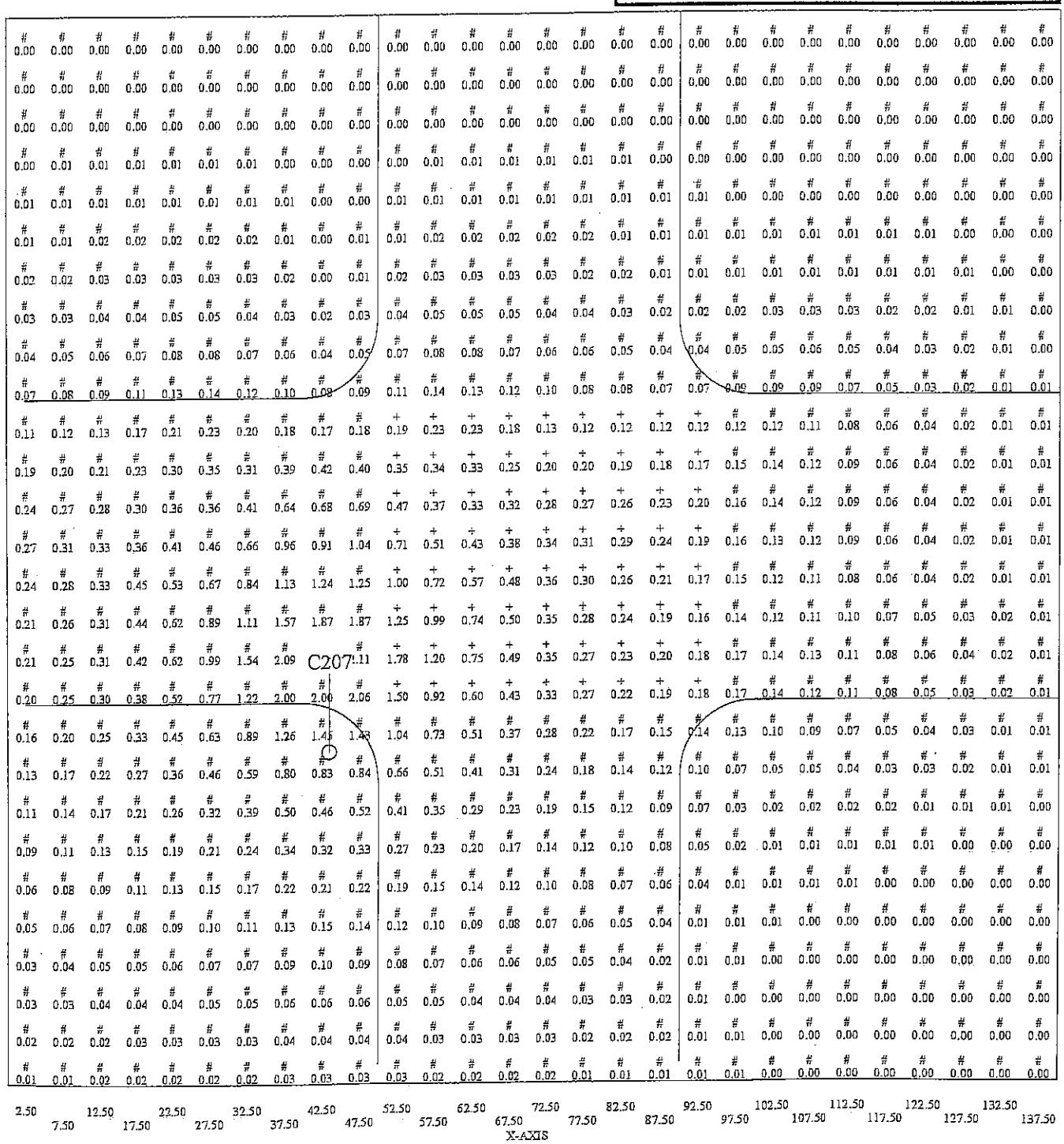
Computed in accordance with IES recommendations

Statistics

GROUP	MIN	MAX	AVE	AVE/MIN	MAX/MIN
+	0.12	1.78	0.40	3.46	15.45
#	0.00	2.11	0.13	N/A	N/A

Typical 40' Residential Local Intersection.

Existing 70 watt HPS, non-cutoff, Type V distribution, acorn-head fixture mounted at 25' with 12' arm, 45 degree orientation.



LitePro 1.05 Point-By-Point Results Apr 28, 2006

PROJECT: Niland Street Lighting Infrastructure/05-NA-02 AREA: 100W-CH-2 GRID: 100W-CH-2
PREPARED BY: G4 Engineering
JES ARE FC, SCALE: 1 IN= 20.0FT, HORZ GRID (U), HORZ CALC, Z= 0.0

Computed in accordance with IES recommendations

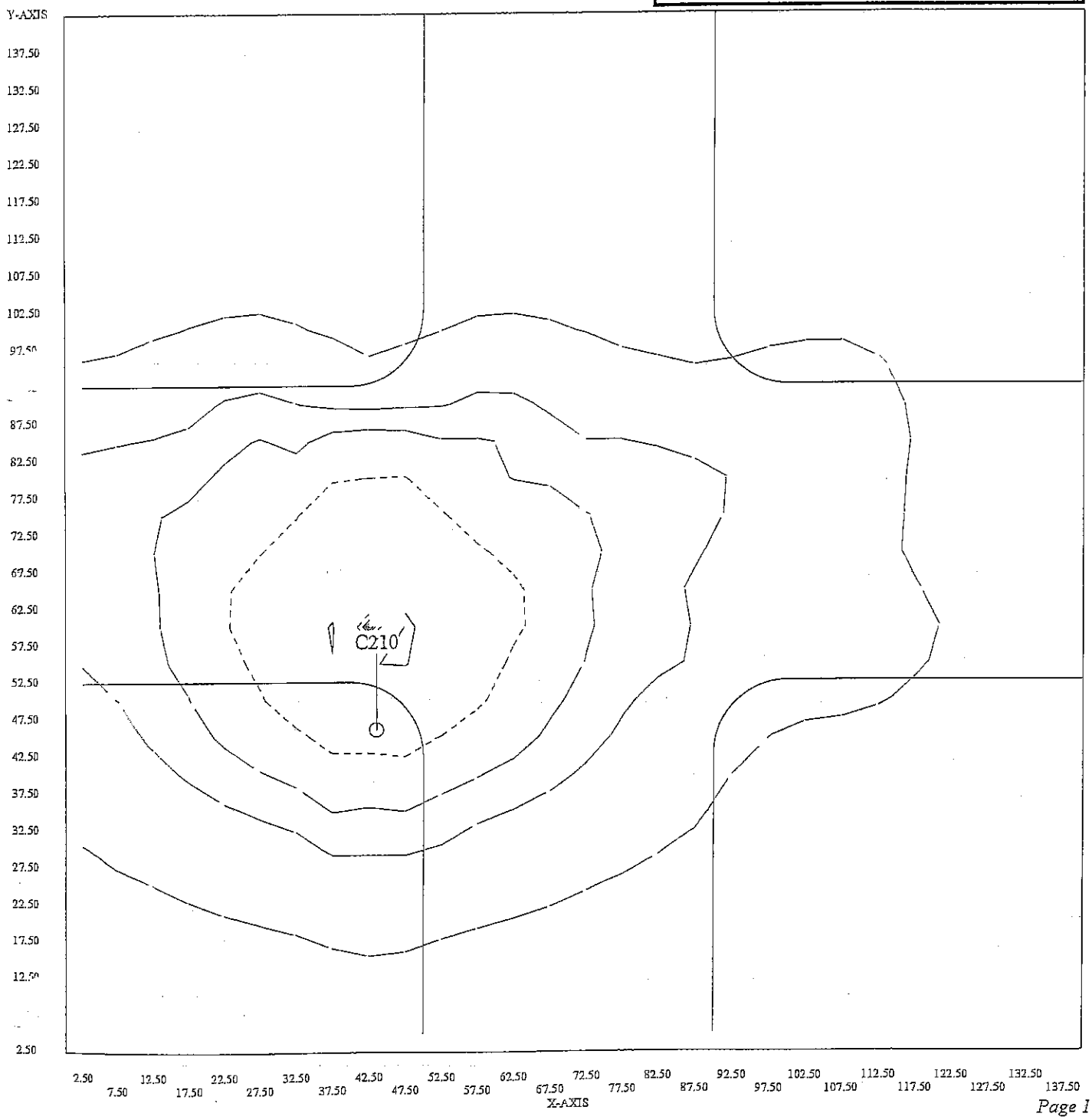
Statistics

GROUP	MIN	MAX	AVE	AVE/MIN	MAX/MIN
+	0.17	2.64	0.63	3.70	15.45
#	0.00	3.13	0.20	N/A	N/A

CONTOUR LEVELS: - = 3.00 -- = 1.00 .. = 0.50 -. = 0.30 -.. = 0.10

Typical 40' Residential Local Intersection.

Existing 70 watt HPS, non-cutoff, Type V distribution, acorn-head fixture mounted at 25' with 12' arm, 45 degree orientation.



LitePro 1.05 Point-By-Point Results

Apr 28, 2006

PROJECT: Niland Street Lighting Infrastructure/05-NA-02 AREA: 100W-CH-2 GRID: 100W-CH-2
PREPARED BY: G4 Engineering
IES ARE FC, SCALE: 1 IN= 20.0FT, HORZ GRID (U), HORZ CALC, Z= 0.0

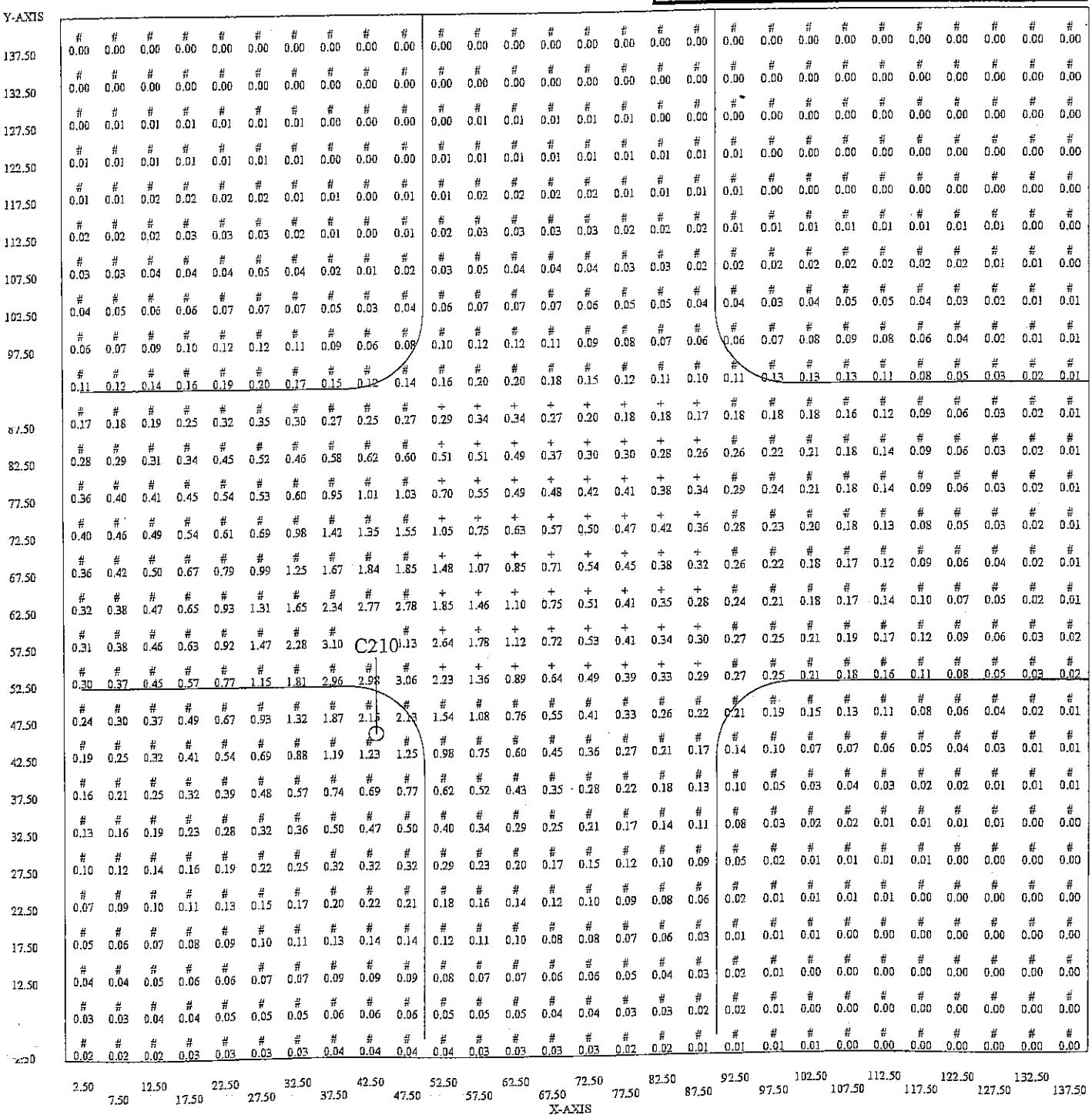
Computed in accordance with IES recommendations

Statistics

GROUP	MIN	MAX	AVE	AVE/MIN	MAX/MIN
+	0.17	2.64	0.63	3.70	15.45
#	0.00	3.13	0.20	N/A	N/A

Typical 40' Residential Local intersection.

Existing 70 watt HPS, non-cutoff, Type V distribution, acorn-head fixture mounted at 25' with 12' arm, 45 degree orientation.



APPENDIX G

Street Light Upgrades
Cost Opinion Data

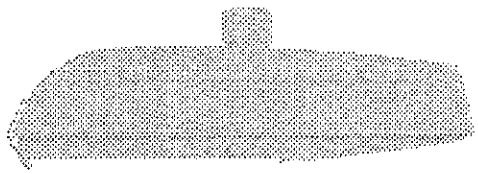
Niland CSA Proposed Upgrades to Existing Street Lighting System

Pole # (reference)	Location	Light Fixture Data							Pole Data		Upgrade Cost Opinion				Remarks
		Style	Lamp Type	Lamp Wattage	Distribution Type II, III, or V	Orientation Angle	Approx Mounting Height	Approx Arm Length	Type	Utilization	Pole	Arm	Fixture	Total	
1	Niland Avenue (North of Noffsinger Street)	Cobrahead	HPS	100	II	45	25	12	Wood	Street Light Only			$ 600	$ 600	Replace head
2	Niland Avenue (South of 6th Street)	Cobrahead	HPS	100	II	90	25	12	Wood	Street Light Only			$ 600	$ 600	Replace head
3	Niland Avenue (North of 6th Street)	Cobrahead	HPS	100	II	90	25	12	Wood	Street Light Only			$ 600	$ 600	Replace head
4	Niland Avenue (South of 5th Street)	Cobrahead	HPS	100	II	90	25	12	Wood	Utility & Street Light			$ 600	$ 600	Replace head
5	Niland Avenue (South of 4th Street)	Cobrahead	HPS	100	II	90	25	12	Wood	Utility & Street Light			$ 600	$ 600	Replace head
6	Niland Avenue (North of 4th Street)	Cobrahead	HPS	100	II	90	25	12	Wood	Utility & Street Light			$ 600	$ 600	Replace head
7	Niland Avenue (South of 3rd Street)	Cobrahead	HPS	100	II	90	25	12	Wood	Utility & Street Light			$ 600	$ 600	Replace head
8	Niland Avenue (North of 3rd Street)	Cobrahead	HPS	100	II	90	25	12	Wood	Utility & Street Light			$ 600	$ 600	Replace head
9	Niland Avenue (South of Main Street)	Cobrahead	HPS	100	II	90	25	12	Wood	Street Light Only			$ 600	$ 600	Replace head
10	Highway 111 (North of Noffsinger Street)	Cobrahead	HPS	250	II or III	90	25	12	Wood	Street Light Only					No upgrade
11	Highway 111 (North of 6th Street)	Cobrahead	HPS	250	II or III	90	25	12	Wood	Street Light Only					No upgrade
12	Highway 111 (Between 4th & 6th Streets)	Cobrahead	HPS	250	II or III	90	25	12	Wood	Utility & Street Light					No upgrade
13	Highway 111 (South of 4th Street)	Cobrahead	HPS	150	II or III	90	30	15	Steel	Street Light Only					No upgrade
14	Highway 111 (North of 4th Street)	Cobrahead	HPS	250	II or III	90	25	12	Wood	Street Light Only					No upgrade
15	Highway 111 (North of 3rd Street)	Cobrahead	HPS	250	II or III	90	25	12	Wood	Street Light Only					No upgrade
16	Highway 111 (Between Main & 3rd Streets)	Cobrahead	HPS	250	II or III	90	25	12	Wood	Street Light Only					No upgrade
17	Highway 111 (North of Main Street - West)	Cobrahead	HPS	250	II or III	90	30	15	Steel	Street Light Only					No upgrade
18	Highway 111 (North of Main Street - East)	Cobrahead	HPS	250	II or III	90	30	15	Steel	Street Light Only					No upgrade
19	Highway 111 (Between 1st & Main Streets - East)	Cobrahead	HPS	250	II or III	90	30	15	Steel	Street Light Only					No upgrade
20	Highway 111 (Between 1st & Main Streets - West)	Cobrahead	HPS	250	II or III	90	30	15	Steel	Street Light Only					No upgrade
21	Highway 111 (South of 1st Street)	Cobrahead	HPS	250	II or III	90	30	15	Steel	Street Light Only					No upgrade
22	1st Street & Isis Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Street Light Only		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
23	1st Street & International Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Street Light Only		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
24	1st Street (Between International & Luxor Avenues)	Cobrahead	HPS	70	II	90	25	12	Wood	Street Light Only			$ 600	$ 600	Replace head
25	1st Street & Luxor Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
26	1st Street & Memphis Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Street Light Only			$ 600	$ 600	Replace head
27	Main Street & Isis Avenue	Cobrahead	HPS	100	II	90	25	12	Wood	Street Light Only		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
28	Main Street (Between Isis & International Avenues)	Cobrahead	HPS	100	II	90	25	12	Wood	Utility & Street Light			$ 600	$ 600	Replace head
29	Main Street & International Avenue	Cobrahead	HPS	100	II	90	25	12	Wood	Street Light Only		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
30	Main Street & Luxor Avenue	Cobrahead	HPS	100	II	90	25	12	Wood	Street Light Only		$ 400	$ 600	$ 1,000	Re-orient arm, replace head

Niland CSA Proposed Upgrades to Existing Street Lighting System

Pole # (reference)	Location	Light Fixture Data							Pole Data		Upgrade Cost Opinion				Remarks
		Style	Lamp Type	Lamp Wattage	Distribution Type II, III, or V	Orientation Angle	Approx Mounting Height	Approx Arm Length	Type	Utilization	Pole	Arm	Fixture	Total	
31	Main Street & Memphis Avenue - North	Cobrahead	HPS	100	II	45	25	12	Wood	Utility & Street Light			$ 600	$ 600	Replace head
32	Main Street & Memphis Avenue - South	Cobrahead	HPS	100	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
33	Main Street & Commercial Avenue	Cobrahead	HPS	100	II	90	25	12	Wood	Street Light Only		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
34	3rd Street & Isis Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
35	3rd Street & International Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Street Light Only		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
36	3rd Street & Luxor Avenue - FIRE STATION	Cobrahead	HPS	250	II	90	25	12	Wood	Utility & Street Light			$ 600	$ 600	Replace head
37	3rd Street & Memphis Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
38	3rd Street & Commercial Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
39	4th Street (West of Highway 111)	Cobrahead	HPS	100	II	90	30	15	Steel	Street Light Only			$ 600	$ 600	Replace head
40	4th Street (West of Highway 111)	Cobrahead	HPS	70	II	90	30	15	Steel	Street Light Only			$ 600	$ 600	Replace head
41	4th Street (West of Highway 111)	Cobrahead	HPS	70	II	90	30	15	Steel	Street Light Only			$ 600	$ 600	Replace head
42	4th Street & Isis Avenue - SCHOOL	Cobrahead	HPS	250	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
43	4th Street & International Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Street Light Only		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
44	4th Street & Memphis Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Street Light Only		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
45	4th Street & Commercial Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light			$ 600	$ 600	Replace head
46	5th Street & Isis Avenue - SCHOOL	Cobrahead	HPS	250	II	90	25	12	Wood	Utility & Street Light			$ 600	$ 600	Replace head
47	5th Street & International Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
48	5th Street & Luxor Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
49	5th Street & Memphis Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
50	5th Street & Commercial Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
51	6th Street & Isis Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
52	6th Street & Luxor Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
53	6th Street & Memphis Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
54	Noffsinger Street & Isis Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
55	Noffsinger Street & International Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
56	Noffsinger Street & Luxor Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
57	Noffsinger Street & Memphis	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
58	Noffsinger Street & Commercial Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Utility & Street Light		$ 400	$ 600	$ 1,000	Re-orient arm, replace head
59	Highway 111 (Between 3rd & 4th Streets)	Acorn	HPS	70	V	90	25	3	Wood	Street Light Only				$	No upgrade
60	6th Street & Commercial Avenue	Cobrahead	HPS	70	II	90	25	12	Wood	Street Light Only	$ 1,800	$ 400	$ 600	$ 2,800	New pole and head
														$ 41,200	

M-250A2 POWR/DOOR® LUMINAIRE WITH CUTOFF OPTICS



APPLICATIONS

- For residential streets, access roads, parking lots where light trespass could be a problem

SPECIFICATION FEATURES

- Powr/Module ballast assembly
- Filtered optics
- Universal two-bolt slipfitter
- Die-cast aluminum housing with electrocoat gray paint finish
- Adjustable mogul base socket (street side) – E39 standard
- ALGLAS® finish on reflector
- No-tool PE receptacle
- Plug-in ignitor
- True 90° cutoff—no light above 90° (meets RP8-2000 for full cutoff)
- External stainless steel ball latch
- Ⓤ/Ⓤ listed for wet location available as an option
- Plastic pest guard standard (not required for 2 in. pipe)

ORDERING NUMBER LOGIC

M2AC	15	S	1	N	2	C	MC3	1	F
PRODUCT TYPE	WATTAGE	LIGHT SOURCE	VOLTAGE	BALLAST TYPE	PE FUNCTION	LENS TYPE	IES DISTRIBUTION TYPE	FILTER	OPTIONS
XXXX	XX	X	X	X	X	X	XX	X	XX
M2AC = M-250A2 with Cutoff Optics	05 = 50 07 = 70 10 = 100 15 = 150 (55V) 17 = 175 20 = 200 21 = 100/150 (55V) 25 = 250 71 = 70/100 NOTE: Dual wattage connected for lower wattage	S = HPS M = MH C = Merc Standard: Lamp not included.	60Hz 0 = 120/208/240/277 Multivolt 1 = 120 2 = 208 3 = 240 4 = 277 5 = 480 7 = 120/240 8 = 240V Ballast 120V PE Receptacle not reconnectable D = 347 F = 120/347 T = 220 50Hz 6 = 220 R = 230 Y = 240 NOTE: Dual voltage connected for lower voltage	See Ballast Selection Table A = Autoreg C = Merc-Reg G = Mag-Reg with Grounded Socket Shell H = HPF Reactor or Lag M = Mag-Reg N = NPF Reactor or Lag P = CWI with Grounded Socket Shell S = Series (in Top Housing)	1 = None 2 = PE Receptacle NOTE: Receptacle connected same voltage as unit except as noted. Order PE Control separately.	See Photometric Selection Table A = Acrylic Clear Globe G = Glass L = Polycarbonate Clear Globe S = Sag Glass Clear Globe NOTE: 150 watt Maximum with Acrylic or Polycarbonate Clear Globes.	See Photometric Selection Table S = Short M = Medium C = Cutoff 2 = Type II 3 = Type III	1 = Fiber gasket 2 = Charcoal with elastomer gasket	F = Fusing (Not available with multivolt or dual voltage) J = Line Surge Protector, Expulsion Type U = Ⓤ/Ⓤ listed (all HPS and up to 175W MH) with glass or polycarbonate

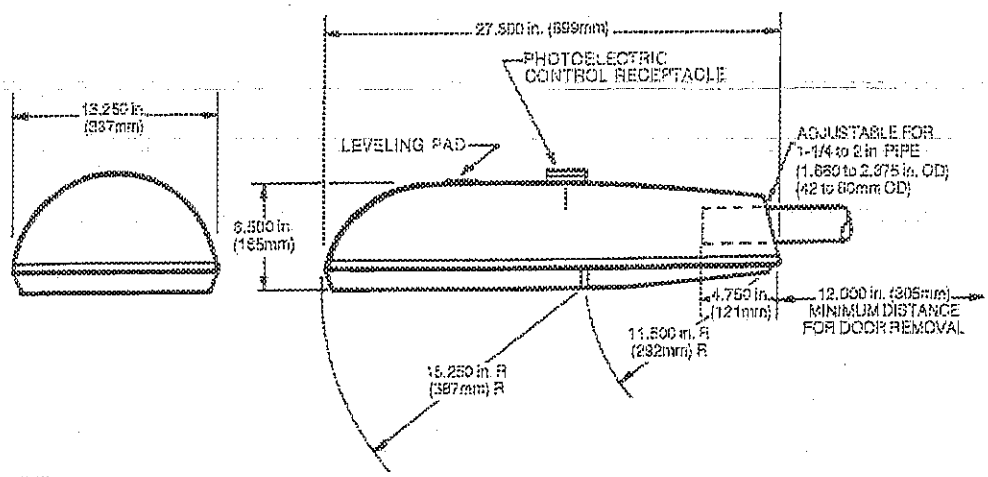
PHOTOMETRIC SELECTION TABLE

Wattage	Light Source	Lens Type	IES Distribution Type Photometric Curve Number (Socket Position) All light sources are clear unless otherwise indicated. MC2	MC3	SC2
50, 70, 100, 150 (55v)	HPS	Clear globe, acrylic or Polycarbonate	N/A	177287 (1A)	N/A
50	HPS	Clear globe, glass	452543 (2CL)	452544 (1CL)	N/A
70	HPS	Clear globe, glass	452545 (3CL)	452546 (1CL)	N/A
100	HPS	Clear globe, glass	452547(2CL)	452548 (1CL)	N/A
150 (55v)	HPS	Clear globe, glass	452549 (2CL)	452550 (1CL)	N/A
50, 70, 100, 150 (55v)	HPS	Glass, flat	177286 (2CL)	177285 (1CL)	N/A
200	HPS	Clear globe, glass	452551 (2CH)	452552 (2DL)	N/A
250	HPS	Clear globe, glass	N/A	452553 (2CH)	N/A
200, 250	HPS	Glass, flat	177303 (2DH)	177304 (1DH)	N/A
175, 250	MH	Glass, flat	N/A	N/A	177299(1B)
100, 175, 250	Merc	Glass, flat	N/A	N/A	177299(1B)

NOTE: N/A=Not Available
*Meets RP8-2000 for full cutoff with flat glass

M-250A2 POWR/DOOR® LUMINAIRE WITH CUTOFF OPTICS

FIXTURE DIMENSIONS



DATA		
Approximate Net Weight	20-30 lbs	9-14 kgs
Effective Projected Area		
Flat Glass Unit	0.9 sq. ft. max	0.08 sq. M max
Clear Acrylic Globe Unit	1.0 sq. ft. max	0.09 sq. M max
Suggested Mounting Height	20-40 ft.	6-12 M

REFERENCES

See Page R-48 for start of Accessories.
See Page R-52 for Explanation of Options and Other Terms Used.
See Pole and Bracket Section Page P-2 for pole selection.

BALLAST SELECTION TABLE

		Ballast Type/Voltage												
		60Hz										50Hz		
Wattage	Light Source	Multi-volt	120	208	240	277	480	120X240	347,120X347	240/120 PE R	220	220	230	240
50	HPS	H,N	H,N	H,N	H,N	H,N	H,N	H,N	H,N	H,N	N/A	N/A	N/A	N/A
70,100,150(55V)	HPS	A,H,N	A,G,H,M,N,P	A,G,H,M,N	A,G,H,M,N,P	A,G,H,M,N	G,M	G,M,P	G*,H,M*,N	G,M,N	N/A	H,M,N	H	M††
100/150(55V)	HPS	N/A	H,N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
200	HPS	A,P	A,H,N,P	A,H,N,P	A,H,N,P	A,P	A	A,P	N/A	A,H,N	N/A	N/A	N/A	N/A
250	HPS	A,P	A,H,N,P	A,H,N,P	A,H,N,P	A,P	A,P	A,P	A,P	A,H,N	H	A,H,N	H	A,H
175,250	MH	A	A,P	A,P	A,P	A,P	A,P**	A,P	A,P	A	N/A	A	N/A	N/A
100,175,250	Merc	C	C,N	C	C,H,N	C	C	C	N/A	C,H,N	N/A	N/A	N/A	N/A

NOTE: N/A=Not Available
††150(55V)only
*Not available in 120X347 volt
**Not available in 175W

M2AC — SUGGESTED CATALOG ORDERING NUMBERS

Catalog Number	Wattage	Light Source	Voltage (60Hz)	Ballast Type	Refractor Type	Photometric Distribution
M2AC10S1N2GMC21	100	HPS	120	NPF Reactor	Glass	MC2
M2AC15S1N2GMC21	150	HPS	120	NPF Reactor	Glass	MC2
M2AC25S0A2GMC31	250	HPS	Multivolt	Auto-Regulator	Glass	MC3

GE suggested catalog ordering numbers come with PE receptacle. PE control must be ordered separately. Order and install SCCL-PECTL if no PE is desired.

Multivolt ballasts can be for either 120, 208, 240, or 277 volt incoming power supply.