

PRE-INCIDENT SURVEY

Building Name: Thomson TV & Radio Shop Survey #: 59
Street Address: 2063 W 15th St.
City, State, Zip: _____
Primary Use: Retailer Construction Type: Metal
Possible Entry: _____
Possible Occupancy: A.M. 4 P.M. 4 8-6
Known Handicapped Personnel: _____

NOTIFY IN CASE OF EMERGENCY

Name: Jesse R. Norris Name: Chris Norris
Phone: 623-9006 Phone: 402-9626

BUILDING CONSTRUCTION

Roof Type: Metal Floor Construction: Slab
Roof Construction: Metal
Basement Construction Type: _____ Height of Basement: _____
Number of Stories: _____ Height of Each Story: _____
Length: 80 Width: 46 Height: _____
Attic Area: _____ Size: L _____ X W _____ X H _____

UTILITY TYPES

Gas: _____ Type: _____
Gas Shut Off Valve Location: _____
Electric: Washington Utility Phase: 1
Panel Location: _____
Alarm Location: _____

EXPOSURES

North: _____ FT. West: _____ FT. South: 60 FT. East: 65'
Type: _____ Type: _____ Type: Double wide Type: Mobile Home

SUPPRESSION CRITERIA

Needed Fire Flow: _____ Total Water Supply: _____

Fuel Load: _____ Rate of Flow: _____

HYDRANT LOCATIONS

(1) _____ Flow: _____ Unit: _____

(2) _____ Flow: _____ Unit: _____

(3) _____ Flow: _____ Unit: _____

(4) _____ Flow: _____ Unit: _____

OTHER WATER RESOURCES

(1) _____

(2) _____

(3) _____

SPECIAL RESOURCES

(1) _____

(2) _____

(3) _____

MUTUAL AID

(1) _____ Assignment: _____

(2) _____ Assignment: _____

(3) _____ Assignment: _____

STAGING AREA

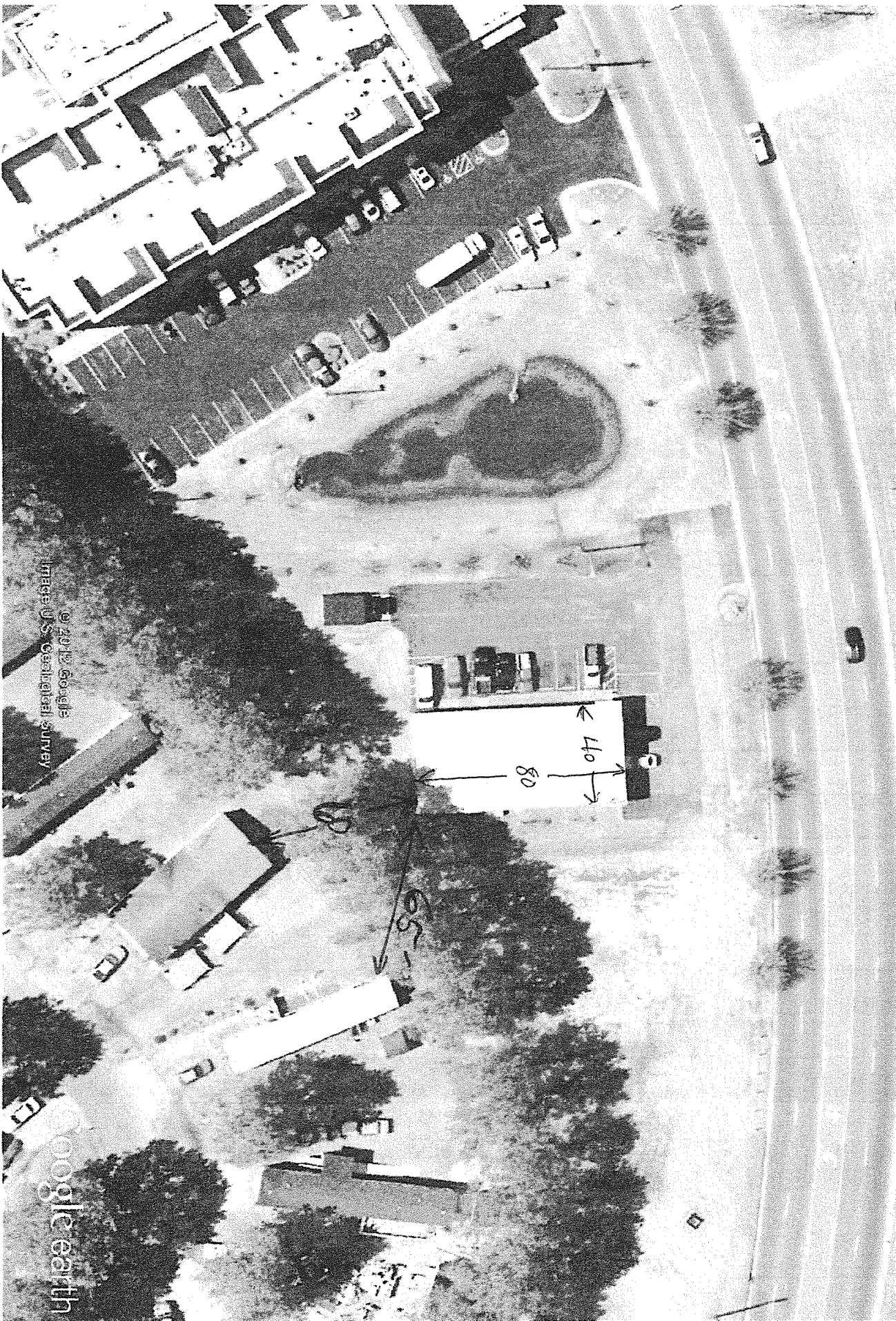
Primary: _____

Secondary: _____

MISCELLANEOUS INFORMATION

Sprinkler Connection: _____

Standpipe Connection: _____



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Image U.S. Geological Survey

Google earth

feet
meters



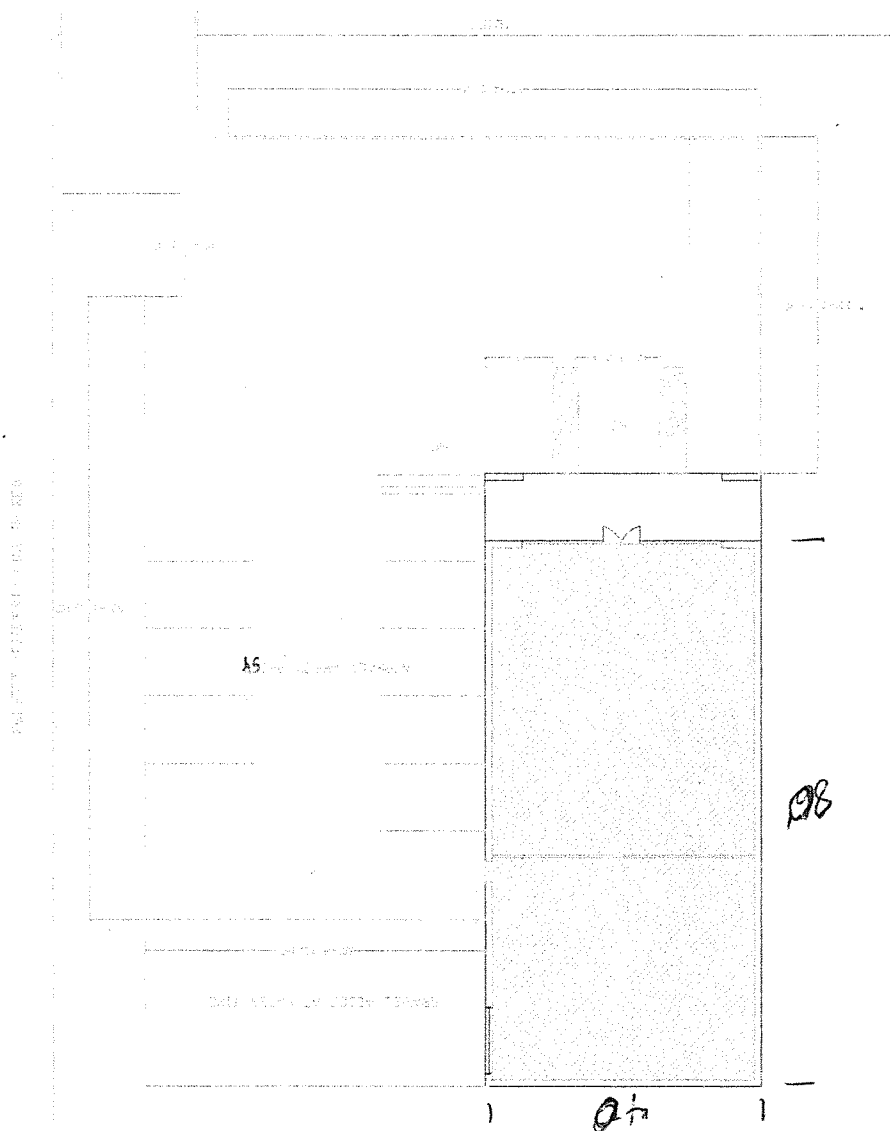
300
90



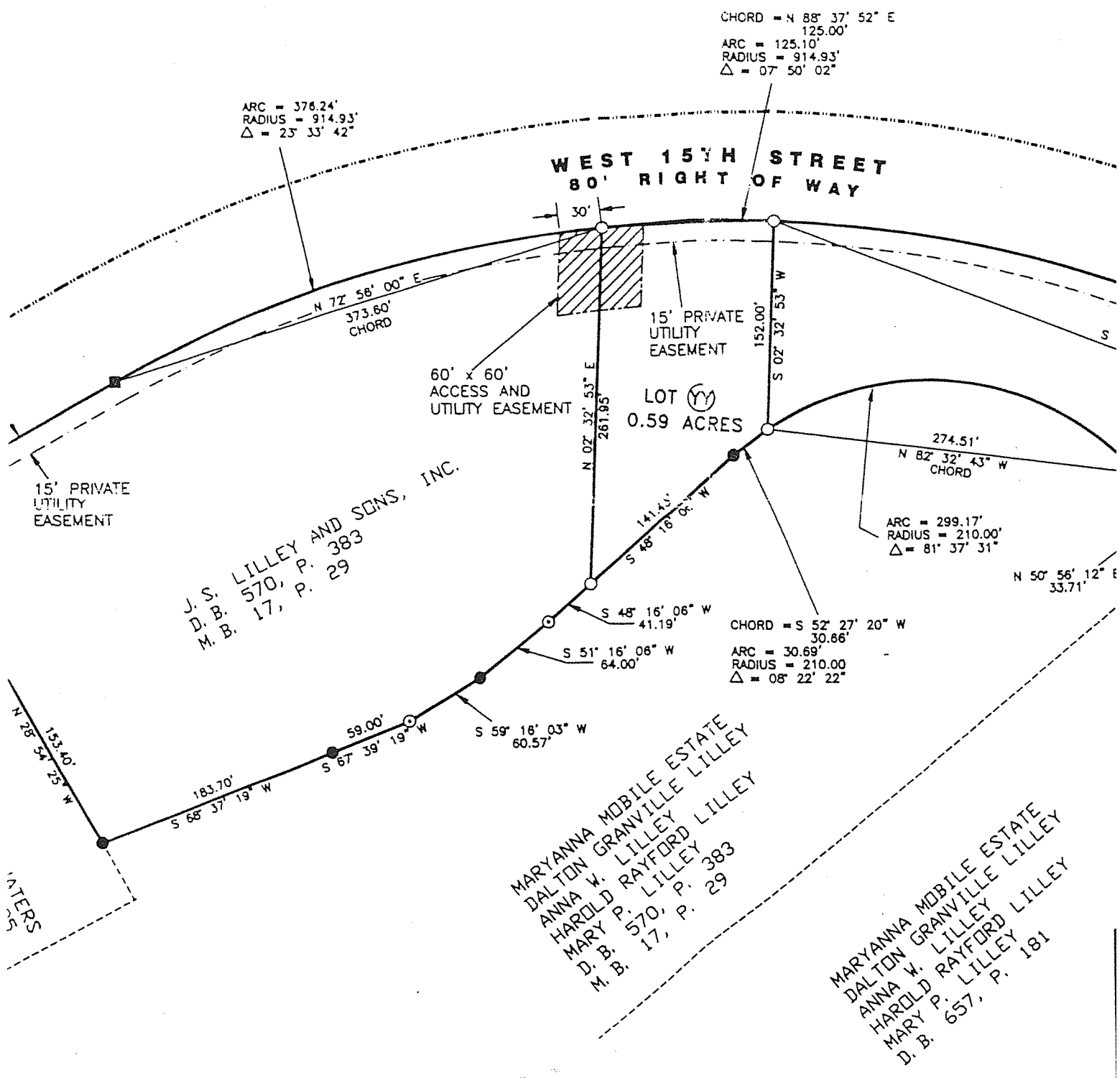
Google earth

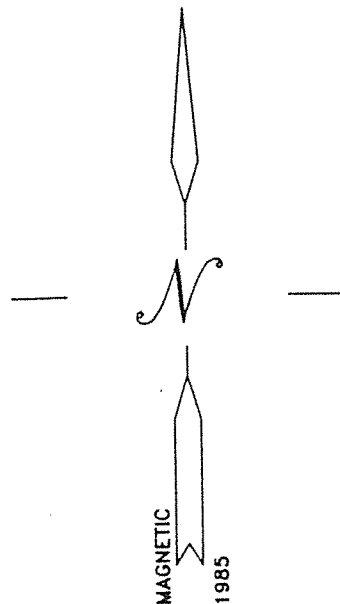
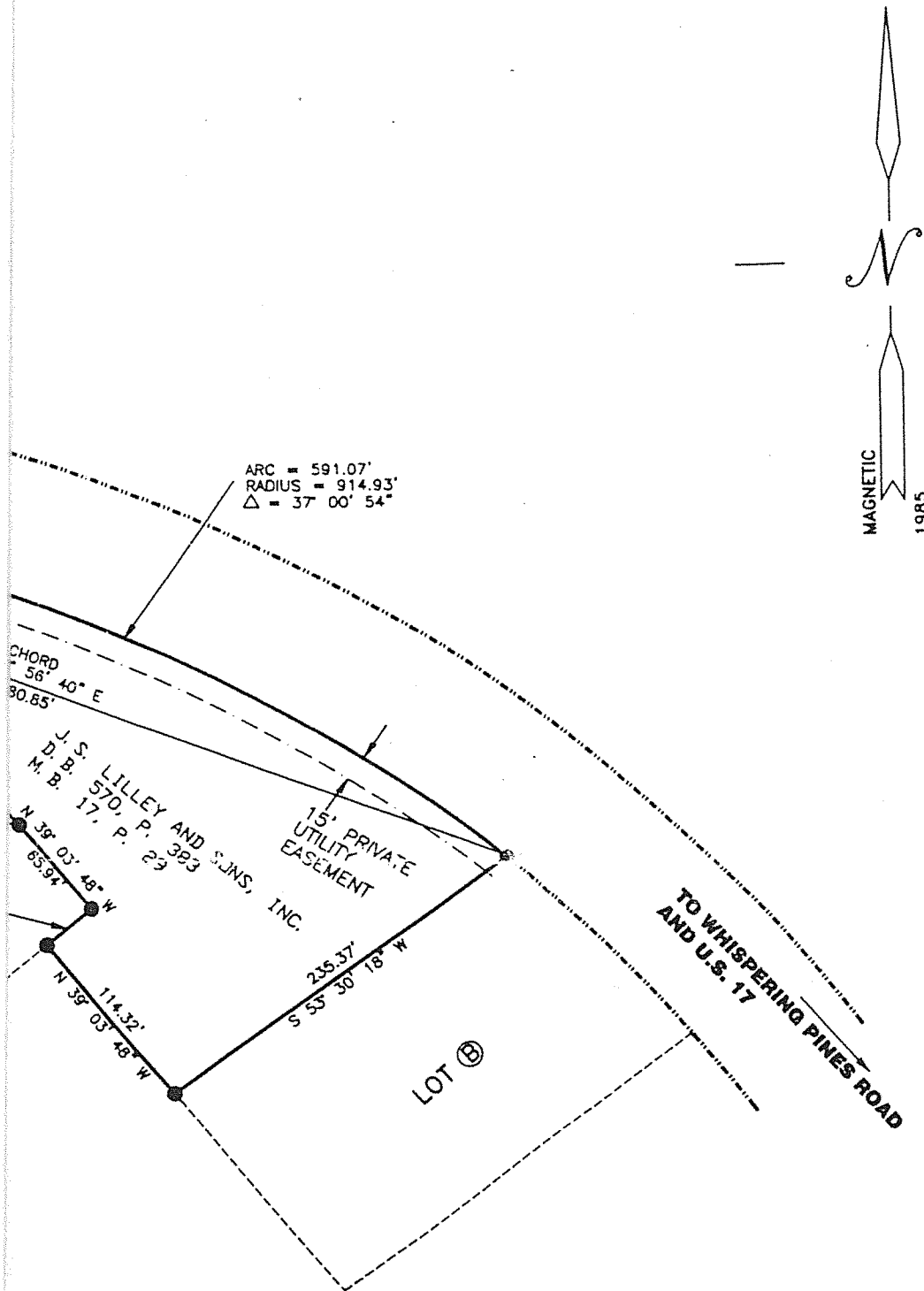
Radio Shack

15th Street Ext
Washington, NC 27689
Drawn by: Kevin Rawls



- ② FOUND ROD AND CONTROL
- ⊙ POINT, CONTROL
- FENCE
- △ FOUND RAILROAD IRON, CONTROL
- ⊙ FOUND ROD, CONTROL
- ⊙ FOUND PK NAIL, CONTROL
- N.C.G.S. MONUMENT "BOWEN", CONTROL





OWNERS STATEMENT

THIS IS EVIDENCE THAT THIS SUB-DIVISION IS MADE AT THE REQUEST OF J.S. LILLEY AND SONS, INC.

SWORN AND SUBSCRIBED TO BEFORE ME THIS _____ DAY OF _____

SOURCE OF TITLE

THIS IS TO CERTIFY THAT THE LAST INSTRUMENT(S) IN THE CHAIN OF TITLE(S) OF THIS PROPERTY AS RECORDED IN THE BEAUFORT COUNTY REGISTRY IN WASHINGTON, NORTH CAROLINA IS:

DEED BOOK 570 PAGE 383

Structure Name Thomson TV Co & Radio Shack
 Structure Address 2063 W 15th St.

Length	Width	Sq Ft	Sq Root	X 18	X construction type	GPM sum 1	X Occupancy	GPM sum 2
80	40	3200	56.57	1018.23	0.8	814.59	0.85	692.40

Column F
 Fire Resistive 0.6
 Non-combustible 0.8
 Ordinary 1
 Wood Frame 1.5

Column H
 .75 if Mostly non-combustible contents
 .85 if Limited combustibles (apartments, churches, schools, hospitals)
 1.0 if Mostly combustible (restaurants, sheds, garages)
 1.15 if Free burning contents (post offices, horse stables, feed mills, repair garages, ag storage)
 1.25 if Rapid burning (aircraft hangers, tires, flammable liquids, wood working)

Exposure % add	Exposure add GPM	Exposure per side (75% max) Side A	Exposure per side 75% max Side B	Exposure per side 75% max Side C	Exposure per side 75% max Side D	Total GPM with exposures
25%	173.10			62	97	0
19%	131.56					
14%	96.94					
9%	62.32					
75%	519.30	Total A, B, C, D				
	MAX	159				
			Column J, K, L and M			
			If up to 10 feet add 25% per side			
			If 11 to 30 feet add 19% per side			
			If 31 to 60 feet add 14% per side			
			If 61 to 100 feet add 9% per side			

Round off to nearest 250 GPM for flows less than 2500 GPM the nearest 500 GPM over 2500 GPM

Total GPM with exposures	Add 50% for each floor above ground floor	# of floors above	Total to add for floors above	Sub-total with floors added	If wood shingles on roof add 500 GPM
750.00	375	0	0.00	750.00	0

FIRE FLOW NEEDED
 GPM
750.00

PRE-INCIDENT SURVEY

Building Name: Green Enterprises Survey #: 60
Street Address: 7568 US 264 E
City, State, Zip: Washington NC Pitt Co.
Primary Use: Over road trucking Construction Type: Metal
Possible Entry: _____
Possible Occupancy: A.M. 4-5 P.M. 8 to 6
Known Handicapped Personnel: _____

NOTIFY IN CASE OF EMERGENCY

Name: Keith Green Name: _____
Phone: 252-531-9237 Phone: _____

Ryan Anderson

BUILDING CONSTRUCTION

Roof Type: Metal Floor Construction: Slab
Roof Construction: Metal
Basement Construction Type: _____ Height of Basement: _____
Number of Stories: 1 Height of Each Story: 16
Length: 150 Width: 100 Height: 32
Attic Area: _____ Size: L _____ X W _____ X H _____

UTILITY TYPES

Gas: N/A Type: _____
Gas Shut Off Valve Location: _____
Electric: EMC EMC Phase: _____
Panel Location: NW of ~~Green~~ Middle
Alarm Location: _____

EXPOSURES

North: _____ FT. West: 55 FT. South: 4087 70 FT. East: _____
Type: _____ Type: Metal Type: Wood Shop Type: _____

45 x 45 office inside
NE corner of building.

SUPPRESSION CRITERIA

Needed Fire Flow: _____ Total Water Supply: _____

Fuel Load: _____ Rate of Flow: _____

HYDRANT LOCATIONS

(1) _____ Flow: _____ Unit: _____

(2) _____ Flow: _____ Unit: _____

(3) _____ Flow: _____ Unit: _____

(4) _____ Flow: _____ Unit: _____

OTHER WATER RESOURCES

(1) _____

(2) _____

(3) _____

SPECIAL RESOURCES

(1) _____

(2) _____

(3) _____

MUTUAL AID

(1) _____ Assignment: _____

(2) _____ Assignment: _____

(3) _____ Assignment: _____

STAGING AREA

Primary: _____

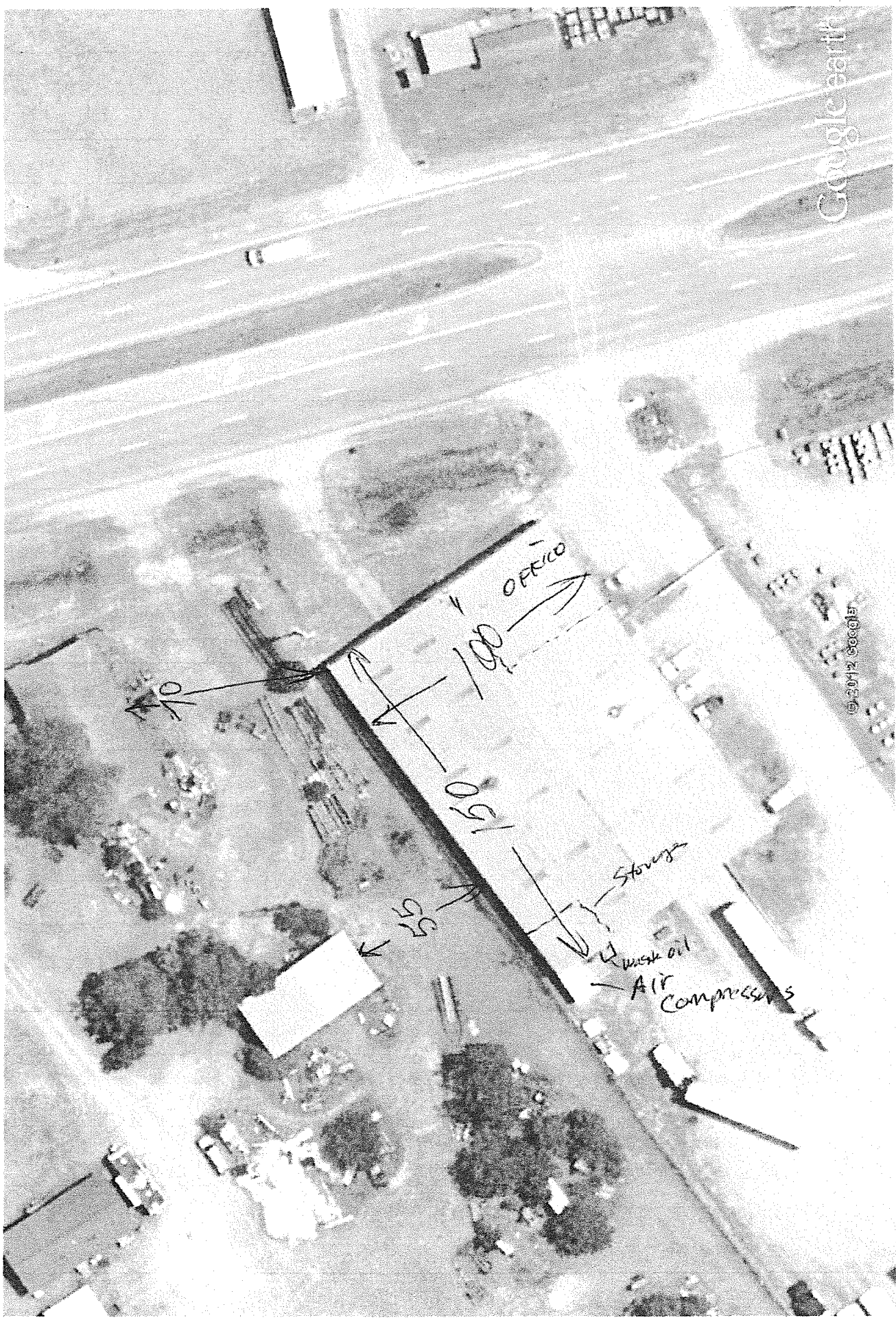
Secondary: _____

MISCELLANEOUS INFORMATION

Sprinkler Connection: _____

Standpipe Connection: _____

Brooks?



10
150
100
OFFICE
Storage
Waste oil
Air compressors



Google earth

Structure Name Green Enterprises - (Trucking Co.)
 Structure Address 7568 W 264 E

Length	Width	Sq Ft	Sq Root	X 18	X construction type	GPM sum 1	X Occupancy	GPM sum 2
150	100	15000	122.47	2204.54	0.8	1763.63	0.85	1508.87

Exposure % add	Exposure add GPM	Exposure per side (75% max) Side A	Exposure per side 75% max Side B	Exposure per side 75% max Side C	Exposure per side 75% max Side D	Total GPM with exposures
25%	374.77					374.77
19%	284.83					284.83
14%	209.87					209.87
9%	134.92					134.92
75%	1124.32	Total A, B, C, D				1124.32
	MAX	345				345

Round off to nearest 250 GPM for flows less than 2500 GPM, the nearest 500 GPM over 2500 GPM

Column F
 Fire Resistive 0.6
 Non-combustible 0.8
 Ordinary 1
 Wood Frame 1.5

Column H
 .75 if Mostly non-combustible contents
 .85 if Limited combustibles (apartments, churches, schools, hospitals)
 1.0 if Mostly combustible (restaurants, sheds, garages)
 1.15 if Free burning contents (post offices, horse stables, feed mills, repair garages, ag storage)
 1.25 if Rapid burning (aircraft hangers, tires, flammable liquids, wood working)

Total GPM with exposures	Add 50% for each floor above ground floor	# of floors above	Total to add for floors above	Sub-total with floors added	If wood shingles on roof add 500 GPM
1750.00	875	0	0.00	1750.00	0

FIRE FLOW NEEDED
GPM
1750.00

Bldg 1 2000 GPM
Bldg 2 1500 GPM
Bldg 3 750 GPM
Bldg 4 1000 GPM
Bldg 5 - 500 GPM

HANDOUT #17

PRE-INCIDENT SURVEY

Building Name: P+6 Manufacturing Survey #: 61
Street Address: 2401 W. 5th St.
City, State, Zip: _____
Primary Use: Air Filtration Construction Type: _____
Possible Entry: _____
Possible Occupancy: A.M. 50 P.M. 50 — 866 - Day
Known Handicapped Personnel: 10 - 6 to 2:30 2nd

NOTIFY IN CASE OF EMERGENCY

Name: Scott Cox - Mgr Name: Charlie Rasmussen
Phone: 495-1293 Phone: 721-0485
946 9110

BUILDING CONSTRUCTION

Roof Type: _____ Floor Construction: _____
Roof Construction: _____
Basement Construction Type: _____ Height of Basement: _____
Number of Stories: _____ Height of Each Story: _____
Length: _____ Width: _____ Height: _____
Attic Area: _____ Size: L _____ X W _____ X H _____

UTILITY TYPES

Gas: None Type: _____
Gas Shut Off Valve Location: _____
Electric: Wash. Utilities Phase: 3
Panel Location: _____
Alarm Location: _____

EXPOSURES

North: _____ FT. West: _____ FT. South: 38 FT. East: _____
Type: _____ Type: _____ Type: Metal Type: _____

Airgas UN 1977
Liquid Nitrogen - 320°F

SUPPRESSION CRITERIA

Needed Fire Flow: _____ Total Water Supply: _____

Fuel Load: _____ Rate of Flow: _____

HYDRANT LOCATIONS

(1) _____ Flow: _____ Unit: _____

(2) _____ Flow: _____ Unit: _____

(3) _____ Flow: _____ Unit: _____

(4) _____ Flow: _____ Unit: _____

OTHER WATER RESOURCES

(1) _____

(2) _____

(3) _____

SPECIAL RESOURCES

(1) _____

(2) _____

(3) _____

MUTUAL AID

(1) _____ Assignment: _____

(2) _____ Assignment: _____

(3) _____ Assignment: _____

STAGING AREA

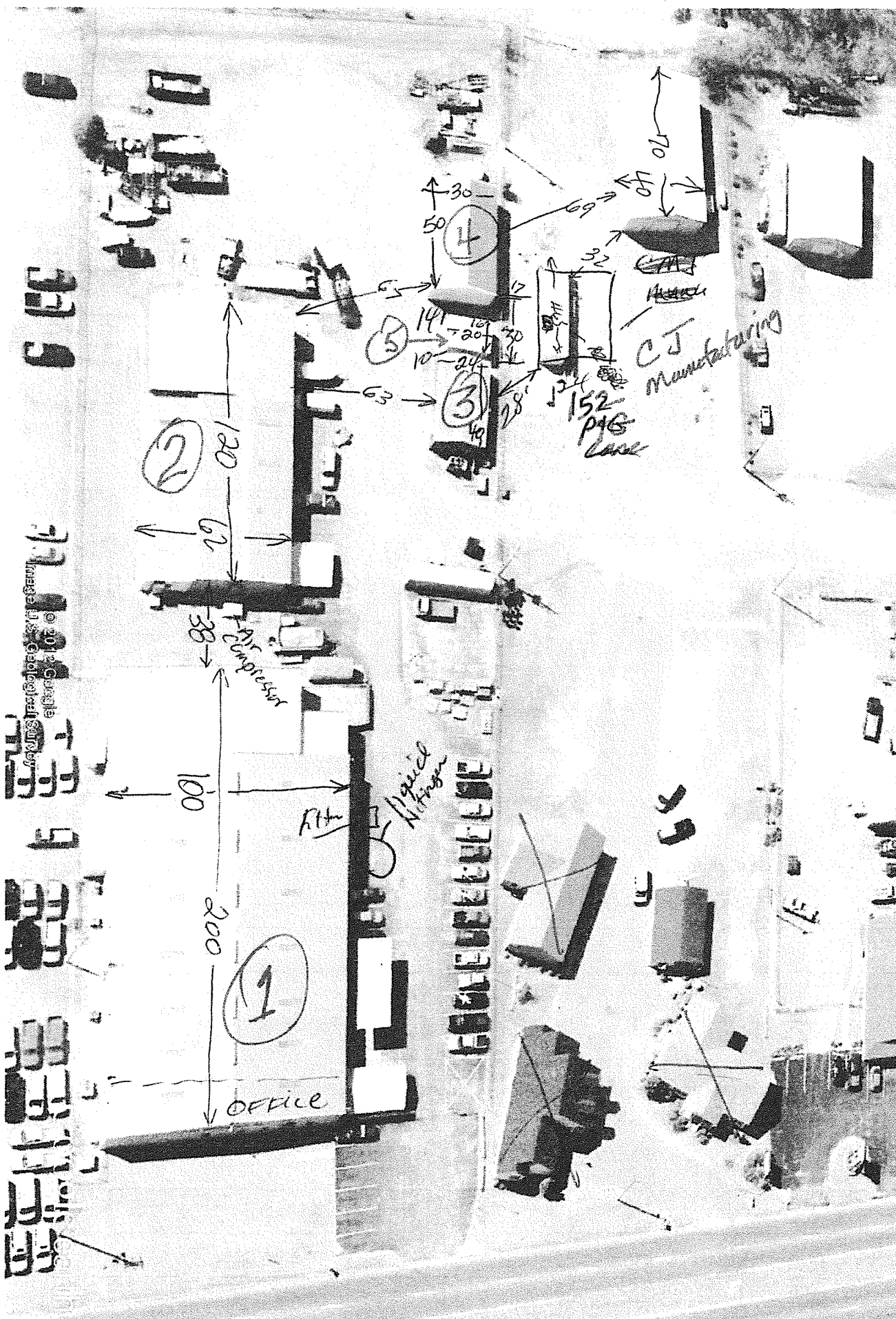
Primary: _____

Secondary: _____

MISCELLANEOUS INFORMATION

Sprinkler Connection: _____

Standpipe Connection: _____



Structure Name P & G Manufacturing - Bldg 1 w/ Office
 Structure Address 2401 W. 5th St.

Length	Width	Sq Ft	Sq Root	X 18	X construction type	GPM sum 1	X Occupancy	GPM sum 2
200	100	20000	141.42	2545.58	0.8	2036.47	0.85	###

Exposure % add	Exposure add GPM	Exposure per side (75% max) Side A	Exposure per side 75% max Side B	Exposure per side 75% max Side C	Exposure per side 75% max Side D	Total GPM with exposures
25%	432.75		0	242	0	1973.00
19%	328.89					0
14%	242.34					
9%	155.79					
75%	1298.25	Total A, B, C, D				
	MAX	242				

Round off to nearest 250 GPM for flows less than 2500 GPM, the nearest 500 GPM over 2500 GPM

Column F
 Fire Resistive 0.6
 Non-combustible 0.8
 Ordinary 1
 Wood Frame 1.5

Column H
 .75 If Mostly non-combustible contents
 .85 If Limited combustibles (apartments, churches, schools, hospitals)
 1.0 If Mostly combustible (restaurants, sheds, garages)
 1.15 If Free burning contents (post offices, horse stables, feed mills, repair garages, ag storage)
 1.25 If Rapid burning (aircraft hangers, tires, flammable liquids, wood working)

Total GPM with exposures	Add 50% for each floor above ground floor	# of floors above	Total to add for floors above	Sub-total with floors added	If wood shingles on roof add 500 GPM
2000.00	1000	0	0.00	2000.00	0
				2000.00	2000.00

FIRE FLOW NEEDED
 GPM
2000.00

Structure Name P4 & Main. Bldg 2
 Structure Address 2401 W. 5th St.

Length	Width	Sq Ft	Sq Root	X 18	X construction type	GPM sum 1	X Occupancy	GPM sum 2
120	62	7440	86.26	1552.60	0.8	1242.08	1	###

Exposure % add	Exposure add GPM	Exposure per side (75% max) Side A	Exposure per side 75% max Side B	Exposure per side 75% max Side C	Exposure per side 75% max Side D	Total GPM with exposures
25%	310.52	174	0	0	112	1640.08
19%	235.99				112	
14%	173.89					
9%	111.79					
75%	931.56	Total A, B, C, D				
	MAX	398				

Round off to nearest 250 GPM for flows less than 2500 GPM, the nearest 500 GPM over 2500 GPM

Column F
 Fire Resistive 0.6
 Non-combustible 0.8
 Ordinary 1
 Wood Frame 1.5

Column H
 .75 if Mostly non-combustible contents
 .85 if Limited combustibles (apartments, churches, schools, hospitals)
 1.0 if Mostly combustible (restaurants, sheds, garages)
 1.15 if Free burning contents (post offices, horse stables, feed mills, repair garages, ag storage)
 1.25 if Rapid burning (aircraft hangers, tires, flammable liquids, wood working)

FIRE FLOW NEEDED
GPM
1500.00

Total GPM with exposures	Add 50% for each floor above ground floor	# of floors above	Total to add for floors above	Sub-total with floors added	If wood shingles on roof add 500 GPM
1500.00	750	0	0.00	1500.00	0

Structure Name P4 G Mfg. Bldg. 3
 Structure Address 2401 W 5th St

Length	Width	Sq Ft	Sq Root	X 18	X construction type	GPM sum 1	X Occupancy	GPM sum 2
40	24	960	30.98	557.71	0.8	446.17	1	446.17

Column F
Fire Resistive 0.6
Non-combustible 0.8
Ordinary 1
Wood Frame 1.5

Column H
 .75 if Mostly non-combustible contents
 .85 if Limited combustibles (apartments, churches, schools, hospitals)
 1.0 if Mostly combustible (restaurants, sheds, garages)
 1.15 if Free burning contents (post offices, horse stables, feed mills, repair garages, ag storage)
 1.25 if Rapid burning (aircraft hangers, tires, flammable liquids, wood working)

Exposure % add	Exposure add GPM	Exposure per side (75% max) Side A	Exposure per side 75% max Side B	Exposure per side 75% max Side C	Exposure per side 75% max Side D	Total GPM with exposures
25%	111.54	0	0	40	112	85
19%	84.77					0
14%	62.46					
9%	40.16					
75%	334.63	Total A, B, C, D				
	MAX	237				
		Column J, K, L and M				
		If up to 10 feet add 25% per side				
		If 11 to 30 feet add 19% per side				
		If 31 to 60 feet add 14% per side				
		If 61 to 100 feet add 9% per side				

Round off to nearest 250 GPM for flows less than 2500 GPM, the nearest 500 GPM over 2500 GPM

Total GPM with exposures	Add 50% for each floor above ground floor	# of floors above	Total to add for floors above	Sub-total with floors added	If wood shingles on roof add 500 GPM
750.00	375	0	0.00	750.00	0
				750.00	750.00

FIRE FLOW NEEDED
GPM
750.00

Structure Name P4B Mtg. Bldg. 4
 Structure Address 2401 W. 54th St.

Length	Width	Sq Ft	Sq Root	X 18	X construction type	GPM sum 1	X Occupancy	GPM sum 2
50	30	1500	38.73	697.14	0.8	557.71	1	557.71

Exposure % add	Exposure add GPM	Exposure per side (75% max) Side A	Exposure per side 75% max Side B	Exposure per side 75% max Side C	Exposure per side 75% max Side D	Total GPM with exposures
25%	139.43	106	78	0	50	897.71
19%	105.96				106	
14%	78.08					
9%	50.19					
75%	418.28	Total A, B, C, D				
	MAX	340				

Round off to nearest 250 GPM for flows less than 2500 GPM, the nearest 500 GPM over 2500 GPM

Column F
Fire Resistive 0.6
Non-combustible 0.8
Ordinary 1
Wood Frame 1.5

Column H
 .75 if Mostly non-combustible contents
 .85 if Limited combustibles (apartments, churches, schools, hospitals)
 1.0 if Mostly combustible (restaurants, sheds, garages)
 1.15 if Free burning contents (post offices, horse stables, feed mills, repair garages, ag storage)
 1.25 if Rapid burning (aircraft hangers, tires, flammable liquids, wood working)

FIRE FLOW NEEDED
GPM
1000.00

Total GPM with exposures	Add 50% for each floor above ground floor	# of floors above	Total to add for floors above	Sub-total with floors added	If wood shingles on roof add 500 GPM
1000.00	500	0	0.00	1000.00	0
					1000.00

Structure Name P4G Mtg. Bldg. 5
 Structure Address 2401 W. 5th St.

Length	Width	Sq Ft	Sq Root	X 18	X construction type	GPM sum 1	X Occupancy	GPM sum 2
20	16	320	17.89	321.99	0.8	257.60	1	257.60

Column F
Fire Resistive 0.6
Non-combustible 0.8
Ordinary 1
Wood Frame 1.5

Column H
 .75 if Mostly non-combustible contents
 .85 if Limited combustibles (apartments, churches, schools, hospitals)
 1.0 if Mostly combustible (restaurants, sheds, garages)
 1.15 if Free burning contents (post offices, horse stables, feed mills, repair garages, ag storage)
 1.25 if Rapid burning (aircraft hangers, tires, flammable liquids, wood working)

Exposure % add	Exposure add GPM	Exposure per side (75% max) Side A	Exposure per side (75% max) Side B	Exposure per side (75% max) Side C	Exposure per side (75% max) Side D	Total GPM with exposures
25%	64.40	23	49	49	64	442.60
19%	48.94				0	
14%	36.06					
9%	23.18					
75%	193.20	Total A, B, C, D				
	MAX	185				

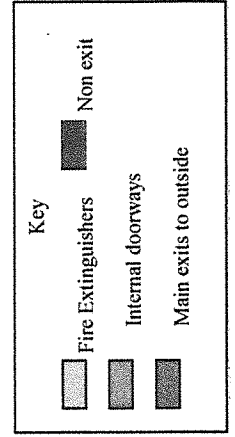
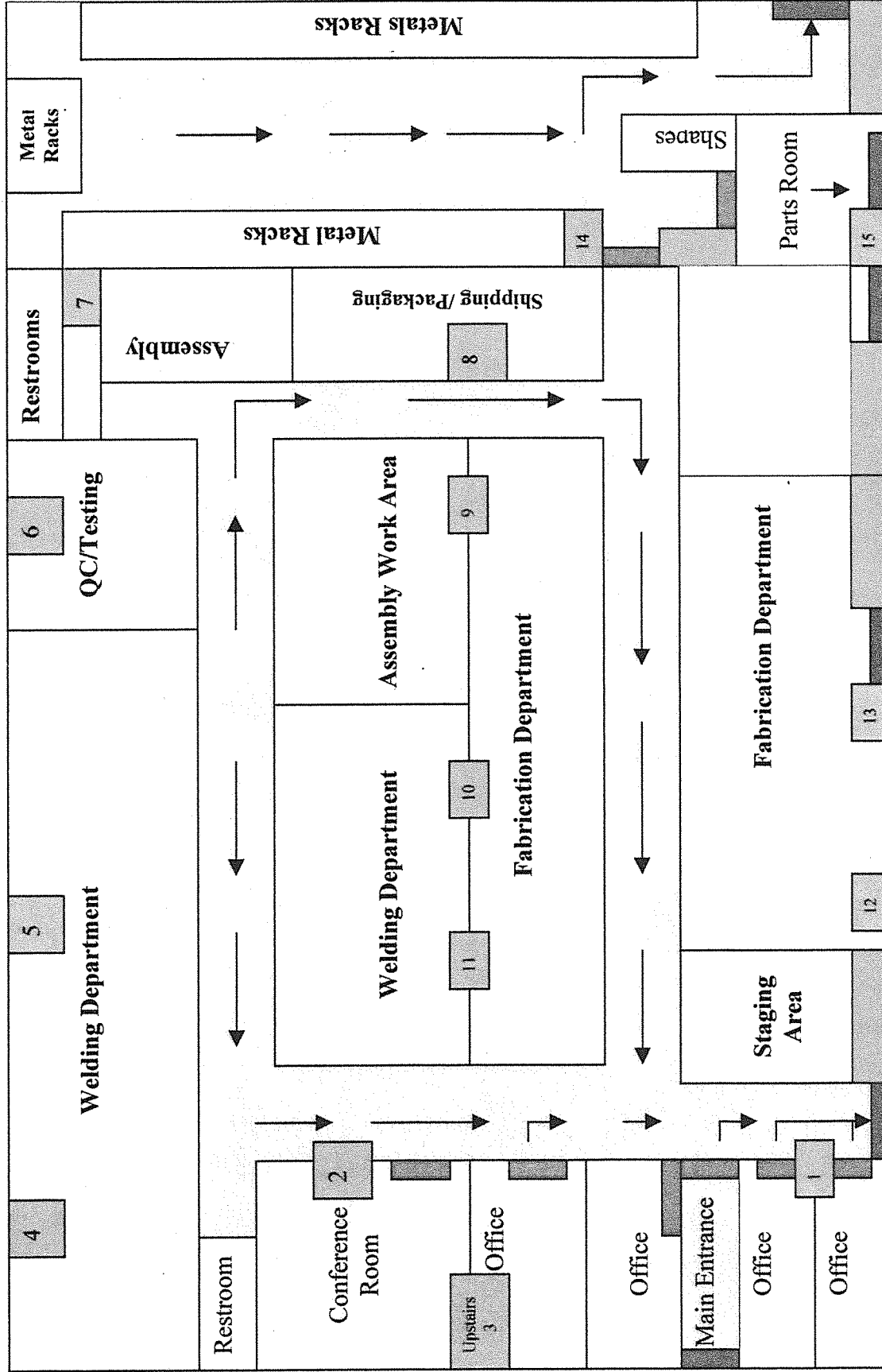
Round off to nearest 250 GPM for flows less than 2500 GPM, the nearest 500 GPM over 2500 GPM

Column J, K, L and M
If up to 10 feet add 25% per side
If 11 to 30 feet add 19% per side
If 31 to 60 feet add 14% per side
If 61 to 100 feet add 9% per side

Total GPM with exposures	Add 50% for each floor above ground floor	# of floors above	Total to add for floors above	Sub-total with floors added	If wood shingles on roof add 500 GPM
500.00	250	0	0.00	500.00	0
					500.00

FIRE FLOW NEEDED
GPM
500.00

P&G Manufacturing Floor Plan Building 1 Evacuation Route



Parking Lot / Safe Zone

Oxygen sensors are sometimes used as a safety precaution when working with liquid nitrogen to alert workers of gas spills into a confined space.^[9]

Vessels containing liquid nitrogen can condense oxygen from air. The liquid in such a vessel becomes increasingly enriched in oxygen (boiling point 90 K; −183 °C; −298 °F) as the nitrogen evaporates, and can cause violent oxidation of organic material.^[*citation needed*]

See also

- Computer cooling
- Liquid nitrogen vehicle

References

- ¹ ^ "Dielectric Constants". <http://www.apgsensors.com/ltr2/access.php?file=pdf/dielectric-constants.pdf>.
- ² ^ Umrath, W. (1974). "Cooling bath for rapid freezing in electron microscopy". *Journal of Microscopy* **101**: 103–105. doi:10.1111/j.1365-2818.1974.tb03871.x.
- ³ ^ William Augustus Tilden (2009). *A Short History of the Progress of Scientific Chemistry in Our Own Times*. BiblioBazaar, LLC. p. 249. ISBN 1103358421. <http://books.google.com/books?id=8SKrWdFLEd4C&pg=PA249>.
- ⁴ ^ Wainner, Scott; Robert Richmond (2003). *The Book of Overclocking: Tweak Your PC to Unleash Its Power*. No Starch Press. pp. 44. ISBN 188641176X.
- ⁵ ^ Liquid Nitrogen Ice Cream Recipe, March 7, 2006
- ⁶ ^ Brent S. Mattox. "Investigative Report on Chemistry 301A Cylinder Explosion" (reprint). Texas A&M University. http://ucih.ucdavis.edu/docs/chemistry_301a.pdf.
- ⁷ ^ British Compressed Gases Association (2000) BCGA Code of Practice CP30. The Safe Use of Liquid nitrogen Dewars up to 50 litres. ISSN 0260-4809.
- ⁸ ^ Inquiry after man dies in chemical leak, BBC News, October 25, 1999.
- ⁹ ^ *Liquid Nitrogen - Code of practice for handling*. United Kingdom: Birkbeck, University of London. 2007. <http://www.bbk.ac.uk/so/policies/liqn2>. Retrieved 2012-02-08.

Retrieved from "http://en.wikipedia.org/w/index.php?title=Liquid_nitrogen&oldid=477860208"

Categories: Nitrogen Coolants

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Liquid nitrogen

From Wikipedia, the free encyclopedia

Liquid nitrogen is nitrogen in a liquid state at an extremely low temperature. It is produced industrially by fractional distillation of liquid air. Liquid nitrogen is a colourless clear liquid with density of 0.807 g/mL at its boiling point and a dielectric constant of 1.4.^[1] Liquid nitrogen is often referred to by the abbreviation, LN₂ or "LIN" or "LN" and has the UN number 1977.

At atmospheric pressure, liquid nitrogen boils at −196 °C (77 K; −321 °F) and is a cryogenic fluid which can cause rapid freezing on contact with living tissue, which may lead to frostbite. When appropriately insulated from ambient heat, liquid nitrogen can be stored and transported, for example in vacuum flasks. Here, the very low temperature is held constant at 77 K by slow boiling of the liquid, resulting in the evolution of nitrogen gas. Depending on the size and design, the holding time of vacuum flasks ranges from a few hours to a few weeks.

Liquid nitrogen can easily be converted to the solid by placing it in a vacuum chamber pumped by a rotary vacuum pump.^[2] Liquid nitrogen freezes at 63 K (−210 °C; −346 °F). Despite its reputation, liquid nitrogen's efficiency as a coolant is limited by the fact that it boils immediately on contact with a warmer object, enveloping the object in insulating nitrogen gas. This effect, known as the Leidenfrost effect, applies to any liquid in contact with an object significantly hotter than its boiling point. More rapid cooling may be obtained by plunging an object into a slush of liquid and solid nitrogen than into liquid nitrogen alone.

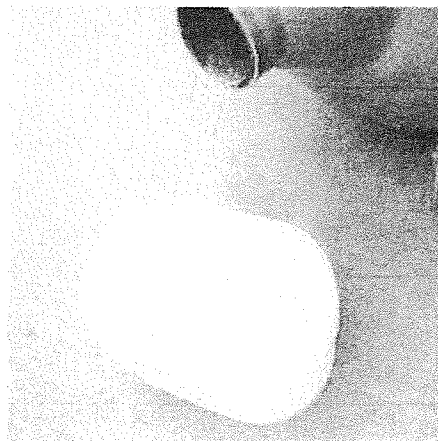
Nitrogen was first liquefied at the Jagiellonian University on 15 April 1883 by Polish physicists, Zygmunt Wróblewski and Karol Olszewski.^[3]

Contents

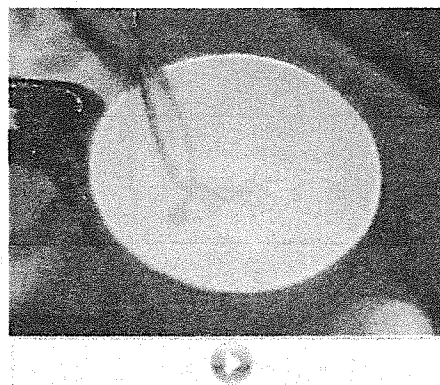
- 1 Uses
- 2 Safety
- 3 See also
- 4 References

Uses

Liquid nitrogen is a compact and readily transported source of nitrogen gas without pressurization. Further, its ability to maintain temperatures far below the freezing point of water makes it extremely useful in a wide range of applications, primarily as an open-cycle



Liquid nitrogen



Air balloon submerged into liquid nitrogen



MIT students preparing homemade ice cream with liquid nitrogen.

refrigerant, including:

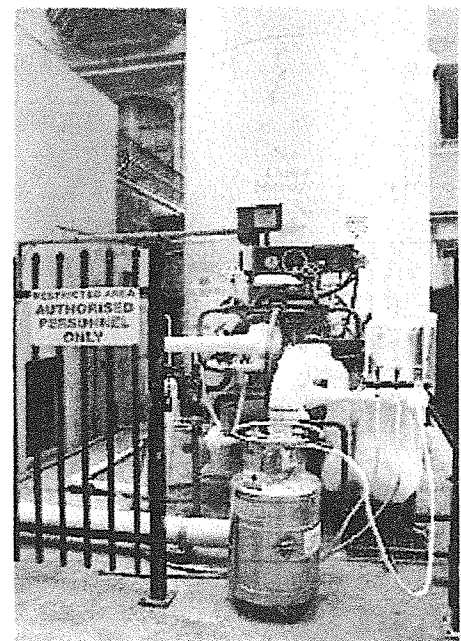
- in cryotherapy for removing unsightly or potentially malignant skin lesions such as warts and actinic keratosis
- as a coolant for CCD cameras in astronomy
- to store cells at low temperature for laboratory work
- in cryogenics
- as a source of very dry nitrogen gas
- for the immersion freezing and transportation of food products
- for the cryopreservation of blood, reproductive cells (sperm and egg), and other biological samples and materials
- as a method of freezing water pipes in order to work on them in situations where a valve is not available to block water flow to the work area
- in the process of promession, a way to dispose of the dead
- for cooling a high-temperature superconductor to a temperature sufficient to achieve superconductivity
- for the cryonic preservation in the hope of future reanimation.
- to preserve tissue samples from surgical excisions for future studies
- to shrink-weld machinery parts together
- as a coolant for vacuum pump traps and in controlled-evaporation processes in chemistry.
- as a coolant to increase the sensitivity of infrared homing seeker heads of missiles such as the Strela 3
- as a coolant to temporarily shrink mechanical components during machine assembly and allow improved interference fits
- as a coolant for computers^[4]
- in food preparation, such as for making ultra-smooth ice cream.^[5]

Safety

Since the liquid to gas expansion ratio of nitrogen is 1:694 at 20 °C (68 °F), a tremendous amount of force can be generated if liquid nitrogen is rapidly vaporized. In an incident in 2006 at Texas A&M University, the pressure-relief devices of a tank of liquid nitrogen were malfunctioning and later sealed. As a result of the subsequent pressure buildup, the tank failed catastrophically and exploded. The force of the explosion was sufficient to propel the tank through the ceiling immediately above it.^[6]

Because of its extremely low temperature, careless handling of liquid nitrogen may result in cold burns.

As liquid nitrogen evaporates it will reduce the oxygen concentration in the air and might act as an asphyxiant, especially in confined spaces. Nitrogen is odorless, colorless and tasteless, and may produce asphyxia without any sensation or prior warning.^[7] A laboratory assistant died in Scotland in 1999, apparently from asphyxiation caused by liquid nitrogen spilled in a basement storage room.^[8]



Filling a liquid nitrogen Dewar from a storage tank