Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

ALABAMA MEDICAL CANNABIS COMMISSION

Help Alexzandra Fields

Review

Selected Account:Pinamint
Your application has been filed with the Alabama Medical Cannabis Commission.
Your reference code is **1693**.

File Date : **03/24/2023 3:59 PM**

Your transaction ID is : **89103134**
Transaction Token: **3202999b-9979-4c82-971e-3742836028ac**

If you do not receive email notifications, please check your spam folder.

You must print or save this page as a PDF as part of your redacted filing.

Request for Business Application Information

- **Request Number:** 0276

General Applicant Information

- [redacted]
- **Applying as:** Business Entity
- **Trade Name (DBAs)** :
- **Identification Number Type** : FEIN
- **Federal Tax Identification Number** : 921277050
- **Business Entity Name** [redacted]
- **Business Entity Type** : Limited Liability Company
- [redacted]
- [redacted]
- **Date of Qualification, Organization or Incorporation:** 12/08/2022

Applicant Street Address

- **Street:** 212 W TROY ST
- **Unit No / Apt No:**
- **City:** DOTHAN
- **County:** 35-Houston
- **State:** Alabama
- **Zip Code:** 36303
- **Address Verified?:** Yes

Applicant Mailing Address

[redacted]

✔ **Do you have a management service agreement in place?:** No

✔ **Is the applicant: (1) at least 51% owned by (or, in the case of a corporation, 51% of the shares belong to) members of any minority group (as defined by 20-2A-51(b)), and (2) managed and controlled in its daily operations by members of any minority group?** :Yes

✔ **Does the applicant verify that it is: (1) at least 51% owned by (or, in the case of a corporation, 51% of the shares belong to) members of any minority group (as defined by 20-2A-51(b)), and (2) managed and controlled in its daily operations by members of any minority group?** :Yes

Primary Contact Person

✔ **First Name:** Jonathan

✔ **Last Name:** Loevy

✔ **Title:** Owner

[redacted]

License Information

✔ **License Type:** Integrated Facility

Facility Information

Facility Information

✔ **Facility Type:** Dispensing Site (Retail Facility)

✔ **Dispensing Site Premises** : Stand Alone Building

Physical Address

[redacted]

Facility Information Questions

✔ **Applicant's interest in property where proposed facility is located** : Agreement Contingent on Receipt of License

✔ **Is this facility under construction?** : No

- **The number of days, if awarded a license, within which the Applicant reasonably projects it will commence operations at this facility** : 180
- **The number of days, if awarded a license, within which the Applicant reasonably projects it will reach full capacity at this facility** : 540
- **Does the applicant verify that this proposed facility will be in a permissible location, if applicable, and will maintain compliance with all State and local laws, resolutions and ordinances?** : Yes

- **Facility Type:** Dispensing Site (Retail Facility)
- **Dispensing Site Premises** : Multi-use Structure

Physical Address

[redacted]

- **Applicant's interest in property where proposed facility is located** : Agreement Contingent on Receipt of License
- **Is this facility under construction?** : No
- **The number of days, if awarded a license, within which the Applicant reasonably projects it will commence operations at this facility** : 180
- **The number of days, if awarded a license, within which the Applicant reasonably projects it will reach full capacity at this facility** : 540
- **Does the applicant verify that this proposed facility will be in a permissible location, if applicable, and will maintain compliance with all State and local laws, resolutions and ordinances?** : Yes

- **Facility Type:** Dispensing Site (Retail Facility)
- **Dispensing Site Premises** : Stand Alone Building

Physical Address

[redacted]

Facility Information Questions

- **Applicant's interest in property where proposed facility is located** : Agreement Contingent on Receipt of License

- **Is this facility under construction?** : No

- **The number of days, if awarded a license, within which the Applicant reasonably projects it will commence operations at this facility** : 180

- **The number of days, if awarded a license, within which the Applicant reasonably projects it will reach full capacity at this facility** : 540

- **Does the applicant verify that this proposed facility will be in a permissible location, if applicable, and will maintain compliance with all State and local laws, resolutions and ordinances?** : Yes

- **Facility Type:** Dispensing Site (Retail Facility)
- **Dispensing Site Premises** : Multi-use Structure

Physical Address

[redacted]

Facility Information Questions

- **Applicant's interest in property where proposed facility is located** : Agreement Contingent on Receipt of License

- **Is this facility under construction?** : No

- **The number of days, if awarded a license, within which the Applicant reasonably projects it will commence operations at this facility** : 180

- **The number of days, if awarded a license, within which the Applicant reasonably projects it will reach full capacity at this facility** : 540

- **Does the applicant verify that this proposed facility will be in a permissible location, if applicable, and will maintain compliance with all State and local laws, resolutions and ordinances?** : Yes

- **Facility Type:** Dispensing Site (Retail Facility)
- **Dispensing Site Premises** : Strip Mall

Physical Address

[redacted]

Facility Information Questions

- **Applicant's interest in property where proposed facility is located** : Agreement Contingent on Receipt of License
- **Is this facility under construction?** : No
- **The number of days, if awarded a license, within which the Applicant reasonably projects it will commence operations at this facility** : 120
- **The number of days, if awarded a license, within which the Applicant reasonably projects it will reach full capacity at this facility** : 500
- **Does the applicant verify that this proposed facility will be in a permissible location, if applicable, and will maintain compliance with all State and local laws, resolutions and ordinances?** : Yes

- **Facility Type:** Cultivation Facility

Physical Address

[redacted]

Facility Information Questions

- **Applicant's interest in property where proposed facility is located** : Agreement Contingent on Receipt of License
- **Is this facility under construction?** : No
- **The number of days, if awarded a license, within which the Applicant reasonably projects it will commence operations at this facility** : 180
- **The number of days, if awarded a license, within which the Applicant reasonably projects it will reach full capacity at this facility** : 700
- **Does the applicant verify that this proposed facility will be in a permissible location, if applicable, and will maintain compliance with all State and local laws, resolutions and ordinances?** : Yes

- **Facility Type:** Processing Facility

Physical Address

[redacted]

- **Address Verified?** : Yes

Facility Information Questions

- **Applicant's interest in property where proposed facility is located** : Agreement Contingent on Receipt of License
- **Is this facility under construction?** : No
- **The number of days, if awarded a license, within which the Applicant reasonably projects it will commence operations at this facility** : 180
- **The number of days, if awarded a license, within which the Applicant reasonably projects it will reach full capacity at this facility** : 700
- **Does the applicant verify that this proposed facility will be in a permissible location, if applicable, and will maintain compliance with all State and local laws, resolutions and ordinances?** : Yes

Ownership of Applicant

- **Select type of record:** Individual
- **Does the individual have an ownership interest in the applicant?** : Yes

Individual

[redacted]

Residence Address

[redacted]

- **Select type of record:** Individual

- ✔ **Does the individual have an ownership interest in the applicant?** : Yes

Individual

- ✔ **Address Verified?** : Yes

- ✔ **Select type of record:** Individual

- ✔ **Does the individual have an ownership interest in the applicant?** : Yes

Individual

- ✔ **Select type of record:** Individual

- **Does the individual have an ownership interest in the applicant?** : Yes

Individual

- **Address Verified?** : Yes

- **Select type of record:** Individual

- **Does the individual have an ownership interest in the applicant?** : Yes

Individual

- **Select type of record:** Individual

- **Does the individual have an ownership interest in the applicant?** : Yes

Individual

Verified?

- **Select type of record:** Individual

- **Does the individual have an ownership interest in the applicant?** : Yes

Individual

- **Select type of record:** Individual

✔ **Does the individual have an ownership interest in the applicant?** : Yes

Individual

[redacted]

Cannabis Industry Entities

✔ **Is any individual or entity below connected to any entity that is directly or indirectly involved in the cannabis industry, including, but not limited to, the cultivation, processing, packaging, labeling, testing, transporting, or sale of cannabis or medical cannabis, either in Alabama or any other jurisdiction?**
(1) an individual with an ownership interest in the applicant;
(2) the spouse, parent, or child of an individual with an ownership interest in the applicant; or
(3) an entity with an ownership interest in the applicant. : Yes

✔ **Select Individual or Entity:** : Individual

Individual

[redacted]

✔ **Address Verified?** : Yes

Cannabis Entity's Primary Contact/Responsible Person

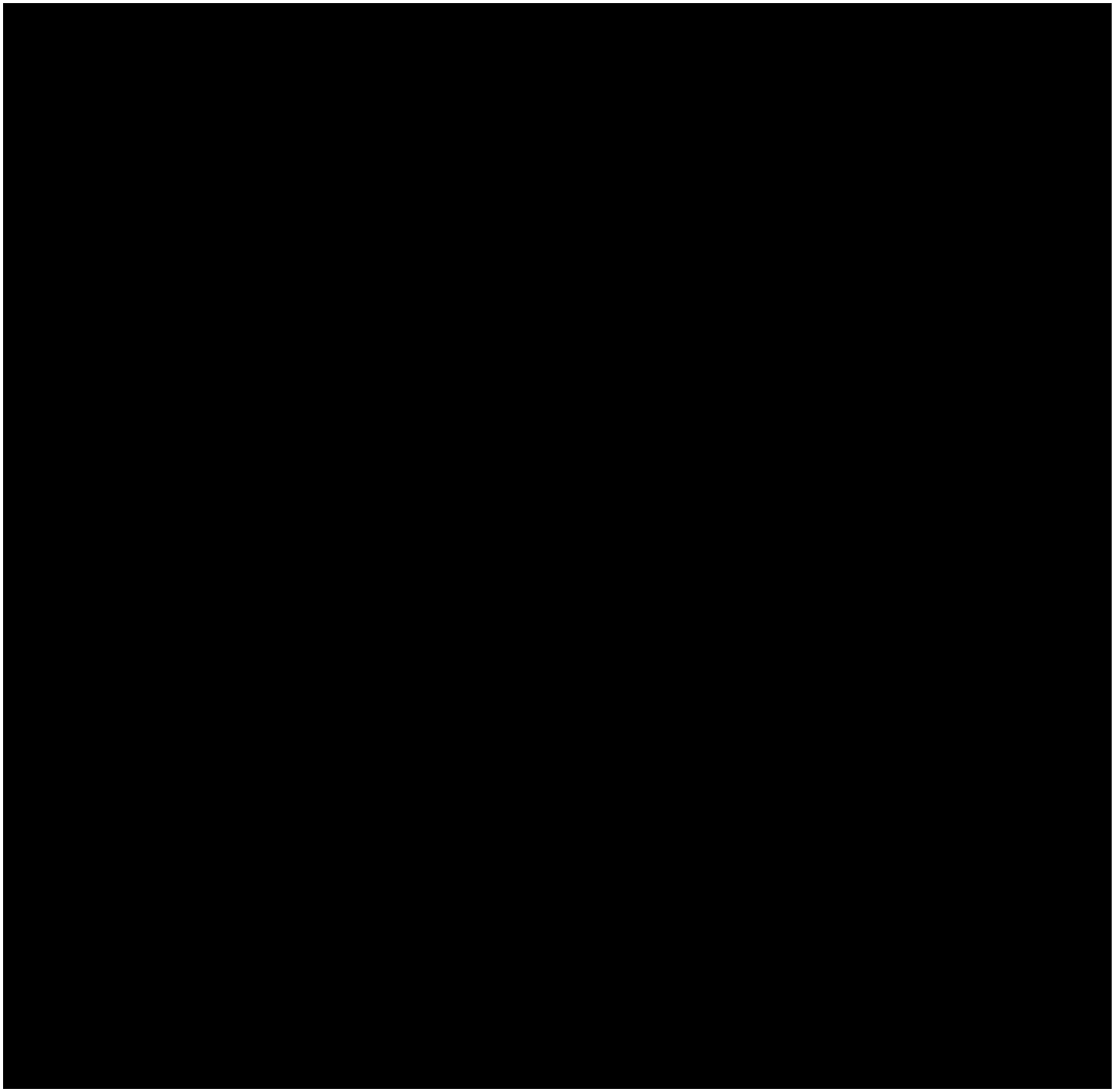
[redacted]

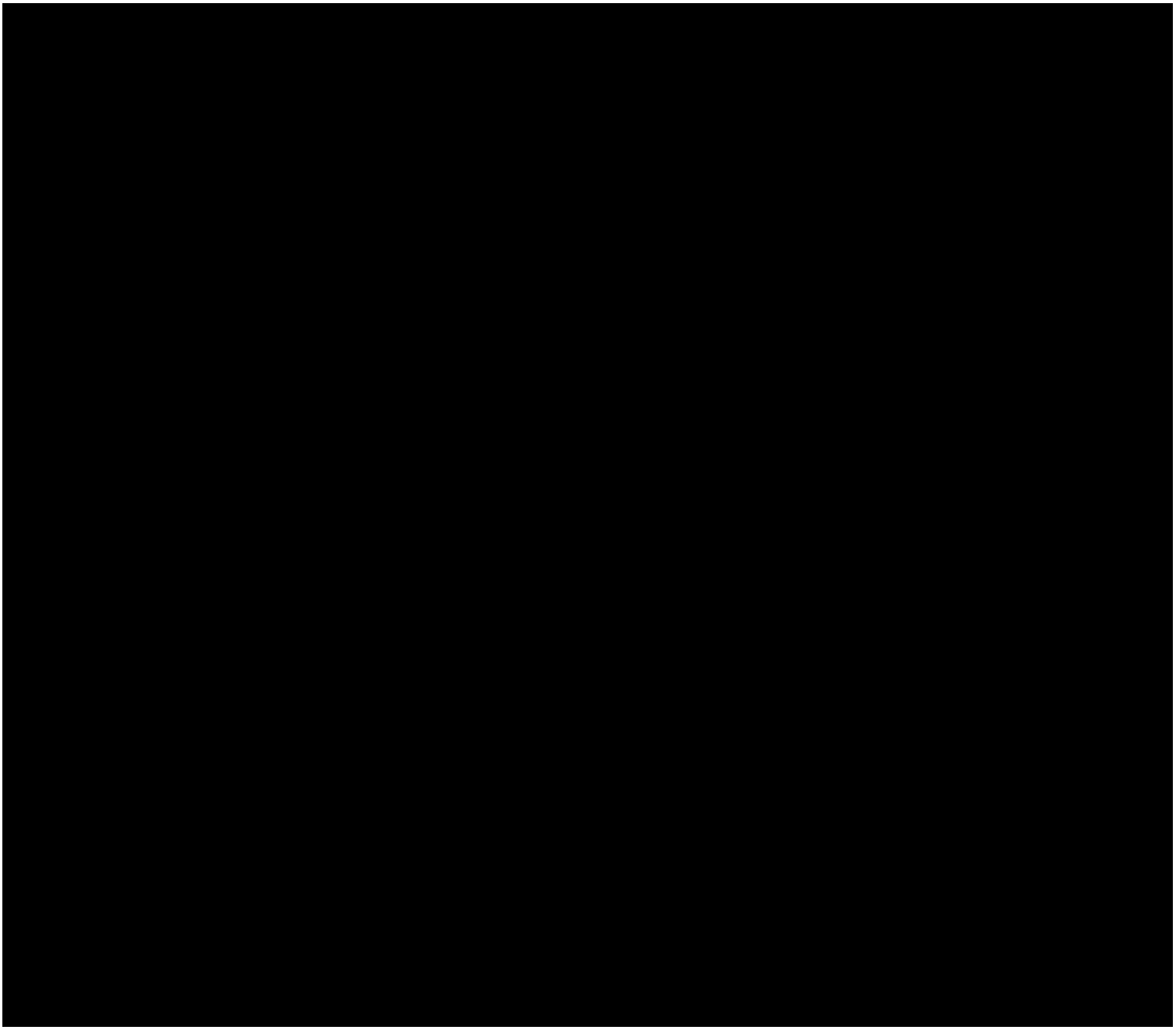
Cannabis Entity's Primary Contact/Responsible Person

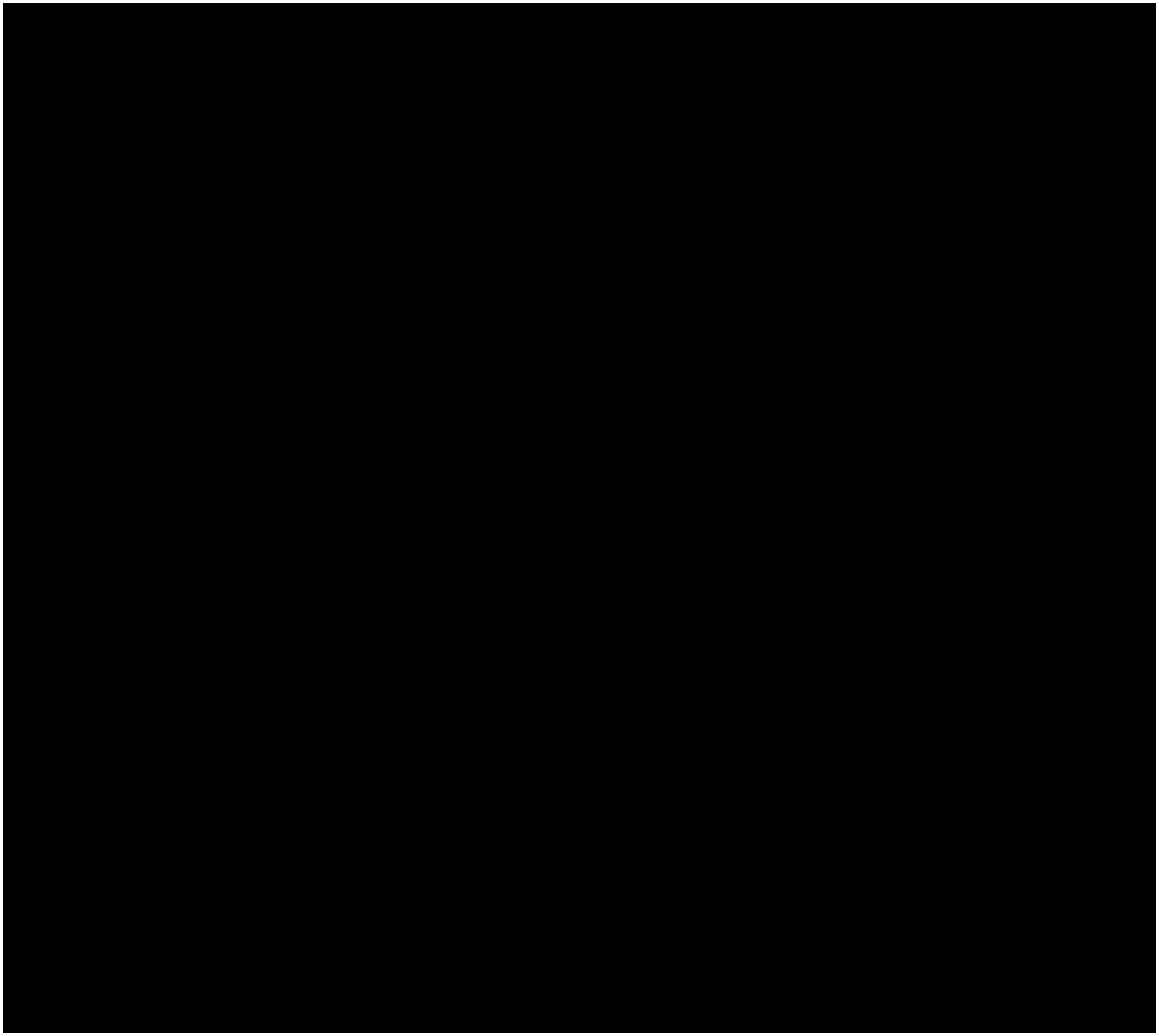
[redacted]

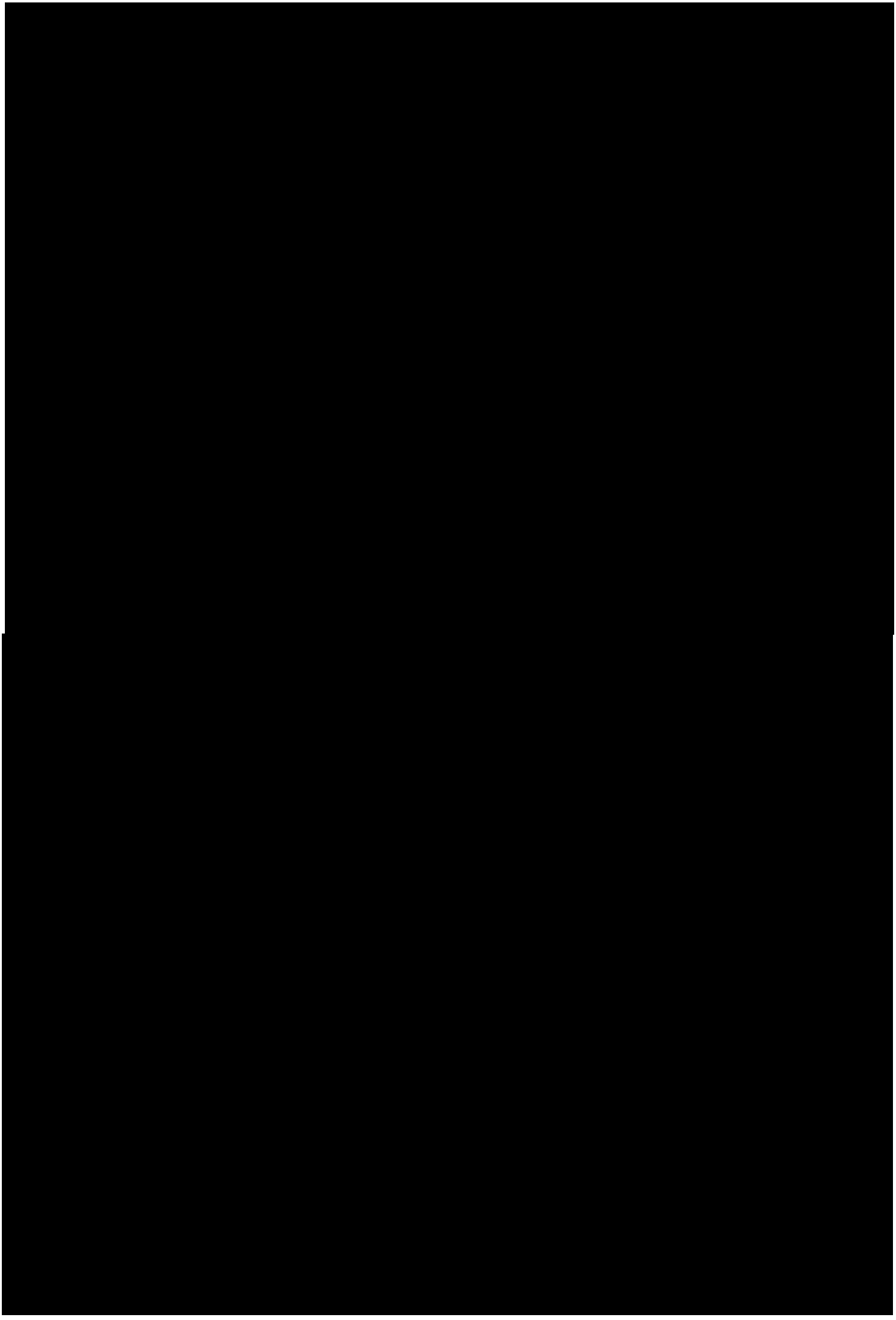
Individual

[redacted]

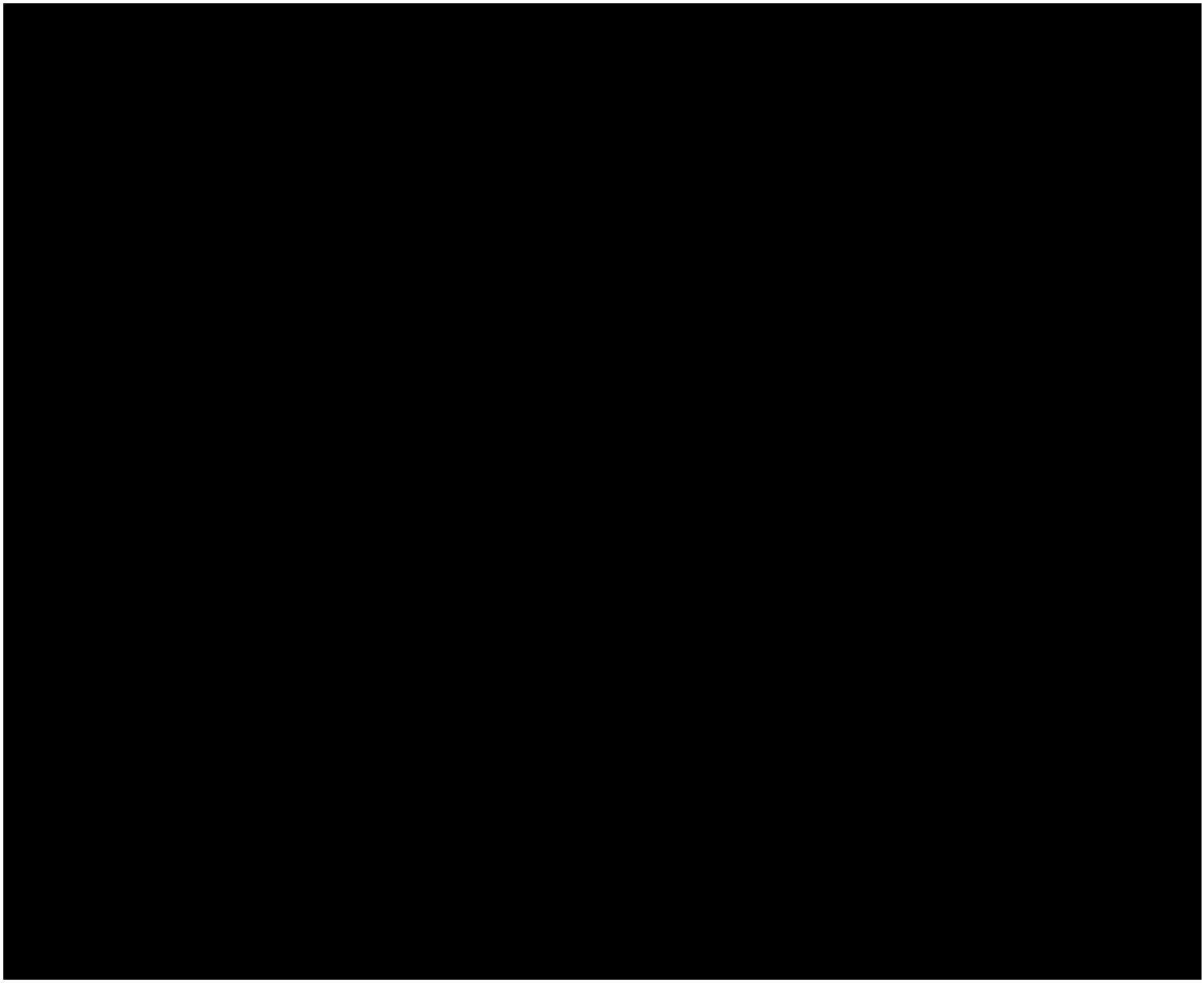


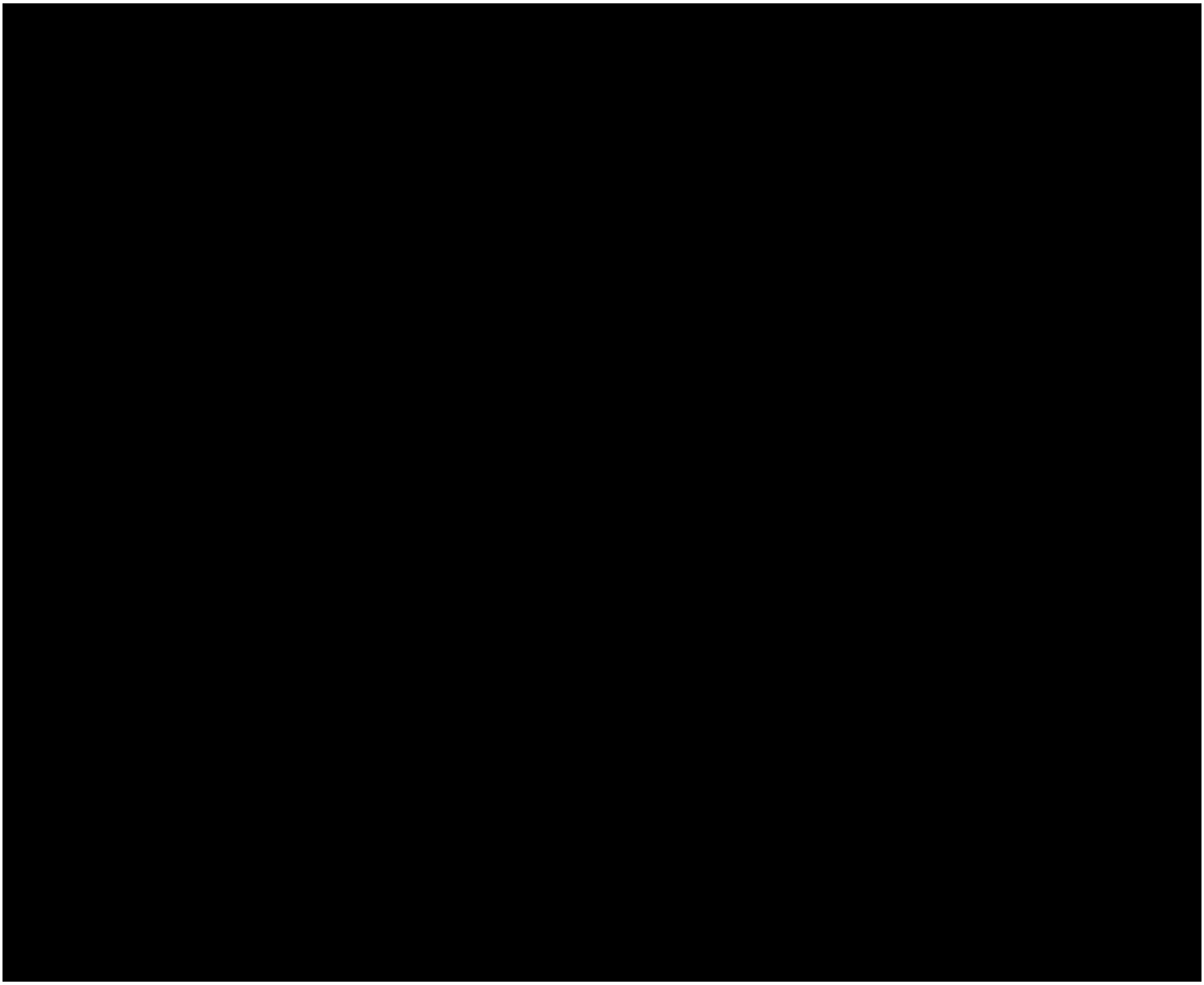


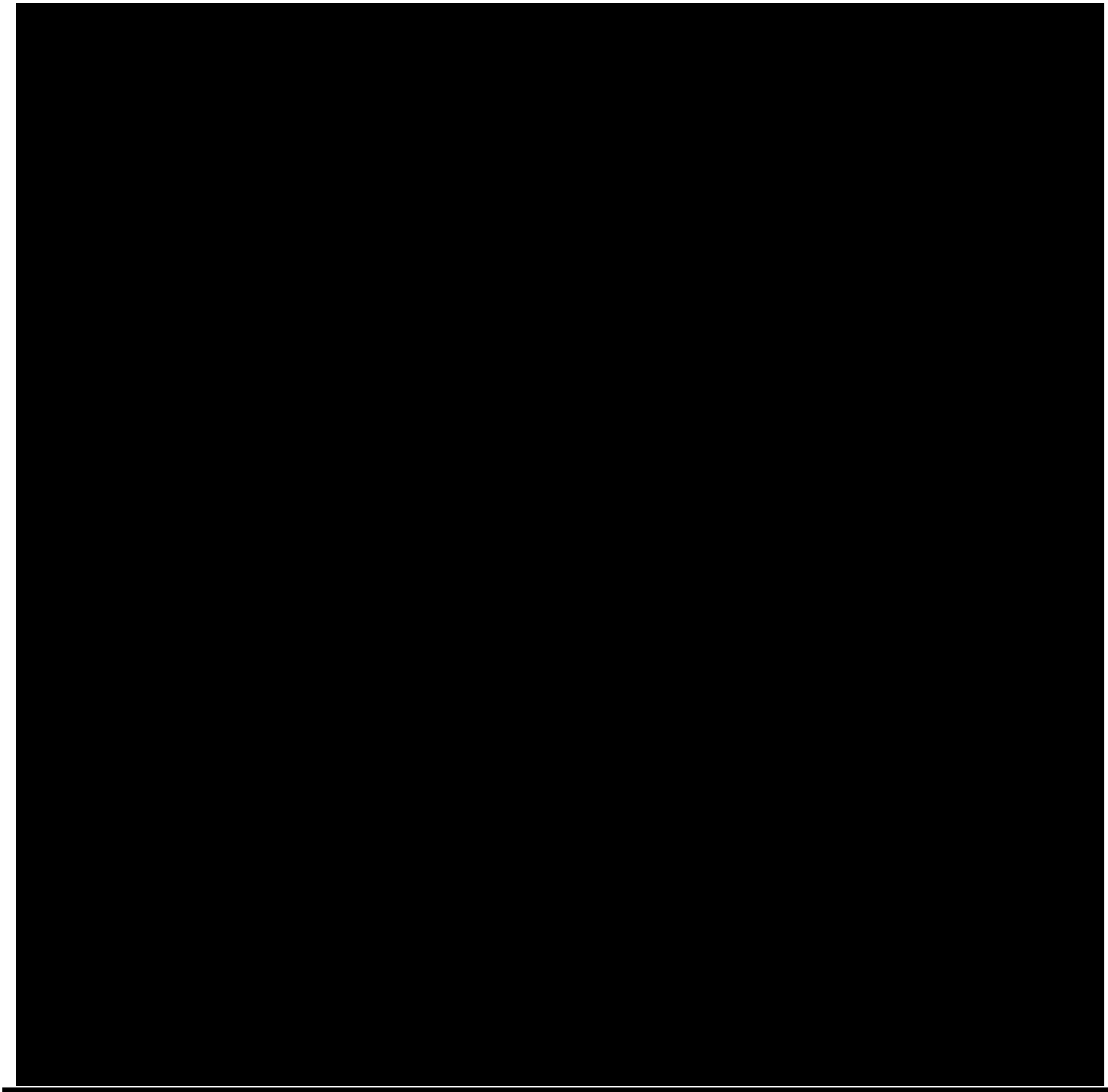


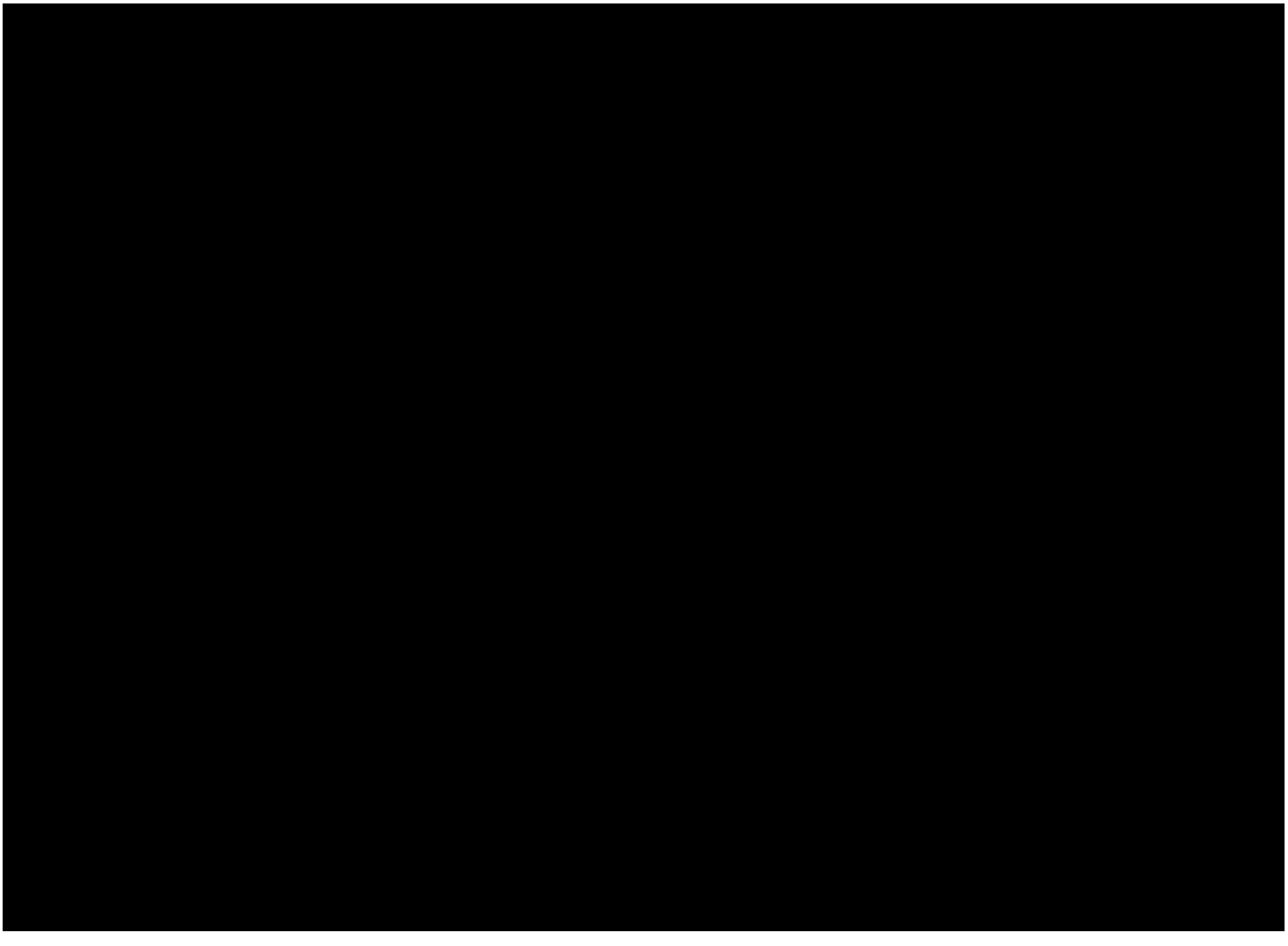


✔ **Address Verified?** : Yes





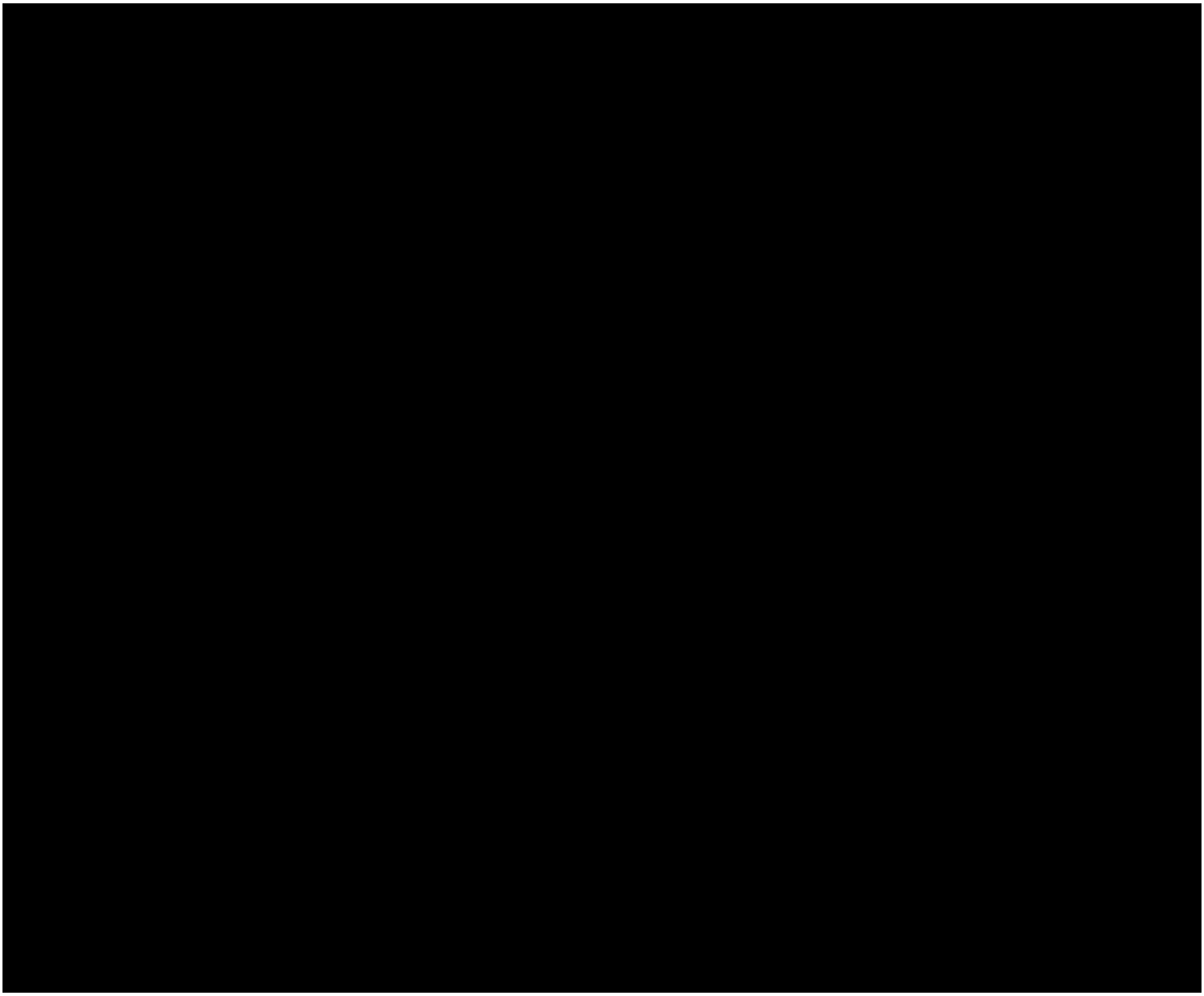




[redacted]

[redacted]

✔ **Select Individual or Entity:** Individual



[redacted]

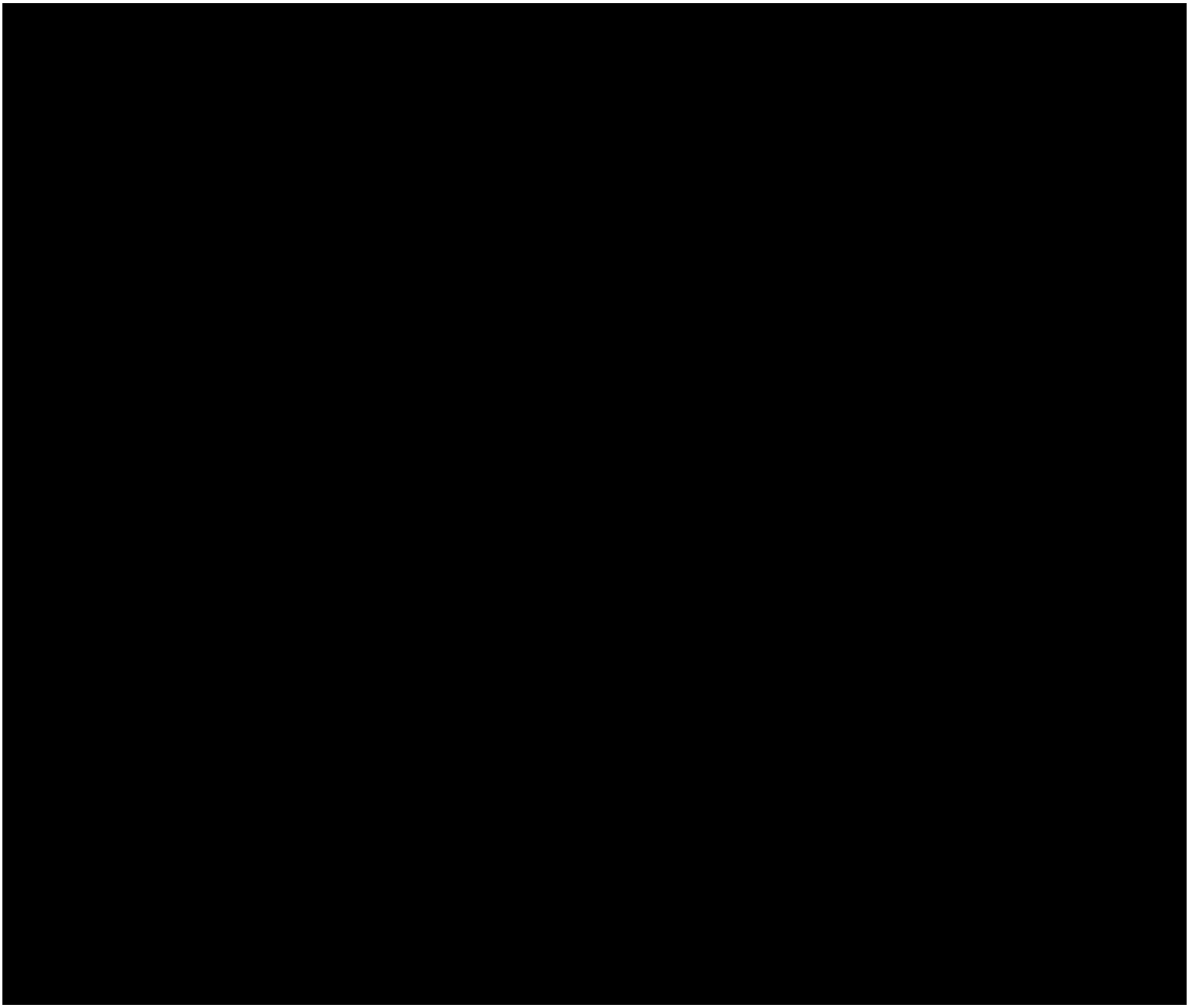
Questions and Attestations

- ✔ **Has the applicant, any ownership entity, or any cannabis entity connected to any individual or entity with an ownership interest in the applicant ever applied for or been granted any commercial license or certificate (not related to cannabis industry) issued by a licensing board or commission, either in Alabama or any other jurisdiction?** : NO

- ✔ **Was any commercial license or certificate disclosed above denied, restricted, suspended, revoked, or non-renewed?:** NO

- ✔ **Has the applicant, any ownership entity, or any cannabis entity connected to any individual or entity with an ownership interest in the applicant, ever been authorized to participate in the cannabis or medical cannabis industry, licensed (i.e., a "licensee" as defined in Chapter 1 of the AMCC Rules), or provided similar status in any other jurisdiction?** : YES

[redacted]



- **Has the applicant, any ownership entity, or any cannabis entity connected to any individual or entity with an ownership interest in the applicant, within the last ten (10) years, filed or been served with a complaint or other notice by any governmental body, regarding a delinquency in the payment of, or a dispute over the filings concerning the payment of, any tax required under federal, state, or local law?** : NO

- **Has the applicant filed, or had filed against it, any proceeding for bankruptcy within the past 7 years?:** NO

- **Is the applicant currently, or has it been in the past 10 years, a defendant in litigation involving any of its business practices?:** NO

- **Is any public official of any unit of government:**
  (1) an owner (directly or indirectly) of any financial or beneficial interest in the applicant;
  (2) a creditor of the applicant;
  (3) a holder of any debt instrument issued by the applicant; or (4) a holder of, or interested party in, any contractual or service relationship with the applicant? : NO

- **Is the spouse, parent or child of a public official of any unit of government:**
  (1) an owner (directly or indirectly) of any financial or beneficial interest in the applicant;
  (2) a creditor of the applicant;
  (3) a holder of any debt instrument issued by the applicant; or
  (4) a holder of, or interested party in, any contractual or service relationship with the applicant? : NO

- **Has any owner, director, board member, or individual with a controlling interest in the applicant ever been indicted for, charged with, arrested for, convicted of, pled guilty or nolo contendere to, or forfeited bail concerning any felony or controlled substance-related misdemeanor, not including traffic violations, regardless of whether the offense has been reversed on appeal or otherwise?** : NO

- **Has any leader, secure transport driver, or secure transport passenger of the applicant received a criminal conviction within the last eight years for any of the following:**
  (1) any indictable offense;
  (2) any offense involving stolen property or vehicles;
  (3) fraud relating to any business any driver has owned, in whole or part, or in which the driver has been employed;
  (4) stolen property, or other offense of similar nature;
  (5) operation of a motor vehicle while under the influence of a controlled substance, or offense of similar nature; or (6) any offense involving possession, distribution or trafficking in, any illegal substance? : NO

What is the applicant's anticipated or actual number of employees (including all facilities) at the prospective commencement of operations and during the first five calendar years thereafter?

- **Commencement of Operation** : 150
- **Year One:** 200
- **Year Two:** 300
- **Year Three:** 400
- **Year Four:** 400
- **Year Five:** 400

- **Does the applicant verify that it has the ability to maintain adequate minimum levels ($2,000,000) of liability and casualty insurance, as required by § 20-2A-53(a)(2), Code of Alabama 1975 (as amended)?** : Yes

- **Does the applicant verify that each of its proposed dispensing sites is at least 1000 feet from any school, daycare, or childcare facility?:** YES

✔ **Does the applicant consent as required by § 20-2A-55(d), Code of Alabama 1975 (as amended) to the inspections, examinations, searches, and seizures contemplated by § 20-2A-52(a)(3), Code of Alabama 1975 (as amended), which shall specifically extend to all secure transport vehicles of the applicant?**	:	YES
✔ **Does the applicant verify that neither it nor its leadership have any economic interest in any other license or applicant for license under the Act? (See § 20-2A-55(e), Code of Alabama 1975 (as amended))**	:	YES
✔ **I attest that this application is truthful and complete based on the best available information as of the date of filing.:**		YES

✔ **Signature:** Jon Loevy

✔ **Signature Date:** 12/26/2022

Documents

✔ **Resume or Curriculum Vitae of Individuals with Ownership Interest:**	1693_01_Resume or Curriculum of Individuals with Ownership Interest in Applican…
✔ **Residency of Owners:**	1693_02_Residency of Owners_Amended.pdf (./api/documents/HwhVMjfIL/downl…
✔ **Commercial Horticulture or Agronomic Production Experience of Owners:**	1693_03_Commercial Horticulture or Agronomic Production Experience_Amended…
✔ **Criminal Background Check:**	1693_04_Criminal Background Check_Corrected.pdf (./api/documents/sOiEvD75b…
✔ **Minimum Performance Bond Requirement:**	1693_05_Minimum Performance Bond Requirement_Corrected.pdf (./api/docume…
✔ **Minimum Liquid Assets Requirement:**	1693_06_Minimum Liquid Assets Requirement_Corrected.pdf (./api/documents/p…
✔ **Demonstration of Sufficient Capital:**	1693_07_Demonstration of Sufficient Capital_Amended.pdf (./api/documents/XX-…
✔ **Minimum Operating Capital Requirement:**	1693_08_Minimum Operating Capital Requirement_Amended.pdf (./api/document…
✔ **Financial Statements:**	1693_09_Financial Statements_Amended.pdf (./api/documents/Il54p7cGz/downl…
✔ **Tax Plan:**	1693_10_Tax Plan.pdf (./api/documents/WxgEKHIXy/download)
✔ **Business Formation Documents:**	1693_11_ Business Formation Documents.pdf (./api/documents/s1-j7Ht5M/down…
✔ **Business License and Authorization of Local Jurisdictions:**	1693_12_Business License and Authorization of Local Authorities_Amended.pdf (….
✔ **Business Plan:**	1693_13_Business Plan_Amended.docx (1).pdf (./api/documents/5sjeFXqfI/down…
✔ **Evidence of Business Relationship with other Licensees and Prospective Licensees:**	1693_14_Evidence of Business Relationship with Other Licensees and Prospective…
✔ **Coordination of Information from Registered Certifying Physicians:**	1693_15_Coordination of Information from Registered Certifying Physicians_Ame…
✔ **Point-of-Sale Responsibilities:**	1693_16_ Point-of-Sale Responsibilities_Amended.pdf (./api/documents/bAm2tH…
✔ **Confidentiality of Patient Information:**	1693_17_ Confidentiality of Patient Information.pdf (./api/documents/TCuYRqfvH…

✔ **Money Handling and Taxes:**	1693_18_Money Handling and Taxes_Amended.pdf (./api/documents/xOKeswxs5…
✔ **Standard Operating Plan and Procedures:**	1693_19_Standard Operating Plans and Procedures_Amended.pdf (./api/documen…
✔ **Policies and Procedures Manual:**	1693_20_Policies and Procedures Manual.pdf (./api/documents/0ONNmyyZj/dow…
✔ **Production and Manufacturing Process:**	1693_21_Production & Manufacturing Process_Amended.pdf (./api/documents/hi…
✔ **Machinery and Equipment:**	1693_22_Machinery and Equipment_Amended.pdf.zip (./api/documents/I6CsEeX…
✔ **Receiving and Shipping Plan:**	1693_23_Receiving and Shipping Plan_Amended.pdf (./api/documents/fkudQA4s…
✔ **Secure Transport Vehicles:**	1693_24_Secure Transport Vehicles_Amended.pdf (./api/documents/bg8fFizk8/d…
✔ **Compliance with Alabama Public Service Commission Requirements:**	1693_25_Compliance with Alabama Public Service Commission Requirements_A…
✔ **Commercial Drivers' License:**	1693_26_Commercial Driver's License_Amended.pdf (./api/documents/b4ksP7jzY…
✔ **Fleet Summary:**	1693_27_Fleet Summary_Amended.pdf (./api/documents/SrP_xC-kj/download)
✔ **Care and Maintenance of Vehicles:**	1693_28_Care and Maintenance of Vehicles_Amended.docx.pdf (./api/documents…
✔ **Route Plans:**	1693_29_Route Plans_Amended.pdf (./api/documents/3SDT8wYK0/download)
✔ **Plan for Segregation of Processes Within and Transportation Between Facilities:**	1693_30_Plan for Segregation of Processes Within and Transportation Between Fa…
✔ **Facilities:**	1693_31_Facilities_Amended.pdf (./api/documents/Wp7VDV2C2/download)
✔ **Engineering Plans and Specifications:**	1693_32_Engineering Plans and Specifications (Cultivation Facilities)_Amended.p…
✔ **Security Plan:**	1693_33_Security Plan_Amended.docx.pdf (./api/documents/JXK1KJ8KK/downlo…
✔ **Personnel:**	1693_34_Personnel_Amended.pdf (./api/documents/pXuOW5P8h/download)
✔ **Business Leadership Credentials:**	1693_35_Business Leadership Credentials_Amended.pdf (./api/documents/ZtM2e…
✔ **Employee Handbook:**	1693_36_Employee Handbook_Amended.pdf (./api/documents/ScYY5LbUC/down…
✔ **Secure Transport Drivers:**	1693_37_Secure Transport Drivers_Amended.pdf (./api/documents/lKIchza7f/do…
✔ **Drivers' Manual:**	1693_38_Driver's Manual_Amended.docx.pdf (./api/documents/u4KuGoqMn/dow…
✔ **Quality Control and Quality Assurance Plan:**	1693_39_Quality Control and Quality Assurance Plan_Amended.pdf (./api/docume…
✔ **Contamination and Recall Plan:**	1693_40_Contamination and Recall Plan_Amended.docx.pdf (./api/documents/_4…
✔ **Marketing and Advertising Plan:**	1693_41_Marketing and Advertising Plan_Amended.pdf (./api/documents/oycHho…

✔ **Website and Social Media:**	1693_42_Website and Social Media_Amended.pdf (./api/documents/MVeKC97F2/…
✔ **Ownership Entity Individuals (if applicable):**	Black Owned Proof _reduced_.pdf (./api/documents/2VbrWGcY4/download)
✔ **Minority Ownership Documents:**	1693_Minority Ownership Documents_Amended.pdf (./api/documents/Hk6VABsx…
✔ **Proof of Minimum Liability and Casualty Insurance:**	1693_Proof of Minimum Liability and Casualty Insurance.pdf (./api/documents/kZ…
✔ **Affidavit - Entity Applicant:**	1693_FORM-K-Affidavit-of-Entity-Applicant-for-License.pdf (./api/documents/I5pW…

Payments

✔ **Payment Options:** Credit Card

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 1- Resume or Curriculum Vitae of Individuals with Ownership Interest in Applicant

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**12/28/22**
Signature of Verifying Individual	**Verification Date**

FORM A: OWNERSHIP RESUME / CURRICULUM VITAE

Justice Cannabis Alabama LLC
B
[redacted]
Individual with Ownership Interest in Applicant

Integrated Facility
License Type

24.5%
Individual's Ownership Percentage in Applicant

Residential History

Provide all residential addresses, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted]
Residential Street Address

[redacted]
City

AL
State

35211
Zip

[redacted]
Date Resided From (MM/YYYY)

[redacted]
Date Resided To (MM/YYYY)

Residential Street Address

City

State

Zip

Date Resided From (MM/YYYY)

Date Resided To (MM/YYYY).

Residential Street Address

City

State

Zip

Date Resided From (MM/YYYY)

Date Resided To (MM/YYYY)

Residential Street Address

City

State

Zip

Date Resided From (MM/YYYY)

Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Education

Provide all institutions of higher education attended; attach additional form(s) if necessary.

Institution	City	State
University of AL at Birmingham	Birmingham	AL

Date Attended From (MM/YYYY)	Date Attended To (MM/YYYY)	Degree Received
08/2005	12/2009	Master of Science

Institution	City	State
University of AL at Birmingham	Birmingham	AL

Date Attended From (MM/YYYY)	Date Attended To (MM/YYYY)	Degree Received
08/1977	12/1981	Bachelor of Science

Institution	City	State
University of Alabama at Birminghqm	Birmingham	AL

Date Attended From (MM/YYYY)	Date Attended To (MM/YYYY)	Degree Received
08/2005	08/2008	Graduate Cert./Low Vision Rehab.

Institution	City	State

Date Attended From (MM/YYYY)	Date Attended To (MM/YYYY)	Degree Received

Employment History

Provide all employers, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

Employer	Contact Person	Telephone
[redacted]	[redacted]	

Business Address: [redacted]

City	State	Zip
[redacted]	AL	35211

Date Employed From (MM/YYYY)	Date Employed To (MM/YYYY)
[redacted]	[redacted]

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

[redacted] | AL | 35205

City | State | Zip

[redacted] | [redacted]

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

[redacted] | AL | 35209

City | State | Zip

[redacted] | [redacted]

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

[redacted] | AL | 35068

City | State | Zip

[redacted] | [redacted]

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Form A: Ownership Resume / Curriculum Vitae
Page 4

Employer　　Contact Person　　Telephone

Business Address

City　　State　　Zip

Date Employed From (MM/YYYY)　　Date Employed To (MM/YYYY)

Employer　　Contact Person　　Telephone

Business Address

City　　State　　Zip

Date Employed From (MM/YYYY)　　Date Employed To (MM/YYYY)

Employer　　Contact Person　　Telephone

Business Address

City　　State　　Zip

Date Employed From (MM/YYYY)　　Date Employed To (MM/YYYY)

Employer　　Contact Person　　Telephone

Business Address

City　　State　　Zip

Date Employed From (MM/YYYY)　　Date Employed To (MM/YYYY)

FORM A: OWNERSHIP RESUME / CURRICULUM VITAE

Justice Cannabis Alabama LLC — Business Name

Integrated Facility — License Type

[redacted] — Individual with Ownership Interest in Applicant

24.5% — Individual's Ownership Percentage in Applicant

Residential History

Provide all residential addresses, in reverse chronological order, for 15 years prior to date of application;

[redacted] — Residential Street Address

[redacted] — City

AI — State

35211 — Zip

[redacted] — Date Resided From (MM/YYYY)

Date Resided To (MM/YYYY)

Residential Street Address

City

State

Zip

Date Resided From (MM/YYYY)

Date Resided To (MM/YYYY).

Residential Street Address

City

State

Zip

Date Resided From (MM/YYYY)

Date Resided To (MM/YYYY)

Residential Street Address

City

State

Zip

Date Resided From (MM/YYYY)

Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Education

Provide all institutions of higher education attended; attach additional form(s) if necessary.

[redacted] | Birmingham | Al

Institution | City | State

[redacted] | Internation Business Machine Accounting

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Employment History

Provide all employers, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

Birmingham | Al | 35205

City | State | Zip

[redacted]

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Form A: Ownership Resume / Curriculum Vitae
Page 4

Employer	Contact Person	Telephone

Business Address

City	State	Zip

Date Employed From (MM/YYYY)	Date Employed To (MM/YYYY)

Employer	Contact Person	Telephone

Business Address

City	State	Zip

Date Employed From (MM/YYYY)	Date Employed To (MM/YYYY)

Employer	Contact Person	Telephone

Business Address

City	State	Zip

Date Employed From (MM/YYYY)	Date Employed To (MM/YYYY)

Employer	Contact Person	Telephone

Business Address

City	State	Zip

Date Employed From (MM/YYYY)	Date Employed To (MM/YYYY)

Form A: Ownership Resume / Curriculum Vitae
Page 5

FORM A: OWNERSHIP RESUME / CURRICULUM VITAE

JusticeCannabisAlabama, LLC — Business License Applicant Name

Integrated — License Type

[redacted] — Individual with Ownership Interest in Applicant

5% — Individual's Ownership Percentage in Applicant

Residential History

Provide all residential addresses, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted]

Residential Street Address

[redacted] NV 89138

City State Zip

[redacted]

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

[redacted]

Residential Street Address

[redacted] NV 89138

City State Zip

[redacted]

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY).

[redacted]

Residential Street Address

[redacted] CA 93933

City State Zip

[redacted]

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

[redacted]

Residential Street Address

[redacted] NV 89145

City State Zip

[redacted]

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

[redacted]

Residential Street Address

[redacted] AZ 85004

City State Zip

[redacted]

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

[redacted]

Residential Street Address

[redacted] AZ 85281

[redacted]

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

[redacted]

Residential Street Address

Phoenix AZ 85032

City State Zip

[redacted]

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

[redacted]

Residential Street Address

Savannah GA 31409

City State Zip

[redacted]

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

Residential Street Address

City State Zip

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

Education

Provide all institutions of higher education attended; attach additional form(s) if necessary.

Harvard Business School | Cambridge | MA
Institution | City | State

[redacted]

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Harvard Business School | Cambridge | MA
Institution | City | State

[redacted]

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Arizona State University | Tempe | AZ
Institution | City | State

[redacted]

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Employment History

Provide all employers, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

Edgewood | IL | 62426
City | State | Zip

[redacted]

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

Encinitas | CA | 92024

City | State | Zip

[redacted]

[redacted]

[redacted]

Business Address

Las Vegas | NV | 89109

City | State | Zip

[redacted]

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

Scottsdale | AZ | 85251

City | State | Zip

[redacted]

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

[redacted]

Employer | Contact Person | Telephone

[redacted]

Phoenix | AZ | 85032

City | State | Zip

[redacted]

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

Savannah | GA | 31409

[redacted]

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

FORM A: OWNERSHIP RESUME / CURRICULUM VITAE

Justice Cannabis Alabama LLC	Integrated License
Business License Applicant Name	License Type
[redacted]	21%
Individual with Ownership Interest in Applicant	Individual's Ownership Percentage in Applicant

Residential History

Provide all residential addresses, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted]

Residential Street Address

Chicago	IL	60625
City	State	Zip

[redacted]

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

[redacted]

Residential Street Address

Chicago	IL	60625

[redacted]

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY).

Residential Street Address

City State Zip

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

Residential Street Address

City State Zip

Date Resided From (MM/YYYY) Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Education

Provide all institutions of higher education attended; attach additional form(s) if necessary.

University of Michigan | AnnArbor | MI

[redacted]

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Columbia Law School | New York City | NY

Institution | City | State

[redacted]

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Employment History

Provide all employers, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

Loevy & Loevey | Jon Loevy | 312-243-5900

Employer | Contact Person | Telephone

[redacted]

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

FORM A: OWNERSHIP RESUME / CURRICULUM VITAE

Justice Cannabis Alabama LLC
Business License Applicant Name

Integrated
License Type

[redacted]
Individual with Ownership Interest in Applicant

21%
Individual's Ownership Percentage in Applicant

Residential History
Provide all residential addresses, in reverse chronological order, for 15 years prior to date of application;

[redacted]
Residential Street Address

Chicago — IL — 60640
City — State — Zip

[redacted]
Date Resided From (MM/YYYY) — Date Resided To (MM/YYYY)

[redacted]
Residential Street Address

Chicago — IL — 60625

[redacted]
Date Resided From (MM/YYYY) — Date Resided To (MM/YYYY).

Residential Street Address

City — State — Zip

Date Resided From (MM/YYYY) — Date Resided To (MM/YYYY)

Residential Street Address

City — State — Zip

Date Resided From (MM/YYYY) — Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Education

Provide all institutions of higher education attended; attach additional form(s) if necessary.

Brandeis University | Waltham | MA

Institution | City | State

[redacted]

Cornell Law School | Ithaca | NY

[redacted]

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

Employment History

Provide all employers, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted]

Chicago | IL | 60607

City | State | Zip

[redacted]

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer Contact Person Telephone

Business Address

City State Zip

Date Employed From (MM/YYYY) Date Employed To (MM/YYYY)

Employer Contact Person Telephone

Business Address

City State Zip

Date Employed From (MM/YYYY) Date Employed To (MM/YYYY)

Employer Contact Person Telephone

Business Address

City State Zip

Date Employed From (MM/YYYY) Date Employed To (MM/YYYY)

Employer Contact Person Telephone

Business Address

City State Zip

Date Employed From (MM/YYYY) Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

FORM A: OWNERSHIP RESUME / CURRICULUM VITAE

Justice Cannabis Alabama LLC
Business License Applicant Name

Integrated
License Type

[redacted]

1%
Individual's Ownership Percentage in Applicant

Residential History
Provide all residential addresses, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted]

Bessemer | Alabama | 35020
City | State | Zip

[redacted]

[redacted]

Bessemer | Alabama | 35007
City | State | Zip

[redacted]

[redacted]

Fultondale | Alabama | 35068
City | State | Zip

[redacted]

[redacted]

Vestavia | Alabama | 35216
City | State | Zip

[redacted]

[redacted]

Pleasant Grove | Alabama | 35127
City | State | Zip

[redacted]

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Education

Provide all institutions of higher education attended; attach additional form(s) if necessary.

Institution	City	State
University of Alabama at Birmingham	Birmingham	Alabama

[redacted]

Date Attended From (MM/YYYY)	Date Attended To (MM/YYYY)	Degree Received

Institution	City	State
University of Alabama at Birmingham	Birmingham	Alabama

[redacted]

Institution	City	State
University of Alabama	Tuscaloosa	Alabama

[redacted]

Institution	City	State

Date Attended From (MM/YYYY)	Date Attended To (MM/YYYY)	Degree Received

Employment History

Provide all employers, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted]

Employer	Contact Person	Telephone

[redacted]

Business Address

City	State	Zip
Birmingham	Alabama	35209

[redacted]

[redacted]

Employer | Contact Person | Telephone

[redacted]

Birmingham | Alabama | 35203

City | State | Zip

[redacted]Y)

Home Depot Warehouse | 205-230-4030

Employer | Contact Person | Telephone

[redacted]

Business Address

McCalla | Alabama | 35111

City | State | Zip

[redacted]MM/YYYY)

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

Birmingham | Alabama | 35242

City | State | Zip

[redacted]

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

Tuscaloosa | Alabama | 35405

City | State | Zip

[redacted]

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

FORM A: OWNERSHIP RESUME / CURRICULUM VITAE

Justice Cannabis Alabama LLC — Business License Applicant Name

Integrated — License Type

[redacted]

1% — Individual's Ownership Percentage in Applicant

Residential History

Provide all residential addresses, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted] — Residential Street Address

Bessemer — City | Alabama — State | 35020 — Zip

[redacted] — Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

[redacted] — Residential Street Address

Alabaster — City | Alabama — State | 35007 — Zip

[redacted] — Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY).

[redacted] — Residential Street Address

Birmingham — City | Alabama — State | 35216 — Zip

[redacted] — Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Education

Provide all institutions of higher education attended; attach additional form(s) if necessary.

[redacted]

Institution | City | State

08/2016 | 05/2018 | Commercial & Residential Electrician Certificate

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

---

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

---

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

---

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

---

Employment History

Provide all employers, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted]

Employer | Contact Person | Telephone

[redacted]

Business Address

Birmingham | Alabama | 35203

City | State | Zip

[redacted]

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer Contact Person Telephone

Business Address

City State Zip

Date Employed From (MM/YYYY) Date Employed To (MM/YYYY)

Employer Contact Person Telephone

Business Address

City State Zip

Date Employed From (MM/YYYY) Date Employed To (MM/YYYY)

Employer Contact Person Telephone

Business Address

City State Zip

Date Employed From (MM/YYYY) Date Employed To (MM/YYYY)

Employer Contact Person Telephone

Business Address

City State Zip

Date Employed From (MM/YYYY) Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

FORM A: OWNERSHIP RESUME / CURRICULUM VITAE

Justice Cannabis Alabama LLC
Business License Applicant Name

Integrated Facility
License Type

[redacted]
Applicant

2%
Individual's Ownership Percentage in Applicant

Residential History

Provide all residential addresses, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

[redacted]

Birmingham
City

AL
State

35211
Zip

[redacted]

[redacted]

Birmingham
City

AL
State

35211
Zip

[redacted]

[redacted]

Birmingham
City

AL
State

35211
Zip

[redacted]

[redacted]

Birmingham
City

AL
State

35211
Zip

[redacted]

Date Resided From (MM/YYYY)

Date Resided To (MM/YYYY)

Residential Street Address

[redacted]

City | State | Zip

Birmingham | AL | 35211

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

[redacted]

Residential Street Address

[redacted]

City | State | Zip

Deerfield | IL | 60015

[redacted]

Residential Street Address

[redacted]

State | Zip

Birmingham | AL | 35211

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

[redacted]

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Residential Street Address

City | State | Zip

Date Resided From (MM/YYYY) | Date Resided To (MM/YYYY)

Education
Provide all institutions of higher education attended; attach additional form(s) if necessary.

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

---

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

---

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

---

Institution | City | State

Date Attended From (MM/YYYY) | Date Attended To (MM/YYYY) | Degree Received

---

Employment History
Provide all employers, in reverse chronological order, for 15 years prior to date of application; attach additional form(s) if necessary.

Employer | Contact Person | Telephone

[redacted]

Zip

Vestavia Hills AL 35242

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

[redacted]

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Employer | Contact Person | Telephone

Business Address

City | State | Zip

Date Employed From (MM/YYYY) | Date Employed To (MM/YYYY)

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 2 - Residency of Owners

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

_____Jon Loevy_____ _____ Co-Owner_____

Printed Name of Verifying Individual Title of Verifying Individual

_____/s/ Jon Loevy_____ _____3/23/23_____

Signature of Verifying IndividualVerification Date

JUSTICE CANNABIS ALABAMA

PROOF OF 51% OWNERSHIP BY ALABAMA RESIDENTS

Table of Contents

Summary

51% of this Applicant business is owned by Alabama residents. These include [redacted], 24.5% ownership, [redacted], 24.5% ownership, [redacted], 1% ownership, and [redacted], 1% ownership. Attached are records providing proof of residence in Alabama for a continuous period of no less than 15 years preceding the date of application.

[redacted]

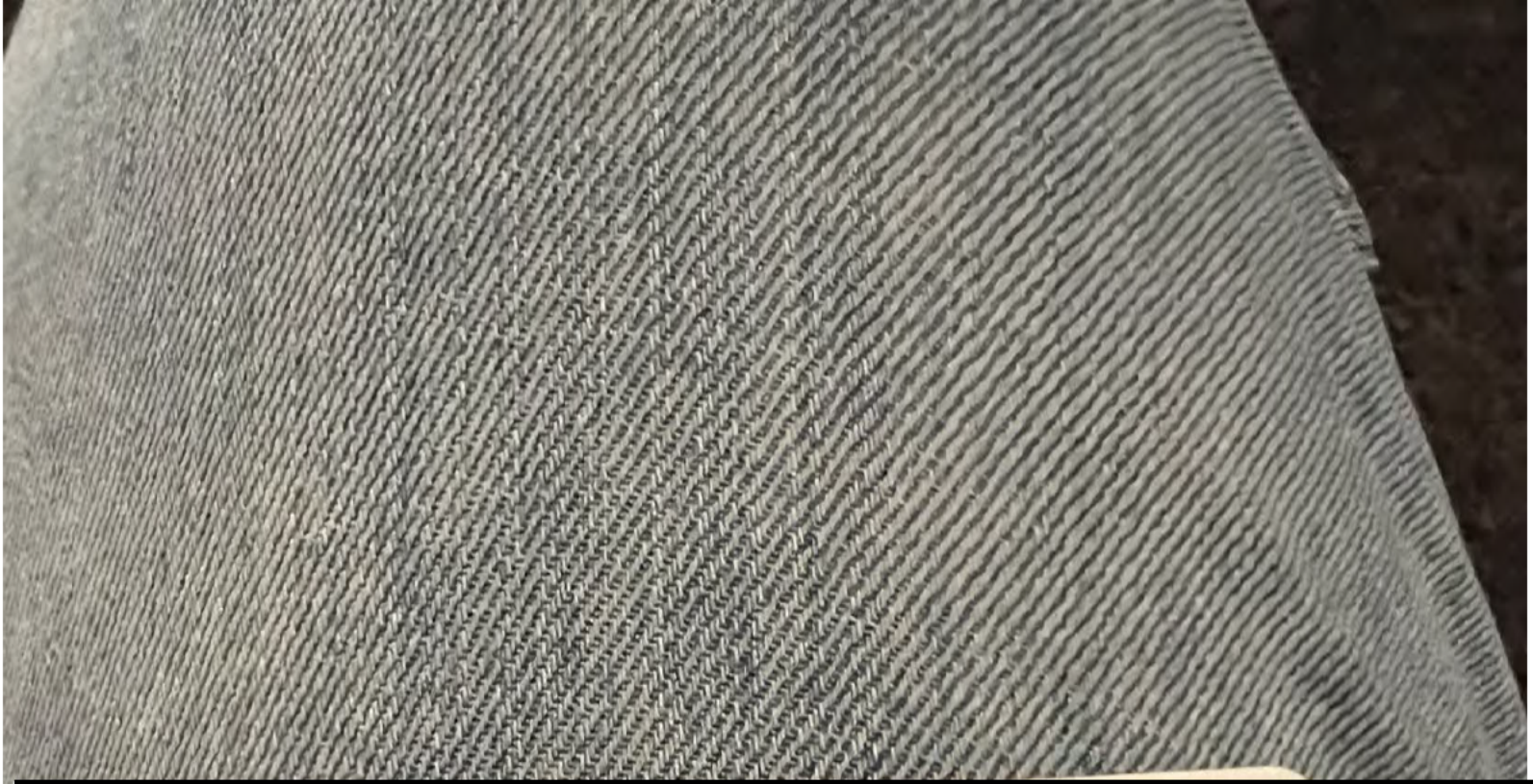
RESIDENCY DOCUMENTS

[redacted]

RESIDENCY DOCUMENTS

[redacted]

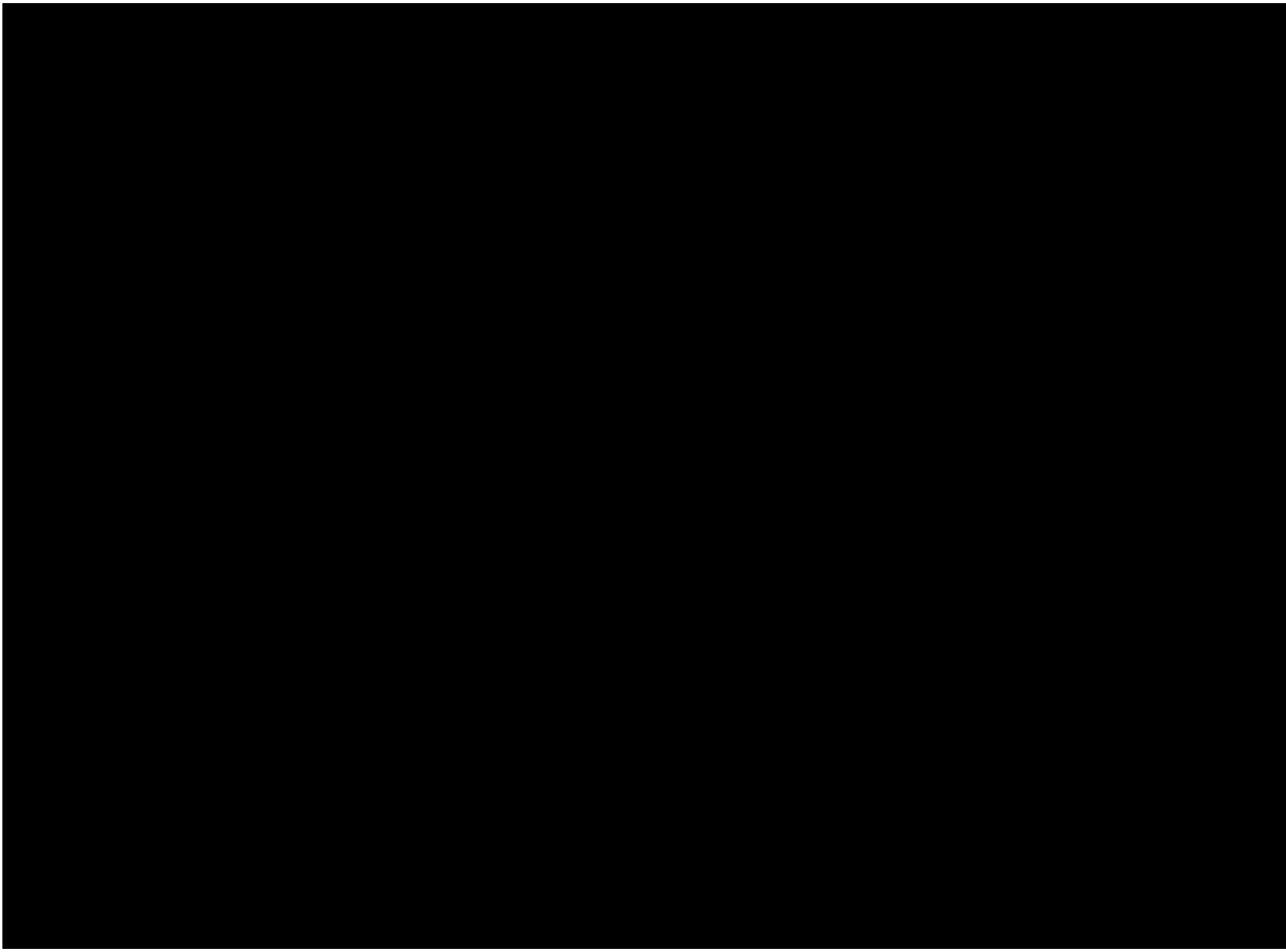
RESIDENCY DOCUMENTS



[redacted]

[redacted]

RESIDENCY DOCUMENTS



Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 3 – Commercial Horticulture or Agronomic Production Experience

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

JUSTICE CANNABIS ALABAMA LLC

PROOF OF MAJORITY OWNERSHIP BY INDIVIDUALS WITH COMMERCIAL HORTICULTURE OR AGRONOMIC PRODUCTION EXPERIENCE

Summary

Our leadership team has approximately 41 years of combined commercial horticulture or agronomic production experience. These individuals include:

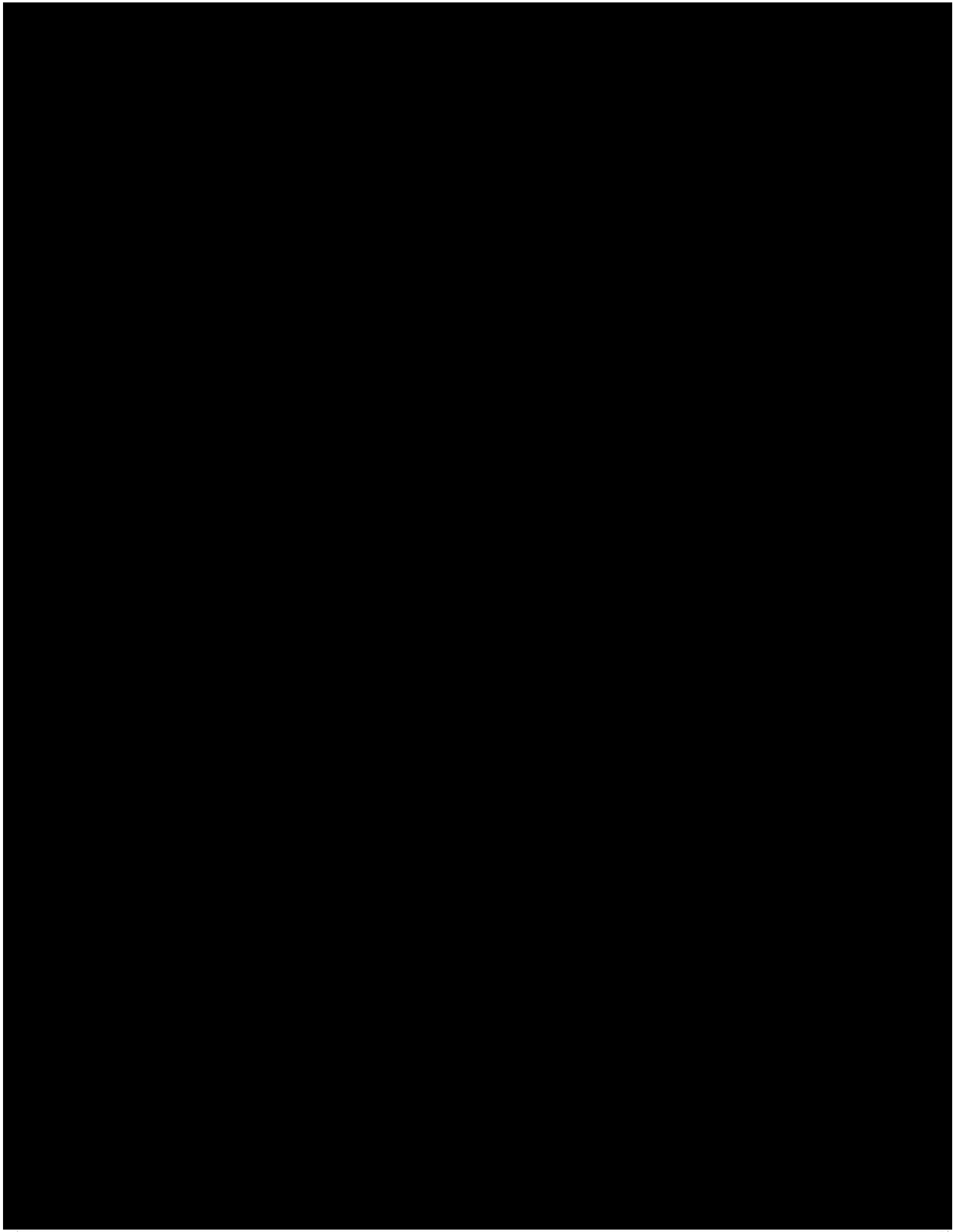
- [redacted] – 21% owner with approximately 8 years of commercial horticulture or agronomic production experience
- [redacted] – 21% owner with approximately 8 years of commercial horticulture or agronomic production experience
- [redacted] – 1% owner with approximately 5 years of commercial horticulture or agronomic production experience
- [redacted] – 1% owner with approximately 5 years of commercial horticulture or agronomic production experience
- [redacted] – 5% owner with over 10 years of commercial horticulture or agronomic production experience
- [redacted] – 2% owner with approximately 5 years of commercial horticulture or agronomic production experience

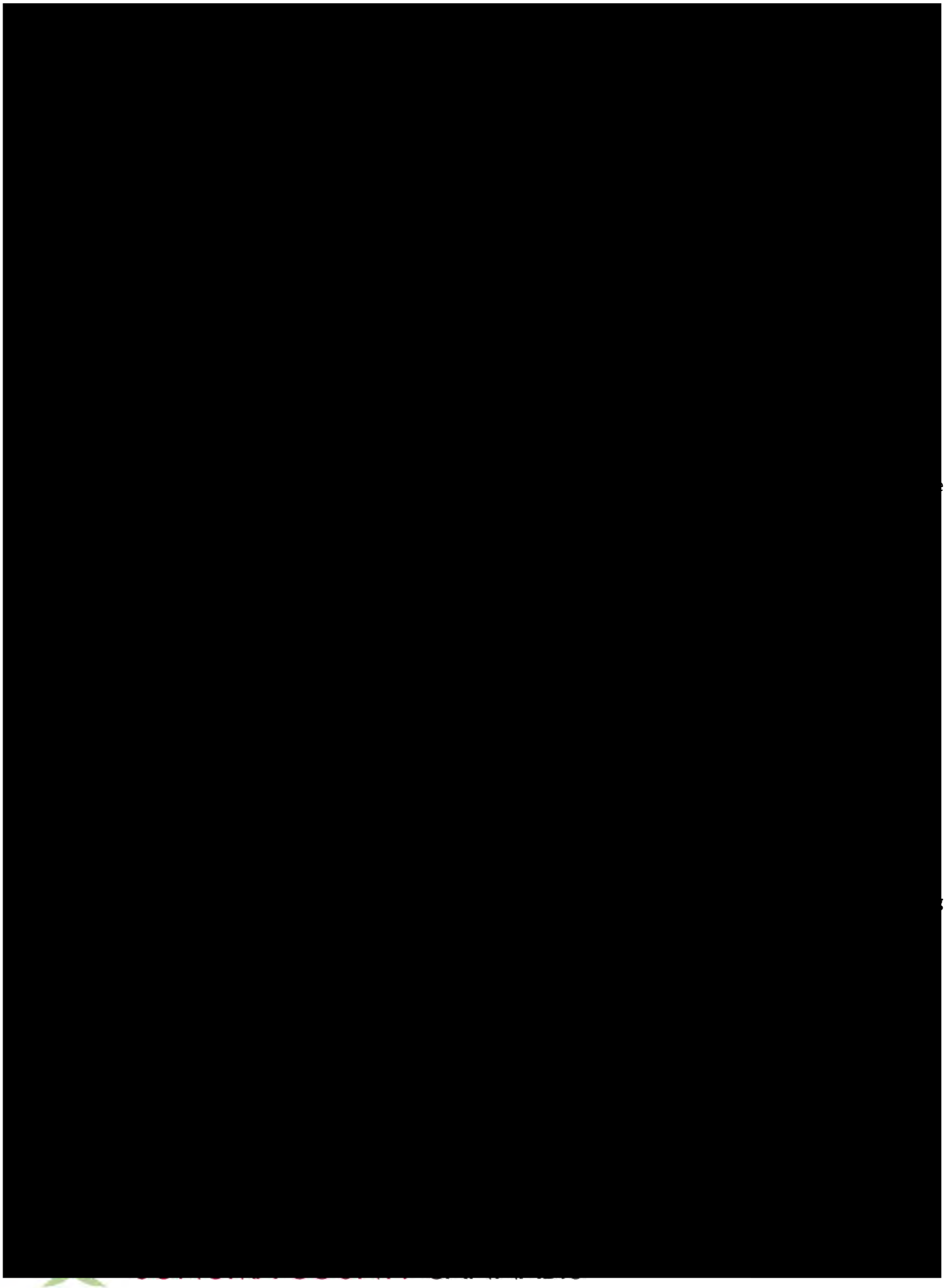
Table of Contents

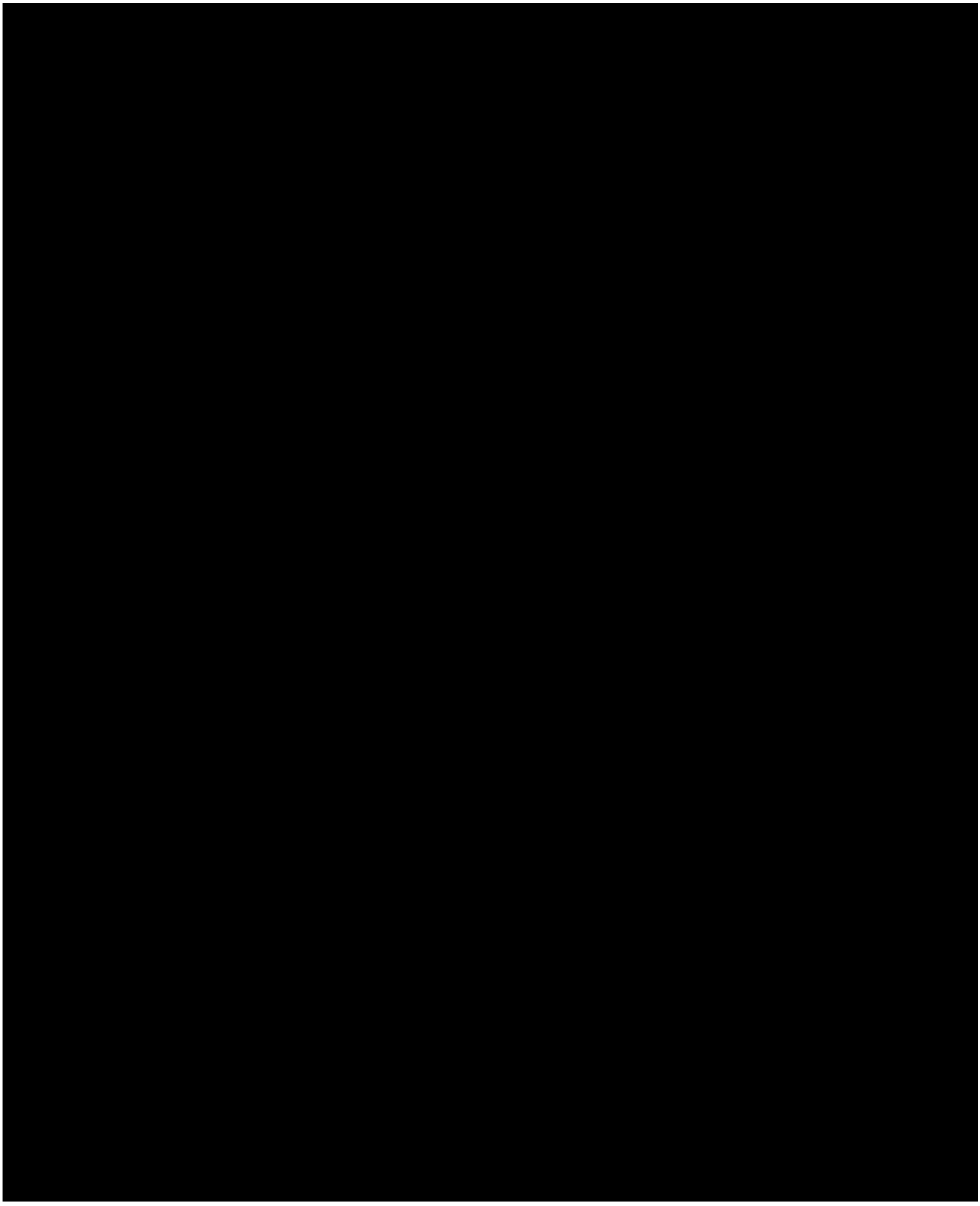
[redacted] a 21% owner, and [redacted], a 21% owner, each have over 8 years of commercial horticulture or agronomic experience as shown in the documents that follow.

Specifically, [redacted] have been engaged in commercial cannabis horticulture in California and in Illinois since 2014 and 2015.

Attached herewith is proof of their cultivation licenses in Illinois and California, and the proof that [redacted] own these licenses.







STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH
MANUFACTURED CANNABIS SAFETY BRANCH

ANNUAL MANUFACTURING LICENSE

MEDICINAL CANNABIS PRODUCTS - PROVISIONAL

LICENSEE:
Matanzas Alliance LLC
Justice Grown

EMISES:
3541 REGIONAL PKWY
SANTA ROSA, CA 95403-8249

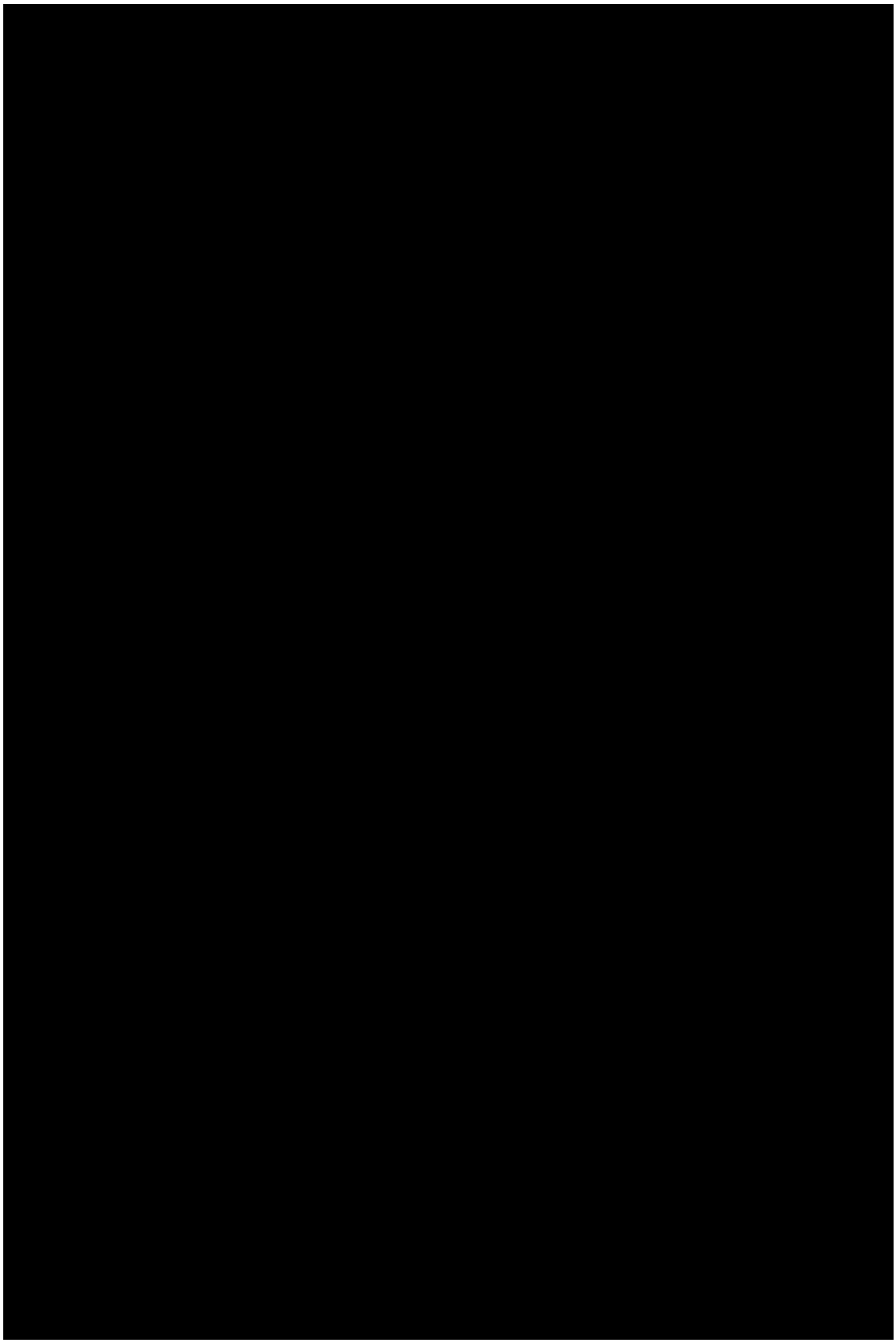
LICENSE NUM CDPH-10003361 **E:** 06/05/2019
LICENSE TYPE Type 6: Non Volatile Solvent Extraction **TE:** 06/05/2020

The licensee named he ugh the expiration date of this license. This ann and Professional Code and is not transferable tured Cannabis Safety Branch of changes per censed premises. This license shall be subje nd that manufacturing operation is in violation

California Department of Public Health
P.O. Box 997377, MS-7606
Sacramento, CA 95899-7377

Asif A. Maan Ph.D.
Chief, Manufactured Cannabis Safety Branch

[redacted] – 1% owner with approximately 5 years of commercial horticulture or agronomic production experience



[redacted] – 1% owner with approximately 5 years of commercial horticulture or agronomic production experience

Better Business Bureau®

Find businesses, charities, category Near Washington Bridge, NY US

Home > Alabama > Bessemer > Zoo Animals > DART Family Farm, LLC

Is this Your Business?

[redacted]

Business Profile

DART Family Farm, LLC

Zoo Animals

Contact Information

600 Eastern Valley Rd
Bessemer, AL 35020

Visit Website

(205) 760-4622

Customer Reviews

This business has 0 reviews

Read Reviews

Be the First to Review!

Customer Complaints

This business has 0 complaints

File a Complaint

BBB Rating & Accreditation

A

THIS BUSINESS IS NOT BBB ACCREDITED

Search for Accredited Businesses in this category

Years in Business: 1

Customer Reviews are not used in the calculation of BBB Rating

Reasons for BBB Rating

Related Categories

Zoo Animals

Business Details

Location of This Business
600 Eastern Valley Rd, Bessemer, AL 35020

BBB File Opened: 5/19/2022

Years in Business: 1

Business Started: 5/3/2021

Business Incorporated: 11/29/2021

Type of Entity: Limited Liability Company (LLC)

Business Management
Mrs. Tasheka Wilson, Owner

Contact Information
Principal
Mrs. Tasheka Wilson, Owner
Customer Contact
Mrs. Tasheka Wilson, Owner

Additional Contact Information

Customer Complaints

0 Customer Complaints

Customer Reviews

0 Customer Reviews

What do you think? Be the first to review!
How BBB Processes Complaints and Reviews

Start a Review

Local BBB

BBB Serving Central & South Alabama

More Info on Local BBB

BBB Reports On

BBB reports on known marketplace practices.

See What BBB Reports On

[redacted] – 5% owner with over 10 years of commercial horticulture or agronomic production experience

[redacted]

Deletion was successful.

[redacted]

Save was successful. ×

[redacted] 2% owner with approximately 5 years of commercial horticulture or agronomic production experience

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 4 – Criminal Background Check

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	Co-Owner
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	12/28/22
Signature of Verifying Individual	**Verification Date**

FORM B: BACKGROUND CHECK APPLICANT VERIFICATION

Justice Cannabis Alabama LLC — Business License Applicant Name

Integrated — License Type

Provide the name and title of each individual identified by § 20-2A-55(b), Code of Alabama 1975 (as amended) (i.e., each owner, shareholder, director, board member, and individual with an economic interest in the Applicant). Attach additional forms if necessary.

NAME	ROLE (select all that apply)
[redacted]	☑ Owner ☑ Shareholder ☐ Director ☐ Board Member ☑ Individual with Economic Interest in Applicant
	☑ Owner ☑ Shareholder ☐ Director ☐ Board Member ☑ Individual with Economic Interest in Applicant
	☑ Owner ☑ Shareholder ☐ Director ☐ Board Member ☑ Individual with Economic Interest in Applicant
	☑ Owner ☑ Shareholder ☐ Director ☐ Board Member ☑ Individual with Economic Interest in Applicant
	☑ Owner ☑ Shareholder ☐ Director ☐ Board Member ☑ Individual with Economic Interest in Applicant
	☑ Owner ☑ Shareholder ☐ Director ☐ Board Member ☑ Individual with Economic Interest in Applicant
	☑ Owner ☑ Shareholder ☐ Director ☐ Board Member ☑ Individual with Economic Interest in Applicant
	☑ Owner ☑ Shareholder ☐ Director ☐ Board Member ☑ Individual with Economic Interest in Applicant
	☐ Owner ☐ Shareholder ☐ Director ☐ Board Member ☐ Individual with Economic Interest in Applicant
	☐ Owner ☐ Shareholder ☐ Director ☐ Board Member __ Individual with Economic Interest in Applicant

<u>**Applicant Verification**</u>: The undersigned hereby verifies that the individuals listed hereinabove (and attached, as necessary) are all of the individuals identified by § 20-2A-55(b), Code of Alabama 1975 (as amended) with respect to the Applicant. The undersigned further verifies that each individual listed hereinabove (and attached, as necessary) has requested a state criminal background check from the Alabama Law Enforcement Agency (ALEA) and a national criminal background check from the FBI.

[redacted]

Printed Name of Verifying Individual

Member

Title of Verifying Individual

[redacted]

☐

12/29/2022

Verification Date

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 5 – Minimum Performance Bond Requirement

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**12/28/22**
Signature of Verifying Individual	**Verification Date**

FORM M: Surety Verification of Applicant Qualification for Integrated Facility Performance Bond

[redacted]

Section A – Applicant Information (to be completed by Applicant)

[redacted]

Integrated Facility Applicant | Contact Person

[redacted]

Applicant Address

Dothan | AL | 36303

City | State | Zip

[redacted]

Section B – Surety Information (to be completed by Surety)

[redacted]

Section C – Surety Verification (to be completed by Surety)

The Surety identified in Section B, by and through its authorized representative, hereby verifies the following statements, as indicated by the initials of the authorized representative.

JMN The Applicant has requested that the Surety provide a professional opinion as to the Applicant's qualifications for the Integrated Facility Performance Bond required by the Alabama Medical Cannabis Commission.

Surety Verification of Applicant Qualifications for
Integrated Facility Performance Bond – Page 2

JMN The Surety has reviewed and understands all obligations required by the Integrated Facility Performance Bond (Alabama Medical Cannabis Commission FORM F).

JMN The Surety has considered all available business information pertinent to the Surety's underwriting requirements regarding the Applicant, in the context of the Integrated Facility Performance Bond, and the Surety hereby confirms the Applicant possesses the requisite qualifications such that Applicant currently qualifies for the Integrated Facility Performance Bond required by the Alabama Medical Cannabis Commission.

JMN The Surety, in the event that the Applicant is awarded an Integrated Facility license by the Alabama Medical Cannabis Commission, will be prepared to execute the Integrated Facility Performance Bond, in the amount of $2,000,000, contingent upon execution of bond agreements, delivery of collateral security, payment of premium and fees, and Applicant's satisfaction of the Surety's underwriting considerations at the time of the Bond request.

JMN The Surety acknowledges and understands that the Integrated Facility Performance Bond must be fully executed and filed with the Alabama Medical Cannabis Commission on or before the date set by the Commission for issuance of any Integrated Facility license awarded to the Applicant.

JMN The Surety's consideration and issuance of bonds is a matter solely between the Surety and the Applicant, and the Surety assumes no liability to third parties, including the Alabama Medical Cannabis Commission, by executing this Surety Verification of Applicant Qualifications for Integrated Facility Performance Bond.

JMN The Surety possesses, at a minimum, an A- rating and verified proof of such rating is attached hereto.

Jacquelyn M Norstrom
_____
Signature of Surety's Authorized Representative

UNITED STATES FIRE INSURANCE COMPANY ★ DELAWARE ★

12/29/2022
_____
Date

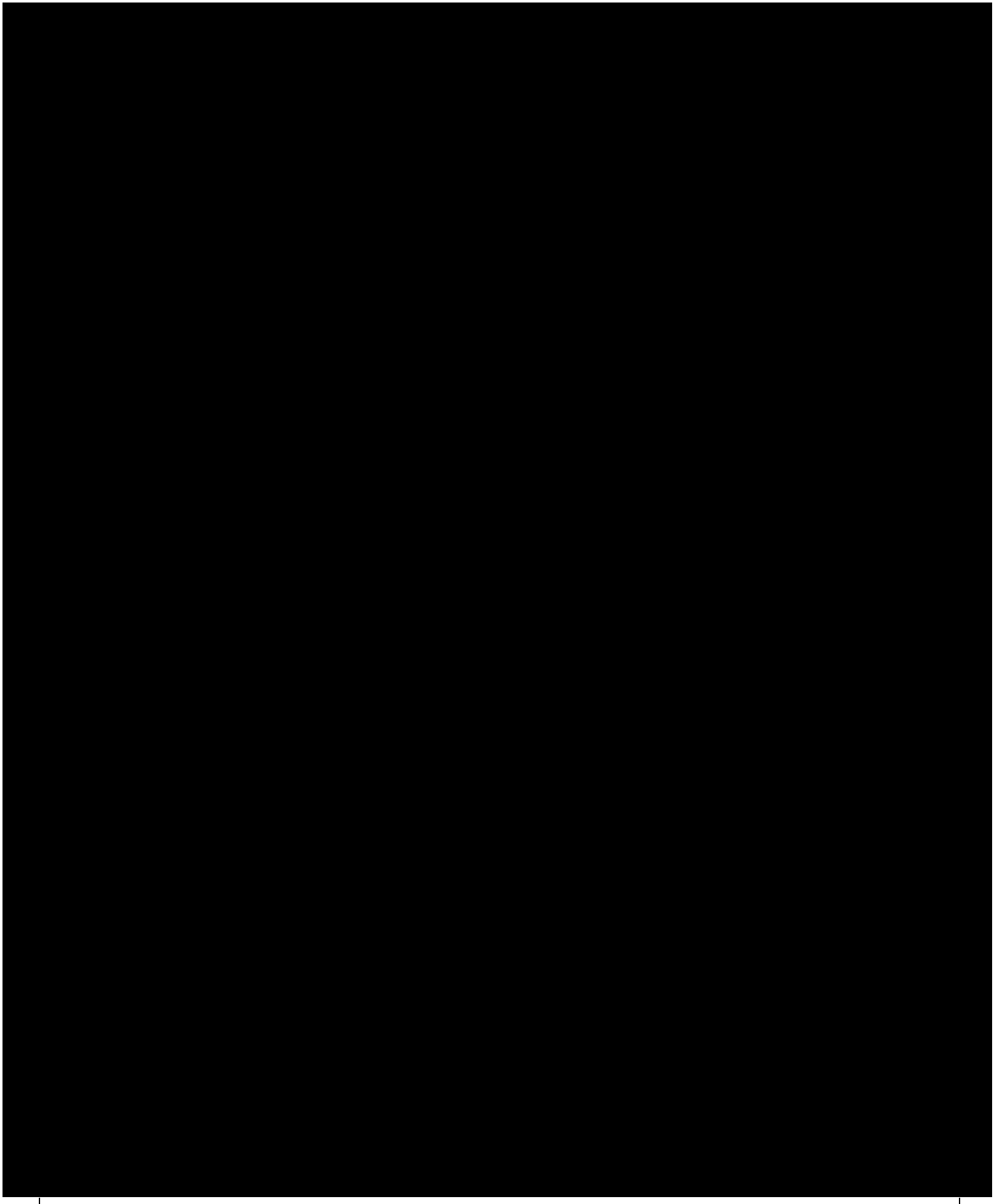
Sworn to and subscribed before M Labno, a Notary Public,
by Jacquelyn M. Norstrom on this 29th day of
December, 2022.

M Labno
_____
Signature of Notary

September 11, 2023
_____
My Commission Expires

(Note to Surety: Attach Power of Attorney or other documents as necessary)

OFFICIAL SEAL
M LABNO
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES:09/11/23



Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 6 – Minimum Liquid Assets Requirement

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**12/28/22**
Signature of Verifying Individual	**Verification Date**

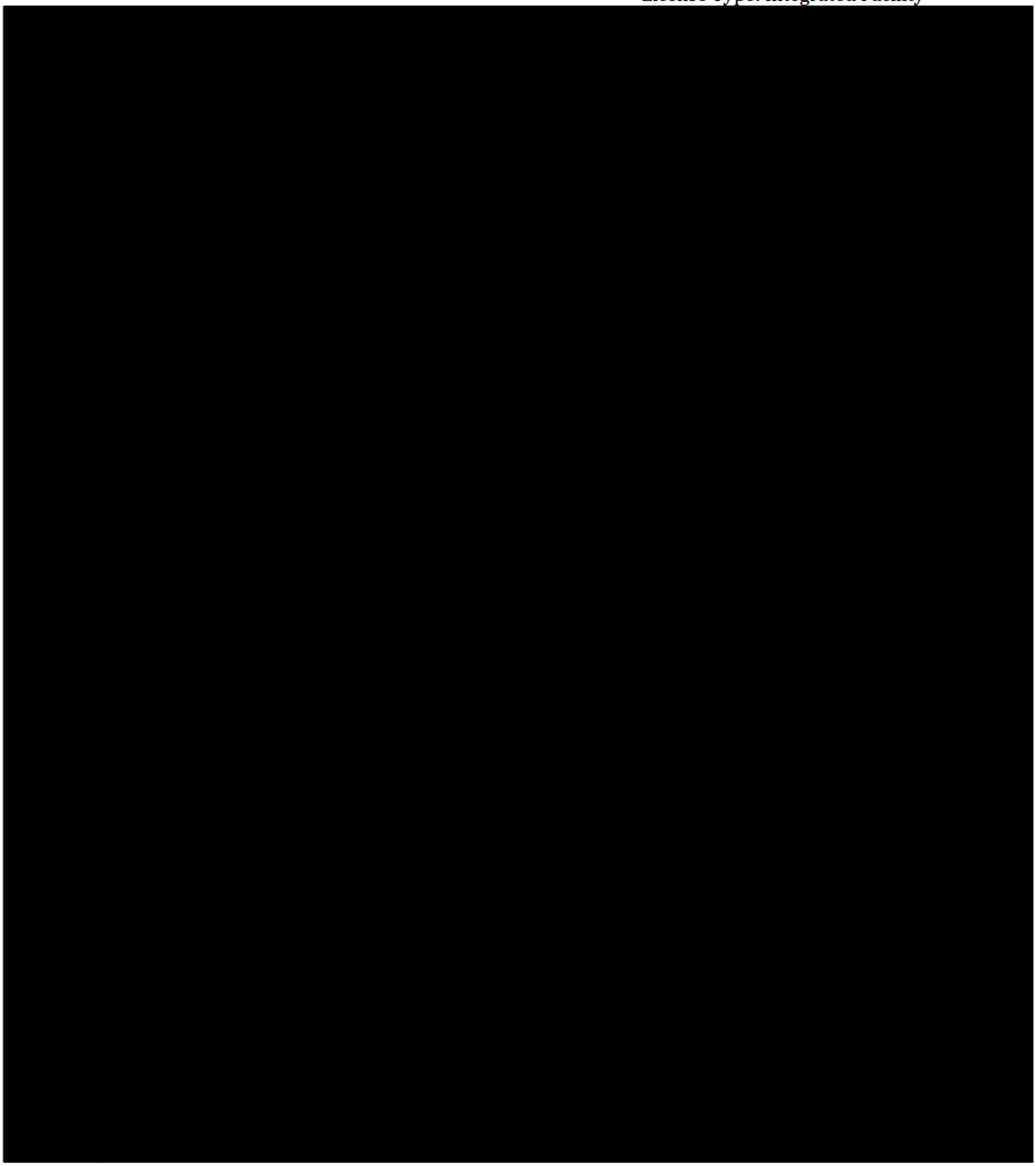
Co-owners [redacted] and [redacted] co-own a cannabis company called Justice Cannabis Co. Together [redacted] own and control the funds in the screen shot of the bank account of their law firm attached here. This is liquid capital that belongs to them that can be used for the project, as defined by the rules:

[redacted]

[redacted] attaches a brokerage account that he owns personally with his wife. This is liquid capital that belongs to them, as defined by the rules. The screenshot accurately depicts the balance as of this date, December 28, 2022:

[redacted] is also the co-owner of [redacted], a law firm that he co-owns with another co-owner of the Justice applicant [redacted] own and control the funds in the screen shot of the bank account of their law firm, attached here:

[redacted]



877.698.3278
bankwithbos.com

HIGHLAND
VENTURES

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 7 – Demonstration of Sufficient Capital

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

Co-owners [redacted] co-own a cannabis company called Justice Cannabis Co. Together [redacted] own and control the funds in the screenshot of the bank account of their law firm attached here. This is liquid capital that belongs to them that can be used for the project, as defined by the rules:

[redacted]

[redacted]ttaches a brokerage account that he owns personally with his wife. This is liquid capital that belongs to them, as defined by the rules. The screenshot accurately depicts the balance as of this date, December 28, 2022:

[redacted]

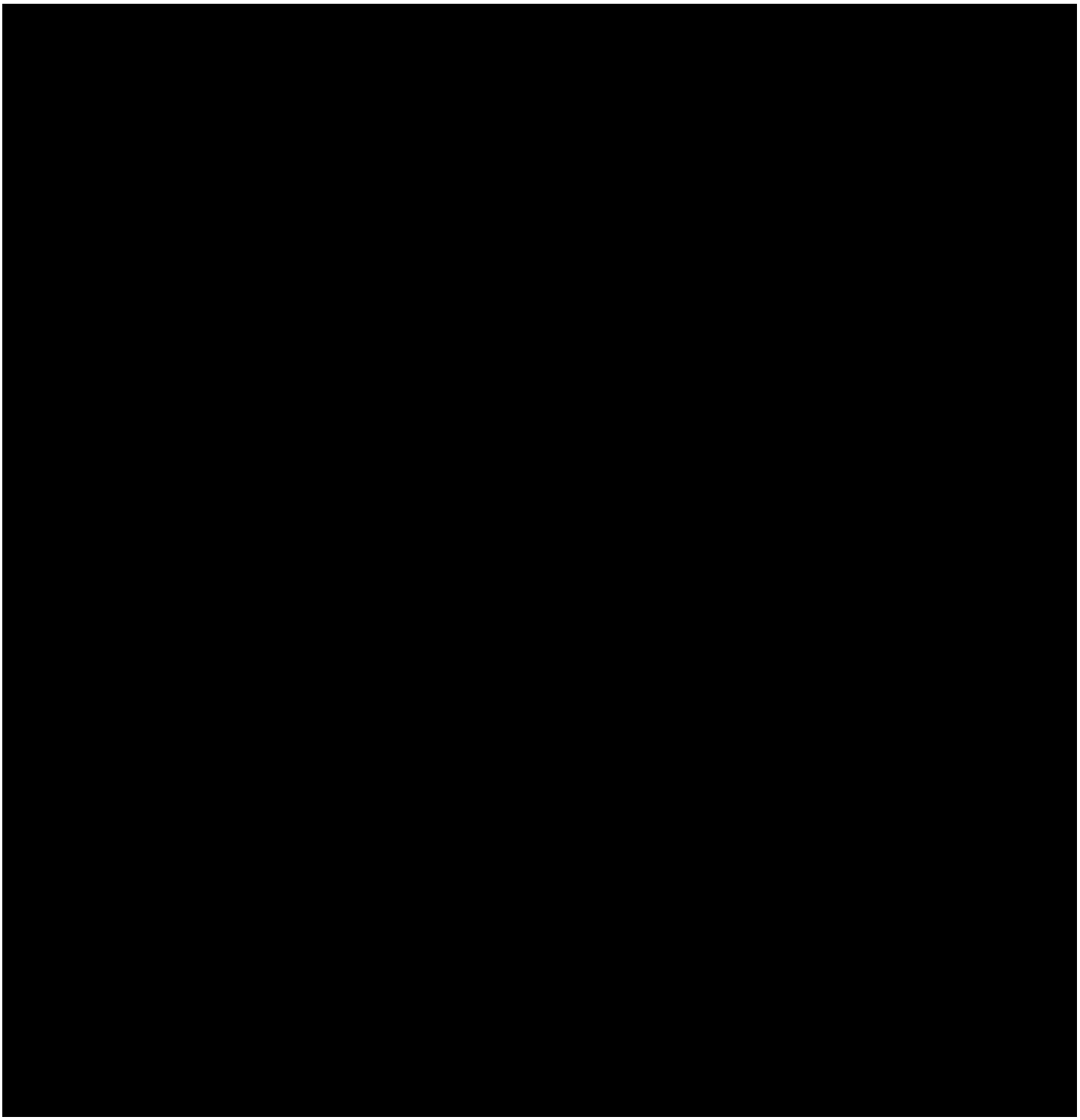
[redacted] is also the co-owner of [redacted], a law firm that he co-owns with another co-owner of the Justice applicant [redacted] own and control the funds in the screen shot of the bank account of their law firm, attached here:

[redacted]

The following is a verification by an independent CPA of all of the foregoing:

Large & Associates, Ltd.
CERTIFIED PUBLIC ACCOUNTANTS

Additionally, Alabama applicant Justice Cannabis has partnered with a capital partner (Highland Ventures) who has entered into contracts to purchase each of the sites proposed by applicant for its dispensaries. That capital partner has multiple hundreds of millions of dollars in assets, and stands ready to finance the Alabama project, including the first full three years of operations. The following is a verification by an independent CFO:



Finally, as back up, Alabama applicant Justice Cannabis has a capital partner with a massive cannabis fund, Altmore Capital, that has funded prior Justice Cannabis projects, and is also prepared to help finance the Alabama project, should any additional funds be necessary:

Vice President of Altmore Capital

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 8 – Minimum Operating Capital Requirement

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

Co-owners [redacted] co-own a cannabis company called Justice Cannabis Co. Together [redacted] own and control the funds in the screenshot of the bank account of their law firm attached here. This is liquid capital that belongs to them that can be used for the project, as defined by the rules:

[redacted]

[redacted] attaches a brokerage account that he owns personally with his wife. This is liquid capital that belongs to them, as defined by the rules. The screenshot accurately depicts the balance as of this date, December 28, 2022:

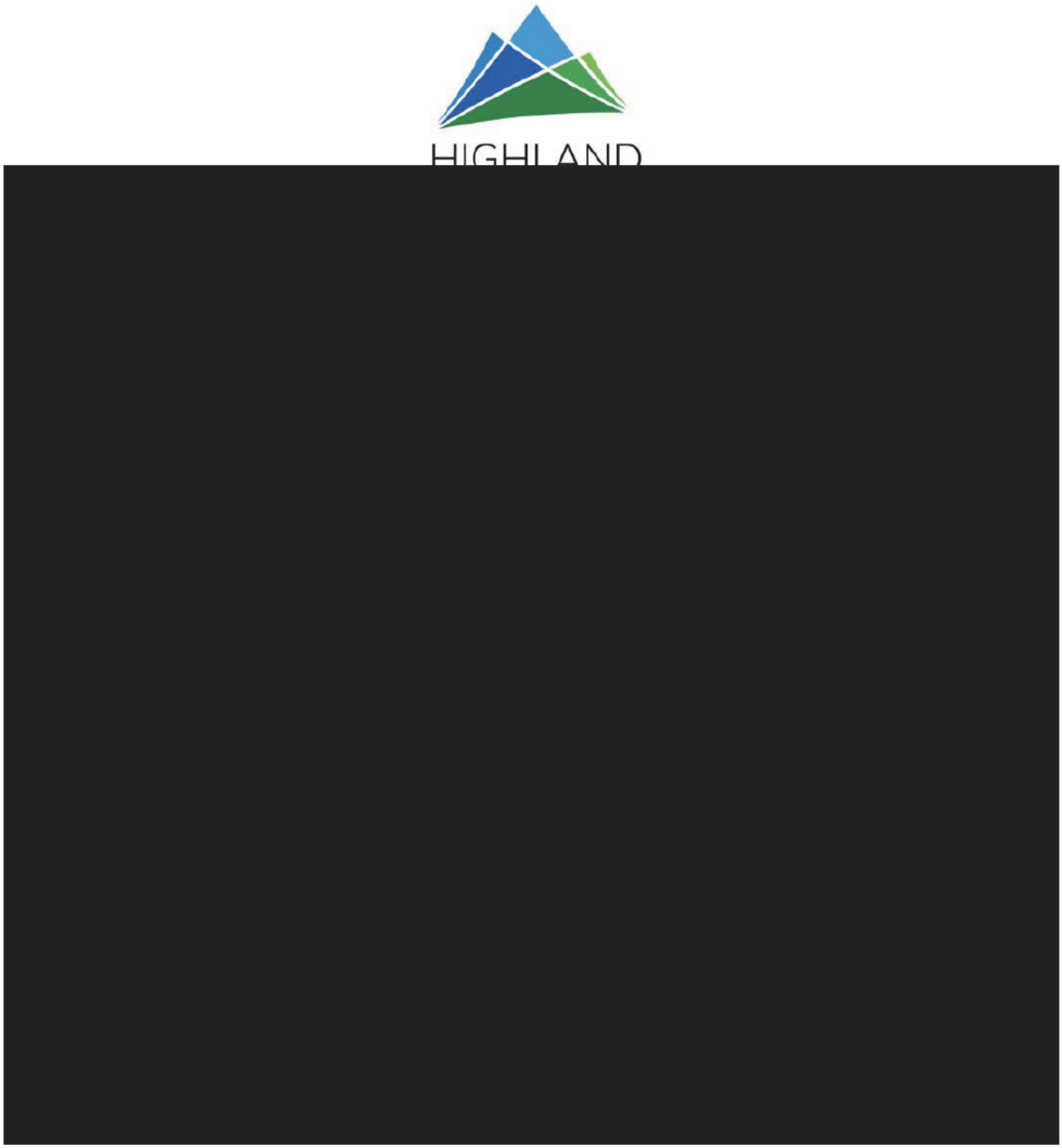
[redacted] is also the co-owner of [redacted] a law firm that he co-owns with another co-owner of the Justice applicant [redacted] own and control the funds in the screenshot of the bank account of their law firm, attached here:

[redacted]

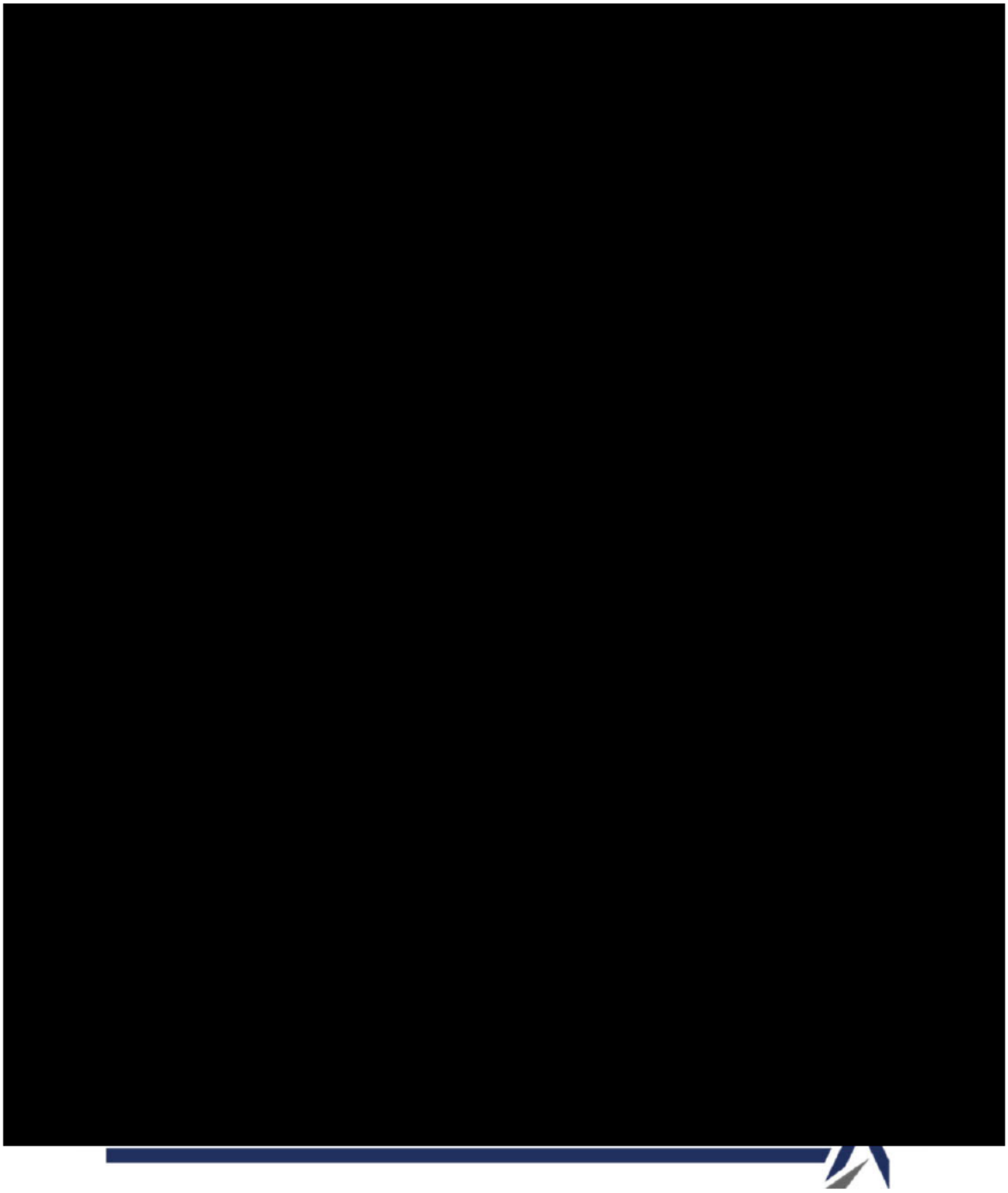
The following is a verification by an independent CPA of all of the foregoing:

Large & Associates, Ltd.
CERTIFIED PUBLIC ACCOUNTANTS

Additionally, Alabama applicant Justice Cannabis has partnered with a capital partner (Highland Ventures) who has entered into contracts to purchase each of the sites proposed by applicant for its dispensaries. That capital partner has multiple hundreds of millions of dollars in assets, and stands ready to finance the Alabama project, including the first full three years of operations. The following is a verification by Highland Venture's CFO, Jon Hill:



Finally, as back up, Alabama applicant Justice Cannabis has a capital partner with a massive cannabis fund, Altmore Capital, that has funded prior Justice Cannabis projects, and is also prepared to help finance the Alabama project, should any additional funds be necessary. The following is a verification of that signed by Michael Villapiano, Vice President of Altmore Capital:



Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 9 – Financial Statements

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

Background and Introduction

Our financial documents, set forth below, were created by our [redacted] Their background is as follows.

[redacted]

[redacted] has over 35 years of enterprise, operations and financial management experience in both public and private companies, with tenures as CEO, CFO and COO across multiple industry sectors.

[redacted] most recently served as Executive Vice President and Chief Financial Officer of Akonni Biosystems, a privately-held developer of molecular diagnostic platforms; and as Chairman of FirePower Technology, a privately held manufacturer of ATX power supplies for the IT and instrumentation markets.

In the public company sector, [redacted] has served as Chief Executive Officer of Qualstar Corporation, Chief Financial Officer of Advanced Energy Industries, and Chief Financial Officer of Applied Films Corporation.

He has served on numerous Boards including those of Qualstar, CVD Equipment, Amtech Systems, and Hyperspace Communications. [redacted] received his Bachelor of Science in Business Administration with a concentration in Accounting from Slippery Rock University of Pennsylvania.

[redacted]

[redacted]has over 15 years of experience in the financial markets working in various senior roles. Holding positions such as Managing Director and Partner at prominent investment banks, merchant banks. While also acting as an Angel investor across several sectors. [redacted] has also held board positions for publicly traded entities and venture funds. [redacted] has been an active member of the cannabis sector since 2014.

Prior to joining Justice Cannabis [redacted] was the Managing Director at Gravitas Financial, a Toronto based Merchant Bank. [redacted] headed up their cannabis division, which included various capital raises and investments. [redacted] then worked as a Managing Director at Antera Inc, a Venture Capital and Merchant Bank in Toronto.

Internationally, he was also a partner at Silver Bear Capital, an investment bank in Hong Kong, which focuses on the Technology sector.

He has served on public boards such as Alerio Gold Corp, CNSX: ALE formerly Project One Resources. CNSX:PJO. Also currently sits on the board of Avalon Bridge. A venture capital-based cannabis fund.

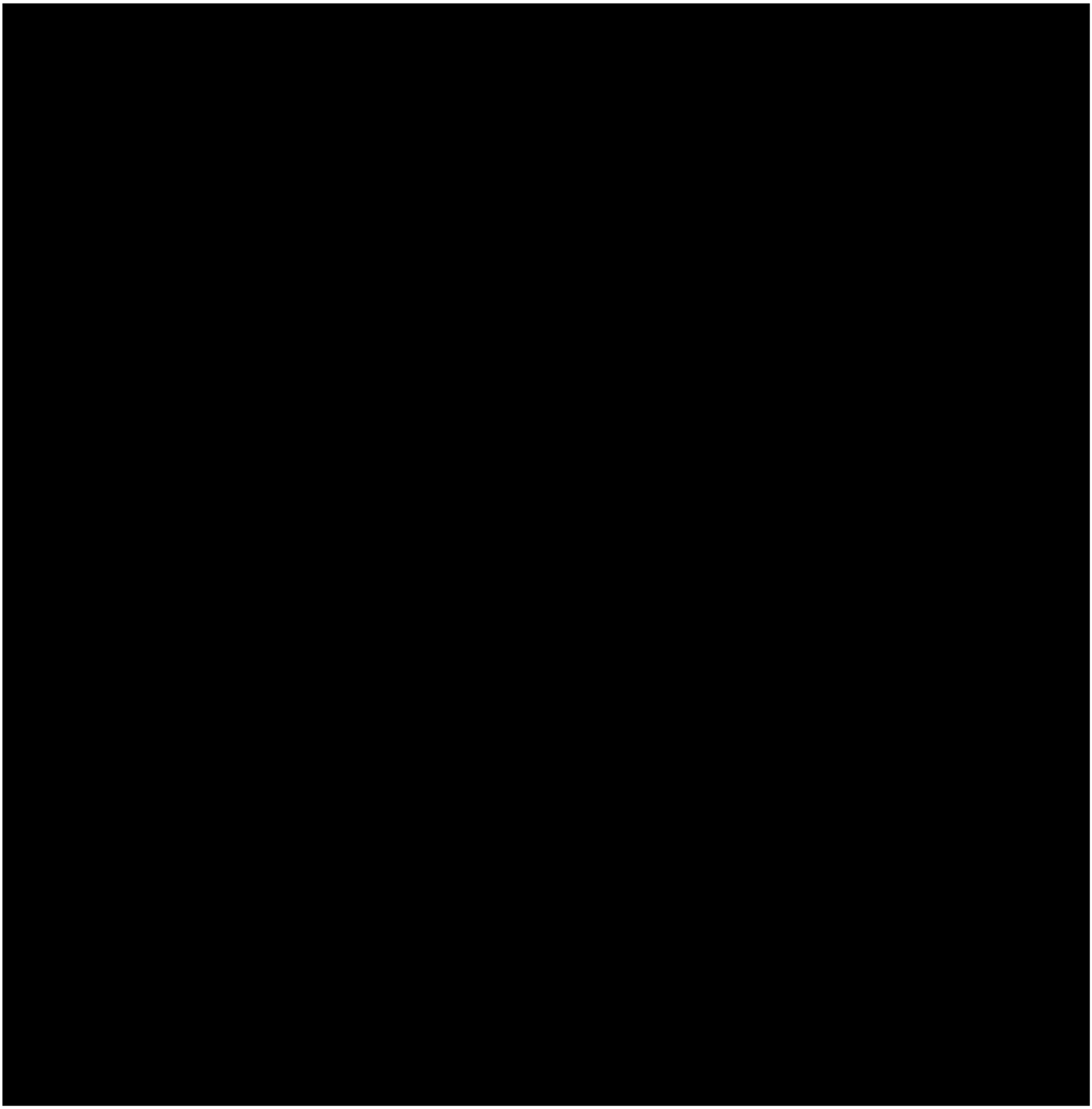
The Financial Statements

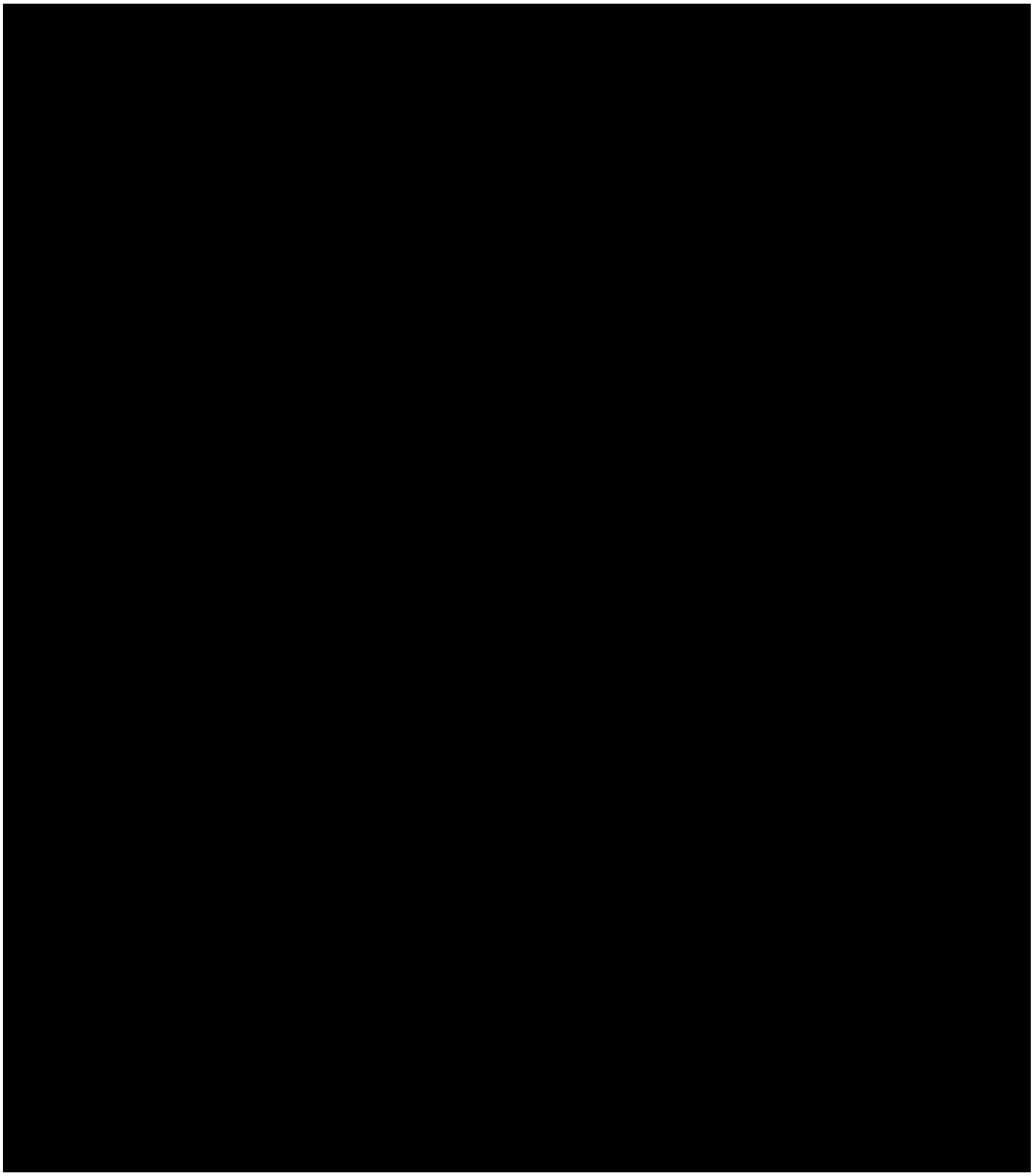
The financial documents set forth below are based on actual operations in various states. Daring back to 2014, our company, Justice Cannabis, has had medical cannabis licenses and operations across the United States, including Pennsylvania, Utah, New Jersey, Illinois, California, Michigan, Maryland, and Missouri. This considerable experience and historical data provides the foundation for the following projections for the Alabama markets.

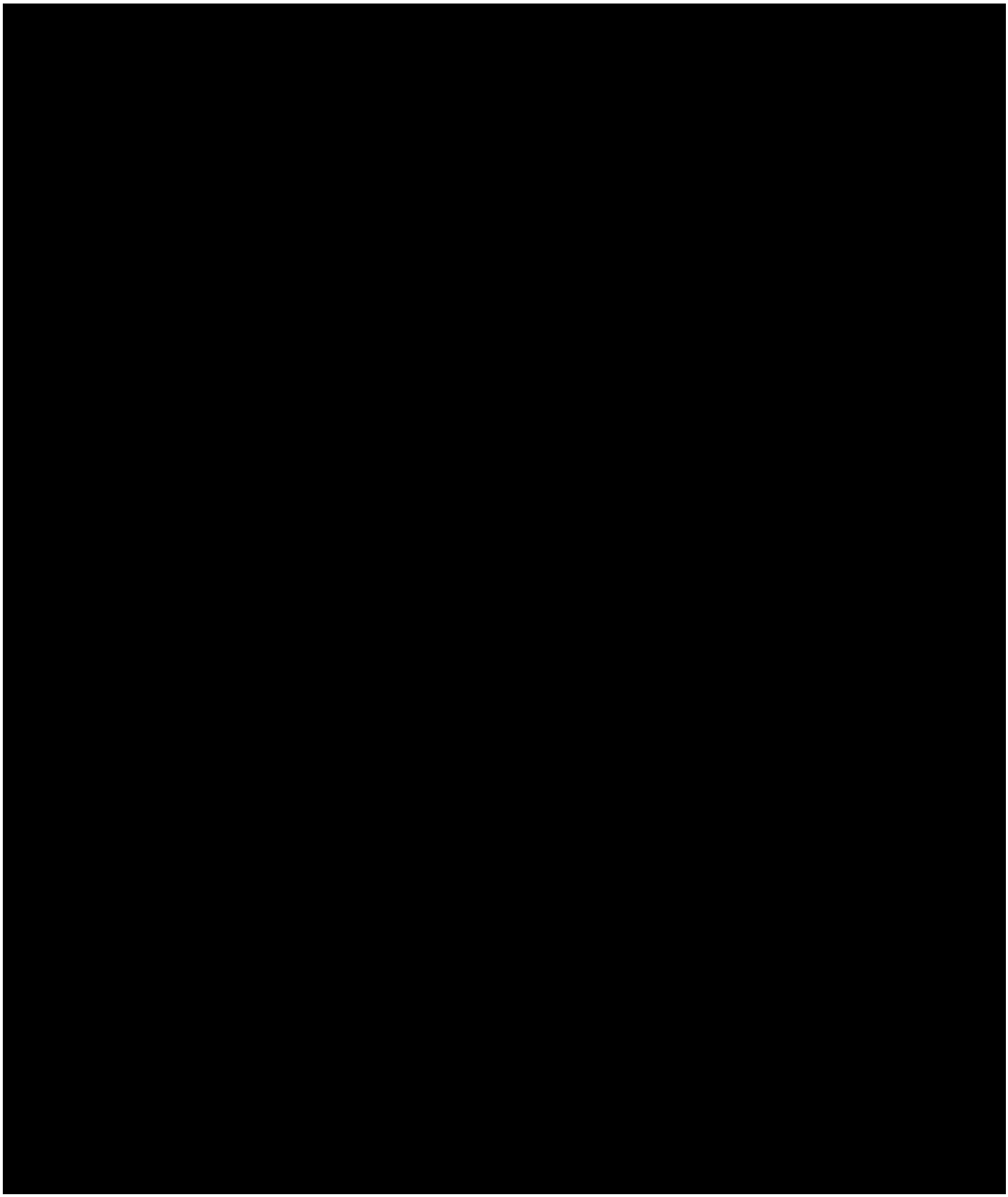
Section 9.1: Balance Sheet Report: Providing a snapshot of the value of assets, liabilities and equity at commencement, or for projections, as of December 31 of each year.

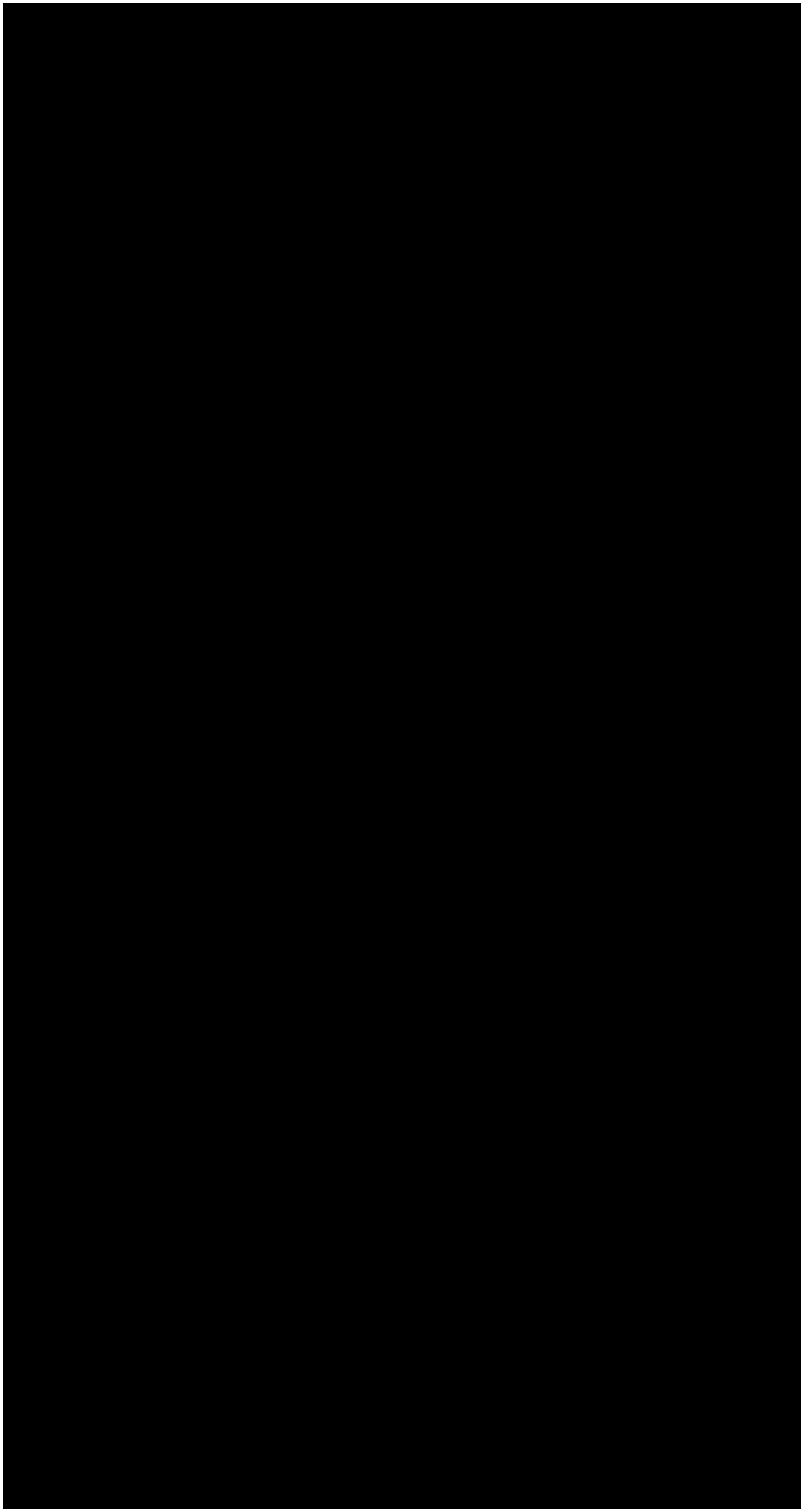
Alabama
Balance Sheet

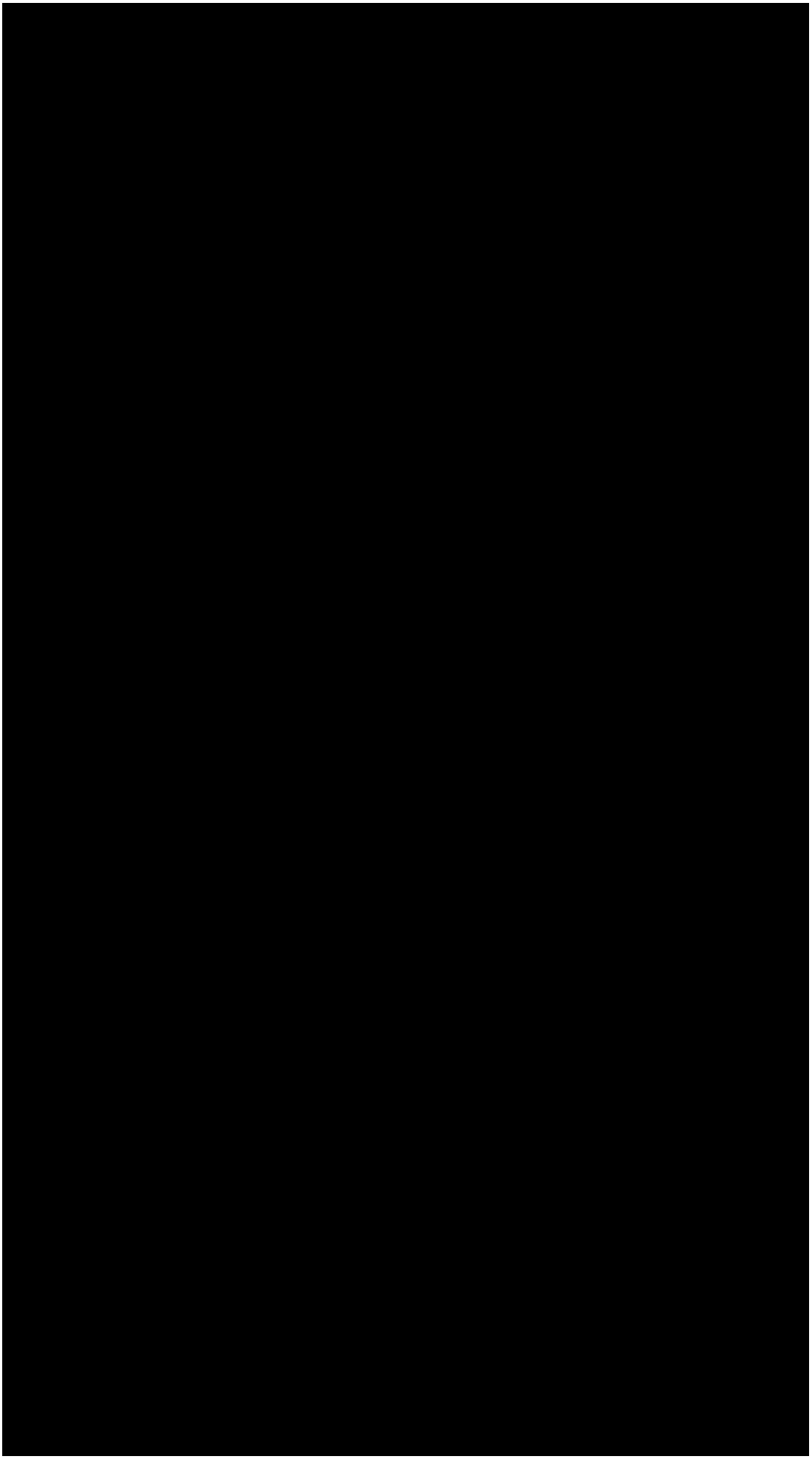
Section 9.2: Profit and Loss Report: Summarizing any income, expenses and net profit from the applicant's inception to date of commencement and as projected over each calendar year thereafter, including the year of commencement.

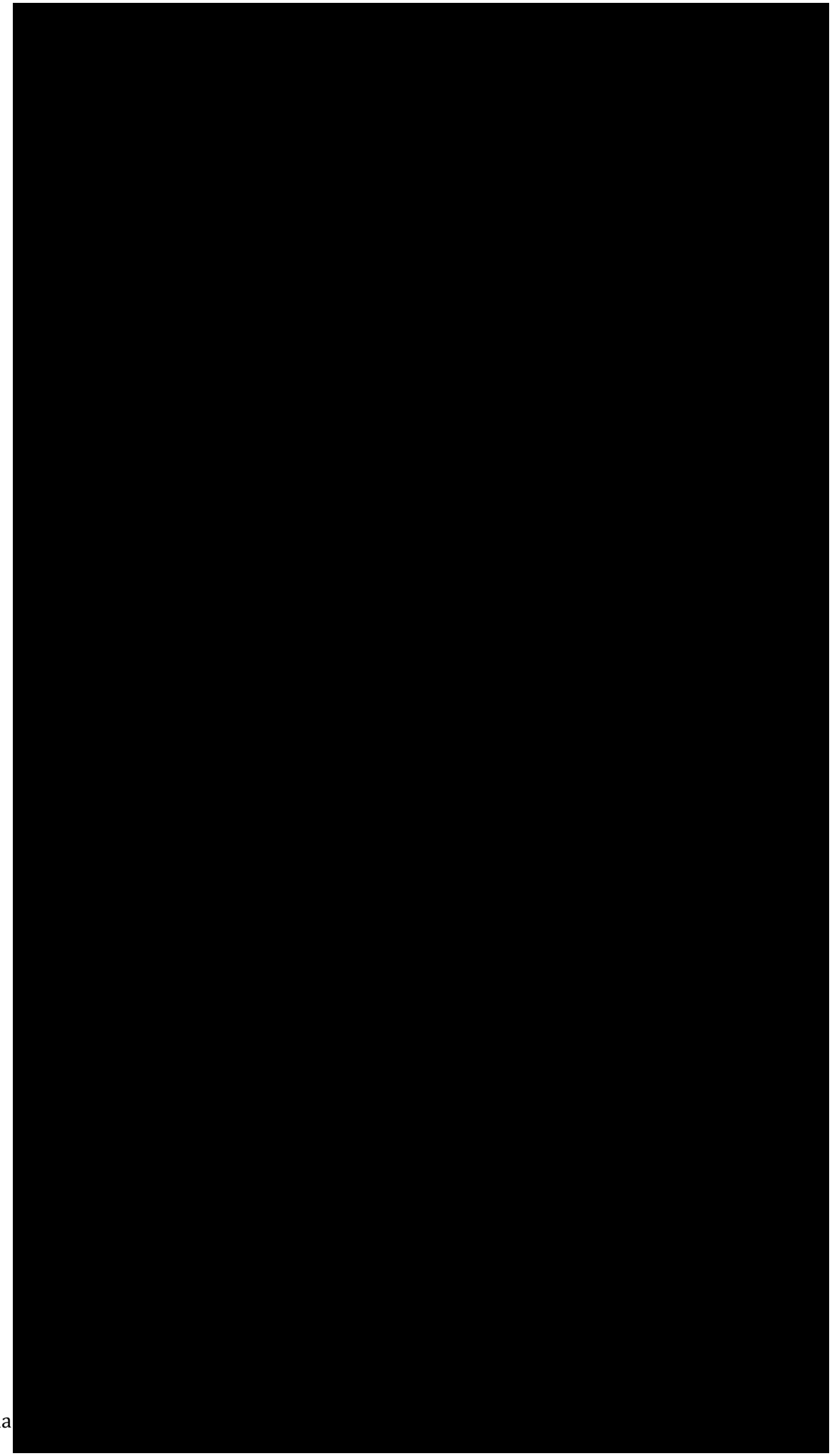


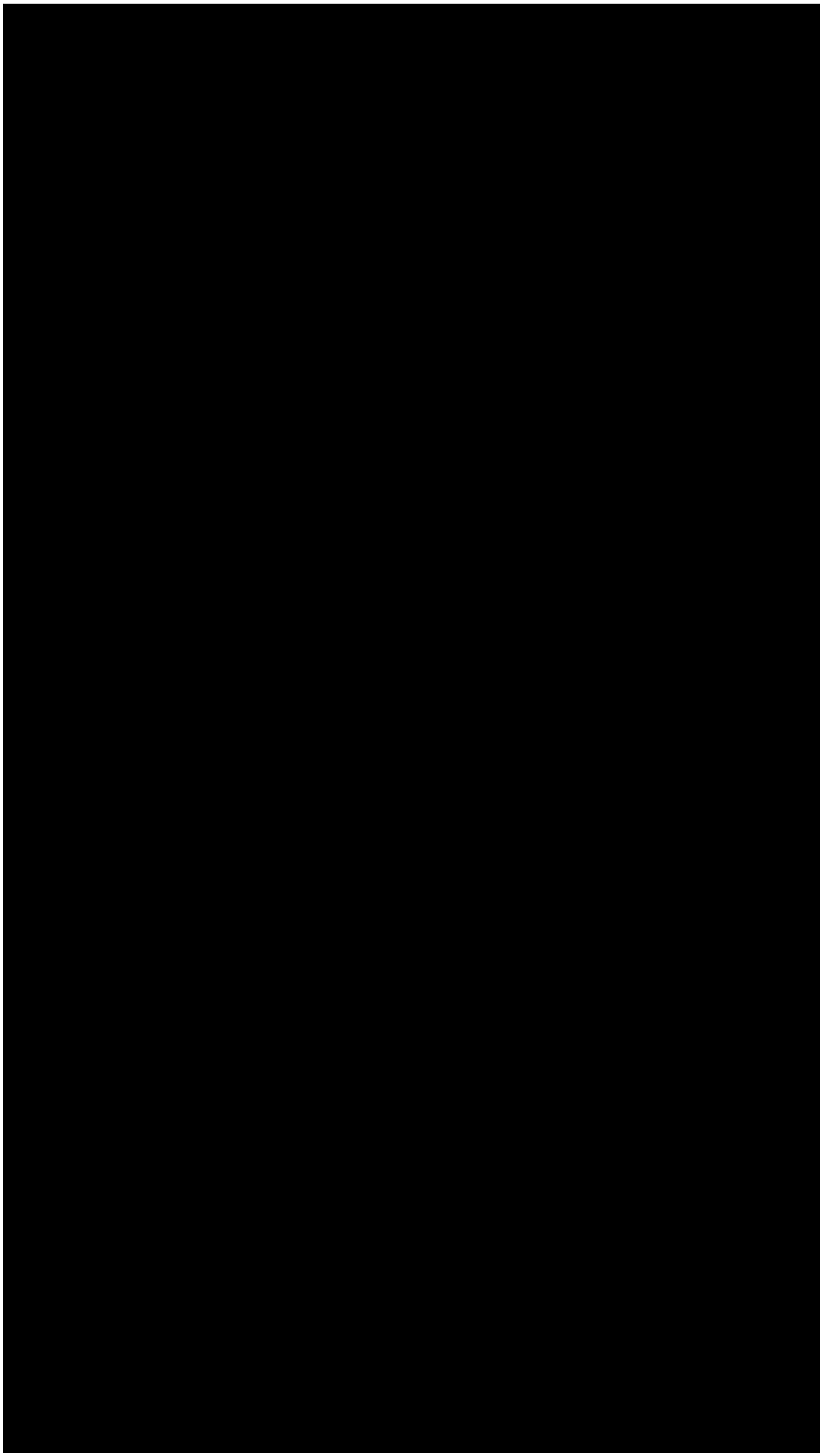


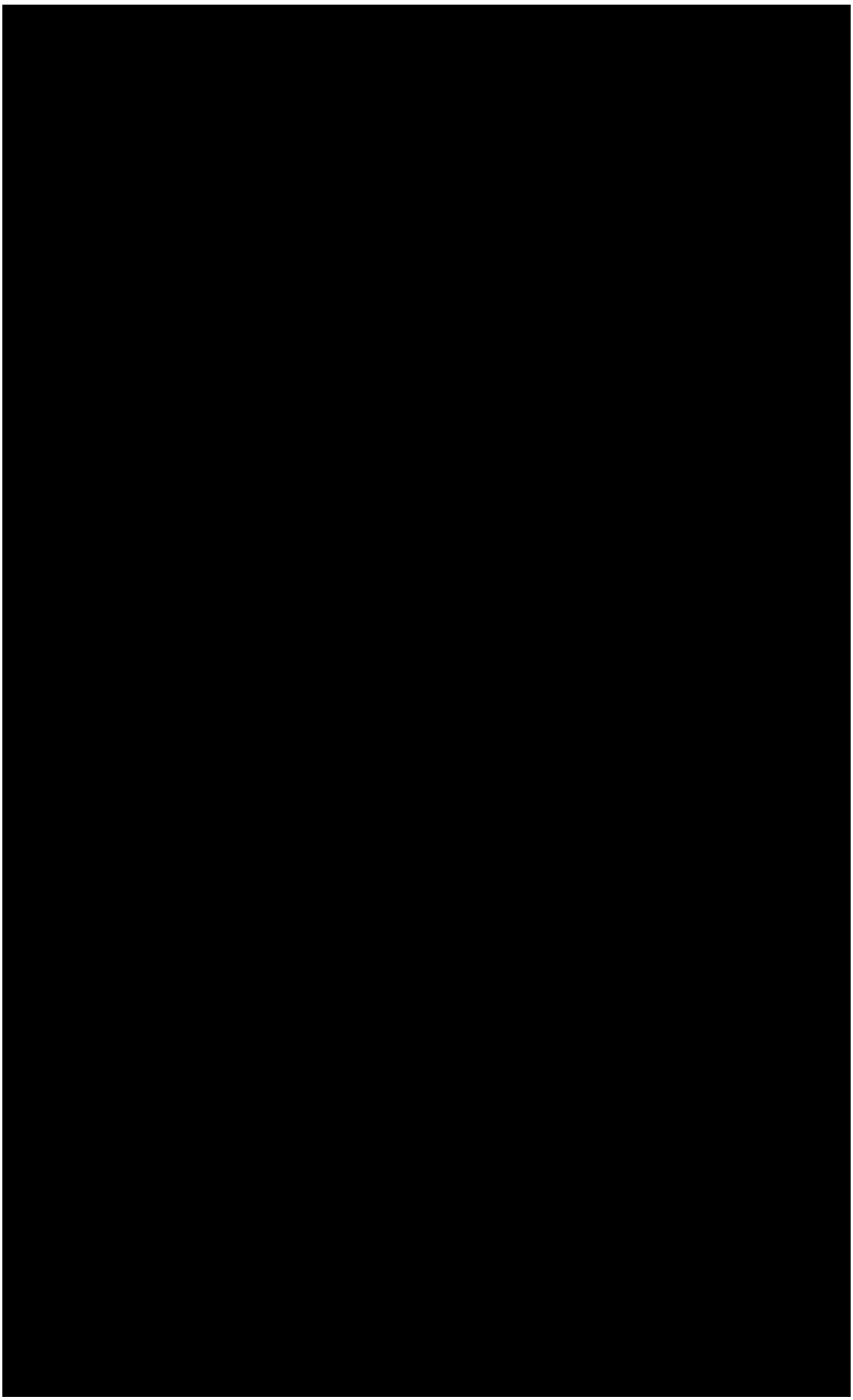


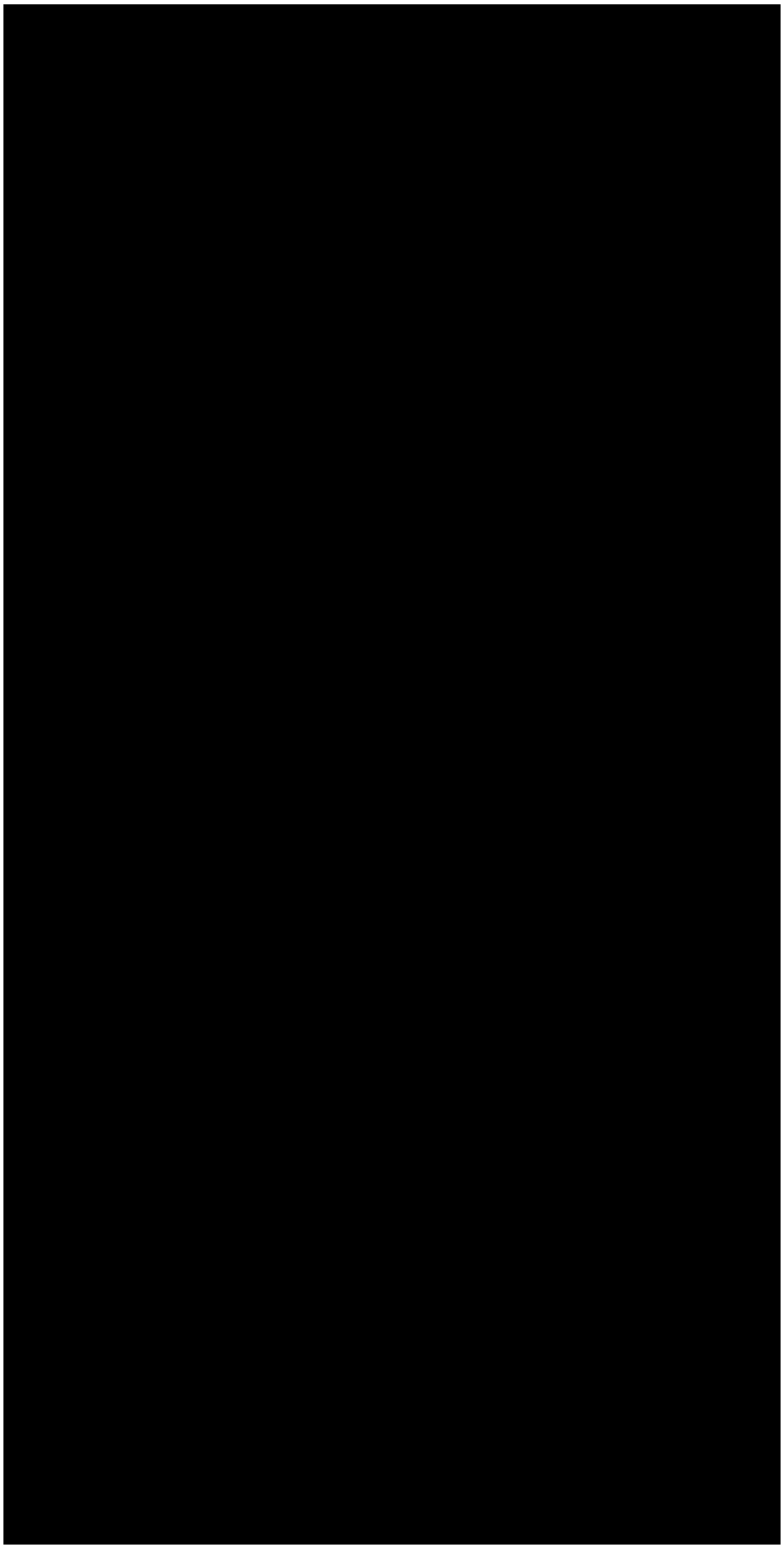


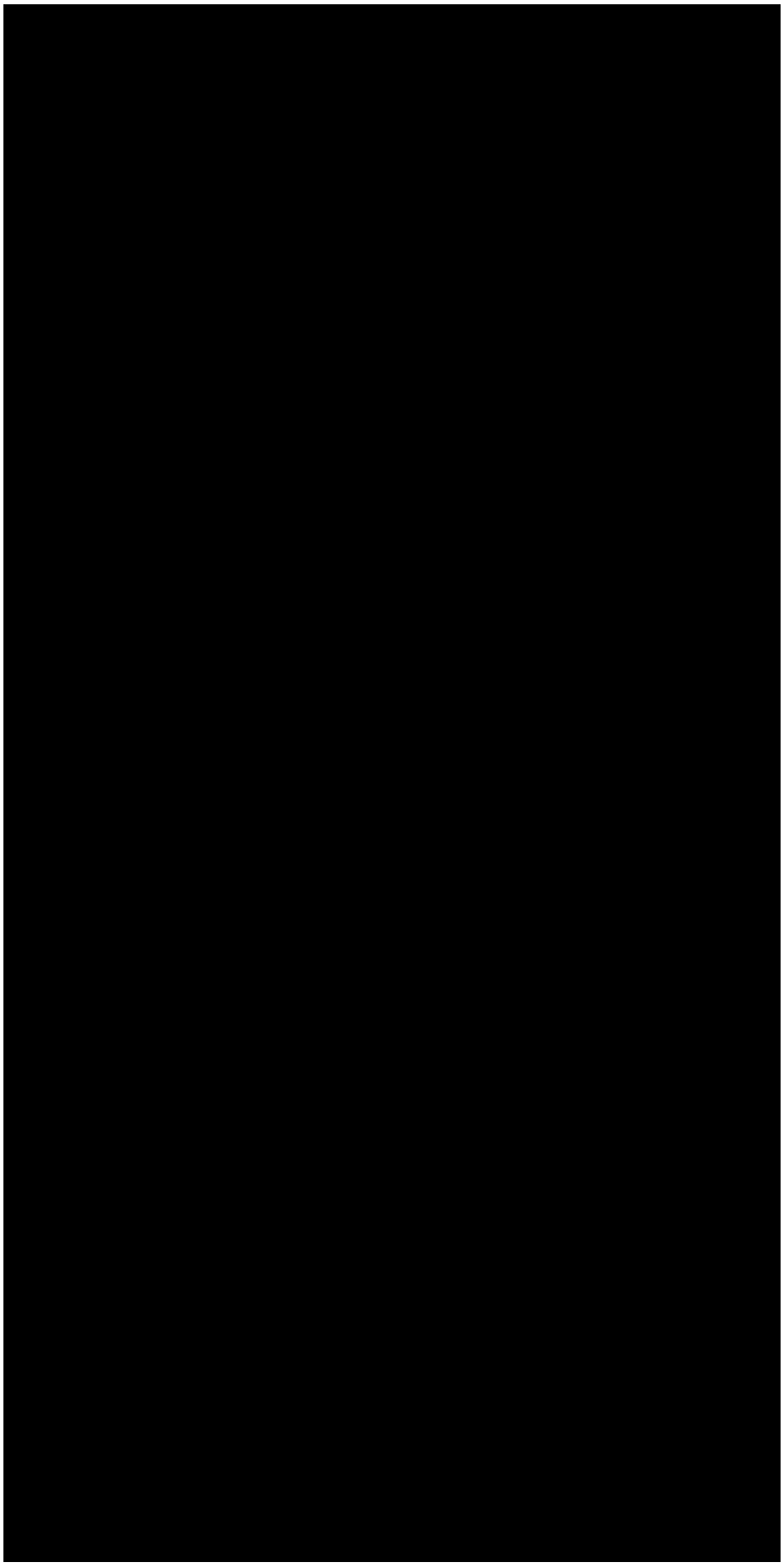












Section 9.3: Statement of Cash Flow: Examining the cash flowing into and out of the Applicant's business from inception to commencement and during each calendar year thereafter, including the year of commencement.

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 10 - Tax Plan

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	
Signature of Verifying Individual	**13/23/23**
	Verification Date

The Applicant is an Alabama LLC, owned and controlled by longtime Alabama residents, but its minority owners also own a large, successful multistate cannabis operator called [redacted] Accordingly, the Applicant can take advantage of [redacted] expertise in all areas, including tax compliance.

The Applicant will, of course, comply with all ordinary business taxes, including sales taxes, income taxes, property taxes, and all relevant use taxes. The Applicant will also meticulously comply with state and federal cannabis-specific tax provisions, including Alabama's Cannabis Privilege Tax.

Federal Cannabis Tax Provision

The Applicant is knowledgeable about federal cannabis tax law, and we will comply to the letter. The Internal Revenue Code prohibits entities engaged in the production, sale, or distribution of cannabis from deducting ordinary business expenses. Specifically, section 280E of the Code permits cannabis businesses to deduct only the Cost of Goods Sold ("COGS"), but not indirect business expenses, such as most payroll, rent, depreciation, insurance, and other so-called below-the-line expenses.

The calculation of COGS differs as between cultivation facilities and retail dispensaries. As an Integrated Licensee, the Applicant will have to navigate 280E as it applies to both types of facilities. That will require meticulous record-keeping and inventory tracking, as well as knowledgeable tax preparation advice.

The Applicant will work with [redacted] an accounting and financial services provider, and the leading cannabis accounting specialists in the nation. MGO serves hundreds of cannabis businesses in the US, including several of the largest multi-state operators. The Applicant's partner, Justice Cannabis Co., has utilized [redacted] for years.

With the advice of [redacted] and the experience and expertise of our partner, the Applicant will be well positioned to comply with federal cannabis tax laws.

Alabama Cannabis Tax Provisions

The Applicant is also aware of Alabama's cannabis-specific taxation scheme.

Chapter 2A of Title 20, Code of Alabama contains two different cannabis-related tax provisions: a sales tax set forth in § 20-2A-80(a), and privilege tax set forth in § 20-2A-80(b). The Applicant will comply with both.

Sales Tax: Alabama law imposes a retail sales tax on cannabis at a rate of nine percent of the gross proceeds of sales. Ala. Code § 20-2A-80(a). "Gross proceeds of sales" is defined at Ala. Code § 40-23-1.

That tax is collected and remitted like any other sales tax, pursuant to Article 1 of Chapter 23 of Title 40, Code of Alabama. Specifically, for at least the first calendar year, the Applicant report and pay sales tax on a monthly basis, on or before the 20th of the month. Sales tax must be reported to the Department of Revenue on a form prescribed by the Department. Ala. Code § 40-23-7.

After the first calendar year of business, depending on the amount of the business's sales tax during the preceding year, the Applicant may be required to report and pay sales tax *either* monthly, quarterly, semi-annually, or annually. Ala. Code § 40-23-7.

Medical Cannabis Privilege Tax: Alabama law also imposes an annual medical cannabis privilege tax, based on a combination of the entity's income and its net worth. Ala. Code § 20-2A-80(b). That privilege tax parallels Alabama's Business Privilege Tax, set forth in Ala. Code §§ 40-14A-22 and -23.

The Applicant, as an Alabama-based LLC that intends to conduct business in Alabama, is subject to that privilege tax. To comply with the medical cannabis privilege tax, the Applicant will engage in a multistep calculation.

First, the Applicant must determine its net worth (generally assets minus liabilities, with certain adjustments as detailed in subsections 40-14A-22(e), (f), and (g)).

Second, the Applicant must determine what portion of its net worth is attributable to sales, payroll, and property in Alabama (as compared to total sales, payroll, and property). Since the Applicant will be located solely in Alabama and will conduct business solely in Alabama, we anticipate that our net worth in Alabama will be our entire net worth.

Third, the Applicant must calculate its federal taxable income, which it will use to determine its privilege tax rate. Alabama businesses are subject to a privilege tax at varying rates, depending on their amount of federally taxable income. The rates are as follows:

Federal Taxable Income		**Rate per $1,000 in AL assets**
At least	***Less than***	***Rate:***
$0	$1	$0.25
$1	$200,000	$1.00
$200,000	$500,000	$1.25
$500,000	$2.5 Million	$1.50
More than $2.5 Million		$1.75

Thus, for example, an entity that received federal taxable income of $300,000 in the prior tax year would be subject to an annual privilege tax of $1.25 for every $1,000 of its net worth in Alabama. If that entity had a net worth in Alabama of $1,000,000, for example, its privilege tax would total $1,250 that is, ($1,000,000 ÷ 1,000) × ($300,000) = $1,250.

Importantly, the medical cannabis privilege tax is subject to both minimum and maximum amounts. All covered entities must pay a minimum of $100 per year, and, apart from financial institutions and insurance companies, all covered entities are subject to an annual cap of $15,000.

Lastly, we are aware that our initial medical cannabis privilege tax return must be filed no later than two and one-half months after the Applicant is licensed to do business, or commences business, in Alabama, unless we timely seek and receive an extension.

The Applicant intends to work closely with [redacted], its accounting service provider, to comply with the medical cannabis privilege tax.

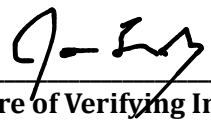
Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 11 – Business Formation Documents

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	Co-Owner
Printed Name of Verifying Individual	**Title of Verifying Individual**
	12/28/22
Signature of Verifying Individual	**Verification Date**

See copies of the Applicant's business formation documents attached.

STATE OF ALABAMA

DOMESTIC LIMITED LIABILITY COMPANY (LLC)
CERTIFICATE OF FORMATION

PURPOSE: In order to form a Limited Liability Company (LLC) under Section 10A-5A-2.01 of the *Code of Alabama 1975*, this Certificate of Formation and the appropriate filing fees must be filed with the Office of the Secretary of State. **The information required in this form is required by Title 10A.**

[redacted]

Mailing address in Alabama of registered office (if different from street address): _____

_____

4. The undersigned certify that there is at least one member of the limited liability company.

[redacted]

DOMESTIC LIMITED LIABILITY COMPANY (LLC) CERTIFICATE OF FORMATION

5. Check **only** if the type applies to the Limited Liability Company being formed:

   ◯ Series LLC complying with Title 10A, Chapter 5A, Article 11

   ◯ Professional LLC complying with Title 10A, Chapter 5A, Article 8

   ◯ Non-Profit LLC complying with Section 10A-5A-1.04(c)

6. The filing of the limited liability company is effective immediately on the date received by the office of the Secretary of State, Business Services Division or at the delayed filing date (cannot be prior to the filing date) specified in this filing complying with Section 10A-1-4.12
   The undersigned specify 12 / 8 / 2022 as the effective date (must be on or after the date filed in the office of the Secretary of State, but no later than the 90th day after the date this instrument was signed) and the time of filing to be 11 : 47 ◉ AM or ◯ PM. (cannot be noon or midnight – 12:00)

☐ Attached are any other matters the members determine to include herein (if this item is checked there must be attachments with the filing).

12 / 8 / 2022
Date (MM/DD/YYYY)

[redacted]
Signature as required by 10A-5A-2.04

Co-Owner
Typed title (organizer or attorney-in-fact)

*County of Registered Agent is requested in order to determine distribution of County filing fees.

[redacted]

DEPARTMENT OF THE TREASURY
INTERNAL REVENUE SERVICE
CINCINNATI OH 45999-0023

Date of this notice: 12-08-2022

Employer Identification Number:
[redacted]

Form: SS-4

Number of this notice: CP 575 B

For assistance you may call us at:
1-800-829-4933

IF YOU WRITE, ATTACH THE
STUB AT THE END OF THIS NOTICE.

[redacted]

WE ASSIGNED YOU AN EMPLOYER IDENTIFICATION NUMBER

Thank you for applying for an Employer Identification Number (EIN). We assigned you EIN [redacted] This EIN will identify you, your business accounts, tax returns, and documents, even if you have no employees. Please keep this notice in your permanent records.

Taxpayers request an EIN for their business. Some taxpayers receive CP575 notices when another person has stolen their identity and are opening a business using their information. If you did **not** apply for this EIN, please contact us at the phone number or address listed on the top of this notice.

When filing tax documents, making payments, or replying to any related correspondence, it is very important that you use your EIN and complete name and address exactly as shown above. Any variation may cause a delay in processing, result in incorrect information in your account, or even cause you to be assigned more than one EIN. If the information is not correct as shown above, please make the correction using the attached tear-off stub and return it to us.

Based on the information received from you or your representative, you must file the following forms by the dates shown.

Form 1065	03/15/2023

If you have questions about the forms or the due dates shown, you can call us at the phone number or write to us at the address shown at the top of this notice. If you need help in determining your annual accounting period (tax year), see Publication 538, *Accounting Periods and Methods*.

We assigned you a tax classification (corporation, partnership, estate, trust, EPMF, etc.) based on information obtained from you or your representative. It is not a legal determination of your tax classification, and is not binding on the IRS. If you want a legal determination of your tax classification, you may request a private letter ruling from the IRS under the guidelines in Revenue Procedure 2020-1, 2020-1 I.R.B. 1 (or superseding Revenue Procedure for the year at issue). Note: Certain tax classification elections can be requested by filing Form 8832, *Entity Classification Election*. See Form 8832 and its instructions for additional information.

A limited liability company (LLC) may file Form 8832, *Entity Classification Election*, and elect to be classified as an association taxable as a corporation. If the LLC is eligible to be treated as a corporation that meets certain tests and it will be electing S corporation status, it must timely file Form 2553, *Election by a Small Business Corporation*. The LLC will be treated as a corporation as of the effective date of the S corporation election and does not need to file Form 8832.

(IRS USE ONLY) 575B 12-08-2022 JUST B 9999999999 SS-4

IMPORTANT REMINDERS:

* Keep a copy of this notice in your permanent records. This notice is issued only one time and the IRS will not be able to generate a duplicate copy for you. You may give a copy of this document to anyone asking for proof of your EIN.

* Use this EIN and your name exactly as they appear at the top of this notice on all your federal tax forms.

* Refer to this EIN on your tax-related correspondence and documents.

* Provide future officers of your organization with a copy of this notice.

Your name control associated with this EIN is JUST. You will need to provide this information along with your EIN, if you file your returns electronically.

Safeguard your EIN by referring to Publication 4557, Safeguarding Taxpayer Data: A Guide for Your Business.

You can get any of the forms or publications mentioned in this letter by visiting our website at www.irs.gov/forms-pubs or by calling 800-TAX-FORM (800-829-3676).

If you have questions about your EIN, you can contact us at the phone number or address listed at the top of this notice. If you write, please tear off the stub at the bottom of this notice and include it with your letter.

Thank you for your cooperation.

Keep this part for your records. CP 575 B (Rev. 7-2007)

Return this part with any correspondence so we may identify your account. Please correct any errors in your name or address.

CP 575 B

9999999999

Your Telephone Number ( ) - _____

Best Time to Call _____

DATE OF THIS NOTICE: 12-08-2022
EMPLOYER IDENTIFICATION NUMBER: [redacted]
FORM: SS-4 NOBOD

INTERNAL REVENUE SERVICE
CINCINNATI OH 45999-0023

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 12 – Business License and Authorization of Local Authorities

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	Co-Owner
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	3/6/23
Signature of Verifying Individual	**Verification Date**

12.1 Business License

Not applicable. The municipalities that the Applicant's facilities will be located in do not require local business licenses at this time.

12.2 County Resolution/Ordinance

The proposed properties for the Applicant are located in Gadsden, Phenix City, Alexander City, Montgomery, and Fairfield. See the relevant ordinances and letters of support provided by those municipalities attached.

Gadsden

CITY OF GADSDEN

December 13, 2022

Alabama Medical Cannabis Commission
P.O. Box 309585
Montgomery, Alabama 36130

To Whom It May Concern,

I am writing to express support for this applicant to open and operate a medical cannabis facility in Gadsden. The City of Gadsden has established a task force of administrative leaders to facilitate inquiries and assist with the application process, and this company has been in contact with our administration throughout their application development process.

I feel their business will be beneficial to Gadsden residents and the goals of the state.

I appreciate you taking the time to review my thoughts on their application. If you need any additional information from me, please contact me.

Sincerely,

Craig Ford, Mayor

City of
GADSDEN

P. O. Box 267
Gadsden, Alabama 35902
Phone: (256) 549-4520
FAX: (256) 549-4851

Heath Williamson
Director of Engineering
Nick Hall
Director of Planning

December 15, 2022

Justice Cannabis Alabama, LLC

Re: [redacted]

To Whom it May Concern:

The subject property located at [redacted], is located within the corporate limits of the City of Gadsden and has a zoning designation of B-1, Neighborhood Business District. The City of Gadsden Chart of Permitted Uses, Chapter 130, Section 312(I) allows for a Medical Cannabis Dispensary as a "use by right" in a B-1, Neighborhood Business District. This letter does not exempt this use or property from any other requirements for permitting or licensing.

A Medical Cannabis Dispensary, as proposed to be located at [redacted] being a "use by right" in a B-1, Neighborhood Business District, is eligible to apply for a City of Gadsden business license only after the applicant has received a provisional Integrated Facility license or a provisional Medical Cannabis Dispensary license, as may be applicable, from the Alabama Medical Cannabis Commission.

The subject property is in compliance with the Alabama Medical Cannabis Commission Rules and Regulations, Chapter 8, Regulation of Dispensaries, Section 538-x-8-.04, Requirements and Limitations as to Dispensing Sites.

This information was researched on December 15, 2022, by the undersigned, per request and as a public service. The undersigned certifies that the above information contained herein is believed to be accurate and is based upon, or relates to the information provided by the requestor. The Authority assumes no liability for errors or omissions. All information was obtained from public records, which may be inspected during regular business hours. Should you have further questions, please contact me at 256 549-4525.

Sincerely,

Tina P. Cody
Zoning Administrator
City of Gadsden Planning Department

Phenix City

PHENIX CITY Alabama
BUILDING DEPARTMENT
1119 Broad Street | Phenix City, AL 36867 | Ph: 334-448-2740 | Fx: 334-448-2742 | phenixcityal.us

December 15, 2022

RE: [redacted]

To Whom It May Concern:

This is to advise you that the zoning and use of the above-captioned Premises is governed by the laws and regulations of the City of Phenix City, State of Alabama and the Premises is zoned C-4: Highway Commercial District under the applicable zoning regulations of the City of Phenix City. We are in the process of updating our Use regulations to allow for a Medical Cannabis Dispensary to be located in this zone.

Please feel free to contact me if you need further assistance.

Sincerely,

Ray Rogers
Deputy Building Official
rrogers@phenixcityal.us

Alexander City

ALEXANDER CITY
ALABAMA

P.O. Box 552 • Alexander City • Alabama 35011-0552 • (256) 329-6700
www.alexandercityal.gov

December 14, 2022

[redacted]

RE: [redacted]

To whom it may concern:

This letter is to confirm that (i) the Property referenced above is zoned General Business ("B-2") and (ii) the proposed use of the dispensing of medical cannabis is permitted in the B-2 zone.

Ordinance No. 2023-04 authorizes the operation of medical cannabis dispensaries within the city of limits of Alexander City. We have determined that the Property's B-2 zoning thus permits the proposed use of dispensing (sales) of medical cannabis under Alexander City Zoning Ordinance Section 12.2(F) and 12.2(M). There are currently no other local approvals necessary to operate the business in Alexander City.

Should you need any further clarification or have any additional questions, please feel free to call me directly at (256) 329-6708 or email me at amanda.thomas@alexandercityal.gov.

Regards,

Amanda F. Thomas

Amanda Thomas
Community Development Director
City of Alexander City
Municipal Complex
281 James D. Nabors Dr.
Alexander City, AL 35010
(256) 329-6700
amanda.thomas@alexandercityal.gov

Montgomery

City of **Montgomery**, Alabama

Land Use Division
Thomas M. Tyson, Jr.

Steven L. Reed
Mayor

City Council Members

Charles W. Jinright – President
Cornelius "CC" Calhoun – Pres. Pro Tem
Ed Grimes
Brantley W. Lyons
Marche Johnson
Audrey Graham
Oronde K. Mitchell
Clay McInnis
Glen O. Pruitt Jr.

December 27, 2022

Alabama Medical Cannabis Commission
P.O. Box 309585
Montgomery, AL 36130

RE: [redacted]

Dear Sir or Madam:

This is to advise you that the property located at [redacted] is in a B-2 (Commercial) Zoning District, which permits a medical cannabis dispensary.

There are no variances, special exceptions or open zoning violations on file.

The City is providing this information solely as a courtesy and the person requesting such information should independently confirm the information contained, herein. The City assumes no liability or responsibility for any misstatements or inaccuracies contained. If we can be of any further assistance, please do not hesitate to contact me at (334)625-2722.

Sincerely,

Thomas M. Tyson, Jr.
Land Use Control Administrator

/jmh

Fairfield

March 3, 2023

To Whom It May Concern,

The City of Fairfield strongly supports the application of [redacted] LLC to open a Medical Dispensary in the City of Fairfield. The proposed site will be [redacted] We believe this business will provide a valuable benefit to our citizens and surrounding areas.

Our city would benefit from the jobs this business would bring. We intend to work with [redacted] in issuing all the proper permits and licenses with the hopes that this business will be successful. Thank you for your consideration, and please feel free to contact us if you have any further questions.

Sincerely,

Mary Roberson /jk

Mary Roberson
City Manager

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

License Type: Integrated Facility

Exhibit 13 – Business Plan

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

13.1

Applicant is majority-owned by Alabama residents with deep connections to this State. Our primary owners include real estate professionals and developers, with a background of buying and selling properties. One is also the owner and founder of a small business that sold computers and electronics. Another was a part-owner in a small business in the home health care industry. Other Alabama partners also have long experience in agriculture.

In recognition of the reality that we need to bring in the cannabis experience necessary to succeed, we have partnered with a national cannabis company with licenses in eight different states. Our cannabis partner has been operating in highly regulated medical cannabis markets since 2014, and has the SOPs, products, technical expertise, and operational experience necessary to succeed.

Our combination of Alabama roots with an experienced cannabis operator is the perfect combination to thrive in Alabama for the long term.

BACKGROUND

Founded in 2014 in Illinois, our partner is a national cannabis company with a tremendous amount of experience. They have grown their national footprint not by purchasing licenses, but by consistently winning highly-competitive cannabis license contests wherever they've competed. Out of many hundreds of applicants, they were among the few winners selected in various license categories in New Jersey, Illinois, Pennsylvania (twice), Maryland, and Missouri.

The differentiator, and the reason they have so successfully earned the trust of the states where they have competed for licenses, lies in their unusual sweet spot in the industry. Unlike many other multi-state operators, this is not a massive public company expanding through brute force and other people's money, nor is it among the novices lacking sufficient expertise. Uniquely in between, thee three founders have invested and re-invested more than $30MM of their own capital without raising a dime in outside money--essentially betting on themselves and their ability to succeed. In so doing, they have built a dynamic, fast-growing, and thriving cannabis company through a combination

of hustle and execution by a super-dedicated team, coupled with superior products and outstanding service.

The Company now has hundreds of employees and a multi-state licensing footprint on par with some of the corporate marijuana behemoths, but the competitive personality and drive of a scrappy start-up innovating to serve a new industry. Immune from having to answer to shareholders or investors, they have also been able to maximize their commitment to operating in a responsible manner. There are few, if any, large cannabis companies like it.

CLEARLY DEFINED BUSINESS STRUCTURE AND PLAN FOR ADHERENCE TO APPLICABLE CORPORATE CONVENTIONS

Undersigned authors have applied for licenses in many states, and completed many applicants. That said, we candidly confess to not being able to determine exactly what this measure is asking for.

A far as our clear business structure, we are an LLC, duly incorporated under the laws of Alabama. That business structure may be straightforward and even simple, but it is clearly defined. Our company will also have clearly defined roles, including CEO, CFO and COO, among others. See organizational chart, below, which is incorporated by reference into this response.

By and through the actions of our CFO [redacted]) and General Counsel[redacted] we will at all times respect all corporate formalities and will avoid impermissible breaches of corporate structure, such as intermingling of assets or other activities that could jeopardize the concept of the corporate veil.

These individuals, as well as our CEO[redacted] have significant experience in adhering to proper corporate conventions. [redacted], in particular, has been CFO (and CEO) at numerous companies, including public companies, and has a deep understanding of the need to adhere to corporate conventions, and how to do so. [redacted] too, will apply our corporate policies and practices to ensure adherence to all applicable corporate conventions.

13.2

Our company has clearly defined business goals, including a 3-year and a 5-year plan.

Our Goals

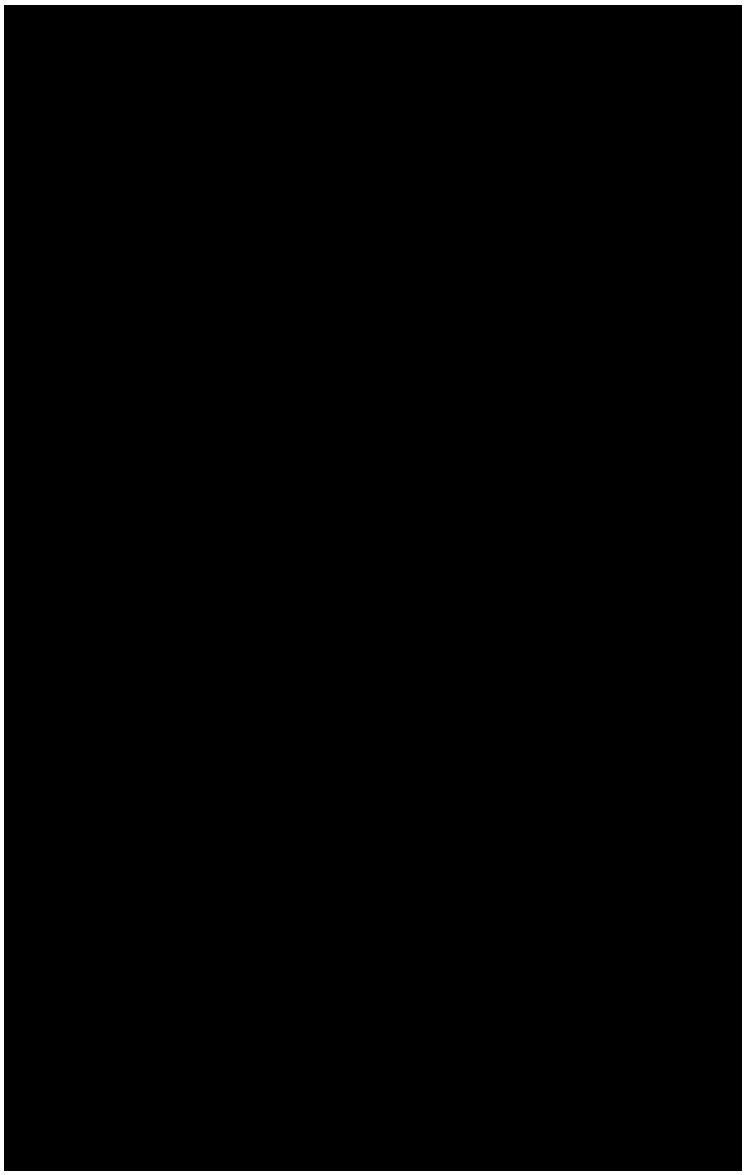
[redacted]

[redacted]

The 3- and 5-year Plan

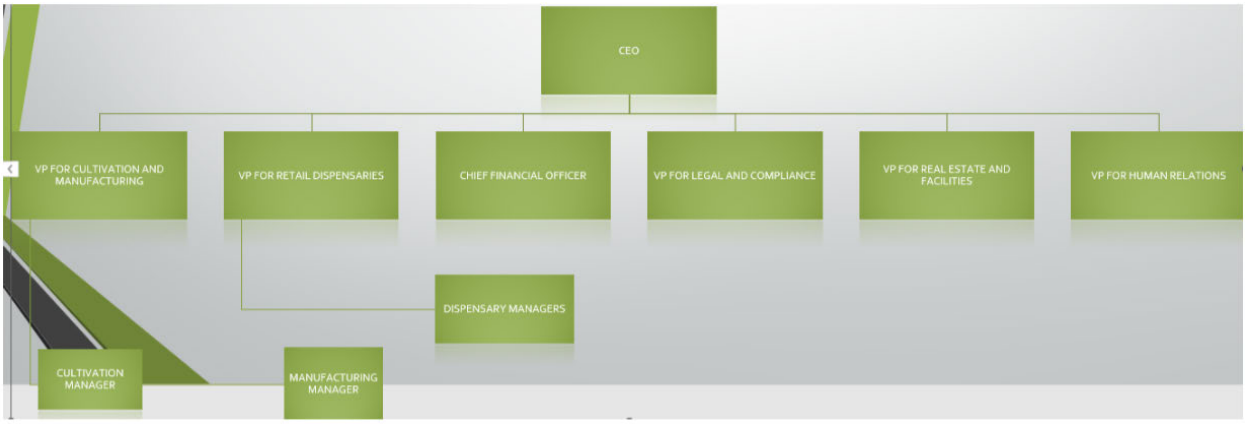
[redacted]

[redacted]

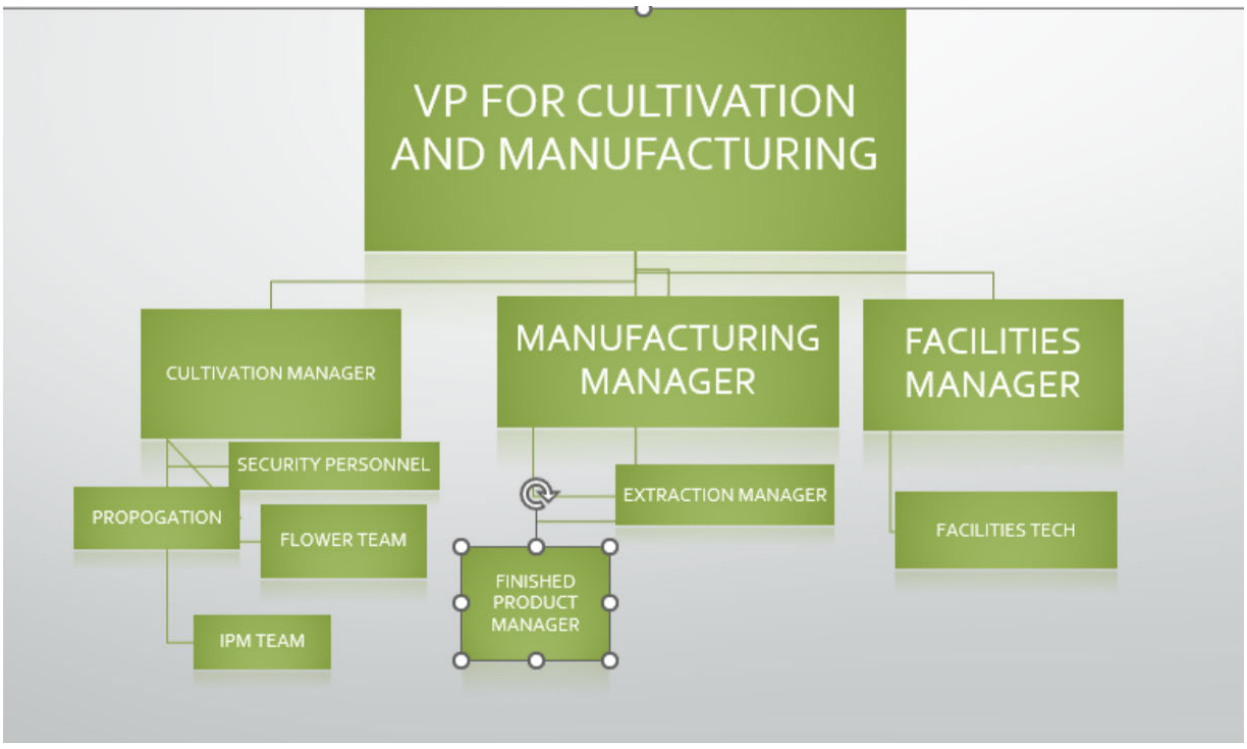


[redacted]

Our Company will have an Executive Team, consisting of a CEO, overseeing a CFO and Vice Presidents for Cultivation and Manufacturing, Retail Dispensaries, Legal and Compliance Affairs, Real Estate and Facilities, and Human Relations, as depicted below:



The VP for Cultivation and Manufacturing will oversee Cultivation and Manufacturing Divisions, as depicted below:



The VP for Retail Dispensaries will oversee Dispensary Managers, and each Dispensary Manager will over see the dispensary staff, as depicted below:

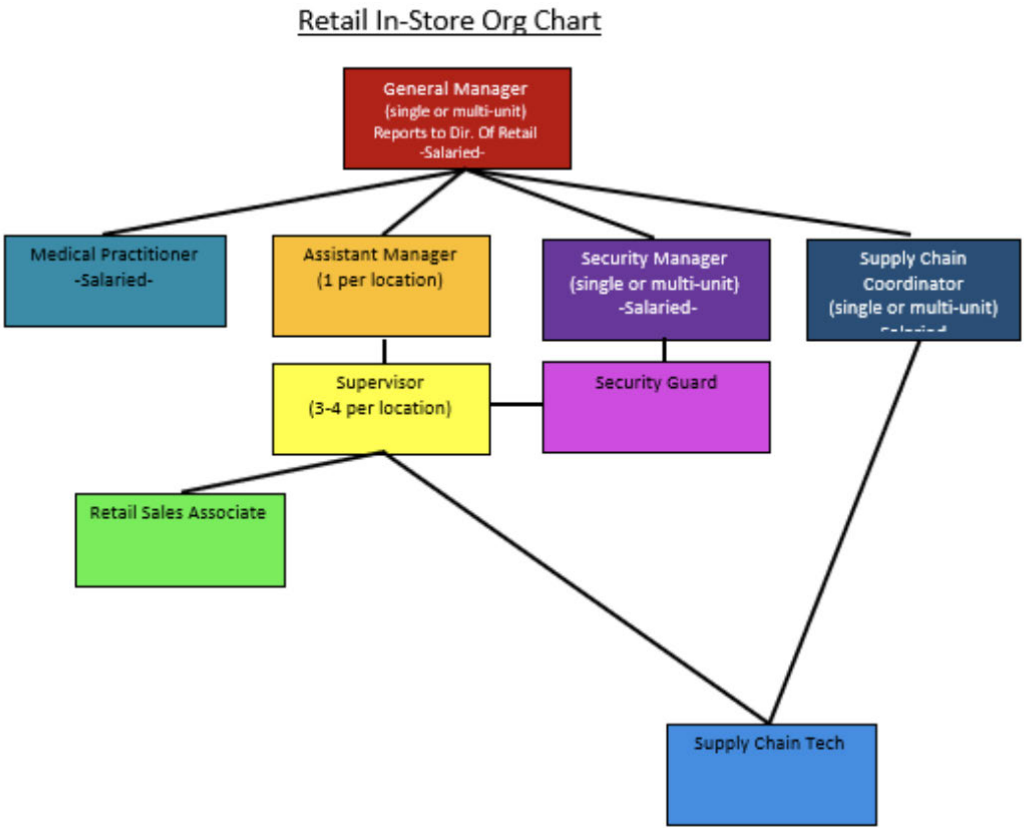

Retail In-Store Org Chart
General Manager
(single or multi-unit)
Reports to Dir. Of Retail
-Salaried-
Medical Practitioner
-Salaried-
Assistant Manager
(1 per location)
Security Manager
(single or multi-unit)
-Salaried-
Supply Chain
Coordinator
(single or multi-unit)
Supervisor
(3-4 per location)
Security Guard
Retail Sales Associate
Supply Chain Tech

Exhibit 13.4: Job Descriptions of Managerial Employees

We have developed extensive and specific job descriptions for managerial employees in Cultivation Facilities, Manufacturing Facilities, and Dispensary Facilities. Those documents alone exceed the page limit for this exhibit, but this summary follows:

Cultivation: The Cultivation Facility will have a Cultivation Manager, responsible for the operation of the entire Cultivation Facility. The Cultivation Manager oversees all aspects of cultivation of cannabis flower, from clone through vegetative state through flower. The Cultivation Manager is responsible for ensuring the highest quality product for our patients.

That person will supervise the following:

- Propagation Team Leaders. This position overseas the delivery and arrangement of plants to all facilities and manages the effort of dividing and propagating mother plants and monitoring environmental controls; maintaining temperature, relative humidity, air flow and hygiene. Plan and organize the daily functions for cloning efforts and mother room care.
- Flower Team Leaders,
- IPM Team Leaders,
- Faciity Manager, and
- Security and Drivers. These employees are responsible for ensuring the safety and security of all employees and the physical plant, and making deliveries.

Manufacturing: The Manufacturing Facility will have a Manufacturing Manager, responsible for the operation of the entire Manufacturing Facility. The Manufacturing Manager oversees both the harvest of cannabis flower and the extraction process that converts cannabis flower to distillate and extracts for use in medical cannabis products.

That person will supervise the following:

- Finish Products Manager. This position is responsible for overseeing the daily operations in the trim room, and Manufacturing department, and actively works to develop staff. This position works closely with other department heads to ensure compliancy, transfer and develop product and coordinate staffing.

[redacted]

Summary

[redacted] is committed to providing patients with the highest quality legal, safe, and effective cannabis products, services, and resources available today. We focus on markets with high barriers to entry, and markets that are highly regulated, all which maximize our investment platform.
With our roots founded in social activism, our team shows a strong commitment to giving back to all local communities where we operate.

Under direction, the Cultivation Manager oversees the regional cultivation department and personnel. This position works with leadership to develop annual and quarterly cultivation plans, including labor and Integrative Pest Management plan. In addition, this position manages the indoor, outdoor and greenhouse cultivation systems at two facilities while training support staff and ensuring safe and compliant operations.

Essential Functions and Responsibilities

Cultivation Oversight

- Supervise the human and material resources within the cultivation department.
- Safely monitor and train support staff to be able to assist in cultivation methods and procedures.
- Monitor and administer the nutrient and irrigate care plan and environmental controls; documenting and reporting deficiencies or malfunctions and relaying them to management.
- Maintain safe and healthy work environment by following CAL/OSHA regulations, organization standards and legal regulations.
- Applies chemicals, fertilizers and other materials as directed to invested crop.
- Assists with the collection of raw field data.
- Safely transport crew (s) and medicine to and from work sites, arranging carpool details during harvest cycles.

People/General Management

- Manages and supervises the cultivation department (entry level gardeners, level I and II Cultivation Associates, and senior Cultivation Team Members).

[redacted]

Summary

The Facilities Supervisor performs a variety of skillied and semi-skilled tasks in the maintenance and operation of [redacted] facilities including buildings, greenhouses, and groundskeeping. This role functions within the operations department and coordinates and assists with the execution of production and operations projects, as well as safety and skills training for workers.

Essential Functions and Responsibilities

- Continually inspects and assesses facility structure to determine needed repairs and renovations
- Plans and coordinates all repairs, installations, and refurbishments with site management to ensure adequate resources (financial and human) are attained to facilitate projects/improvements
- Maintains inventory of critical items for building operations (light bulbs, toilet paper, etc.) and refreshes inventory as required
- Supervises maintenance related contractors and vendors in the performance of outsourced tasks or functions
- Collaborates with the site management team to ensure facility compliance with state, federal, local, and industry specific legislation/regulations
- Assists management in identifying, planning, and budgeting for building repairs, improvements, and expansions
- Collaborates with site managers on the design and implementation of security systems aimed at protecting the facility, personnel, and inventory
- Oversees utility costs/consumption and continually seeks opportunities to improve energy utilization and reduce costs without impacting projected yields
- Collaborates with the site management team to establish and execute an annual facilities budget
- Manages the prioritization and execution of work orders within the facility
- Develops and executes a preventative maintenance program for company owned equipment and automobiles
- Manages and maintains service and repair records for all managed assets (vehicles, generators, etc.)
- Operates a variety of tools/equipment including automobiles, power tools, hand tools, hvac systems, fans and filters, dehumidifiers, power edgers, power mowers, irrigation system, blowers, aerators, power sprayers, atomizer and backpack sprayer, and other related equipment
- Maintains greenhouse irrigation systems, hvac systems, and septic systems for both indoor and outdoor cultivation
- Performs skilled interior building maintenance such as painting, carpentry, welding, and hvac repairs
- Assists in gathering project information for facility expansion and improvement projects
- Monitors work in progress for compliance with company policies; and, ensures strict adherence to state and federal health and safety standards
- Reports upcoming services or routine maintenance jobs to management to ensure budgetary resources are obtained

[redacted]

Summary

The Site SVP is responsible for building, developing, motivating and leading a multi-functional Team that is commited to achieving operational, revenue, and profit targets. This role has full P&L responsibility and continuously seeks opportunities to improve operations by drawing on data-driven insights to optimize results. This role is a focal point for operations within an assigned territory; and, a serves as a member of the Justice Grown Management Team.

Essential Functions and Responsibilities

Operational Management

- Oversees all Facility operations (e.g. Cultivation, Production, Packaging, Extraction, Security, Logistics, Supply Chain, etc.)
- Translates business strategy into actionable short and long-term goals and defines key performance indicators related to company performance and growth.
- Develops strategic and tactical plans for business operations including the creation and execution of SOPs, operational best practices, and policies/procedures necessary to ensure proper site management and operational efficiencies.
- Coordinates with Sales/Revenue generating Staff to identify opportunities for optimizing growth and exceeding company sales objectives
- Maintains effective working relationships with national team partners including Finance and Accounting, Marketing, Compliance, and Human Resources
- Responsible for site compliance with of all local, state, and federal cannabis guidelines
- Develops and implements internal and external reporting systems.
- Effectively and clearly communicates potential risks in a timely manner.
- Collaborates with the National Leadership team to develop and implement plans for an operational infrastructure of systems, processes, and personnel required to accommodate goals and objectives.
- Continually identifies and implements business process improvements

Financial Management

- Interfaces with Accounting/Finance on all accounting related systems and processes
- Oversees procurement and purchase of required materials and resources to enable execution of the operational strategy
- Maintains internal controls to safeguard assets and to ensure accurate recording of revenue, costs, program budgets, and expenditures.
- Monitors budgetary performance and establishes corrective measures as needed.
- Manages Site Level Accounts Receivable

Summary

The Assistant Manager (AM) supports the DM in leading all departments within their assigned dispensary to ensure delivery of an exceptional customer experience while maintaining a positive team culture. This role is a crucial liaison between in-store staff and upper management. This position also assists in overseeing customer service, cash and inventory management, medical and security teams, and team member training and development.

Essential Functions and Responsibilities

People Management Responsibilities

- Leads by example in creating a positive atmosphere, encouraging a customer first philosophy, and promoting a global mindset
- Ensures the consistent delivery of an exceptional customer experience via staff training and development and the enforcement of Justice Cannabis Co.'s policies, practices, and procedures
- Provides on-going coaching and regular individualized feedback to all Team Members
- Maintains records on staff performance (productivity, sales, attendance, etc.) and ensures plans for performance improvement are instituted in a timely manner where required
- Supports the DM in interviewing, hiring, on-boarding, training, and managing dispensary staff
- Helps train and develop staff in accordance with Justice Cannabis Co.'s policies, practices, and procedures
- Holds all team members accountable for performing in a manner that is consistent with individual job descriptions, position goals/KPIs, and the Justice Cannabis Co.'s's code of conduct
- Utilizes rewards, recognition, and personal development tools to continuously encourage optimal levels of employee engagement and performance
- Supports the DM by documenting HR matters relating to employee performance and discipline
- Performs other related duties as assigned

Sales and Operations Management Responsibilities

- Ensures all staff are trained on dispensary SOPs and state compliance protocols
- Ensures relevant legislative and procedural changes are communicated and trained to dispensary staff

[redacted]

The Dispensary Manager is responsible for leading their assigned dispensary, ensuring an exceptional customer experience, maintaining a highly engaged and positive team culture, and meeting company defined revenue targets. This role oversees all sales and service, business operations, and cash and inventory management. This position also ensures, consistent SOPs, training and development for all assigned Team Members and ensures regulatory compliance.

Essential Functions and Responsibilities

People Management Responsibilities

- Responsible for interviewing, hiring, on-boarding, training, and managing dispensary staff for all assigned locations
- Oversees dispensary work schedules to ensure adequate staffing to meet customer volume and demand
- Manages employee timekeeping to ensure accurate pay (troubleshoots any pay issues in collaboration with payroll and HR staff)
- Leads by example in performing transactions, meeting sales goals and creating an exceptional customer experience
- Ensures on-going team training and development for assigned team members
- Ensures all staff activities are conducted in accordance with company policies, practices, and procedures
- Manages KPI achievement for dispensary staff and, ensures performance reviews and improvement plans are executed and retained in employee records
- Conducts regular meetings with assigned employees to assess KPI, goal, and task performance, and identify developmental opportunities
- Collaborates with Retail Trainer and Supply Chain Manager to ensure on-going staff training on products, product usage methods, properties of cannabis, cannabinoids, and terpenes
- Utilizes reward and recognition programs to recognize exceptional employee performance
- Addresses HR matters and employee relations issues swiftly and strategically with the HR Team
- Promotes effective communication amongst all assigned teams and ensures national leadership is briefed on key employee issues impacting operations.

Sales and Operations Management Responsibilities

- Regularly monitors P&L and strategizes on the achievement of outlined KPI's including but not limited to sales, customer service, inventory levels, payroll cost, profitability, and EBITA.
- Implements operational procedures in compliance with applicable state regulations; and ensures legislative and procedural changes relating to the sales and distribution of cannabis are clearly communicated and trained to dispensary staff

[redacted]

Summary

The Pharmacist supports the patient care team in providing medical marijuana patients with the best possible service and support. This role is responsible for conducting patient consultations, prescribing products based on patient requirements and issuing medical marijuana prescriptions in full compliance with applicable state laws. Additionally, this role exists as a subject matter expert on the use and prescription of medical cannabis for dispensary staff and patients.

Essential Functions and Responsibilities

Patient Services

- Conducts patient consultations to assess medical history, document currently prescribed pharmaceuticals and identify patient risk factors
- Makes product, strain, and usage recommendations based on personalized patient consultation and assessment
- Educates new and existing patients on treatment regimens and responds to patient questions and telephone calls
- Follows up with patients on their experiences with prescribed products and ensures patients understand additional treatment options
- Validates PCA product recommendations, and ensures sales transactions are fully compliant with applicable regulations
- Acts as liaison between the dispensary and the community, including medical facilities/professional, DOH representatives, and Pharmacy training institutions
- Develops operational procedures in compliance with applicable regulations and ensures legislative and procedural are communicated to dispensary staff
- Supports the training of patient care staff
- Maintains knowledge on all aspects of the medical cannabis industry to ensure patients are benefitting from the most up to date and effective medical cannabis practices
- Verifies and fill on-line medical cannabis orders and ensures accuracy of dispensed products
- Performs other related duties as required.

- Dedicated to ensuring consistent delivery of exceptional and memorable customer experiences with empathy and understanding
- Achieves daily/weekly sales objectives by seeking opportunities to introduce new and alternative products
- Establishes on-going relationships with customers and completes customer profiles to assist in future sales and service
- Constantly improves cannabis knowledge of team members via informal coaching
- Assists the DM on improving product knowledge and education opportunities
- Remains highly aware of product assortment, availability and trends as well as the best industry practices for prescribing medical marijuana
- Coordinates with Leadership to identify and implement business process improvements
- Partners with the Leadership on goal setting and the establishment of daily/weekly/monthly objectives
- Ensures all customers are logged into state mandated patient tracking systems
- Performs all sales transactions in compliance with state regulations governing the sale of cannabis products
- Assists in maintaining a safe, clean, organized and efficient operating environment
- Complies with all state regulations as well as Justice Cannabis Co.'s operating policies, procedures and practices
- Completes required documentation for product sales
- Ensures all sales and transactions are entered in POS and inventory management systems
- Complies with all safety and security protocols for dispensary staff
- Performs assigned administrative tasks
- Answers phones, returns voicemails, and takes telephone orders.
- Fills online orders and ensures product menus are up to date.
- Performs other related duties as required.

Cultural Responsibilities

- Embodies Justice Cannabis Co.'s values and models our code of conduct
- Builds strong and effective internal, external, and cross-functional relationships.
- Helps create and maintain a collaborative, fun, and productive work environment
- Actively participates in team building and cultural development
- Models honesty, integrity, collaboration, and direct communication in the performance of duties and responsibilities

Qualifications

Education and Experience

- PhD or Bachelors Degree in Pharmacy
- Successful completion of PA Department of Health Medical Marijuana Practitioner course

[redacted]

Summary

The Supply Chain Manager is responsible for maintaining accurate daily, weekly, and monthly accounting of cannabis inventory and ancillary products within one or more assigned dispensaries. This role manages product intake, ensures that product expiration dates are being tracked and managed, and coordinates with dispensary management to ensure the right mix of products are being stocked to meet customer needs. This position will also perform Agent in Charge functions which include bringing in product from cultivators, managing returns, and overseeing destruction duties.

Essential Functions and Responsibilities

Inventory Responsibilities

- Responsible for ensuring adequate product assortment, variety, and quantities within assigned dispensaries
- Regularly runs inventory reports and conducts product analysis for the purpose of recommending sales and specials to move aging product
- Utilizes effective reporting to make informed and strategic ordering decisions
- Partners with the Dispensary Manager on ordering budgets and healthy turn
- Establishes and nurtures relationships with local growers and product vendors
- Responsible for maintaining and updating Vendor contact list
- Coordinates with vendors to determine product availability and coordinates all necessary documentation for purchase
- Ensures purchase orders are built into inventory tracking systems to ensure all product is entered within 24 hours of receipt and ready for sale
- Responsible for maintaining quality and regulatory compliance of all product in stock including packaging, labeling, and sku-ing
- Ensures tests results and proper classifications are accurately entered into systems within 24 hours of receipt
- Adheres to consistent naming conventions and follows product entry SOPs
- Makes suggestions to improve business functions
- Knowledgeable about ancillary cannabis products and is able to articulate and demonstrate

[redacted]

Exhibit 13.5: Job Descriptions of Non-Managerial Employees

[redacted]

[redacted]

Summary

The Cultivator is responsible for providing on-site cultivation in one or more indoor grow rooms. This role monitors and maintains the health and production of our plants, maintains quality control measures to ensure exceptional product; and, maintains the organization, cleanliness, and efficiency of our plant production areas. This role also ensures frequent sanitation of grow facilities to ensure plant and personnel health and safety.

Essential Functions and Responsibilities

- Ensures plant health by pruning, topping, trimming, and analyzing plant health
- Conducts day-to-day plant care including watering, pruning, harvesting, and trimming
- Inspects plants daily for mold, disease or other abnormalities and reports issues to the cultivation manager.
- Responsible for maintaining and cleaning all cultivation facilities, equipment, and tools including lights, reflectors, containers, mixing tools, application tools and ventilation equipment
- Strictly adheres to the cultivation plan and schedule set by the Cultivation Manager
- Assists the Cultivation Manager with tracking plants throughout the growth lifecycle and ensuring accurate documentation per state standards
- Accurately documents all nutrients and substances applied on grow logs
- Complies with all safety safety standards the operation of equipment, fertigation systems, environmental controls, water distribution system, security system, etc.
- Assists with inventory audits/reconciliation for all inventory and materials to include supplies, plants, processed product, equipment, etc.
- Assists with the execution of harvest plans to include bucking, drying and curing.
- Perform other related duties as required.

Qualifications

- High school diploma or general education degree (GED); or equivalent combination of education and experience.
- Experience working in a nursery or agrigultural setting preferred
- Ability to take direction and complete daily tasks with minimal supervision.
- Ability to maintain high standards in a fast paced, constantly evolving environment.
- Punctual, professional, and able to communicate clearly with your managers and other staff.
- Knowledgeable on strains, genetics, and cultivation practices preferred
- The ability to identify cannabis varieties using visual and olfactory senses preferred.

Summary

The Cultivator is responsible for providing on-site cultivation in one or more indoor grow rooms. This role monitors and maintains the health and production of our plants, maintains quality control measures to ensure exceptional product; and, maintains the organization, cleanliness, and efficiency of our plant production areas. This role also ensures frequent sanitation of grow facilities to ensure plant and personnel health and safety.

Essential Functions and Responsibilities

- Ensures plant health by pruning, topping, trimming, and analyzing plant health
- Conducts day-to-day plant care including watering, pruning, harvesting, and trimming
- Inspects plants daily for mold, disease or other abnormalities and reports issues to the cultivation manager.
- Responsible for maintaining and cleaning all cultivation facilities, equipment, and tools including lights, reflectors, containers, mixing tools, application tools and ventilation equipment
- Strictly adheres to the cultivation plan and schedule set by the Cultivation Manager
- Performs applications of pesticides and pest mitigation substances in accordance with the facility pest management
- Perfoms equipment maintenance and preventative maintenance in accordance with facility guidelines
- Troubleshoots and performs repairs on irrigation, fertication, and application equipment
- Troubleshoots and performs repairs and maintenance for HVAC equipment used in grow rooms
- Assist the Cultivation Manager in training junior cultivation employees on processes, practices, procedures and policies to ensuring Team compliance with company standards and the facility cultivation plan
- Assists the Cultivation Manager with tracking plants throughout the growth lifecycle and ensuring accurate documentation per state standards
- Accurately documents all nutrients and substances applied on grow logs
- Performs plant propagation and nursery tasks in collaboration with the Cultivation Manager including cloning, and other key tasks
- Complies with all safety safety standards the operation of equipment, fertigation systems, environmental controls, water distribution system, security system, etc.
- Assists with inventory audits/reconciliation for all inventory and materials to include supplies, plants, processed product, equipment, etc.
- Assists with the execution of harvest plans to include bucking, drying and curing.
- Perform other related duties as required.

[redacted]

Qualifications

- High school diploma or general education degree (GED); or equivalent combination of education and experience.
- Experience working in a nursery or agrigultural setting preferred
- Pesticide ceritifcation and knowledge of state safety and use requirements for pesticide application
- Ability to take direction and complete daily tasks with minimal supervision.
- Ability to maintain high standards in a fast paced, constantly evolving environment.
- Punctual, professional, and able to communicate clearly with your managers and other staff.
- Knowledgeable on strains, genetics, and cultivation practices preferred
- The ability to identify cannabis varieties using visual and olfactory senses preferred.
- High level of efficiency, patience, and flexibility.
- Must be 21 years old and pass a criminal background check.

Supervisory Responsibilities

None

Work Environment and Physical Demands

The work environment characteristics and physical demands described here are representative of those an employee encounters while performing the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

TYPICAL PHYSICAL DEMANDS: Work may require prolonged standing, some bending, stooping and stretching. Requires lifting up to 50 pounds regularly and push/pull up to 100 pounds also use assistance (multiple people, forklift, dolly, etc.) when lifting/moving over 100 pounds. Frequent holding/grasping with the hands and repetitive fine motor skills used in leafing and underbrushing. Frequent lifting up to 50 lbs. Requires eye-hand coordination and manual dexterity sufficient to operate production tools other office equipment. Requires adequate vision with the ability to see color and identify plant issues.

Justice Grown Code of Conduct

All employees are expected to represent the values and maintain the standards contained in the Justice Grown Code of Conduct.

Changes to this Job Description

The Company may amend this job description in whole or part, at any time, without notice.

I understand and accept the responsibilities outlined in this Job Description.

[redacted]

Summary

[redacted] is committed to providing patients with the highest quality legal, safe, and effective cannabis products, services, and resources available today. We focus on providing high-quality cannabis products for people in need of alternative forms of wellness. With our roots founded in social activism, our team shows a strong commitment to giving back to all local communities where we operate.

The Processing Technician I is responsible for the processing and production of cannabis products and bi-products. This position supports the Production Department with various tasks and projects, such as processing, making pre-rolls, and packaging.

Essential Functions and Responsibilities

Production Support

- Manicure, manufacture, and package cannabis flowers, products and bi-products.
- Use various equipment, such as a shredder and knockbox, to create high-quality prerolls.
- Perform quality control inspection on cannabis products and bi-products
- Adhere to inventory controls and processes throughout the finishing process
- Engage in folding dutch crowns, counting finished prerolls, and packaging and labelling final product.
- Acurately track all processing and product information.
- Meet daily goals and processing objectives set by Production Manager.
- Store and transport product in designated areas.
- Maintain cleanliness and sanitization of cultivation and production zones, tools and equipment.
- Maintains safe and healthy work environment by following OSHA regulations, organization standards and legal regulations.
- Perform other related work as required.

[redacted]

Education and Experience

- High school diploma or general education degree (GED); or one to three months related experience and/or training; or or equivalent combination of education and experience.
- Must be 21 years old and pass a criminal background check.
- Experience in a high-volume, fast paced start up environment.
- Strong oral and written communication experience.
- Ability to maintain product accurately and efficiently.
- Ability to communicate with other staff and associates in all situations.
- Ability to meet deadlines while maintaining focus on accuracy and attention to detail.
- Ability to take direction and complete daily tasks with minimal supervision. .
- High level of patience and flexibility.

Supervisory Responsibilities

None

Work Environment and Physical Demands

The work environment characteristics and physical demands described here are representative of those an employee encounters while performing the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

Work is performed in a busy medical cannabis facility and/or operations/finishing area. The outdoor/indoor facility areas are very loud due to fans and filtration systems, fluctuating between extreme cold and hot temperatures. Available to work varied hours/days, including nights, weekends, holidays, and/or events during harvest periods is required.

Work may require prolonged sitting/standing, some bending, stooping and stretching. Requires eye-hand coordination and manual dexterity, specifically fingers and hands (for extended time periods) sufficient to manicuring tools, a computer, photocopier, telephone, calculator and other office equipment. Requires normal range of hearing. Requires close vision with the ability to see color and adjust focus. Requires lifting up to 25 pounds regularly and push/pull up to 25 pounds also use assistance.

Justice Grown Code of Conduct

All employees are expected to represent the values and maintain the standards contained in the Justice Grown Code of Conduct.

Changes to this Job Description

[redacted]

Summary

The Processing Technician II is responsible for leading the processing and production of cannabis products and bi-products. This position performs a variety of tasks and projects including processing, trimming, making pre-rolls, and packaging.

Essential Functions and Responsibilities

Production Support

- Manicure, manufacture, and package cannabis flowers, products and biproducts.
- Use various equipment, such as a shredder and knock-box, to create high-quality pre-rolls.
- Provide quality control on cannabis products and bi-products and adhere to inventory controls.
- Engage in folding dutch crowns, counting finished pre-rolls, and packaging and labelling final product.
- Audit packaging and potency labels.
- Accurately track all processing and product information.
- Meet production goals set by Production Manager.
- Work closely with the Production Manager and Inventory Technician to ensure timely and accurate tracking and transfers of product.
- May assist in training of Production Technician I employees
- Store and transport product in designated areas.
- Maintain cleanliness and sanitization of cultivation and production zones, tools and equipment.
- Maintains safe and healthy work environment by following OSHA regulations, organization standards and legal regulations.
- Maintain a positive work environment conducive to trust and respect.
- Perform other related work as required.

Qualifications

Education and Experience

[redacted]

The Patient Care Associate(PCA) is responsible for delivering an exceptional customer experience. This role ensures all sales are compliant with state regulations and that customer needs are heard and met throughout the sales process. This position is also responsible for ensuring transactions are accurately recorded in point-of-sale (POS) and inventory tracking systems. Most importantly, this role embodies the company's culture and brand image.

Essential Functions and Responsibilities

Sales Responsibilities

- Ensures the consistent delivery of an exceptional customer experience
- Assists customers in product selection based on defined treatment plans and product availability
- Achieves daily/weekly sales objectives by fulfilling customer requests and looking for opportunities introduce new and alternative products
- Continually develops communication and service skills to increase sales and generate positive reviews
- Educates customers on product attributes and usage
- Ensures customers are accurately logged into the patient tracking system
- Performs sales transactions in compliance with all regulations governing the sale of cannabis products
- Completes accurate sales documentation
- Ensures transactions are entered in point-of-sale and inventory management systems in compliance with state regulations
- Assists in maintaining a safe, clean, and organized dispensary environment
- Complies with all Justice Cannabis Co. policies, procedures and practices governing sales and service
- Complies with all safety and security protocols for dispensary staff
- Performs administrative tasks (customer profile completion, sales tracking, etc.) as required
- Answers phones, responds to voicemail, and takes phone orders
- Establishes on-going relationships with dispensary customers
- Completes customer profiles to assist in future sales and service opportunities
- Maintains knowledge of new and existing products via vendor training, documentation, and cross-training with management, pharmacists, and senior sales consultants

[redacted]

Qualifications

- Two or more years of experience working in a retail or hospitality environment with cash handling responsibility
- Demonstrated passion for delivering an exceptional customer experience
- Fast-paced, high volume retail sales experience preferred
- Must be at least 21 years of age and possess a valid driver's license or state ID
- Must pass all required background checks, certifications, and DOH affiliation requirements
- Professional written and verbal communication and interpersonal skills
- Must have strong organizational skills, high attention to detail and the ability to multi-task

Cultural Responsibilities

- Actively models Justice Cannabis Co. 's values and code of conduct
- Builds strong and effective internal, external, and cross-functional relationships.
- Is committed to creating and maintaining a collaborative, fun, and productive work environment
- Actively participates in team building and cultural development activities
- Models honesty, integrity, and direct communication in daily tasks and interactions

Computers and Technology

- Must be computer literate with the ability to learn operational systems (Alpine IQ, Leaflogix, MJ Freeway, Veriscan, Microsoft office, and Metrc, etc.)
- Experience working with Outlook email and Microsoft Office suite

Supervisory Responsibilities

This position does not have supervisory responsibilities.

Work Environment and Physical Demands

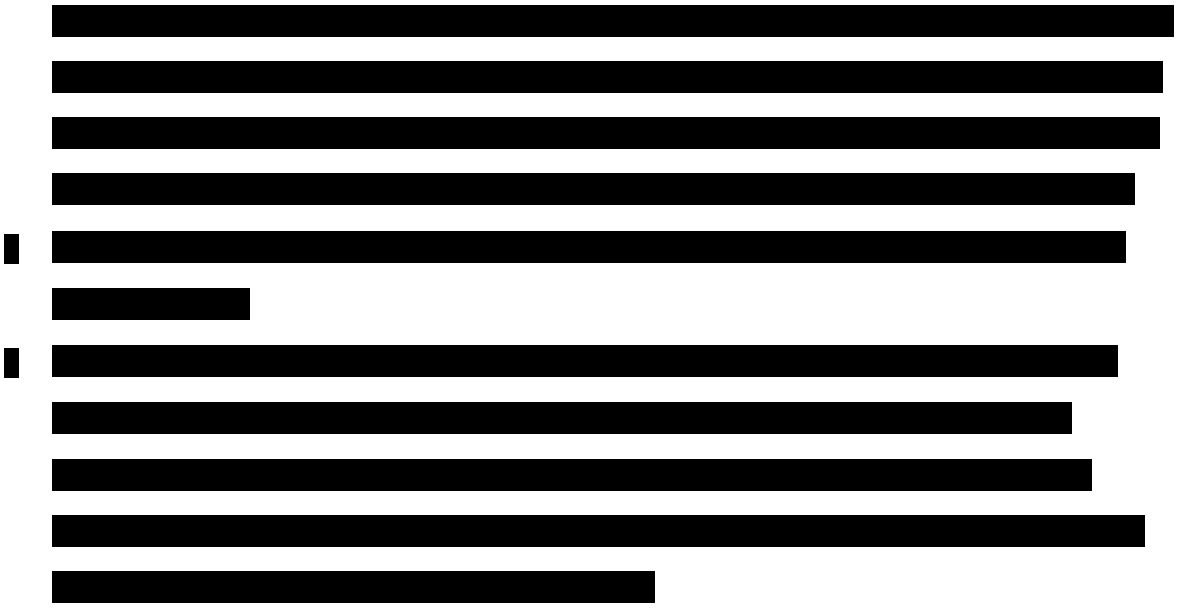
The work environment characteristics and physical demands described here are representative of those an employee encounters while performing the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

Must be capable of lifting 25 pounds to stock product boxes. Position requires frequent reaching into cabinets and displays to show and review product. Ability to maintain a stationary sitting or standing position for up to eight hours in a day based on business needs and sales volume; and, ability to bend and retrieve products from lower shelves. This role also enters information into sales and tracking systems requiring hand dexterity and the ability visually verify correct product information

[redacted]

Dispensary:

[redacted]



13.6

[redacted]

[redacted]

[redacted]

13.7

[redacted]

[redacted]

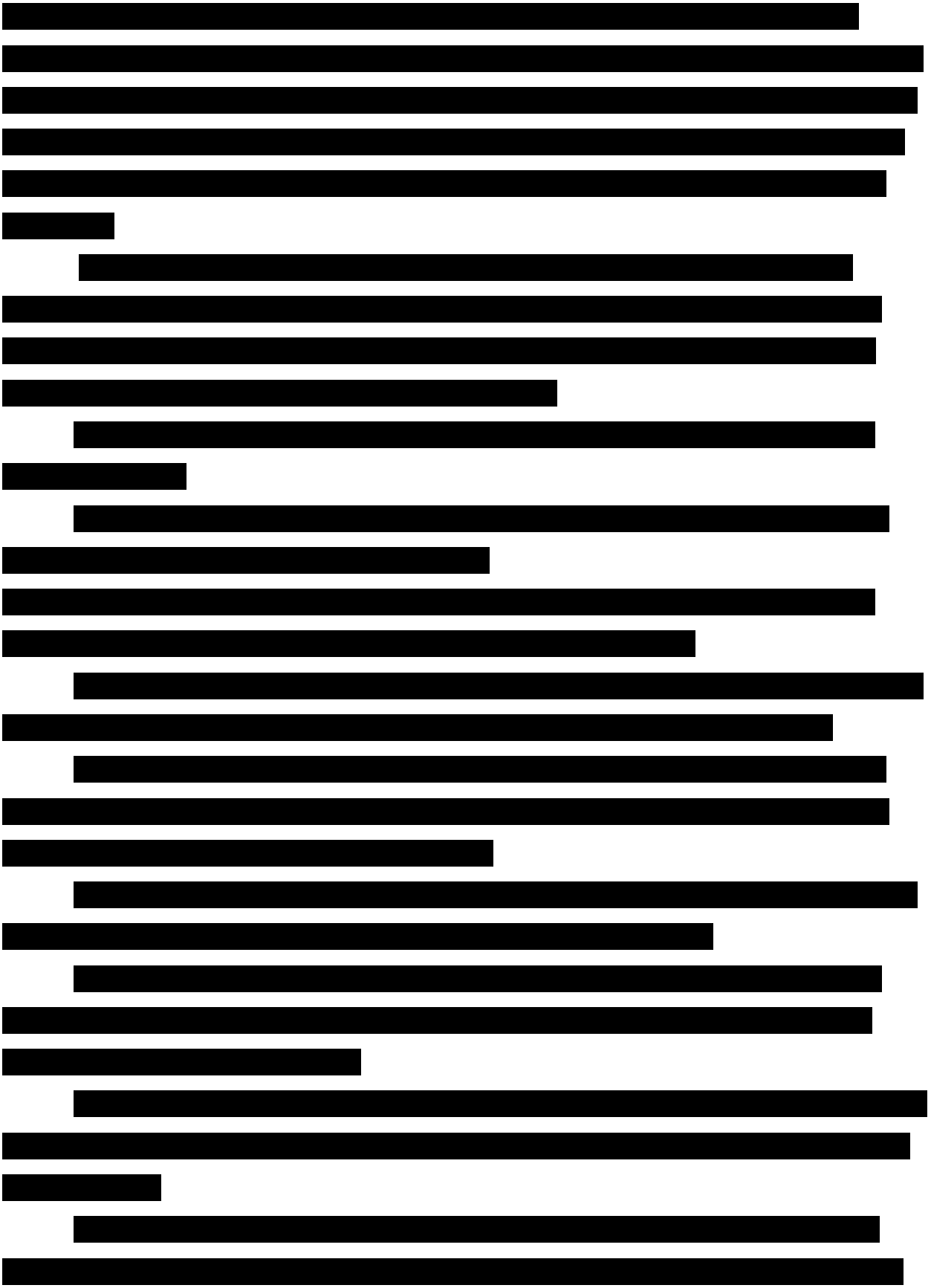
[redacted]

[redacted]

[redacted]

[redacted]

[redacted]



[redacted]

13.8

[redacted]

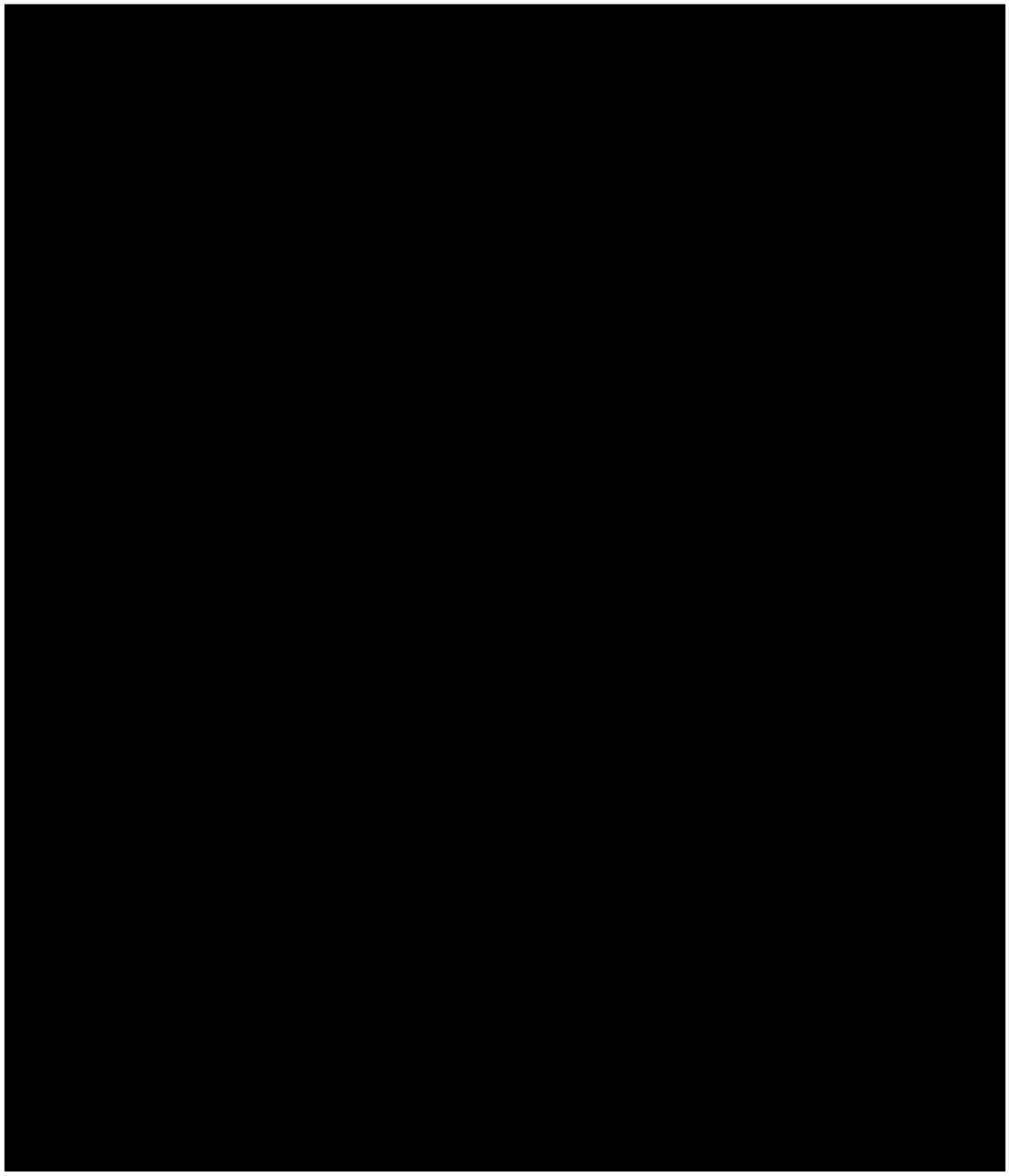
[redacted]

13.9

[redacted]

[redacted]

[redacted]



[redacted]

13.10

[redacted]

[redacted]

13.11 Insurance plan

[redacted]

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 14 – Evidence of Business Relationship with Other Licensees and Prospective Licensees

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/22/23**
Signature of Verifying Individual	**Verification Date**

The Applicant is applying for an integrated license. While we do not yet know the full list of who will be applying for, or receiving, cannabis licenses in Alabama, our owners own a multi state cannabis company with licenses in 9 nine states. As such, we have commercial and personal business relationships with more than a hundred cannabis companies around the country, including most if not all of the major American multistate operators. This includes a long history of transacting with them, buying and selling cannabis products, wholesale and retail.

Some of the cannabis companies with who we have done business include, among others: Standard Wellness Missouri 2, LLC; Stash House MO, LLC; Terrapin Missouri Cultivation, LLC; Vertical Enterprise, LLC; Grassroots OpCo MO, LLC; Green Four Ventures, LLC; Harvest of Missouri, LLC; Hippos, LLC; MIDAMERICANNA, LLC; MR 5025 OH100, LLC; New Growth Horizon, LLC; Organic Remedies MO, Inc.; Robust Missouri Process and Manufacturing 2, LLC; SLCC, LLC; Solgrone Cultivation, LLC; Choice Labs, LLC; City Farm Warren, LLC; CLDD, LLC; Driven Grow, LLC; Evo Pharms, LLC; Ferndale Maize, LLC; Glacial Farms, LLC; Grasshopper Farms, LLC; Green Mitten Harvest, LLC; Kassab Investments, LLC; Peninsula Agriculture, LLC; Redbud Roots Lab IV, LLC; RJB Enterprises, LLC; RWB Michigan, LLC; Sky Labs, LLC; The Coast, LLC; The Machine Grow and Processing, Inc.; Trucenta, LLC; Missouri: BD Health Ag 2, LLC; BD Health Ag 3, LLC; BD Health Retail 1, LLC; Bloom Medicinals of MO - Cultivation 2, LLC; Bootheel CannaCare Columbia, LLC; Cassville GP, LLC; Delta Extraction, LLC; GF Saint Mary, LLC; GFFG, LLC.

As an applicant for an integrated (vertical) license, we have less need for certain contracts in Alabama. However, an example of an agreement we entered into with an applicant in Alabama is attached hereto as well.

14.1 Any Cultivator or Prospective Cultivator

Does not apply. Applicant does not have a relationship with any Cultivators, or prospective Cultivators, at this time.

14.2 Any Processor or prospective Processor

The Applicant has entered into an agreement with [redacted], a prospective Alabama Cannabis business licensee for processing and manufacturing. See the Letter of Intent on page 3.

14.3 Any Secure Transporter or Prospective Secure Transporter

The Applicant has entered into an agreement with [redacted], a prospective Alabama Cannabis business licensee for secure transportation. See the Letter of Intent on page 4.

14.4 Any Dispensary or prospective Dispensary

Does not apply. Applicant does not have a relationships with any Dispensaries, or prospective Dispensaries, at this time.

14.5 Any Integrated Facility or prospective Integrated Facility

Does not apply. Applicant does not have a relationship with any Integrated Facilities, or prospective Integrated Facilities, at this time.

14.6 Any State Testing Laboratory or prospective State Testing Laboratory

The Applicant has intent to enter into an agreement with [redacted], a prospective State Testing Laboratory business licensee. See the Letter of Intent on page 5.

[redacted]

Dear [redacted]

We are happy to confirm that [redacted] ("Client") has selected [redacted] as a legal medical cannabis processor for its Alabama dispensary to be performed by GPH in the event the Client and [redacted] are both awarded Medical Cannabis Licenses through the state of Alabama.

As Chief Executive Officer of [redacted] we support the entire [redacted] efforts, so we offer our deepest gratitude for the opportunity to work with them in this exciting new venture.

We grant the guarantee of the following:
Processing and manufacturing

Again, we're thrilled to potentially be working with [redacted] and look forward to a rewarding and enduring relationship that will increase our ability to offer Alabama patients clean sustainable medical cannabis products.

Sincerely,

[redacted]

March 2, 2023

Dear [redacted],

We are pleased to confirm that [redacted] (a prospective Integrated Facility licensee) has selected [redacted] (a prospective Secure Transporter licensee) to provide secure transportation services in the event that both [redacted] and [redacted] are both awarded Medical Cannabis Licenses through the state of Alabama.

We support [redacted] efforts to provide secure transportation services and we offer our deepest gratitude for the opportunity to work with them in this exciting new venture.

We are thrilled to be working with [redacted] and look forward to a rewarding and enduring relationship that will increase our ability to offer Alabama patients medical cannabis products in a safe and secure manner.

Sincerely,

[redacted]

Dear [redacted]

We are pleased to confirm that [redacted] (a prospective Integrated Facility licensee) has selected [redacted] (a prospective State Testing Laboratory licensee) as one of the contract laboratories, [redacted] may use in the event that both [redacted] and [redacted] are both awarded Medical Cannabis Licenses through the state of Alabama.

We support [redacted] efforts to provide laboratory testing services and look forward to entering into a partnership in the future.

We are thrilled for the potential partnership with [redacted] and look forward to a rewarding and enduring relationship that will increase our ability to offer Alabama patients medical cannabis products in a safe and secure manner.

Sincerely,

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 15 – Coordination of Information from Registered Certifying Physicians

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/22/23**
Signature of Verifying Individual	**Verification Date**

Our cannabis company is majority-owned by a group of Alabama residents who have partnered with a successful national cannabis company with significant experience operating in multiple highly regulated medical cannabis markets, including Missouri, Illinois, Utah, New Jersey, Michigan, and Pennsylvania, among others. As a result of this experience, we have developed best practices for establishing relationships with prescribing physicians.

In Alabama, we will coordinate with certifying physicians through intentional partnerships with vetted physicians for referral, education, and consultation. We currently have a partnership with [redacted], whose purpose is to educate patients from all over the country and connect them with healthcare professionals who can evaluate if cannabis is right for them. We will work with their network in Alabama once it is fully established. We will establish similar agreements and working relationships with [redacted] once their networks in Alabama are also fully established.

[redacted]

We will ensure that physicians only prescribe to residents of Alabama who are 19 years of age or older and are registered qualified patients, ie, only if he or she meets all of the following conditions: a. Has been certified by a registered certifying physician as having a qualifying medical condition. b. Is registered with the commission. c. Has been issued a valid medical cannabis card by the commission. We will also ensure that in order to certify a patient, a registered certifying physician must diagnose the patient with at least one qualifying medical condition or confirm that the patient has been medically diagnosed with at least one qualifying medical condition. All physician referrals will be tracked in the

statewide seed-to-sale system as well as within our internal tracking system.

We will further ensure that our referring physicians are qualified in that they must hold an active license to practice medicine under Chapter 24 of Title 34 and complete a four-hour course related to medical cannabis and complete a subsequent examination. If physicians have difficulty finding such a course, we will contact medical schools to assist. We will maintain a database and contact information of all doctors who meet these qualifications, and will educate them about the benefits of the medicinal products we offer.

We will ensure that all registered certifying physicians do not accept, solicit, or offer any form of remuneration from or to a qualified patient, designated caregiver, or any licensee, including a principal officer, board member, agent, or employee of the licensee, to certify a patient, other than accepting payment from a patient for the fee associated with the examination, medical consultation, or other treatment, including, but not limited to, any third party reimbursement for the same.

We will offer no inducements, and will not solicit or offer any form of remuneration from or to a dispensary for the purpose of referring a patient to a specific dispensary. Nor will we offer a discount of any other item of value to a qualified patient who uses or agrees to designate a specific caregiver or use a specific dispensary to obtain medical cannabis.
No physician in our network will have a direct or indirect economic interest in our company, serve on our board of directors or as an employee of a licensee, or advertise in our dispensary or on the physician's own website, brochures, or any other media that generally describe the scope of practice of the physician, any statement that refers to the physician as a "medical cannabis" or "medical marijuana" physician or doctor, or otherwise advertises his or her status as a registered certifying physician, other than a statement that the doctor is qualified by the State of Alabama to certify patients for medical cannabis use under the Alabama Compassion Act.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Our professionals have decades of collective training to draw upon. This includes our Director of Regulatory Compliance, [redacted] a long-time cannabis educator who has been active in the cannabis industry in California since the early 2000s, and who has considerable practice creating written materials and training our team members to educate patients.

[redacted]

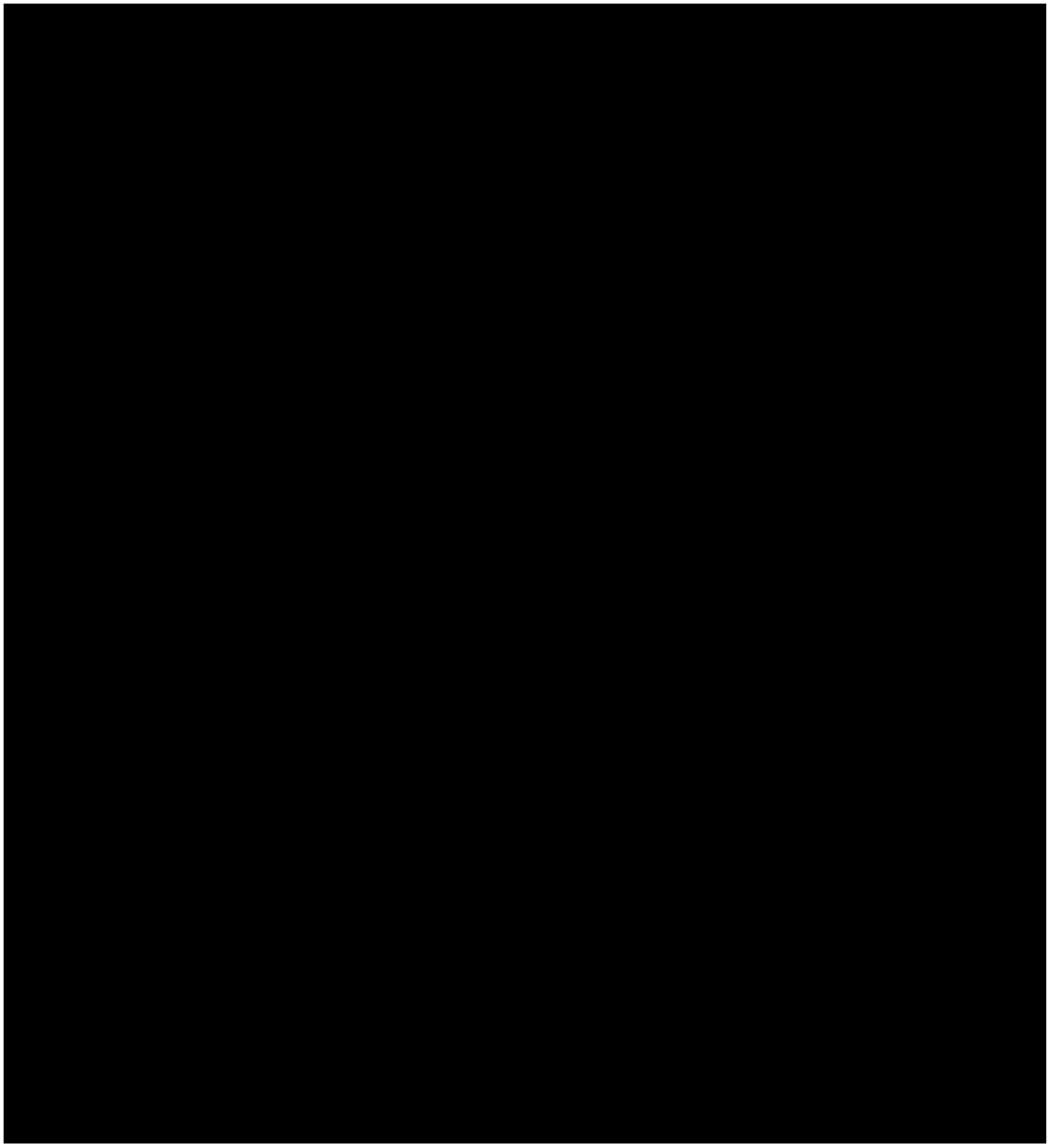


Exhibit 16 – Point-of-Sale Responsibilities

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/22/23**
Signature of Verifying Individual	**Verification Date**

Our cannabis company is majority-owned by a group of Alabama residents who have partnered with a successful national cannabis company with significant experience operating in multiple highly regulated medical cannabis markets. As a result of this experience, we have developed best practices for patient education at the point of sale. This is an area in which we have excelled. More than most, our Company prioritizes and invests in employee training around our products and their medical efficacies. We believe strongly that this is the best way both to not only best serve our patients, but to build a successful medical cannabis business.

[redacted]

A. Educating Patients and Designated Caregivers: [redacted]

Our experience working in some of the strictest medical markets in the country (including Illinois and Pennsylvania) has allowed us to refine and perfect our training. Throughout our years of operation, [redacted] collaboration with regulators has resulted in an effective approach to creating and implementing training protocols that work. With these training protocols, [redacted] has demonstrated a successful record of preparing and providing our patients and caregivers with the most current, evidence-based information regarding the treatment of their qualifying conditions.

[redacted]

[redacted]

B. Our Considerable Training Experience: [redacted]

[redacted]

C. Our Written Educational Materials: [redacted]

[redacted]

D. Patient Consultations: [redacted]

[redacted]

[redacted]

E. Educating Patients on Proper Medical Use of our Products [redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 17 – Confidentiality of Patient Information

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	co-owner
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	12/30/2022
Signature of Verifying Individual	**Verification Date**

Maintaining Confidential Information

We understand that dispensary record-keeping is extremely sensitive due to protected Personal Health Information ("PHI") that we will receive and store. Our plans for maintaining, updating and storing records will be in compliance with all state and federal laws and regulations, and will provide our employees, Department inspectors, auditors and local/State police the necessary and required information for oversight and transparency, all the while protecting and balancing our patients' interests as well.

We will train all our employees on the ETS software and on best practices of data management, including HIPAA training. Because we will be in possession of PHI, it is critical that each employee is fully conversant with the requirements of HIPAA and properly protects all PHI. We will contract with a third-party HIPAA trainer to ensure all employees who may have access to patient health-care information are properly HIPAA trained and certified. The ETS will create and store electronic files. All PHI, other than certifications, will be stored on our servers that are backed up to a HIPAA-compliant cloud-based storage provider.

Cybersecurity:

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 18 – Money Handling and Taxes

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/22/23**
Signature of Verifying Individual	**Verification Date**

Our cannabis company is majority owned by Alabama residents who have partnered with a successful national cannabis company with significant experience operating in multiple highly regulated cannabis markets, including Illinois, New Jersey, Missouri, and Pennsylvania, among others. As a result of this experience, we have developed SOPs and best practices for money handling.

Money Handling

Cannabis is a cash-intensive business. Accordingly, the Applicant has developed policies and procedures relating to the handling of cash in order to ensure the safety of employees, customers, and the public. Our retail dispensaries will use best business practices in transaction management, ensuring the safety of employees and patients and their primary caregivers. [redacted]

Start of Business Day

1. [redacted]

During Business Day

1. [redacted]

2. [redacted]

End of Business Day

[redacted]

4. [redacted]

Change Requests

[redacted]

Taxes

The Applicant will, of course, comply with all ordinary business taxes, including sales taxes, income taxes, property taxes, and all relevant use taxes. The Applicant will also meticulously comply with state and federal cannabis-specific tax provisions, including Alabama's Cannabis Privilege Tax. The Applicant will work with [redacted], an accounting and financial services provider, and the leading cannabis accounting specialists in the nation. [redacted] serves hundreds of cannabis businesses in the US, including several of the largest multi-state operators. The Applicant's partner, [redacted] has utilized [redacted] for years. With the advice of [redacted] and the experience and expertise of our partner, the Applicant will be well positioned to comply with federal and state cannabis tax laws.

Federal Tax Provisions

The Applicant is knowledgeable about federal cannabis tax law, and we will comply to the letter. The Internal Revenue Code prohibits entities engaged in the production, sale, or distribution of cannabis from deducting ordinary business expenses. Specifically, section

License Type: Integrated Facility Page - 4 - of Exhibit 18 – Money Handling and Taxes 56 280E of the Code permits cannabis businesses to deduct only the Cost of Goods Sold ("COGS"), but not indirect business expenses, such as most payroll, rent, depreciation, insurance, and other so-called below-the-line expenses. The calculation of COGS differs as between cultivation facilities and retail dispensaries. As an Integrated Licensee, the Applicant will have to navigate 280E as it applies to both types of facilities. That will require meticulous record-keeping and inventory tracking, as well as knowledgeable tax preparation advice.

Alabama Tax Provisions

The Applicant is also aware of Alabama's cannabis-specific taxation scheme. Chapter 2A of Title 20, Code of Alabama contains two different cannabis-related tax provisions: a sales tax set forth in § 20-2A-80(a), and privilege tax set forth in § 20- 2A80(b). The Applicant will comply with both.

Sales Tax: Alabama law imposes a retail sales tax on cannabis at a rate of nine percent of the gross proceeds of sales. Ala. Code § 20-2A-80(a). "Gross proceeds of sales" is defined at Ala. Code § 40-23-1.

That tax is collected and remitted like any other sales tax, pursuant to Article 1 of Chapter 23 of Title 40, Code of Alabama. Specifically, for at least the first calendar year, the Applicant report and pay sales tax on a monthly basis, on or before the 20th of the month. Sales tax must be reported to the Department of Revenue on a form prescribed by the Department. Ala. Code § 40-23-7.

After the first calendar year of business, depending on the amount of the business's sales tax during the preceding year, the Applicant may be required to report and pay sales tax either monthly, quarterly, semi-annually, or annually. Ala. Code § 40-23-7.

Medical Cannabis Privilege Tax: Alabama law also imposes an annual medical cannabis privilege tax, based on a combination of the entity's income and its net worth. Ala. Code §

20-2A-80(b). That privilege tax parallels Alabama's Business Privilege Tax, set forth in Ala. Code §§ 40-14A-22 and -23. The Applicant, as an Alabama-based LLC that intends to conduct business in Alabama, is subject to that privilege tax. To comply with the medical cannabis privilege tax, the Applicant will engage in a multistep calculation.

First, the Applicant must determine its net worth (generally assets minus liabilities, with certain adjustments as detailed in subsections 40-14A-22(e), (f), and (g)). Second, the Applicant must determine what portion of its net worth is attributable to sales, payroll, and property in Alabama (as compared to total sales, payroll, and property). Since the Applicant will be located solely in Alabama and will conduct business solely in Alabama, we anticipate that our net worth in Alabama will be our entire net worth. Third, the Applicant must calculate its federal taxable income, which it will use to determine its privilege tax rate. Alabama businesses are subject to a privilege tax at varying rates, depending on their amount of federally taxable income.

Importantly, the medical cannabis privilege tax is subject to both minimum and maximum amounts. All covered entities must pay a minimum of $100 per year, and, apart from financial institutions and insurance companies, all covered entities are subject to an annual cap of $15,000.

Lastly, we are aware that our initial medical cannabis privilege tax return must be filed no later than two and one-half months after the Applicant is licensed to do business, or commences business, in Alabama, unless we timely seek and receive an extension.

The Applicant intends to work closely with [redacted], its accounting service provider, to comply with the medical cannabis privilege tax.

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 19 – Standard Operating Plan and Procedures

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

Overview

The Standard Operating Procedures that our company has developed is based on years of experience operating a multi-state vertically integrated cannabis company. Our company has been operating in compliance since 2015 and are now fully licensed and operational in six highly regulated states. Our team has utilized their vast expertise in the industry to assemble valuable intellectual property that is the basis of our standard operating procedures and plans. Each aspect of our supply chain, cultivation, manufacturing, distribution, and retail, have a separate and specific set of standard operating procedures, referred to henceforth as "SOPs" that guide the teams' actions, create uniform product, and ensure safety throughout all our state compliant facilities.

While we are eager to demonstrate our expertise in this regard, each of those manuals is well beyond thirty pages. In lieu of providing a copy of each supply chain manual, we've summarized those procedures below. All manuals will be made physically accessible on site, and will be made readily available to inspectors, the Commission, or Commission staff.

19.1 IT Plan

Being a vertically integrated, multi-state operator, we have the benefit of navigating and [redacted]

[redacted]

[redacted]

[redacted]

19.2 Plan for Maintenance and Storage of Cannabis and Medical Cannabis

[redacted]

[redacted]

[redacted]

Secure Storage

[redacted]

[redacted]

Example of Product Storage Areas

19.3 Quality Control & Quality Assurance Plan

[redacted]

Responsibilities

[redacted]

Taking Possession & Storage of Cannabis Goods Prior to Testing

[redacted]

Cannabis Preservation Methods

[redacted]

Sterilization of Tools

[redacted]

Staff Measures to Prevent Contamination

[redacted]

Raw Cannabis Products & Hazardous Surfaces

[redacted]

Limited-Access Areas

[redacted]

[redacted]

19.4 Contamination and Recall Plan

[redacted]

19.5 <u>Criminal Activity Plan</u>

[redacted]

[redacted]

19.6 Emergency Procedures & Disaster Plan

[redacted]

[redacted]

Steps to Ensure the Safety of Employees

[redacted]

[redacted]

[redacted]

The Preservation of Cannabis or Medical Cannabis

In the event of an emergency human life takes precedence over the preservation of [redacted]

Reasonable Efforts to Maintain Access to Medical Cannabis for Patients

[redacted]

19.7 <u>Alcohol, Smoke, and Drug Free Workplace Policy</u>

[redacted]

[redacted]

Cannabis Consumption Outside of the Workplace

[redacted]

Cannabis Consumption in the Workplace Is Prohibited

[redacted]

[redacted]

Medical Use of Cannabis

The Company accommodates its employees with disabilities and medical conditions.

[redacted]

Drug and Alcohol Policy Overview

[redacted]

[redacted]

Work Rules

[redacted]

Reasonable Suspicion

[redacted]

Post-accident

[redacted]

19.8 <u>Employee Safety Plan</u>

[redacted]

19.9 Confidential Information and Cybersecurity Plan

[redacted]

19.10 Plan for Tracking & Disposal of Cannabis Waste

[redacted]

19.11 Security Plan

A detailed security plan has been provided in Exhibit 33.

19.12 Grow Plan

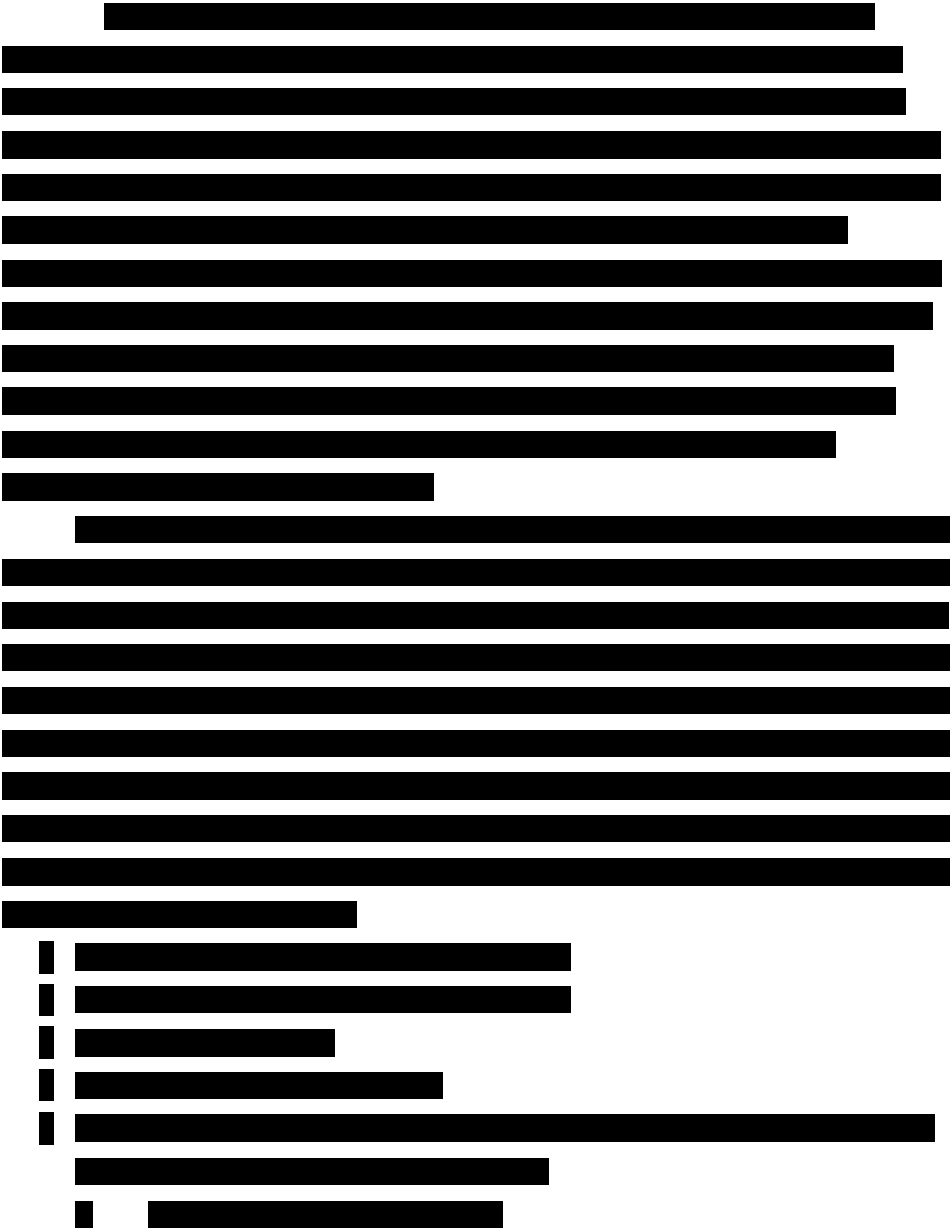
[redacted]

[redacted]

19.13 Engineering Plans and Specifications

Engineering plans and specifications are developed in partnership with our Director of Construction, and Cultivation Director. Detailed engineering plans and specifications have been provided in Exhibit 32.

19.14 Cultivation Facilities Chain of Custody



[redacted]

Laboratory Responsibilities

[redacted]

Receipt of Certificate of Analysis: Testing results

[redacted]

[redacted]

Procedure for Passed Sample

[redacted]

Re-Packaging, Packaging, and Re-Labeling

[redacted]

Failed Certificate of Analysis Status

[redacted]

Final Review Prior Retail Sale

[redacted]

Returns from Licensed Retail

[redacted]

Defective Product Returns to a Licensee

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 20 – Policies and Procedures Manual

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**12/28/22**
Signature of Verifying Individual	**Verification Date**

Overview

The policies and procedures manual that our company has developed is based on years of experience operating a multi-state vertically integrated cannabis company. Our company has been operating in compliance since 2015 and are now fully licensed and operational in six highly regulated states. Our team has utilized their vast expertise in the industry to assemble valuable intellectual property that is the basis of our standard operating procedures and plans. Each aspect of our supply chain, cultivation, manufacturing, distribution, and retail, have a separate and specific set of standard operating procedures, referred to henceforth as "SOPs" that guide the teams' actions, create uniform product, and ensure safety throughout all our state compliant facilities.

While we are eager to demonstrate our expertise in this regard, each of those manuals is well beyond thirty pages. In lieu of providing a copy of each supply chain manual, we've summarized those procedures below. All manuals will be made physically accessible on site, and will be made readily available to inspectors, the Commission, or Commission staff.

IT Plan

[redacted]

[redacted]

Plan for Maintenance and Storage of Cannabis and Medical Cannabis

[redacted]

[redacted]

[redacted]

[redacted].

[redacted]

Secure Storage

[redacted]

Example of Product Storage

Quality Control & Quality Assurance Plan

[redacted]

Responsibilities

[redacted]

Taking Possession & Storage of Cannabis Goods Prior to Testing

[redacted]

[redacted]

Cannabis Preservation Methods

[redacted]

Sterilization of Tools

[redacted]

Staff Measures to Prevent Contamination

[redacted]

Raw Cannabis Products & Hazardous Surfaces

[redacted]

Limited-Access Areas

[redacted]

Contamination and Recall Plan

[redacted]

[redacted]

Criminal Activity Plan

[redacted]

[redacted]

Emergency Procedures & Disaster Plan

[redacted]

Steps to Ensure the Safety of Employees

[redacted]

[redacted]

[redacted]

The Preservation of Cannabis or Medical Cannabis

[redacted]

Reasonable Efforts to Maintain Access to Medical Cannabis for Patients

[redacted]

[redacted]

Alcohol, Smoke, and Drug Free Workplace Policy

[redacted]

Cannabis Consumption Outside of the Workplace

[redacted]

Cannabis Consumption in the Workplace Is Prohibited

[redacted]

Medical Use of Cannabis

[redacted]

Drug and Alcohol Policy Overview

[redacted]

[redacted]

Work Rules

[redacted]

Reasonable Suspicion

[redacted]

Post-accident

[redacted]

[redacted]

Employee Safety Plan

[redacted]

[redacted]

Confidential Information and Cybersecurity Plan

The protection of confidential patient information is paramount to our operation.

[redacted]

Plan for Tracking & Disposal of Cannabis Waste

[redacted]

[redacted]

Cultivation Facilities Chain of Custody

[redacted]

[redacted]

Laboratory Responsibilities

[redacted]

Receipt of Certificate of Analysis: Testing results

[redacted]

[redacted]

Procedure for Passed Sample

[redacted]

Re-Packaging, Packaging, and Re-Labeling

[redacted]

Failed Certificate of Analysis Status

[redacted]

Final Review Prior Retail Sale

[redacted]

[redacted]

Returns from Licensed Retail

[redacted]

Defective Product Returns to a Licensee

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 21 – Production and Manufacturing Process

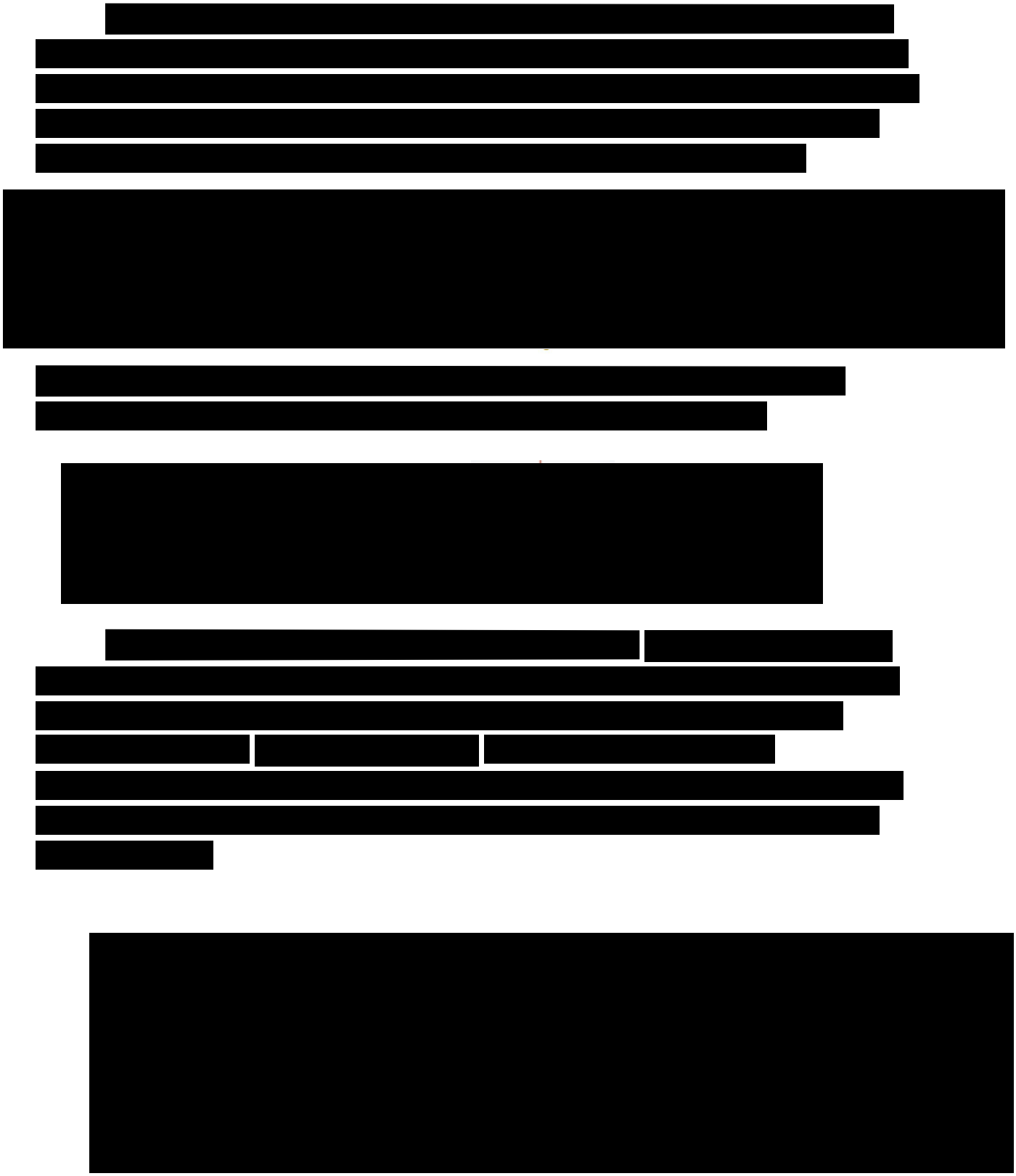
Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	
Signature of Verifying Individual	**03/23/22**
	Verification Date

21.1 Approved types of medical cannabis that will be produced at the production facility where cannabis is to be processed.

[redacted]



21.2 Summary of the Manufacturing Processes and Methods to be Utilized

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

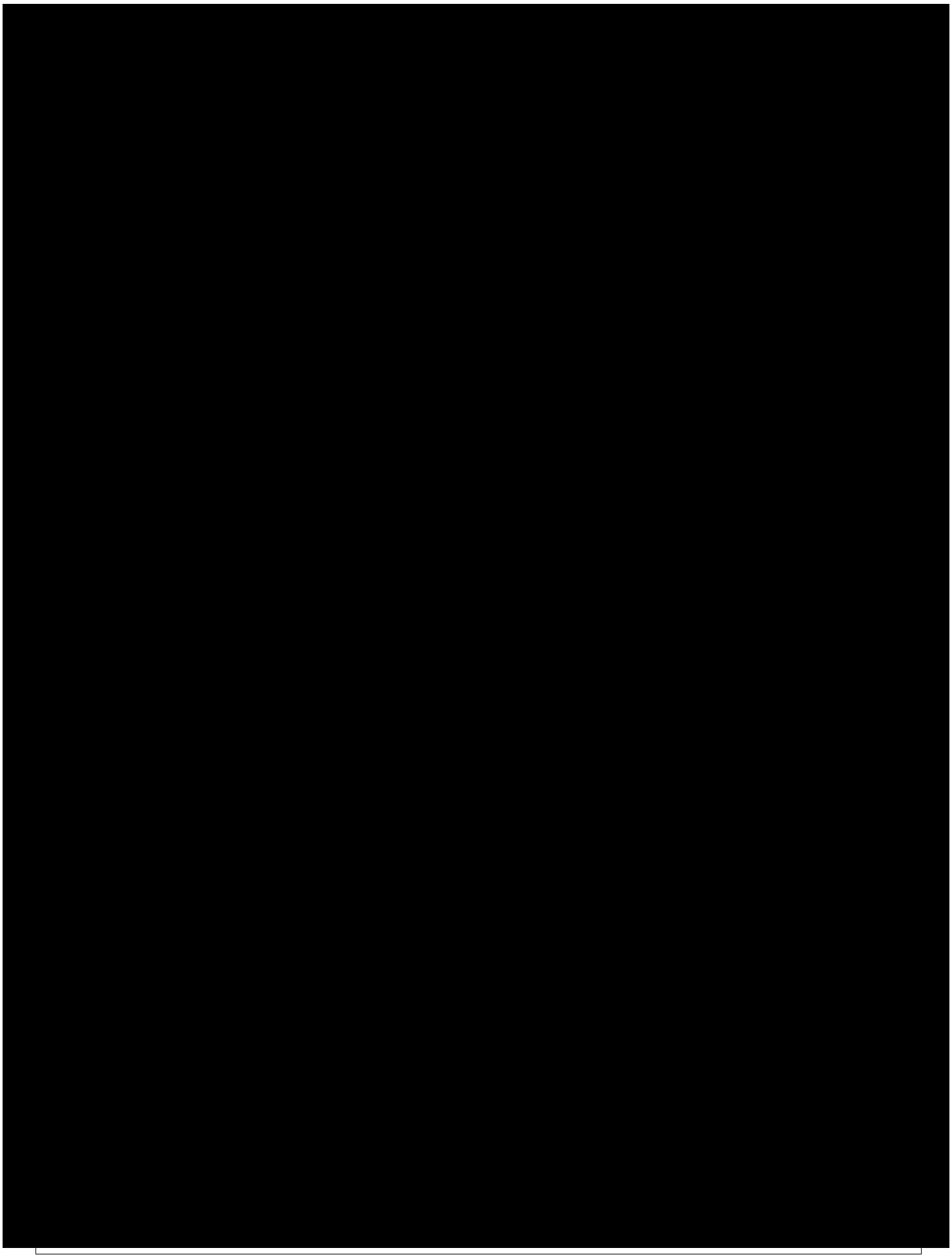
[redacted]

[redacted]

[redacted]

[redacted]

21.3 Professionally-Rendered Blueprints: Showing which portions of the facility are ascribed to a particular phase or department of integrated production – cultivation, processing, transporting, and dispensing is demonstrated on the next three pages.



21.4 Plans to Ensure Safety of Personnel and Facilities

Creating and maintaining an environment free of health and safety hazards is the responsibility of every Company employee. Specifically:

Executive/Corporate Staff Will:

- [redacted]

The Safety Director Will:

- [redacted]

Company Managers and Supervisors Will:

- [redacted]

- [redacted]

Company Employees Will:

- [redacted]

The Company Safety Committee Will:

- [redacted]

GENERAL SAFETY PRECAUTIONS

[redacted]

[redacted]

- [redacted]

[redacted]

HAZARD IDENTIFICATION

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]

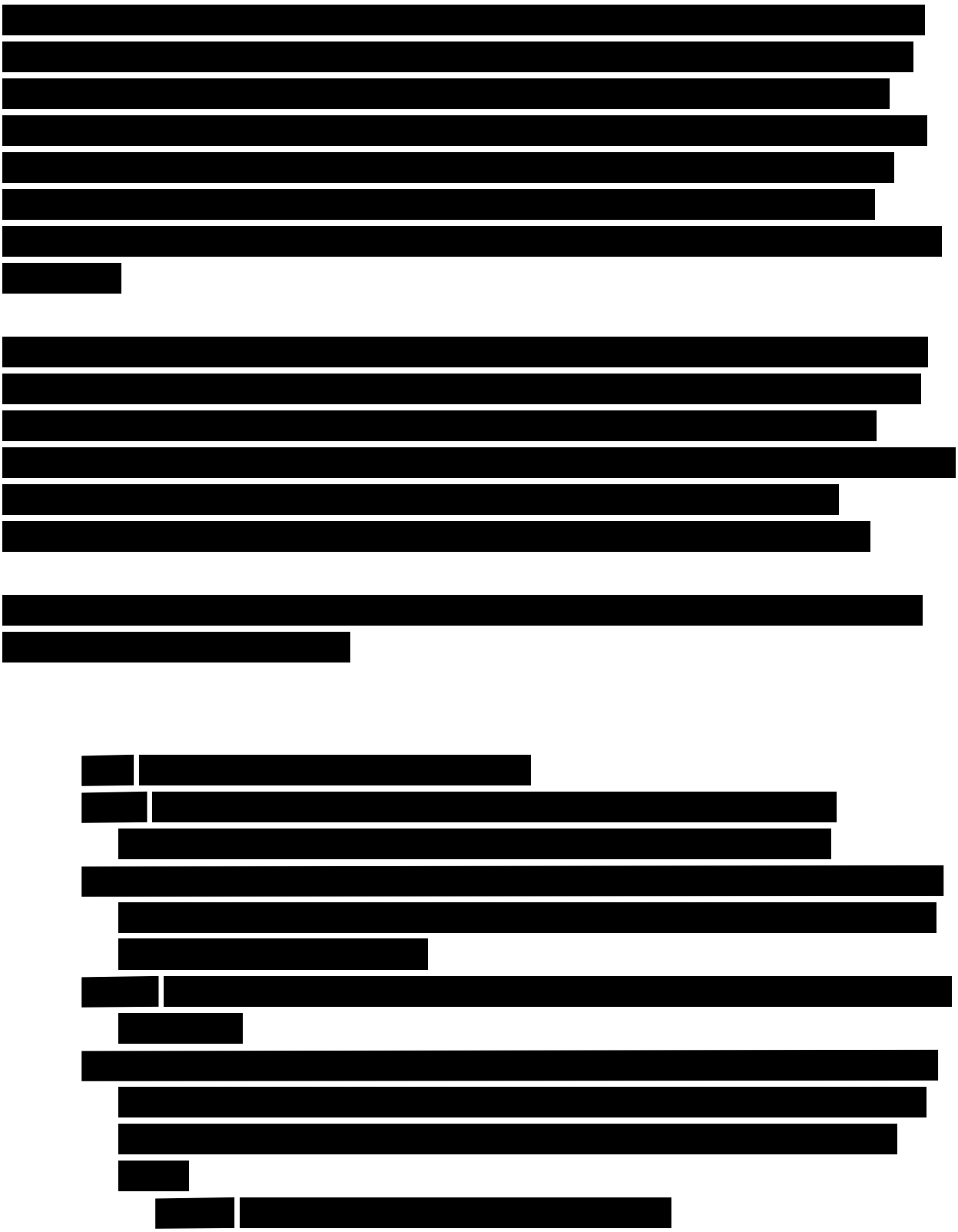
[redacted]

[redacted]

[redacted]

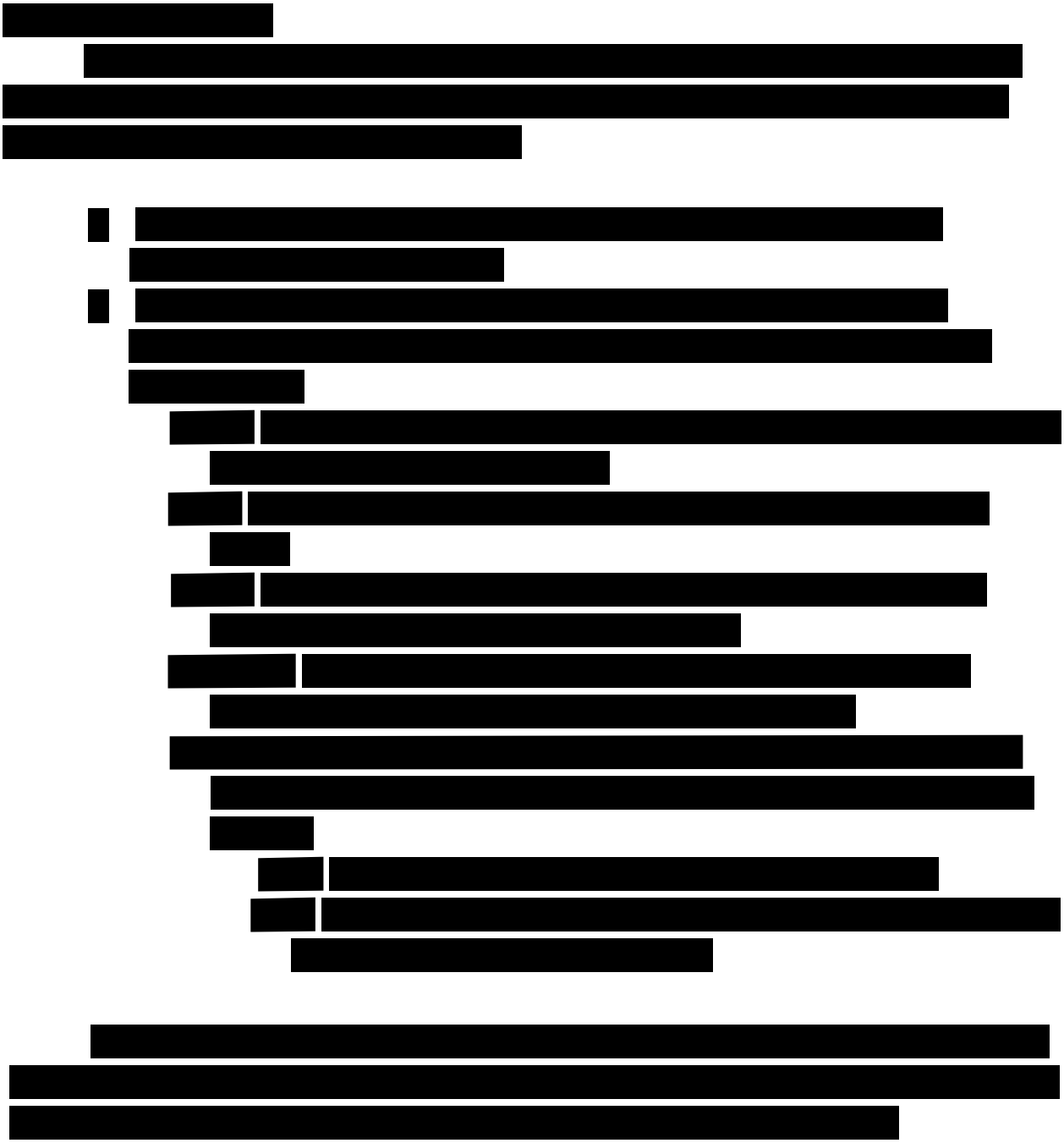
CONTROLLING HAZARDS

[redacted]

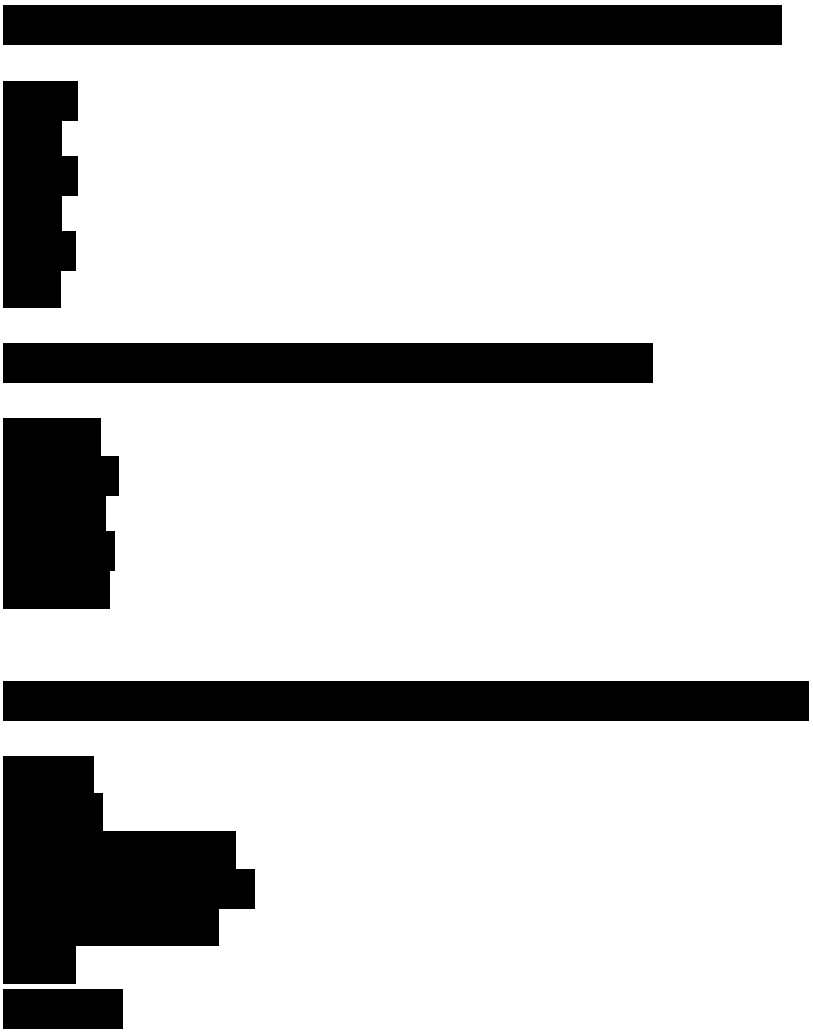


[redacted]

[redacted]



21.5 List of Formulae and Ingredients for each Medical Cannabis Product



Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 22 – Machinery and Equipment

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

Our cannabis company is majority-owned by a group of Alabama residents who have partnered with a successful national cannabis company, called [redacted] with significant experience operating in multiple highly regulated medical cannabis markets. As a result of this experience, we have developed best practices for building manufacturing and equipment. We have excellent relationships with vendors and installers, and we can obtain all necessary machinery and equipment quickly and at the best price the market will bear. Our company has built major cultivation/manufacturing facilities in New Jersey and Pennsylvania (each comprising an investment of $35MM) and has designed a third new one for Illinois. All incorporate state-of- the-art technologies for lighting, power, irrigation, security features, environmental monitoring, and propagation systems.

All cultivation facilities are indoor grows and utilize high-tech, state-of-the art, energy-efficient equipment designed for cannabis cultivation. The specifications of the cultivation machinery and equipment we will use are compiled in Attachment A.

Our processing and manufacturing facilities are precisely designed and calibrated for maximum safety and efficiency. They also minimize waste products. The specifications of the processing and manufacturing machinery and equipment we will use are compiled in Attachment A.

22.2 Machinery Sales Contracts and Receipts

[redacted] purchases all its machinery and equipment used for the cultivation and manufacturing of medical cannabis products. The following documentation in the form of sales contracts, invoices, and receipts, further demonstrate our possessory interest in the sophisticated machinery and equipment that we use in the cultivation, processing, and manufacturing of our medical cannabis products. Each type of machinery or equipment is detailed in the below chart, where we've outlined the machine or equipment's purpose and function within the cannabis production system. The corresponding invoices and sales receipts follow.

Cannabis Cultivation, Processing and Manufacturing Machinery and Equipment List

Machinery/Equipment	Production System	Purpose
LED Lighting	Cultivation	*Provide energy efficient lighting for plants growing cycle.*
Benches	Cultivation	*Provide growing table for plants, moving them off the ground which stabilizes root temperature.*
Fertigation	Cultivation	*Chemical injector to automatically mix and inject nutrients into irrigation lines.*
CI02 Chlorine Dioxide Gas System & Carbon Scrubbers	Cultivation Pest/Disease Control, & Odor Control	*Provide a chlorine dioxide gas system capable of generating liquid CI02 solution, in addition to CI02 gas for odor and powdery mildew control throughout the cultivation warehouse.*
32,000 gallon industrial Reverse Osmosis System	Cultivation/Irrigation	*Water treatment system.*
Fans	Cultivation	*Fans for air circulation.*
Water Tanks	Cultivation	*Holding tanks for treated water.*
Bench Installation & Equipment	Cultivation	*Surface for plants, assist with canopy management and drainage.*

Drying Racks	Cultivation/Processing	*Drying racks are used to dry freshly harvested plant material in preparation for the next phase of medical cannabis processing and extraction.*
Flower Sorter	Processing	*Processing and packaging equipment, machine separates flowers and sorts into various grades of flower quality.*

CO2 Enrichment System	Cultivation	*Provides monitored C02 enrichment for plant health.*
Sorter Model M	Processing	*Machine processes flower removes meri-stem and excess leaf to create finished flower. Which is then used in manufacturing system.*
Hydro Carbon Extraction System	Manufacturing	*Hydro Carbon extraction system produces concentrated medical cannabis extracts.*
Solventless Extraction System	Manufacturing	*Solventless extraction machine to produce solvent-free concentrated medical cannabis products.*
Shredder	Manufacturing	*Machine to shred medical cannabis flower in preparation for extraction process.*

22.2 Machinery Specification and Operation Manuals

See Attachment A, which follows.

Contents

1 Declaration of conformity

WATSON MARLOW Pumps

CE

EC Declaration of Conformity

1. **Qdos20, Qdos 30, Qdos 60, Qdos 120:** Manual, Remote, Universal, Universal+, PROFIBUS, Universal 110V Logic, Universal+ 110V logic, Universal 24V Relay, Universal+ 24V relay.

2. Manufacturer:
WATSON MARLOW LTD
BICKLANDS WATER ROAD
FALMOUTH
UK
TR11 4RU

3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

4. All models and versions of the Qdos series of peristaltic pumps with all approved pump heads, and accessories.

5. The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:
Machinery Directive 2006/42/EC
EMC Directive 2014/30/EU
ROHS Directive 2011/65/EU

6. Harmonised standards used:
BS EN61010-1:2001 third edition Safety requirements for electrical equipment for measurement, control, and laboratory use Part 1: General requirements.
EN61326-1:2006 Electrical equipment for measurement, control and laboratory use – EMC requirements Part 1: General requirements
BS EN 60529:1992+A2:2013 Degrees of protection provided by enclosures (IP code).

7. Intertek Testing and Certification Ltd. No:3050250, performed compliance testing to BS EN 61010-1:2004, IEC 61010-1:2004 , UL 61010-1:2004 Rev:2008 and CAN/CSA C22.2 No 61010-1:2004 Rev:2009 and issued a certification of compliance to these standards, number '100716552LHD-003

Signed for and on behalf of:
Watson-Marlow Ltd.
Falmouth. 03.01.2017

S. Nicholson

Simon Nicholson, Managing Director

ETL This pump is ETL listed: ETL control number 3050250. Cert to CAN/CSA std C22.2 No 61010-1. Conforms to UL std 61010A-1.

See "Pump specifications" on page 14.

2 Warranty

Watson-Marlow Limited ("Watson-Marlow") warrants this product to be free from defects in materials and workmanship for three years from the date of shipment, under normal use and service.

Watson-Marlow's sole responsibility and the customer's exclusive remedy for any claim arising out of the purchase of any product from Watson-Marlow is, at Watson Marlow's option: repair, replacement or credit, where applicable.

Unless otherwise agreed in writing, the foregoing warranty is limited to the country in which the product is sold.

No employee, agent or representative of Watson-Marlow has the authority to bind Watson-Marlow to any warranty other than the foregoing unless in writing and signed by a director of Watson-Marlow. Watson-Marlow makes no warranty of the fitness of its products for a particular purpose.

In no event:

i. shall the cost of the customer's exclusive remedy exceed the purchase price of the product;

ii. shall Watson-Marlow be liable for any special, indirect, incidental, consequential, or exemplary damages, however arising, even if Watson-Marlow has been advised of the possibility of such damages.

Watson-Marlow shall not be liable for any loss, damage, or expense directly or indirectly related to or arising out of the use of its products, including damage or injury caused to other products, machinery, buildings, or property. Watson-Marlow shall not be liable for consequential damages, including, without limitation, lost profits, loss of time, inconvenience, loss of product being pumped, and loss of production.

This warranty does not obligate Watson-Marlow to bear any costs of removal, installation, transportation, or other charges which may arise in connection with a warranty claim.

Watson-Marlow shall not be responsible for shipping damage of returned items.

2.1 Conditions

- Products must be returned by pre-arrangement to Watson-Marlow, or a Watson-Marlow approved service centre.
- All repairs or modifications must have been made by Watson-Marlow Limited, or a Watson-Marlow approved service centre or with the express permission in writing of Watson-Marlow, signed by a manager or director of Watson-Marlow.
- Any remote control or system connections must be made in accordance to Watson-Marlow recommendations.
- All PROFIBUS systems must be installed or certified by a PROFIBUS approved installation engineer.

2.2 Exceptions

- Consumable items including tubing and pumping elements are excluded.
- Pumphead rollers are excluded.
- Repairs or service necessitated by normal wear and tear or by lack of reasonable and proper maintenance are excluded.
- Products which, in the judgement of Watson-Marlow, have been abused, misused, or subjected to malicious or accidental damage or neglect are excluded.
- Failure caused by electrical surge is excluded.
- Failure caused by incorrect or sub-standard system wiring is excluded.
- Damage by chemical attack is excluded.
- Ancillaries such as leak detectors are excluded.
- Failure caused by UV light or direct sunlight.
- All ReNu pumpheads are excluded.
- Any attempt to disassemble a Watson-Marlow product will invalidate the product warranty.

Watson-Marlow reserves the right to amend these terms and conditions at any time.

4 Information for returning pumps

In compliance with the UK Health and Safety at Work Act and the Control of Substances Hazardous to Health Regulations, you are required to declare the substances which have been in contact with product(s) you return to Watson-Marlow or its subsidiaries or distributors. Failure to do so will cause delays. Please ensure that you fax us this form and receive an RGA (Returned Goods Authorisation) before you despatch the product(s). A copy of this form must be attached to the outside of the packaging containing the product(s).

Please complete a separate decontamination declaration for each product. A copy of the appropriate decontamination declaration can be downloaded from the Watson-Marlow website at: www.wmftg.com/decon.

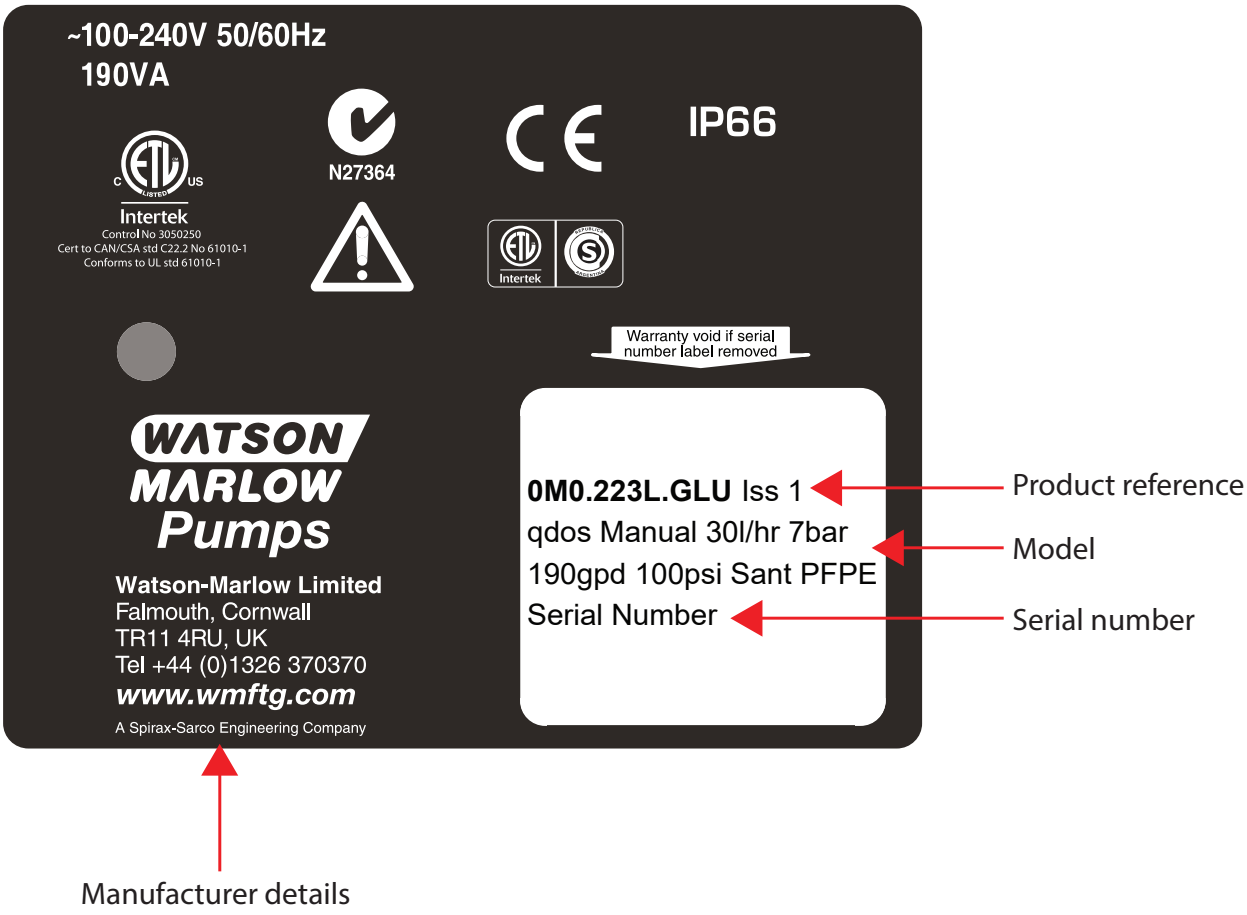
You are responsible for cleaning and decontaminating the product(s) before return.

- do not disable the pump leak detection system
- change the pumphead prior to failure when pumping very aggressive chemicals that are not compatible with the pumphead materials. There are volume and hours counters in the product to provide indication of consumable life.

Qdos 20 only:

- ensure the correct tube type is selected within the configuration of the pump. This can be checked at any time after commissioning by entering the CONTROL SETTINGS via the MENU softkey.
- ReNu PU Pumphead only: when replacing a pumphead prior to the recommended lifespan of the tube or before a tube failure, once the pump has been powered-down, pumphead replaced and power restored, select 'pumphead selection' within the Control Settings accessed by pressing the MENU soft key.

A nameplate is fixed to the rear of the pump. It contains manufacturer and contact details, product reference number, serial number and model details.



6.1 Pump specifications

Flow Range (flow control)	**Manual, PROFIBUS, Universal and Universal+:** qdos120:0.1-2000 ml/min (20000:1) qdos60:0.1-1000 ml/min (10000:1) qdos30:0.1-500 ml/min (5000:1) qdos20:0.1-333 ml/min (3330:1) qdos20 PU: 0.1-484 ml/min (4840:1) **Remote:** qdos120:1.25-2000 ml/min (1600:1) qdos60:0.6-1000 ml/min (1600:1) qdos30:0.3-500 ml/min (1600:1) qdos20:0.2-333 ml/min (1600:1)
AC Supply voltage/frequency	~100-240V 50/60Hz

AC Power consumption	190VA
DC Supply voltage/frequency (12/24VDC power option)	12-24V DC
DC Power consumption (12/24VDC power option)	150W
Installation category (overvoltage category)	II
±10% of nominal voltage. Maximum voltage fluctuation	An electrical mains supply is required along with cable connections to the best practice of noise immunity
Enclosure rating	IP66 to BS EN 60529 NEMA 4X to NEMA 250*
Operating temperature range	4°C to 45°C, 41°F to 113°F
Storage temperature range	-20°C to 70°C, -4°F to 158°F
Maximum altitude	2,000m, 6,560ft
Humidity (non-condensing)	80% up to 31°C, 88°F, decreasing linearly to 50% at 40°C, 104°F
Pollution degree	2
Noise	<70dB(A) at 1m

*Requires the fitting of the HMI protective cover.

6.2 Standards (AC mains power supply)

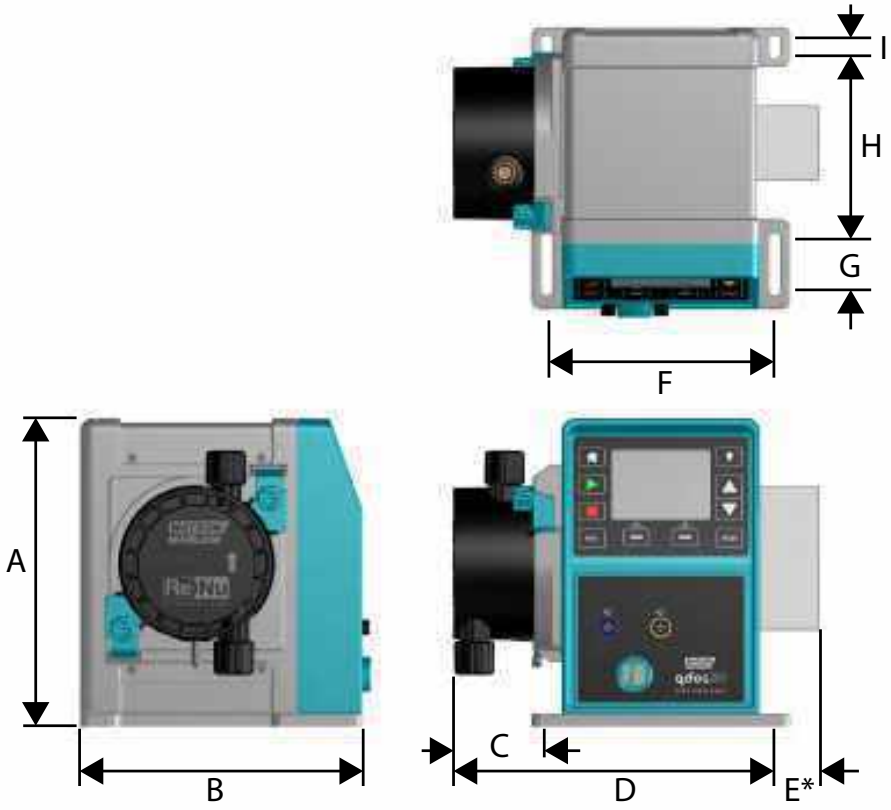
EC Harmonised standards	Safety requirements for electrical equipment for measurement, control and laboratory use: BS EN 61010- 1 incorporating A2 Category 2, Pollution degree 2
	Degrees of protection provided by enclosures (IP code): BS EN 60529 amendments 1 and 2
	EN61326-1:2006 Electrical Equipment for measurement control and laboratory use EMC requirements Part 1

Other Standards	UL 61010A-1, UL/CSA 61010-1
	CAN/CSA-C22.2 No 61010-1
	IEC 61010-1
	Radiated emissions FCC 47CFR, Part 15
	NEMA 4X to NEMA 250
	NSF61 for pumphead

6.3 Standards (12-24V DC power supply)

EC Harmonised standards	Safety requirements for electrical equipment for measurement, control and laboratory use: BS EN 61010- 1 incorporating A2 Category 2, Pollution degree 2
	Degrees of protection provided by enclosures (IP code): BS EN 60529 amendments 1 and 2
	EN61326-1:2006 Electrical Equipment for measurement control and laboratory use EMC requirements Part 1
Other Standards	UL 61010A-1, UL/CSA 61010-1
	CAN/CSA-C22.2 No 61010-1
	IEC 61010-1
	Radiated/conducted emissions FCC 47CFR, Part 15
	NEMA 4X to NEMA 250
	NSF61 for pumphead

6.4 Dimensions



Dimension	qdos20	qdos30	qdos60	qdos120
A	234mm (9.2″)	234mm (9.2″)	234mm (9.2″)	234mm (9.2″)
B	214mm (8.4″)	214mm (8.4″)	214mm (8.4″)	214mm (8.4″)
C	118mm (4.6″)	82.5mm (3.2″)	118mm (4.6″)	118mm (4.6″)
D	266mm (10.5″)	233mm (9.2″)	266mm (10.5″)	266mm (10.5″)
E*—Optional relay modules (H or R)	43mm (1.7″)	43mm (1.7″)	43mm (1.7″)	43mm (1.7″)
F	173mm (6.8″)	173mm (6.8″)	173mm (6.8″)	173mm (6.8″)
G	40mm (1.6″)	40mm (1.6″)	40mm (1.6″)	40mm (1.6″)
H	140mm (5.5″)	140mm (5.5″)	140mm (5.5″)	140mm (5.5″)
I	10mm (0.4″)	10mm (0.4″)	10mm (0.4″)	10mm (0.4″)

6.5 Weights

qdos20, 60 and 120:

Model	Drive		Drive with pumphead	
	kg	lb	kg	lb
Manual	4.6	10lb 2oz	5.7	12lb 9oz
Remote	4.5	9lb 15oz	5.6	12lb 6oz
Universal	4.6	10lb 2oz	5.7	12lb 9oz
Universal+	4.6	10lb 2oz	5.7	12lb 9oz
PROFIBUS	4.6	10lb 2oz	5.7	12lb 9oz
Universal 24V relay	4.8	10lb 9oz	5.9	13lb 0oz
Universal+ 24V relay	4.8	10lb 9oz	5.9	13lb 0oz
Universal 110V relay	4.8	10lb 9oz	5.9	13lb 0oz
Universal+ 110V relay	4.8	10lb 9oz	5.9	13lb 0oz

qdos30:

Model	Drive		Drive with pumphead	
	kg	lb	kg	lb
Manual	4.1	9lb	5.05	11lb 2oz
Remote	4.0	8lb 13oz	4.95	10lb 15oz
Universal	4.1	9lb	5.05	11lb 2oz
Universal+	4.1	9lb	5.05	11lb 2oz
PROFIBUS	4.1	9lb	5.05	11lb 2oz
Universal 24V relay	4.3	9lb 8oz	5.25	11lb 9oz
Universal+ 24V relay	4.3	9lb 8oz	5.25	11lb 9oz
Universal 110V relay	4.3	9lb 8oz	5.25	11lb 9oz
Universal+ 110V relay	4.3	9lb 8oz	5.25	11lb 9oz

7.2 Do's and do not's

Do keep delivery and suction tubes as short and direct as possible - though ideally not shorter than one metre - and follow the straightest route. Use bends of large radius: at least four times the tubing diameter. Ensure that connecting pipework and fittings are suitably rated to handle the predicted pipeline pressure. Avoid pipe reducers and lengths of smaller bore tubing than the pumphead section, particularly in pipelines on the suction side. Any valves in the pipeline must not restrict the flow. Any valves in the flow line must be open when the pump is running.

Do use suction and delivery pipes with the largest diameter bore tube that will fit with your process, especially when pumping viscous product. Care should be taken when pumping solids in suspension as large bore tubes will reduce the fluid velocity, this may lead to solids dropping out of suspension.

Do site the pump at or just below the level of the fluid to be pumped if possible. This will ensure flooded suction and maximum pumping efficiency.

Do run at slow speed when pumping viscous fluids. Flooded suction will enhance pumping performance, particularly for materials of a viscous nature.

Do recalibrate after changing pumphead, fluid, or any connecting pipework. It is also recommended that the pump is recalibrated periodically to maintain accuracy.

Do ensure your PROFIBUS pump is installed in accordance with PROFIBUS installation guidelines.

Do clean any process fluid from the drive in order to maintain normal operation of the leak detect system.

Do check that replacing a pumphead clears a leak detect alert.

Do change the pumphead shortly after failure, this ensures fluid containment is retained.

Do avoid tight bends in the PROFIBUS signal cable.

Do not build a pump into a tight location without adequate airflow around the pump.

Do not pump any chemical not compatible with the pumphead.

Do not tilt the drive with a pumphead fitted, even if it is not running.

Do not allow process fluid to leak onto the drive during pumphead replacement.

Do not use the ignore function as a long term solution to a failed pumphead, prolonged exposure to process fluid may result in the loss of fluid containment resulting in drive or process area contamination. The only approved use of the Ignore function: In order to depressurise and drain down the system and to allow for the safe disposal of the pumphead, the ignore function can be used to operate the pump prior to changing the pumphead.

Do not strap the control and mains cable together.

qdos20 only:

Do select the correct tube type when asked

Do replace the pumphead when recommended to do so by the pumphead management system

Do select ‘pumphead selection’ within the control panel setting when changing a PU pumphead prior to pumphead management system recommendations to avoid a short consumable lifespan

Do not reinstall the used pumphead once the pumphead management system recommends the pumphead to be replaced

7.3 Pressure capability

qdos120 can be operated continuously at discharge pressures of up to 4 bar (60psi)

qdos20, qdos30 and qdos60 can be operated continuously at discharge pressures of up to 7 bar (100psi).

qdos30 can be operated at discharge pressures of up to 10 bar (145psi), however flowrate and pumphead life will be affected.

qdos20 PU can be operated continuously at discharge pressure of up 4 bar (60psi)

7.4 Dry running

qdos will continue to operate when there is gas present in the suction line and will maintain prime in these conditions. The pump can be run dry, however flow rate and pumphead life will be affected.

8.2 DC power supply option

The range of DC sources is intended to include:

- Automotive—either mobile, such as trailer mounted, or static, such as a vehicle battery or auxiliary output
- Conventional DC supplies derived from AC mains, such as 12V or 24V supplies powering PLCs
- Solar panels with any type of back-up battery within the input range
- Other renewable energy generators such as wind/hydro turbines with any type of back up battery within the input range

Power cable: The pump is supplied fitted with a cable gland and approximately 2.0m (6.6ft) of power cable and an IP31 splash proof blade fuse holder and 20A blade fuse. The cable is not user-detachable and the entry gland at the front of the pump should not be disassembled.

Notes

It is highly recommended that an isolating switch is provided between the power source and the pump. The cable is fitted with M8 ring terminals to fit common isolators.

The 20A blade fuse is a safety device and should not be removed or the value changed.

The fuse holder is splashproof (IP31) but NOT waterproof (IP66). Connection to the DC source should be provided with appropriate IP protection.

Large start up currents may be required, especially at low voltages, see "Performance data" on page 133 for correct selection of power source.

We **DO NOT** recommend increasing the cable length when used in 12V systems due to extra voltage loss in the cable. Increasing cable length will also invalidate the pumps EMC compliance and require the user to perform their own system level EMC compliance check.

9 Start-up check list

- Check that the leak detect sensor is clean and free from process fluid.
- Fit the pumphead to the drive. (See "Pumphead Replacement (qdos 30)" on page 116 or "Pumphead Replacement (qdos 20, 60 and 120)" on page 122).
- Ensure the pumphead ports are securely fitted to the interface tubing.
- Ensure proper connection has been made to a suitable power supply.
- Ensure that the general recommendations are followed (see "General recommendations" on page 21).
- **When using a ReNu 20 PU pumphead**, ensure you select the 'PU' tube to apply the correct calibration values.

10 Automatic control wiring - Universal, Universal+ and Remote models without relay modules

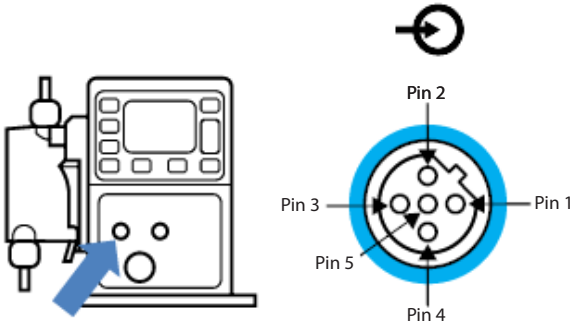
Interfacing the pump with other devices is by means of two IP66 rated five pole M12 connectors mounted on the front of the pump. M12 connectors with flying lead cables can be purchased as an accessory from Watson-Marlow. The function of each of the leads is labelled.

It is the user's responsibility to ensure the safe and reliable operation of the pump under remote and automatic control.

Never apply mains power to the five pole M12 connectors. Apply the correct signals to the pins, as shown below. Limit signals to the maximum values shown. Do not apply voltage across other terminals. Permanent damage may result.

All input and output terminals are separated from mains circuits by reinforced insulation. These terminals must only be connected to external circuits that are also separated from mains voltages by reinforced insulation as a minimum requirement.

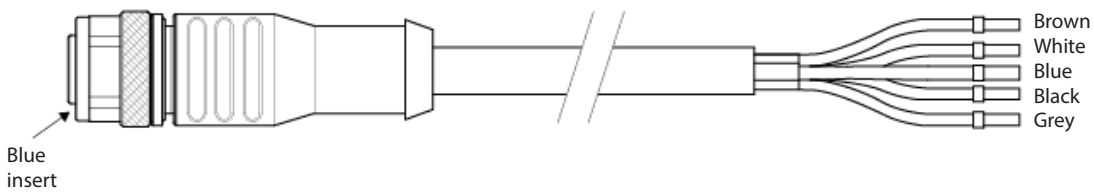
10.1 pin assignments at the pump



Pin No.	Function	Specification	Referenced to	Input lead colour
1	Run/stop	Min. 5V, max.30V	Connect 5-24V DC supply to stop (referenced to pin 4). Alternatively, connect pin 5 of the output connector to this pin via normally open switch.	Brown
2	External Contact Reserved	Min. 5V, max .30V	Pulse 5-24V 40ms minimum pulse length (referenced to pin 4). Alternatively, connect pin 5 of the output to this pin via normally open switch.	White
3	4-20mA	250Ω input impedance 40mA max. current 250Ω load resistance 40mA max.current	Referenced to GND	Blue
4	GND	Ground (0V)		Black
5	Remote fluid recovery	Min. 5V, max. 30V	Connect 5-24V DC supply to reverse the pump in analog mode	Grey

10.2 Optional input lead

Input lead length: 3m (10ft)



Remote stop

Depending on the polarity set in the control settings menu, applying a 5V to 24V signal to pin 1 will STOP the pump in all operating modes. In manual and analogue mode, the pump will start when the signal is removed. The user can reconfigure this input in the control settings menu so that the pump will run when the signal is applied and stop when there is no signal to pin 1.

The MAX key will work in manual mode regardless of the remote STOP input. This enables priming without having to change pump settings or disconnect the input cable.

External contact—Universal and Universal+ models only

Digital pulse input min. 5V, min. pulse duration 40mS maximum duration 1000mS. This input is used to trigger a user defined dose size. Refer to the contact mode section.

Speed: analog input

The speed of this pump can be controlled remotely by a current analog signal within the range 4-20mA.

The analog signal must be applied to pin three of the M12 input connector. The pump will provide an increasing speed for a rising control signal.

The Universal+ model can be calibrated by the user to control the speed proportionally or inversely proportional to the input mA signal.

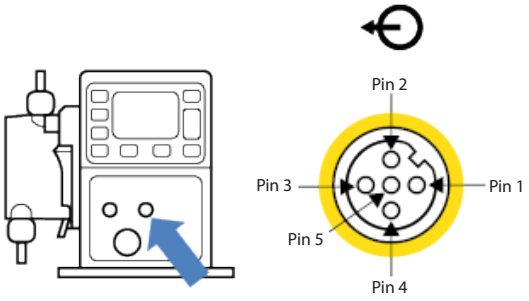
4-20mA circuit impedance: 250Ω.

Do not invert the polarity of the terminals. If the polarity is inverted the motor will not run.

Remote fluid recovery

The user can reverse the pump remotely by supplying a signal to pin five.

10.3 Output pin assignments at the pump

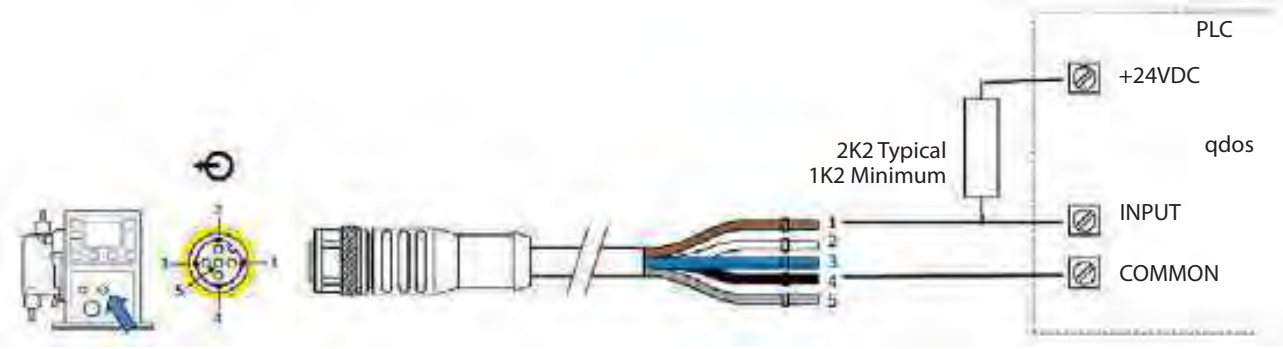


Pin No.	Function	Specification	Output lead colour
1	Run status output	Open collector output uncommitted	Brown
2	Alarm output	Open collector output uncommitted	White

Pin No.	Function	Specification	Output lead colour
3	Analog out	4-20mA into 250Ω (referenced to pin 4)	Blue
4	GND		Black
5	Supply	Pin 5 supply voltage is 5V with impedance of 2.2k, this can be connected via a NO switch to input pin 1 or 2 to power the inputs.	Grey

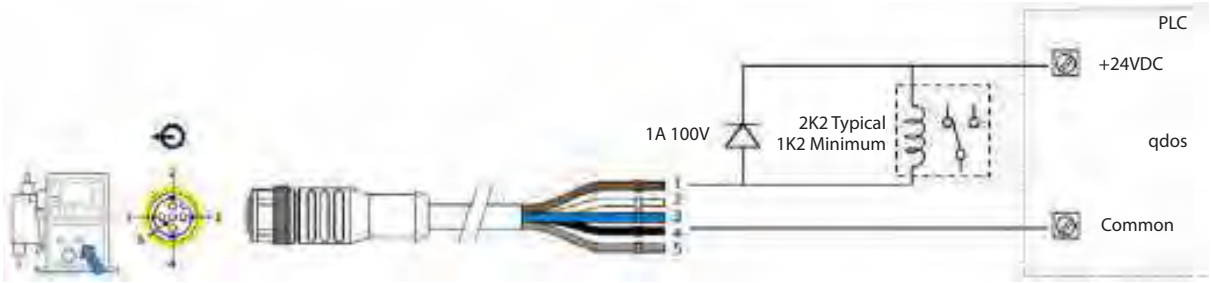
Example wiring for a "pull up resistor"

Diagram depicts either Alarm or Run Stop output.



Example wiring for an external relay, the N/O or N/C contacts could be used for any device

Diagram depicts either Alarm or Run Status output.



The resistor or relay needs to be sized correctly to ensure no damage to the pump transistors. Damage incurred due to incorrect sizing or installation will not be covered by warranty.

These solutions require external 24V power. If connecting to a PLC 24V is usually available.

Alarm Output (Output 1)

Alarm conditions are generated by system errors or leak detection.

Run Status Output (Output 2)

This output changes state when the motor starts/stops.

Speed: analog output—Universal+ and Remote models only

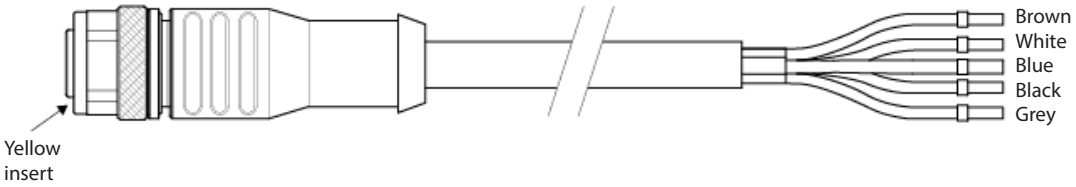
A current analog signal within the range 4-20mA into 250Ω impedance is available between pin three and pin four of the output connector. The current is fixed and directly proportional to the pumphead rotation speed. 4mA = zero speed; 20mA = maximum speed.

On the Universal+ version there is also an option to match the scale of the 4-20mA input if this has been reconfigured by the user. This option is available in the Control settings menu.

Note: If the mA output is to be used for reading from a multimeter, a 250Ω resistor is required in series.

10.4 Optional output lead

Output lead length: 3m (10ft)



11 Automatic control wiring - 24V relay module and 110V relay module (Universal and Universal+ only)

The pump can be connected with other devices by means of the screw-terminal connectors within the relay module situated on the side of the pump. The relay module must be removed from the pump housing to allow suitable cables to be connected to the terminal connectors via the watertight cable glands on the module. The pump can be supplied with either a 24V or 110V relay module. Please confirm whether your relay module is 24V or 110V before wiring the module.

11.1 Module: cover removal and refitting

The pump can be connected with other devices by means of the screw-terminal connectors within the relay module situated on the side of the pump. The relay module must be removed from the pump housing to allow suitable cables to be connected to the terminal connectors via the watertight cable glands on the module.

Removing the relay module cover

The module cover is secured to the side of the drive unit by four M3x10 Pozidriv pan head stainless steel screws.

Remove the four screws from the module cover, leaving the top left screw until last. It is possible that the sealing strip may cause the module to adhere to the drive housing. If so a gentle tap will free it. **Do not** use a tool to force it off.

The sealing strip should be retained within its channel on the side panel of the drive housing. It ensures ingress protection between the drive housing and the module cover. Check the integrity of the sealing strip. If it is damaged it must be replaced.

Refitting the relay module cover

Ensure the sealing strip is undamaged and positioned within its channel on the side of the drive housing. Hold the module cover in place, taking care not to disturb the sealing strip. Starting with the top left screw, tighten the four retaining screws to 2.5Nm.

Ensure that the relay module cover is correctly secured at all times by all four screws. Failure to do so may compromise the IP66 (NEMA 4X) protection.

11.2 Wiring up the terminal connectors

It is the user's responsibility to ensure the pump's safe and reliable operation under remote and automatic control.

Cable entry to the module is via two watertight cable glands on the module cover. These may be fitted in place of the sealing plugs which are fitted to the side of the module cover when the pump is shipped.

The number of glands needed depends on the number of connection cables required and the convenience of the installer. As standard, two ½" cable glands are provided with the pump.

Recommended control cable conductors for the terminal blocks: metric = 0.14sq mm - 2.5sq mm solid and 0.14sq mm - 1.5sq mm stranded. USA = 26AWG - 14AWG solid and 26AWG - 16AWG stranded. Cable: circular. Max/min outside diameter to ensure a seal when passed through the standard gland: 9.5mm-12mm. **The cable section must be circular to ensure a seal.**

For EMC protection, shielded control cable should be used. The shielding should be terminated to either of the provided spade connections.

Cables should have a minimum temperature rating of 85°C.

Note: For 24V modules, screened, circular control cable up to 12 core must be used. For 110V modules, screened, circular control cable up to 25 core must be used. The cable screen must be earthed at both ends of the cable.

Suitable cables for general-purpose use: 300V with extra premium grade PVC jacket with good flame and moisture resistance.

Suitable cables for industrial use: 300V extra-rugged polyurethane grade jacket with resistance to oils, fuels, solvents and water.

For convenience of wiring more than 8 conductors per cable may be awkward to handle.

1. Use a suitable 21mm spanner to unscrew the sealing plugs.

2. Screw in the supplied ½" NPT cable glands complete with new sealing washers in place of the plug, ensuring that the retaining nut is properly seated.

3. Tighten the gland to 2.5Nm using a suitable 21mm spanner, to ensure a seal. If a different gland is used, it must be watertight to IP66.

3. Loosen the gland cap (do not remove it) and pass the cable in through the gland. When it has passed through the gland, continue to push the cable through.
4. Pull through sufficient cable to reach the connectors required, leaving a little slack.
5. Strip the outer sheath as necessary and remove 5mm of insulation from the conductors. No tinning or ferrule is required.

   Note: If very stiff or large-diameter cable is used, it may be convenient to strip the outer sheath before passing the cable's conductors through the gland. However, to ensure a watertight seal, the cable must have an undamaged sheath within the gland when it is tightened.

6. Prepare the cable screen(s) by twisting a suitable length. The twisted length(s) shall ideally be sleeved to prevent shorting.
7. Secure the end of the cable screen to the Faston receptacles on the spade connectors provided.
8. Push the bared conductor into the square hole in the connector. When the conductor is fully inserted, tighten the retaining screw to secure it in place.

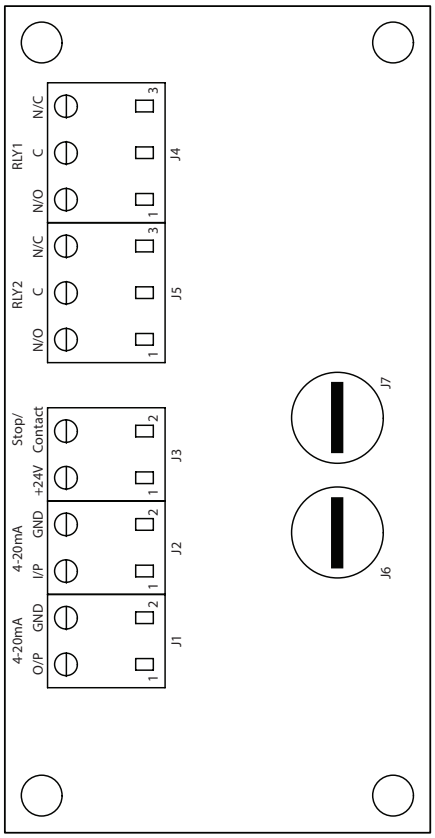
Ensure that multi strand wires are terminated with a crimp, suitable for the wire diameter. Failure to do so may result in electric shock.

9. When all conductors are in position replace the module cover.
10. Using a 21mm spanner tighten the gland cap to 2.5Nm to ensure a watertight seal. Alternatively, tighten the gland by hand until it is finger-tight and use a spanner to tighten it further by one-half a turn.

Ensure that unused openings on the module are sealed using the blanking plugs provided. Failure to do so will result in loss of ingress protection.

11.3 24V relay module pcb connectors

As you look at the module the pcb will appear in the same orientation as shown in the diagram below.



Never apply mains power to the 4-20mA input, 4-20mA output, +24VDC or stop contact terminals. Apply the correct signals to the terminals shown below. Limit signals to the maximum values shown. Do not apply voltage across other terminals. Permanent damage, not covered by warranty, may result. The maximum load on the relay contacts of this pump is 110VAC 5A or 30VDC 5A.

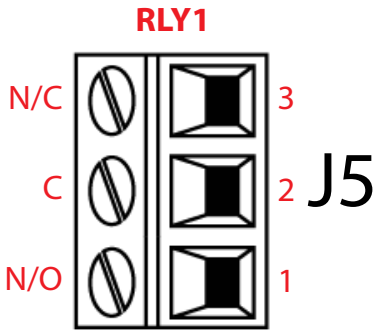
Alarm output (J5)

Connect the output device to the C (common) terminal of the relay connector and either the N/C (normally closed) or N/O (normally open) terminal as required.

This relay coil is energised when the pump has an alarm condition.

Note: Alarm conditions are generated by system errors. This alarm will not be operated for analogue signal errors.

The default for Relay 1 is Alarm, on Universal+ models this output (1) can be configured in the control settings menu.

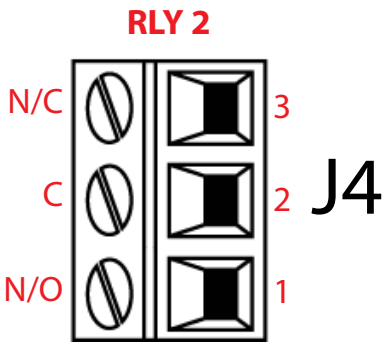


Run status output (J4)

Connect the output device to the C (common) terminal of the relay connector and either the N/C (normally closed) or N/O (normally open) terminal as required.

This relay coil is energised when the pump is running.

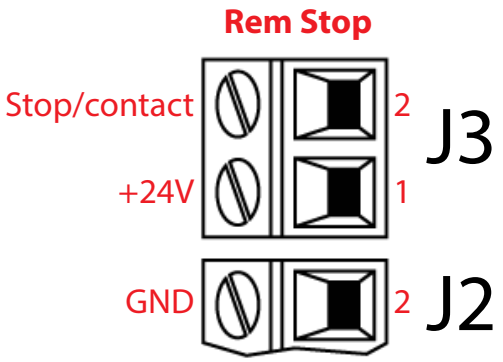
The default for Relay 2 is run status, on Universal+ models this output (2) can be configured in the control settings menu.



Configurable remote stop or contact input(J3)

If Analog 4-20mA mode is selected then terminal J3 will be configured as a remote stop automatically.

If Contact mode is selected then the input J3 will be configured as a contact input automatically.



Remote Stop

Connect a remote switch between the **Stop/Contact** terminal and the **+24V** terminal of the Run/Stop I/P connector (J3). Alternatively a 24V logic input may be applied to the Stop/Contact terminal, ground to the GND terminal of the adjacent 4-20mA I/P connector (J2).

The sense of the remote stop input can be configured in software using the control settings menu.

Remote stop is operational in manual and analog mode.

Contact

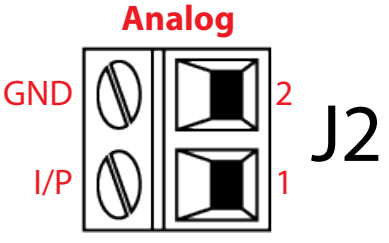
To operate the pump in contact mode the remote stop input should be set to "High".

Speed: analog input (J2)

The analog process signal must be applied to the I/P terminal of the Analog connector (J2). Ground to the GND connector of the same terminal. In Analog mode the pump set speed will be proportional or inversely proportional to the analog input.

4-20mA circuit impedance: 250Ω.

Max current 40mA



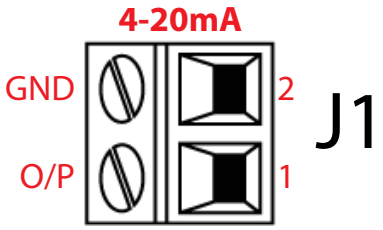
Note: inverting the signal response is set up in software. Do not invert the polarity of the terminals.

See also "Analog 4-20mA mode (Universal and Universal+ only)" on page 70 and "Calibrate the pump for 4-20mA control (Universal+ only)" on page 75.

Speed: analogue output (J1) (Universal+ only)

A current analogue signal within the range 4-20mA is available between the O/P (output) terminal and the GND terminal. The current is fixed and directly proportional to the pump speed. 20mA = maximum speed, 4mA = zero speed.

There is also an option to match the scale of the 4-20mA input if this has been reconfigured by the user. This option is available in the Control settings menu.



Note: If the mA output is to be used for reading from a multimeter (set on mA), a 250Ω resistor is required in series.

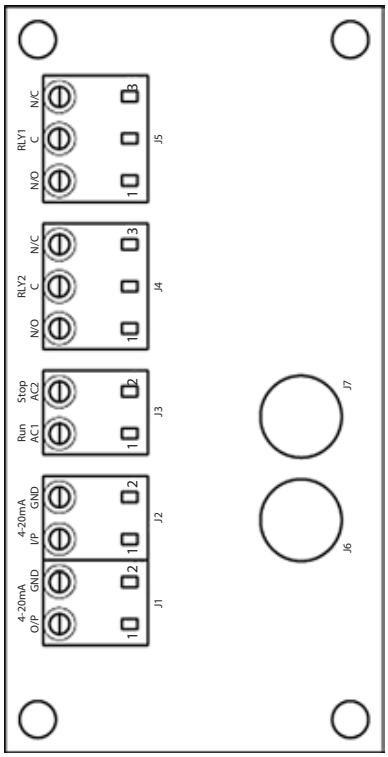
Earth shielding terminals

4.8mm spade terminals are supplied for earth shielding of cables. The input cable and output cable earths can be connected to either terminal.

Keep 4-20mA and low voltage signals separate from mains power. Use separate glanded input cables.

11.4 CCç國D110V relay module pcb connectorsD

CCç國DAs you look at the module the pcb will appear in the same orientation as shown in the diagram below.D



CCç國DApply the correct signals to the terminals shown below. D CCç國DLimit signals to the maximum values shown. D CCç國DDo not apply voltage across other terminals. D CCç國DPermanent damage, not covered by warranty, may result. D CCç國DThe maximum load on the relay contacts of this pump is 115VAC; max current 5A. D CCç國DVoltages do not require transformer isolation. D CCç國DThe relays are specified to switch 115VAC mains powered loads. D CCç國DThese relay outputs are not suitable for 24VDC logic signals.D

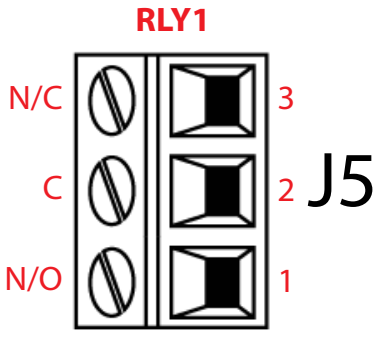
Alarm output (J5)

Connect the output device to the C (common) terminal of the relay connector and either the N/C (normally closed) or N/O (normally open) terminal as required.

This relay coil is energised when the pump has an alarm condition.

Note: Alarm conditions are generated by system errors. This alarm will not be operated for analogue signal errors.

The default for Relay 1 is Alarm, on Universal+ models this output (1) can be configured in the control settings menu.

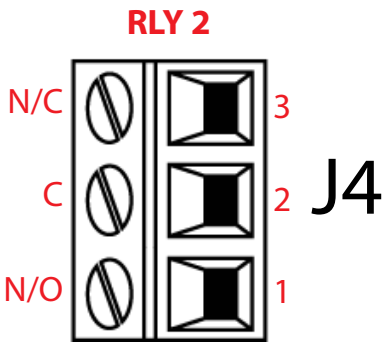


Run status output (J4)

Connect the output device to the C (common) terminal of the relay connector and either the N/C (normally closed) or N/O (normally open) terminal as required.

This relay coil is energised when the pump is running.

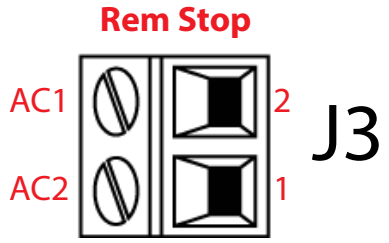
The default for Relay 2 is run status, on Universal+ models this output (2) can be configured in the control settings menu.



Remote stop input (J3)

Apply a signal of 85VAC to 130VAC across terminals AC1 and AC2 to stop the pump. Polarity is not important.

The pump will not run while this signal is applied. In manual and analog mode, the pump will start when the signal is removed.



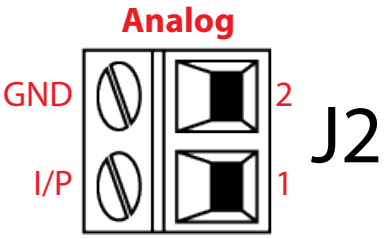
Speed: analog input (J2)

The analog process signal must be applied to the I/P terminal of the Analog connector (J2). Ground to the GND connector of the same terminal. In Analog mode the pump set speed will be proportional or inversely proportional to the analog input.

4-20mA circuit impedance: 250Ω.

Max current 40mA

Note: inverting the signal response is set up in software. Do not invert the polarity of the terminals.

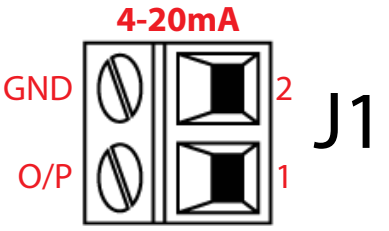


Speed: analogue output (J1) (Universal+ only)

A current analogue signal within the range 4-20mA is available between the O/P (output) terminal and the GND terminal. The current is fixed and directly proportional to the pump speed. 20mA = maximum speed, 4mA = zero speed.

There is also an option to match the scale of the 4-20mA input if this has been reconfigured by the user. This option is available in the Control settings menu.

Note: If the mA output is to be used for reading from a multimeter (set on mA), a 250Ω resistor is required in series.



CCç國DEarth shielding terminalsD

CCç國D4.8mm spade terminals are supplied for earth shielding of cables. D CCç國DThe input cable and output cable earths can be connected to either terminal.D

CCç國D4-20mA and low voltage signals separate from mains power. D CCç國DUse separate glanded input cablesD

12 PROFIBUS control wiring

Interfacing the pump with the PROFIBUS network is by means of an M12 connector mounted on a flying lead on the front of the pump.

It is the user's responsibility to ensure the safe and reliable operation of the pump under PROFIBUS control.

Note: The transmission speed is limited to a maximum of 1.5Mbit/s.

12.1 PROFIBUS installation

All devices in the bus system must be connected in a line. An IP66 rated T adaptor should be used to connect the pump to the PROFIBUS line. A maximum of 32 stations (to include master, slaves and repeaters) are possible and both the beginning and the end of the cable must be terminated with a terminating resistor.

The M12 socket provided for PROFIBUS installation is IP66 rated. To maintain an IP66 rated system, the PROFIBUS cable, T adaptors and terminating resistors used must be fitted with IP66 rated M12 industrial connectors.

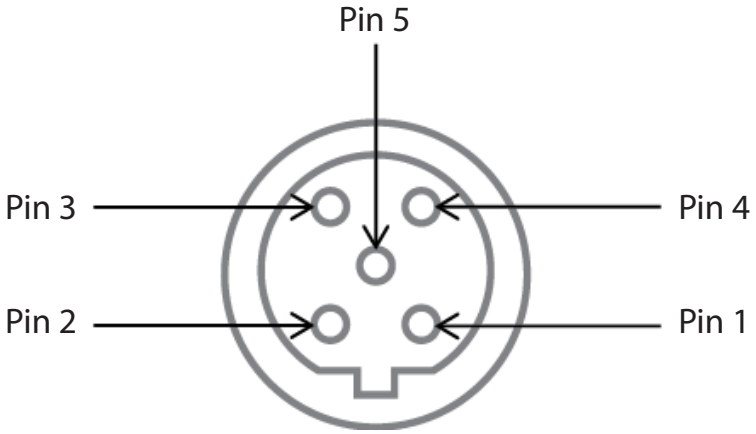
Note: To prevent low-frequency ground loops, screening which is earthed at one end should be used. To counter magnetic HF pick-up, shielding earthed at both ends as well as twisted conductors should be used, this will have no effect against electrical HF pick-up.

The permissible overall length of the bus cabling will vary according to the required bit rate. If a longer cable or higher bit rate are required repeaters should be used. The maximum bit rates achievable are shown in the table below.

Bit rate (Kbit/s)	Max. length of type A bus cable (m)
1500	200
500	400
187.5	1000
93.75	1200
19.2	1200
9.6	1200

Note: Total stub length should not exceed 6.6m.

12.2 Pin assignments at the pump



Pin No.	Signal	Function
1	VP	+5V supply for terminating resistors
2	RxD/TxD-N	Data line minus (A-line)
3	DGND	Data ground
4	RxD/TxD-P	Data line plus (B-line)
5	Shield	Ground connection

Note: If the pump is the last bus device connected to the PROFIBUS cable it must be terminated using terminating resistor (PROFIBUS standard EN 50170). To maintain ingress protection the resistor must be IP66 rated.

13 Switching on (Manual, PROFIBUS, Universal and Universal+)

13.1 Switching on the pump for the first time (Manual, PROFIBUS, Universal and Universal+ only)

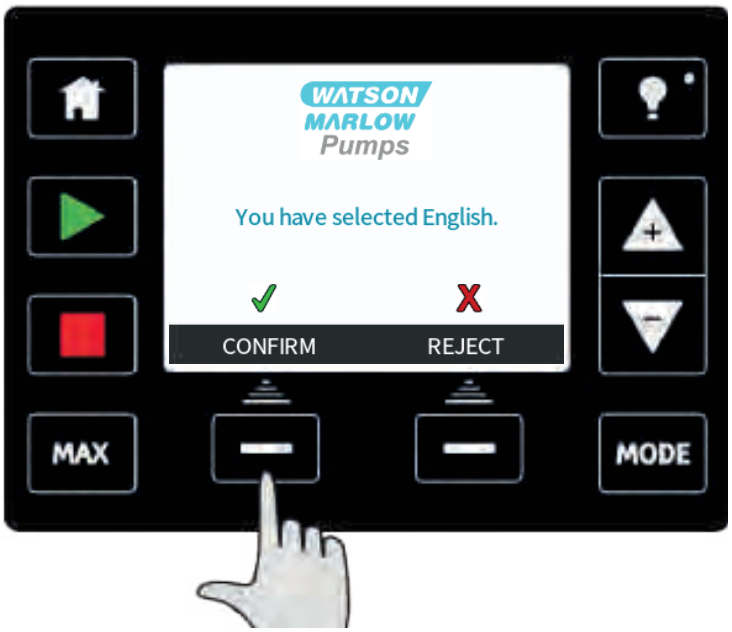
Power-up the pump.

The pump displays the start-up screen with the Watson-Marlow Pumps logo for three seconds.

Selecting your chosen display language

Use the +/- keys to move the selection bar to your required language. Press **SELECT** to choose.

Your selected language will now be displayed on screen, choose **CONFIRM** to continue. All displayed text will now appear in your chosen language.

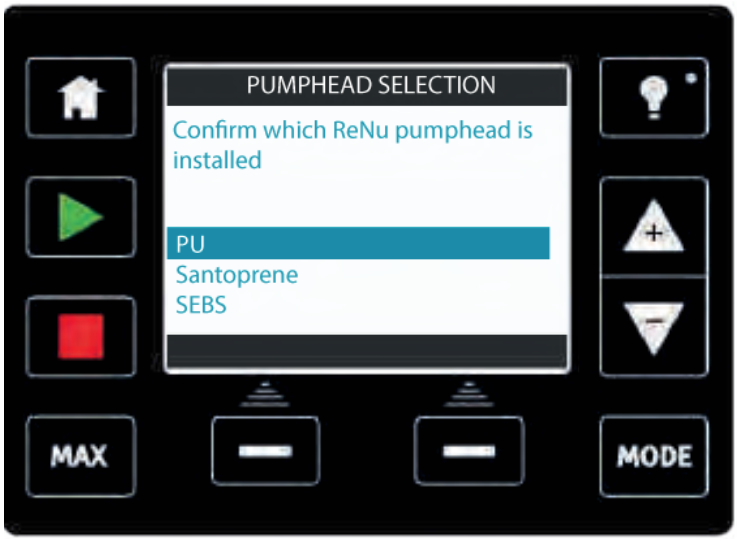


Choose **REJECT** to return to the language choice screen.

The pump is preset with operational parameters as shown in the table below:

Confirm which ReNu pumphead is installed (qdos20 only)

Using the **up/down** arrows select the pumphead installed to the pump. (This will apply correct calibration values)



Choose **REJECT** to return to the pumphead select screen.

The pump is preset with operational parameters as shown in the table below:

First-time start-up defaults			
Flow rate	qdos120:960ml/min qdos60:480ml/min qdos30:240ml/min qdos20:120ml/min qdos20 PU: 158.4 ml/min	**Pump status**	Stopped
Calibration	qdos120:16 ml/rev qdos60:8 ml/rev qdos30:4 ml/rev qdos20:6.67 ml/rev qdos20 PU: 8.8ml/rev	**Flow unit**	ml/min
Backlight	30 minutes	**Pump tag**	WATSON-MARLOW
Auto restart	Off		

This then proceeds to the home screen.

The pump is now ready to operate according to the defaults listed above.

Note: The display background colour changes according to running state as follows:

- **White** background indicates pump stopped
- **Blue** background indicates pump running
- **Red** background indicates error or alarm

All operating parameters may be changed by means of key-presses (see "Pump operation" on page 49).

13.2 Switching the pump on in subsequent power cycles (Manual, PROFIBUS, Universal and Universal+ only)

Subsequent power-up sequences will jump from the start-up screen to the home screen.

- The pump runs a power-on test to confirm proper functioning of the memory and hardware. If a fault is found, an error code is displayed (see "Error codes" on page 112).
- The pump displays the start-up screen with the Watson-Marlow Pumps logo for three seconds followed by the home screen.
- Start-up defaults are those in place when the pump was switched off last.

Check that the pump is set to operate as you require it.

The pump is now ready to operate.

All operating parameters may be changed by means of key-presses (see "Pump operation" on page 49).

Power interruption

This pump has an auto restart feature which, when active, will restore the pump to the operating state it was in when power was lost. See "Main menu (Manual, PROFIBUS, Universal and Universal+ only) " on page 87.

Stop / start power cycles

Do not power up/power down for more than **20 starts per hour**, whether manually or by means of the auto restart facility. We recommend remote control where a high frequency of power cycles is required.

14 Switching on (Remote)

When power is supplied to the pump, all the LED icons will illuminate for three seconds. After this period the pump will operate in accordance with the inputs received.

15 Pump operation

Note: Sections "Keypad functions (Manual, PROFIBUS, Universal and Universal+ only)" below up to and including "Help (Manual, PROFIBUS, Universal and Universal+ only)" on page 108 apply to Manual, PROFIBUS, Universal and Universal+ only. It is only possible to control the Remote pump via the input and output, (I/O) provided.

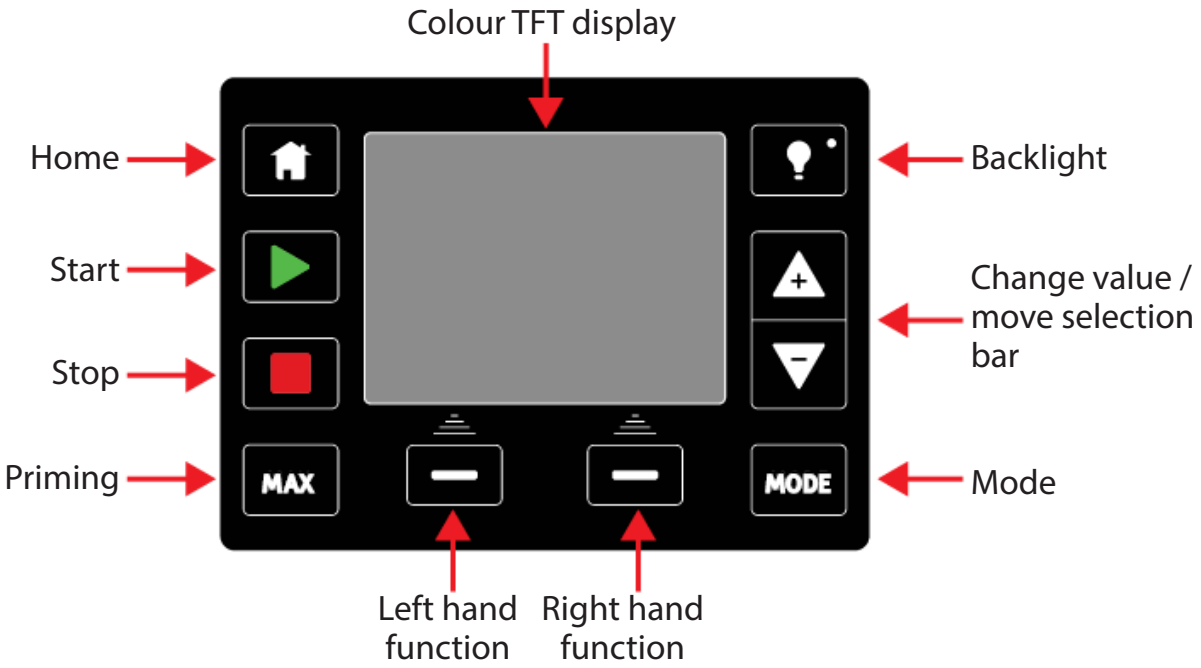
15.1 Pump operation (Remote pump)

The remote pump will operate proportionally to the analog signal provided. The default figures are 4.1mA = 0 rpm, 19.8mA = 125 rpm.

To stop the pump remotely apply a signal, minimum 5V, maximum 24V, to input pin 1. To run the pump in reverse, apply a signal, minimum 5V, maximum 24V to input pin 5.

15.2 Pump operation (Manual, PROFIBUS, Universal and Universal+ only)

Keypad functions (Manual, PROFIBUS, Universal and Universal+ only)



HOME

When the **HOME** key is pressed it will return the user to the last known operating mode. If modifying pump settings when the **HOME** key is pressed, it will disregard any setting changes and return you to the last known operating mode.

START

This key will start the pump at the displayed set speed when in manual mode or flow calibration. This key will deliver a contact dose volume when in **CONTACT** mode. It has no effect in the other remote modes.

STOP

This key will stop the pump when pressed at **any** time.

MAX

This key can be used to prime the pump when in manual mode. When pressed the pump will operate at maximum flow rate.

FUNCTION KEYS

When pressed will perform the function displayed on the screen directly above the relevant function key.

After 30 minutes of no keypad activity, the HMI display will dim to 50% brightness.

To restore full power to the display and reset the timer, press the **BACKLIGHT** key.

+/- KEYS

These keys are used to change programmable values within the pump. For example, flow rate. These keys are also used to move the selection bar up and down in the menus.

MODE

To change modes or mode settings, press the **MODE** key. The **MODE** key can be pressed at any time to enter the mode menu. If modifying pump settings when the **MODE** key is pressed, it will disregard any setting changes and return you to the **MODE** menu.

SCREEN SAVER

The display refreshes every 60 seconds. When this occurs you may notice a brief flash.

Screen Icons (Manual, PROFIBUS, Universal and Universal+ only)

Under certain conditions, various icons will appear in the screen display area:

	The pump displays a RED stop icon when it is in a manually stopped condition. In this state the pump will not start unless the START key is pressed.
	The pump displays a RED PAUSE icon when it is receiving a remote stop input whilst in a standby condition. The pump is placed in a standby condition by pressing the START key in manual mode, or by selecting Analogue mode. In this state the pump will respond to a change in state of the start/stop input, and may start automatically when a control signal is received.
	When the pump is running it displays a turning icon to indicate a pumping state.

Fundamental work with regard to lifting, transportation, installation, starting-up, maintenance and repair should be performed by qualified personnel only. The unit must be isolated from mains power while work is being carried out. The motor must be secured against accidental start-up.

```
;* *
;*
============================================================
========================== *
;* Filename: WAMA0E7D.GSD *
;* GSD file version 3 from 2013-09-24 *
;* ------------------------------------------------------------------------- *
;* *
;*************************************************************************
**********
#Profibus_DP
GSD_Revision = 3
Vendor_Name = "Watson Marlow"
Model_Name = "Qdos Profibus Pump"
Revision = "Version 3.00"
Ident_Number = 0x0E7D
Protocol_Ident = 0
Station_Type = 0
FMS_supp = 0
Hardware_Release = "V1.00"
Software_Release = "V1.00"
Redundancy = 0
Repeater_Ctrl_Sig = 0
24V_Pins = 0
9.6_supp = 1
19.2_supp = 1
45.45_supp = 1
93.75_supp = 1
187.5_supp = 1
500_supp = 1
1.5M_supp = 1
3M_supp = 1
6M_supp = 1
12M_supp = 1
MaxTsdr_9.6=60
MaxTsdr_19.2=60
MaxTsdr_45.45=60
MaxTsdr_93.75=60
MaxTsdr_187.5=60
MaxTsdr_500=100
```

MaxTsdr_1.5M=150

MaxTsdr_3M=250

MaxTsdr_6M=450

MaxTsdr_12M=800

Slave_Family = 0

Implementation_Type = "VPC3+S"

Info_Text="PROFICHIP: PROFIBUS DPV0 - slave, Watson Marlow Qdos"

Bitmap_Device = "WAMA_1N"

Freeze_Mode_supp=1

Sync_Mode_supp=1

Fail_Safe=1

Auto_Baud_supp=1

Set_Slave_Add_supp=0

Min_Slave_Intervall=6

Modular_Station=0

Max_Diag_Data_Len=34

Max_User_Prm_Data_Len = 9

Ext_User_Prm_Data_Const(0)= 0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00

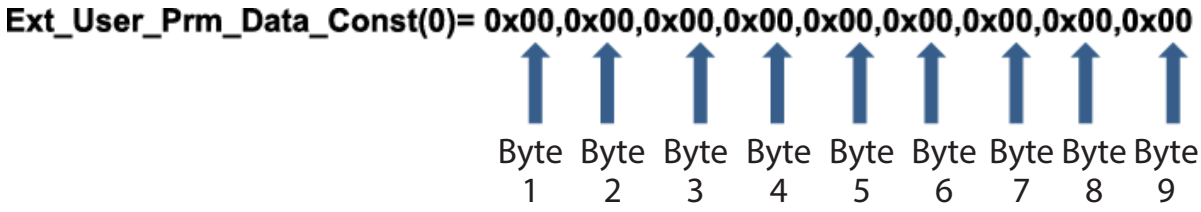
Module="WM Pump, 3/14 word out/in" 0x62,0x5D

1

EndModule

17.4 User Parameter Data

The user parameter data is set by entering values into the 'Ext_User_Prm_Data_ Const(0)' line of the GSD file. This is indicated below and the relevant bytes are listed in the table. No further changes should be made to the GSD file and Watson-Marlow accepts no responsibility for pump failures arising from changes to the GSD file.



8 bit	Byte 1	Pre Assigned
8 bit	Byte 2	Reserved
8 bit	Byte 3	Min Speed (High byte of 16-bit unsigned)
8 bit	Byte 4	Min Speed (Low byte of 16-bit unsigned)
8 bit	Byte 5	Max Speed (High byte of 16-bit unsigned)
8 bit	Byte 6	Max Speed (Low byte of 16-bit unsigned)

8 bit	Byte 7	Fail Safe
8 bit	Byte 8	Fail Safe Speed (Low byte of 16-bit unsigned)
8 bit	Byte 9	Fail Safe Speed (High byte of 16-bit unsigned)

Set Min/Max Speeds

The Min/Max Speed parameters are used to set the minimum and maximum speed from the PROFIBUS interface. The values are only used if the matching bit in the Control Word is enabled and they are not zero. The values are 16 bit unsigned in 1/10th of RPM of the head speed.

If the user requests the pump to operate at a lower speed than the defined minimum speed from the user parameter data (bytes 3, 4) then the pump will operate at the defined minimum speed.

If a maximum speed has been configured in the user parameter data, then the pump will be limited to this maximum speed even when the master requests a higher rpm.

Fail Safe

The fail-safe user parameter is used to set the correct course of action to take in the event of a PROFIBUS communications failure. The fail-safe byte is configured as shown in the following table. If no bits are set or an invalid bit pattern is set the default fail safe behaviour shall be to stop the pump.

Hex	Description
0x00	The pump will stop
0x01	Continue driving using the last demanded speed
0x02	Continue driving using the fail safe speed
0x03 - 0x07	Reserved

Fail Safe Speed

The fail-safe speed parameter is used to set the speed at which the pump should be driven if a PROFIBUS communications error occurs and if the fail-safe user parameter is set to 0x02.

17.5 PROFIBUS data exchange

The data in this section is provided as reference material for a PROFIBUS network operator. Operating this pump under PROFIBUS control is beyond the scope of this instruction manual. Consult your PROFIBUS network literature for further information.

Default address	**126**
PROFIBUS Ident	**0x0E7D**
GSD File:	**WAMA0E7D.GSD**
Config:	**0x62, 0x5D (3 words out, 14 words in)**
User parameter bytes:	**6**

Cyclic Data Write (from Master to pump)

Cyclic Data Write (from Master to pump)		
16 bit	Byte 1 (low), 2 (high)	Control Word
16 bit	Byte 3 (low), 4 (high)	Pumphead Speed Setpoint (unsigned)

If a leak is detected, the leak detect screen or pumphead alert screen (qdos20 PU only) will not be displayed. Bit 10 of the status word will be activated to indicate that a leak has occurred and the pump will continue to run until the Master indicates what action should be taken.

Cyclic Data Read (from pump to Master)

Cyclic data read (from pump to Master)		
16 bit	Byte 1, 2	Status Word
16 bit	Byte 3, 4	Pumphead Measured Speed (unsigned)
16 bit	Byte 5, 6	Hours Run
16 bit	Byte 10,9	No of full motor revolutions
16 bit	Bytes 8,7	Reserved
32 bit	Byte 13, 14, 15, 16	Fluid Level
32 bit	Byte 17, 18, 19, 20	Unassigned
32 bit	Byte 21, 22, 23, 24	Unassigned
32 bit	Byte 25, 26, 27, 28	Unassigned

Status Word	
Bit	**Description**
0	Motor running (1= Running)
1	Global Error Flag (1= Error)
2	Fieldbus Control (1= Enabled)
3	Reserved
4	Over current error
5	Under voltage error
6	Over voltage error
7	Over temperature error
8	Motor stalled
9	Tacho fault
10	Leak detected or pumphead alert for ReNu 20 PU
11	Low Setpoint- Out of range
12	High Setpoint- Out of range
13	Fluid level alert
14	Reserved
15	Reserved

Pumphead Speed

The pumphead speed is a 16-bit unsigned integer value that represents the speed of the pump head in 1/10th of RPM. For example 1205 represents 120.5 RPM.

Hours Run

The hours run parameter is a 16 bit unsigned integer and will represent whole hours of runtime.

No of full motor revolutions

This counts down from FF for each complete motor revolution. Reset this counter to FF by using bit 2 of the control word. The motor relates to the motor inside the pump before the gearbox ratio. The number of pumphead revolutions can be obtained by dividing the number of motor revolutions by the gearbox ratio of 29.55.

	BYTE	
	10	9
A	FF	FF
B	FF	C4

HEX TO DECIMAL	
10	9
65536	
65476	

	MOTOR FULL REVOLUTIONS
A Minus B	59

A = Start of Dose
B = End of Dose

PUMPHEAD REVOLUTIONS	
MOTOR REVS	GEARBOX RATIO
59	29.55
Divide	
1.996 RPM	

Read Flow Calibration

The value is a 16 bit unsigned integer representing µl per revolution.

17.6 Device-related diagnostic data

8 bit	Byte 1	Header Byte
16 bit	Byte 2, 3	Reserved
16 bit	Byte 4, 5	Reserved
16 bit	Byte 6, 7	Min Speed (unsigned)
16 bit	Byte 8, 9	Max Speed (unsigned)
32 bit	Byte 10, 11, 12, 13	Software Version Main CPU
32 bit	Byte 14, 15, 16, 17	Software Version HMI CPU
32 bit	Byte 18, 19, 20, 21	Software Version Flash
32 bit	Byte 22, 23, 24, 25	Software version PROFIBUS CPU

17.7 Channel-related diagnostic data

Channel-related diagnostic blocks are always three bytes long in the following format:

Byte 26	Header
Byte 27	Channel type
Byte 28	Channel-related error code

Channel-related diagnostic data	Byte 3
Global error	=0xA9 (General error)
Over current	=0xA1 (Short circuit)
Under voltage	=0xA2 (Under voltage)
Over voltage =0xA3 (Over voltage)	=0xA3 (Over voltage)
Motor stall	=0xA4 (Overload)
Over temp =0xA5 (Over temp)	=0xA5 (Over temp)
Tacho fault	=0xB1 (Device related 0x11)
Leak detected	=0xB2 (Device related 0x12)
Fluid level alert	=0xB3 (Device related 0x15)
Reserved	=0xA6 (Reserved)
Setpoint out of range- high	=0xA7 (Upper limit exceeded)
Setpoint out of range- low	=0xA8 (Lower limit exceeded)

VXE Series Ball Valves

Product Data Sheet

< STANDARDS >

ASTM D1784
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F437
ASTM F439
ASTM F1498

ANSI B1.20.1

Certified to NSF/ANSI 61-G

NSF-61

The IPEX EasyFit VXE Series True Union Ball Valves represent the latest innovation in thermoplastic ball valve manufacturing technology. Developed in collaboration with Giugiaro Design, the VXE Series replaces the well received VX Series with new and cutting edge features and is designed for industrial, general purpose and O.E.M. applications. This valve features an ultra-compact double block design, and full port bi-directional operation. The true union design allows the valve to be easily removed from the piping system and be fully serviced. A threaded seat stop carrier provides improved seal integrity under tough service conditions while the EasyFit multifunction handle doubles as a tool for ball seat adjustment, and for tightening union nuts precisely.

VXE ball valves are part of our complete system of IPEX pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

VALVE AVAILABILITY

BODY MATERIAL	PVC, CPVC
SIZE RANGE	1/2" through 6"*
Pressure	up to 232 psi
SEATS	Teflon® (PTFE)
SEALS	EPDM or FPM
END CONNECTIONS	Socket (IPS), Threaded (FNPT), Flanged (ANSI150)

* 4" with venturied ends

VXE Series Ball Valves

Product Data Sheet

Sample Specifications

1.0 Ball Valves – VXE

1.1 Material

- The valve body, stem, ball and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, stem, ball and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

- These compounds shall be listed with NSF to Standard 61 for potable water.

1.2 Seats

- The ball seats shall be made of Teflon® (PTFE).

1.3 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be made of Fluoropolymer (FPM).

2.0 Connections

2.1 Socket Style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

2.2 Threaded Style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1.

or The female NPT threaded CPVC end connectors shall conform to the dimensional standards ASTM F437, ASTM F1498, and ANSI B1.20.

2.3 Flanged Style

- The ANSI 150 flanged PVC end connectors shall conform to the dimensional standard ANSI B16.5

or The ANSI 150 flanged CPVC end connectors shall conform to the dimensional standards ANSI B16.5

3.0 Design Features

- The valve shall be double blocking with union ends.
- All sizes 1/2" through 4" shall be full port.
- All sizes shall allow for bi-directional flow.
- The valve body shall be single end entry with a threaded carrier (ball seat support).
- The valve body shall have an expansion and contraction compensating groove on the molded end.
- The valve body, union nuts, and carrier shall have deep square style threads for increased strength.
- The ball shall be machined smooth to minimize wear on valve seats.
- The stem design shall feature a shear point above the o-ring to maintain system integrity in the unlikely event of a stem breakage.
- The handle shall incorporate a tool for adjustment of the threaded carrier.
- The handle shall incorporate a tool for adjustment of union nuts.
- The handle shall incorporate a transparent PVC plug and tag holder for valve identification.

3.1 Pressure Tested

- All valves shall have been pressure tested in both the open and closed positions by the manufacturer.

3.2 Pressure Rating

- Socket and threaded valves shall be rated at 232 psi at 73°F.
- Flanged valves shall be rated at 150psi at 73°F.

3.3 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.4 Color Coding

- All PVC valves shall be color-coded dark gray.

or All CPVC valves shall be color-coded light gray.

4.0 NSF 61 Listing

- All valves shall be listed with NSF to standard 61 for portable water.

5.0 All valves shall be Xirtec® 140 or Corzan® by IPEX or approved equal.

VXE Series Ball Valves

Product Data Sheet

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number			Pressure Rating
			IPS Socket	FNPT Threaded	ANSI Flanged	
1/2	PVC	EPDM	353001		353627	232 psi for socket or threaded
		FPM	353002		353637	
	CPVC	EPDM	353041		353651	
		FPM	353042		353661	
3/4	PVC	EPDM	353003		353628	
		FPM	353004		353638	
	CPVC	EPDM	353043		353652	
		FPM	353044		353662	
1	PVC	EPDM	353005		353629	
		FPM	353006		353639	
	CPVC	EPDM	353045		353653	
		FPM	353046		353663	
1-1/4	PVC	EPDM	353007		353630	
		FPM	353008		353640	
	CPVC	EPDM	353047		353654	
		FPM	353048		353664	
1-1/2	PVC	EPDM	353009		353631	
		FPM	353010		353641	
	CPVC	EPDM	353049		353655	
		FPM	353050		353665	
2	PVC	EPDM	353011		353632	150 psi for flanged
		FPM	353012		353642	
	CPVC	EPDM	353051		353656	
		FPM	353052		353666	
2-1/2	PVC	EPDM	353623	-	353633	
		FPM	353624	-	353643	
	CPVC	EPDM	353647	-	353657	
		FPM	353648	-	353667	
3	PVC	EPDM	353013	353017	353634	
		FPM	353014	353018	353644	
	CPVC	EPDM	353053	353057	353658	
		FPM	353054	353058	353668	
4	PVC	EPDM	353015	353019	353635	
		FPM	353016	353020	353645	
	CPVC	EPDM	353055	353059	353659	
		FPM	353056	353060	353669	
6	PVC	EPDM	353625	-	353636	
		FPM	353626	-	353646	
	CPVC	EPDM	353649	-	353660	
		FPM	353650	-	353670	

Body Material:

☐ PVC ☐ CPVC

Size (inches):

☐ 1/2 ☐ 2

☐ 3/4 ☐ 2-1/2

☐ 1 ☐ 3

☐ 1-1/4 ☐ 4

☐ 1-1/2 ☐ 6

Seals:

☐ EPDM

☐ Fluoropolymer (FPM)

End Connections:

☐ Socket (IPS)

☐ Threaded (FNPT)

☐ Flanged (ANSI 150)

IPEX Part Number:

_____

VXE Series Ball Valves

Product Data Sheet

Valve Selection – Vented

Vented ball valves are used with volatile liquids such as Hydrogen Peroxide (H_2O_2) and sodium hypochlorite (NaClO) to relieve a potentially dangerous pressure build-up in the ball cavity, when the valve is closed.

Size (inches)	Body Material	Seal Material	IPEX Part Number			Pressure Rating
			IPS Socket	FNPT Threaded	ANSI 150 Flanged	
1/2	PVC	FPM	353031		–	232 psi for socket or threaded
	CPVC		353067		–	
3/4	PVC		353032		–	
	CPVC		353068		–	
1	PVC		353033		–	
	CPVC		353069		–	
1-1/4	PVC		353034		–	
	PP		353070		–	
1-1/2	PVC		353035		–	
	CPVC		353071		–	
2	PVC		353036		–	150 psi for threaded
	CPVC		353072		–	
2-1/2	PVC		353037	–	353063	
	CPVC		353073	–	353079	
3	PVC		353038	353040	353064	
	CPVC		353074	353076	353080	
4	PVC		353039	353061	353065	
	CPVC		353075	353077	353081	
6	PVC		353086	–	353066	
	CPVC		353029	–	353082	

Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/4
- ☐ 1-1/2
- ☐ 2
- ☐ 2-1/2
- ☐ 3
- ☐ 4
- ☐ 6

End Connections:

- ☐ Socket (IPS)
- ☐ Threaded (FNPT)
- ☐ Flanged (ANSI 150)

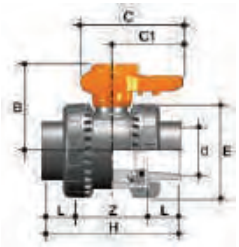
IPEX Part Number:

_____

VXE Series Ball Valves

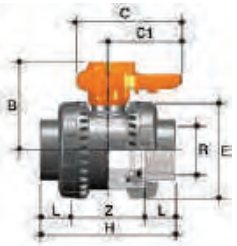
Product Data Sheet

Dimensions



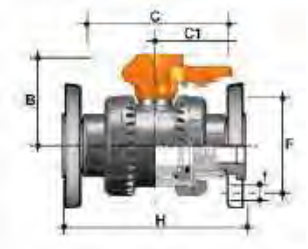
VXE IPS Socket (inches)

Size	d	L	Z	H	E	B	C	C1
1/2	0.84	0.89	2.01	3.78	2.13	1.93	2.52	0.79
3/4	1.05	1.00	2.13	4.13	2.48	2.44	3.07	0.91
1	1.32	1.13	2.34	4.61	2.83	2.80	3.43	1.06
1-1/4	1.66	1.26	2.83	5.35	3.35	3.23	4.02	1.18
1-1/2	1.90	1.38	3.03	5.79	3.94	3.62	4.29	1.30
2	2.38	1.50	3.84	6.85	4.65	4.33	5.24	1.54



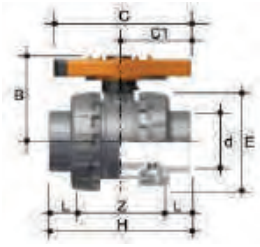
VXE NPT Female (inches)

Size	R	L	Z	H	E	B	C	C1
1/2	1/2-NPT	0.70	2.14	3.54	2.13	1.93	2.52	0.79
3/4	3/4-NPT	0.71	2.24	3.66	2.48	2.44	3.07	0.91
1	1-NPT	0.89	2.55	4.33	2.83	2.80	3.43	1.06
1-1/4	1-1/4-NPT	0.99	3.02	5.00	3.35	3.23	4.02	1.18
1-1/2	1-1/2-NPT	0.97	3.21	5.16	3.94	3.62	4.29	1.30
2	2-NPT	1.17	4.01	6.34	4.65	4.33	5.24	1.54



VXE ANSI Flanged (inches)

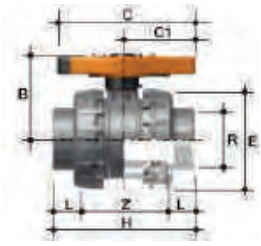
Size	No of Holes	f	F	H	B	C	C1
1/2	4	5/8	2-3/8	5.59	1.93	2.52	0.79
3/4	4	5/8	2-3/4	6.07	2.44	3.07	0.91
1	4	5/8	3-1/8	6.74	2.80	3.43	1.06
1-1/4	4	5/8	3-1/2	7.54	3.23	4.02	1.18
1-1/2	4	5/8	3-7/8	8.29	3.62	4.29	1.30
2	4	3/4	4-3/4	9.60	4.33	5.24	1.54



VXE IPS Socket (inches)

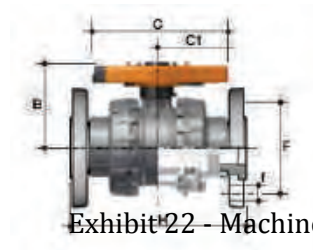
Size	d	L	Z	H	E	B	C	C1
2-1/2	2.875	1.75	4.80	8.31	6.18	5.59	8.43	4.53
3	3.5	1.89	5.98	9.76	6.85	5.95	9.41	4.96
4	4.5	2.26	6.61	11.14	8.35	6.87	10.63	5.71
*6	6.625	3.03	18.56	24.62	8.35	6.87	10.63	5.71

* 6" VXE is a 4" with venturied ends



VXE NPT Female (inches)

Size	R	L	Z	H	E	B	C	C1
2-1/2	2-1/2-NPT	1.31	5.69	8.31	6.18	5.59	8.43	4.53
3	3-NPT	1.40	6.97	9.76	6.85	5.95	9.41	4.96
4	4-NPT	1.48	8.18	11.14	8.35	6.87	10.63	5.71



VXE ANSI Flanged (inches)

Size	No of Holes	f	F	H	B	C	C1
2-1/2	4	3/4	5-1/2	10.93	1.93	2.52	0.79
3	4	3/4	6	12.22	2.44	3.07	0.91
4	8	3/4	7-1/2	13.93	2.80	3.43	1.06
*6	8	7/8	9-1/2	27.48	3.23	4.02	1.18

Note: Flanged connections are assembled at the factory. Due to manufacturing constraints dimension H may not be exactly as shown. The dimensions provided are approximate and should not be used to create precise layouts.

VXE Series Ball Valves

Product Data Sheet

Weights

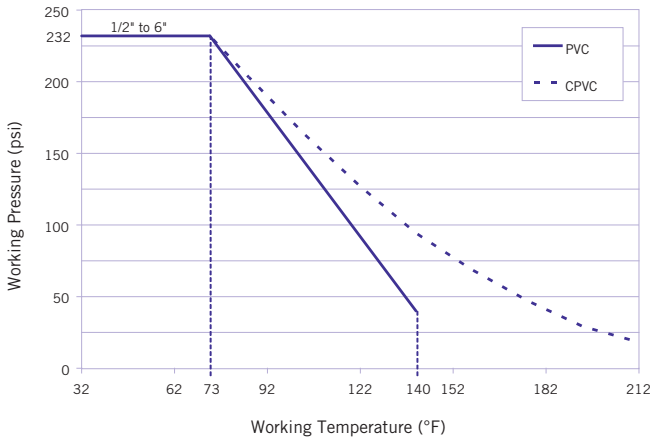
Approximate Weight (lbs)

Size (inches)	PVC		CPVC	
	IPS Socket/ FNPT Threaded	ANSI Flanged	IPS Socket/ FNPT Threaded	ANSI Flanged
1/2	0.39	0.79	0.39	0.79
3/4	0.57	1.11	0.57	1.11
1	0.81	1.63	0.81	1.63
1-1/4	1.25	2.25	1.25	2.25
1-1/2	1.76	2.99	1.76	2.99
2	2.93	4.92	2.93	4.92
2-1/2	6.06	8.64	6.61	9.19
3	7.57	11.36	8.25	12.04
4	12.82	18.09	13.97	19.24
*6	21.42	31.44	23.14	33.74

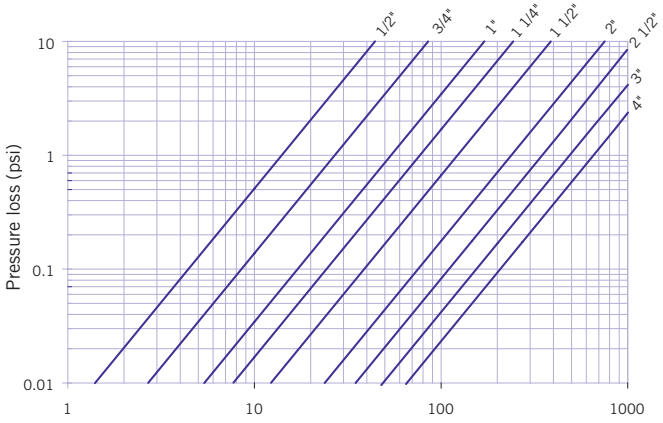
* 6" VXE is a 4" with venturied ends

Pressure – Temperature Ratings

For Socketed and Threaded Only



Pressure Loss Chart



Flow Coefficients

Size	C_v
1/2	14.0
3/4	27.0
1	53.9
1-1/4	77.0
1-1/2	123
2	238
2-1/2	348
3	487.2
4	654.2
*6	654.2

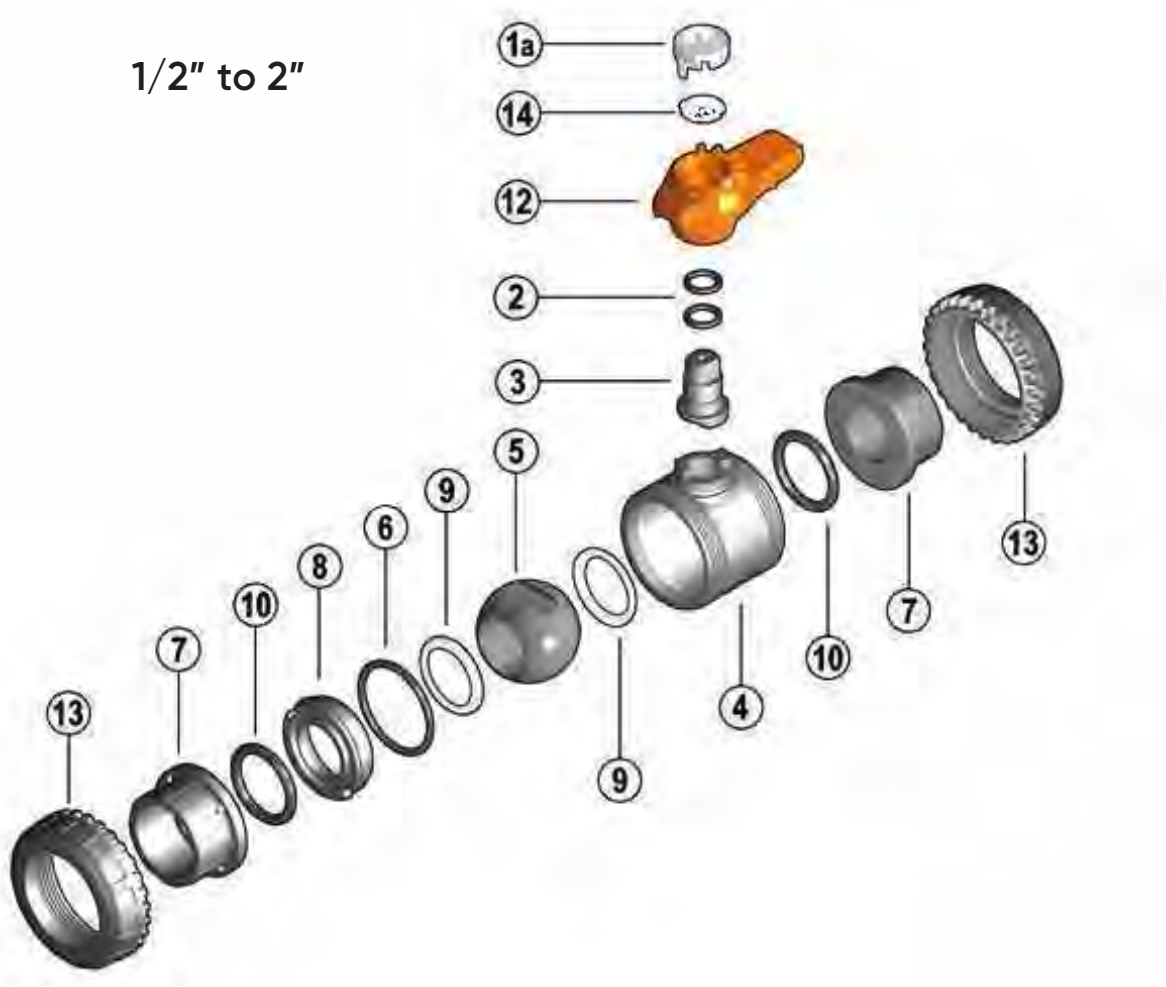
* Not including venturied ends

VXE Series Ball Valves

Product Data Sheet

Components

1/2" to 2"



No.	Component	Material	Qty
1a	Transparent Service Plug	PVC	1
2*	Stem O-Ring	EPDM / FPM	2
3*	Stem	PVC / CPVC	1
4	Body	PVC / CPVC	1
5	Ball	PVC / CPVC	1
6*	Body Seal O-Ring	EPDM / FPM	1
7	End Connector	PVC / CPVC	2
8	Support for Ball Seat	PVC / CPVC	1
9*	Ball Seat	PTFE	2
10*	Socket Seal O-Ring	EPDM / FPM	2
12	Handle	PVC	1
13	Union Nut	PVC / CPVC	2
14	Tag Holder	PVC	1

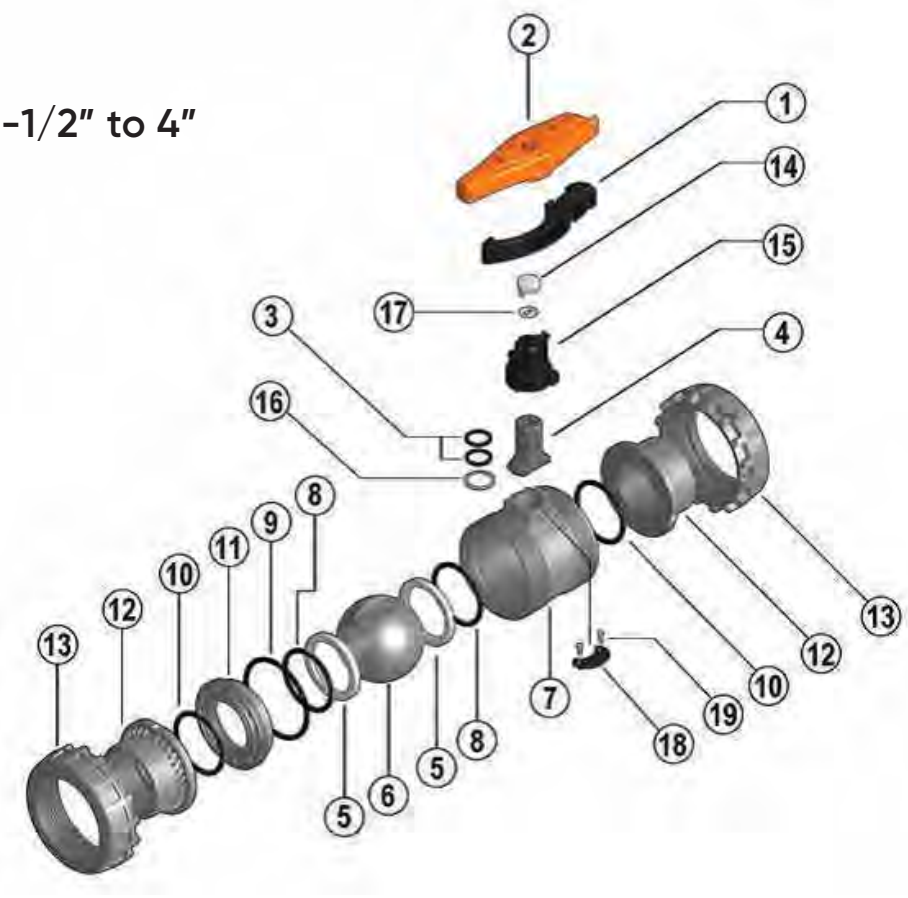
* Spare parts available.

VXE Series Ball Valves

Product Data Sheet

Components

2-1/2" to 4"



No.	Component	Material	Qty
1	Easyfit multifunctional Tool	GFPP	1
2*	Easyfit multifunctional Handle	PVC	1
3*	Stem O-rings	EPDM / FPM	2
4	Stem	PVC / CPVC	1
5	Ball Seat	PTFE	2
6*	Ball	PVC / CPVC	1
7	Body	PVC / CPVC	1
8	Ball Seat O-Ring	EPDM / FPM	2
9*	Radial Seal O-Ring	EPDM / FPM	1
10*	Socket Seal O-Ring	EPDM / FPM	2
11	Support for ball seat	PVC / CPVC	1
12	End Connector	PVC / CPVC	2
13	Union Nut	PVC / CPVC	2
14	Transparent Service Plug	PVC	1
15	Central Hub	PVC	1
16	Friction reducing bush	PTFE	1
17	Tag Holder	PVC	1
18	Tamper-proof plate	PVC	1
19	Self-tapping screw	SS	2

* Spare parts available.

VXE Series Ball Valves

Product Data Sheet

Installation Procedures

1. For socket and threaded style connections, remove the union nuts (part #13 on previous page) and slide them onto the pipe. For flanged connections, remove the union nut / flange assemblies from the valve.
2. Please refer to the appropriate connection style sub-section:

   a. For socket style, solvent cement the end connectors (7 or 12) onto the pipe ends. For correct joining procedure, please refer to the section entitled, *"Joining Methods – Solvent Cementing"* in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems"*. **Be sure to allow sufficient cure time before continuing with the valve installation.**

   b. For threaded style, thread the end connectors (7) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".

3. Open and close the valve to ensure that the ball seat support (8) is at the desired adjustment. If adjustment is required, ensure that the valve is in the closed position then remove the handle (12 or 2) from the valve stem. Line up the moldings on the handle wit the slots in the ball seat support. Tighten or loosen to the desired position then replace the handle on the valve stem.
4. Ensure that the valve is in the closed position, and that the socket o-rings (10) are properly fitted in their grooves. Carefully place the valve in the system between the two end connections.
5. Tighten the union nut on the side opposite to that which is marked "ADJUST". Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. If additional tightening is required, the Easyfit multifunctional handle tool can be used to tighten the union nuts an additional 1/4 turn.
6. Tighten the union nut on the side marked "ADJUST". Tightening the union nuts in this order results in the best possible valve performance due to optimum positioning and sealing of the ball and seat support system.

   Over-tightening may damage the threads on the valve body and/ or the union nut and may even cause the union nut to crack. It is recommended to use the Easyfit handle to prevent damage.

7. Open and close the valve to again ensure that the cycling performance is adequate. If adjustment is required, place the valve in the closed position, loosen the union nuts, remove the valve from system and then continue from Step 3.

VXE Series Ball Valves

Product Data Sheet

Valve Maintenance

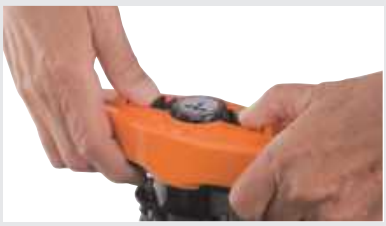
Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing.**
2. Loosen both union nuts (13) and drop the valve out of the line. If retaining the socket o-rings (10), take care that they are not lost when removing the valve from the line.
   a. For 1/2" to 2" remove the handle (12) and the transparent service plug (1a). Turn handle over, and seat on valve stem, ensuring the integrated gear teeth on the handle mesh with the union nut teeth. Turn clockwise to loosen.
   b. For 2-1/2" to 6" remove handle (2). Remove the Easyfit multifunctional tool (1) from the bottom of the handle (2), turn it over and re-install it. Engage the tool (1) with the outer ring profile on the union nut (13) and loosen.
3. To disassemble, place the valve in the closed position and locate the ball seat support adjustment tool on the multifunctional handle. This is found on the bottom of 1/2" to 2" handles and on the top of 2-1/2" to 6" handles.
4. Line up the moldings on the handle with the slots in the ball seat support (found on the side marked "ADJUST"). Loosen and remove the ball seat support (8 or 11) by turning in a counterclockwise direction.
5. Carefully press the ball (5 or 6) out of the valve body, taking care not to score or damage the outer surface.
6. To remove the stem (3 or 4), remove the central hub (15) on 2-1/2" to 6" sizes, press the stem into the valve body (4 or 7) from above.
7. The stem o-rings (2 or 3), body o-ring (6 or 9), friction reducing bushing (16) and ball seats (9 or 5) can now be removed and/or replaced.

1/2" – 2" VXE Ball Valves



2-1/2" – 6" VXE Ball Valves



VXE Series Ball Valves

Product Data Sheet

Testing & Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, *"Volume I: Vinyl Process Piping Systems" under the section entitled "Testing".* The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

IMPORTANT POINTS:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

For safety reasons, please contact IPEX customer service and technical support when using volatile liquids such as hydrogen peroxide (H202) and sodium hypochlorite (NaClO). These liquids may vaporize causing a potentially dangerous pressure increase in the dead space between the ball and the valve body. Special VXE ball valves are available for these types of critical applications.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

License Type: Integrated Facility

Precision Pumping Systems
6515 S BUSINESS WAY
BOISE, ID 83716
(208) 323-5300
WWW.GOPPS.US

QUOTE#: ____________________________

SYSTEM MODEL #: UG100

DATE: ______________________________

SYSTEM SUMMARY

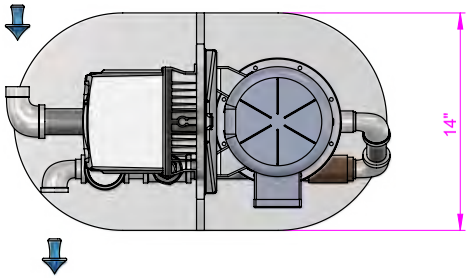
FLOW RATE	10 GPM
BOOST PRESSURE	35 PSI
PUMP MODEL	ACDU70/315D3C
VARIABLE FREQUENCY DRIVE	ACS255-01U-05A8-1+B063
MOTOR HP	1.5 HP

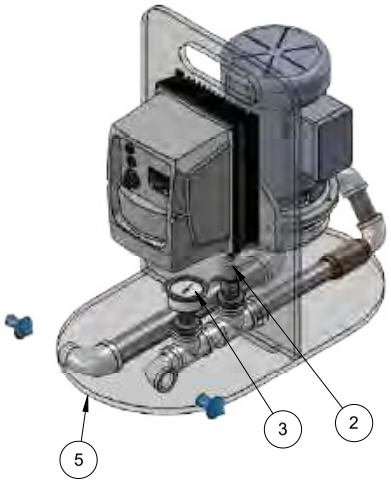
APPROVED BY: ______________________________

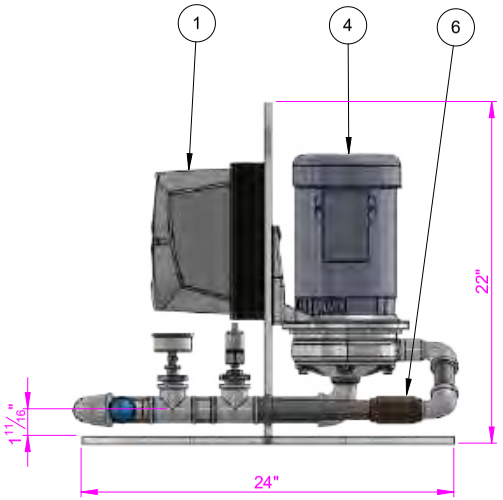
DATE: ____________________

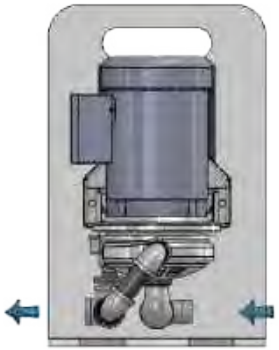
VOLTAGE/PHASE: 120V/1PH

INITIALS: __________









NON-POTABLE

DESIGN SPECIFICATIONS

Design Flow Rate:	10 GPM @ 35 PSI Boost		
Duty Pump Details:	1.5 HP/Pump | 30 GPM @ TDH		
Minimum Power:	208 Volt / 3 Phase		
Model #	NEUTRON V		
ITEM NO.	DESCRIPTION	Size	QTY.
1	CONTROL UNIT, ACS255		1
2	PRESSURE TRANSDUCER	1/4"	1
3	PRESSURE GAUGE, 100PSI, BACK	2-1/2"	1
4	PUMP, CENTRIFUGAL, EBARRA	1.5 HP	1
5	SKID, HDPE	24"x24"x18"	1
6	VALVE, CHECK		1

PPS
PRECISION PUMPING SYSTEMS
6515 BUSINESS WAY
BOISE, IDAHO 83716
208-323-5300
www.gopps.us

MATERIAL
Piping: STEEL A53
HDPE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL: ±1/8'
ONE PLACE DECIMAL: ±.10
TWO PLACE DECIMAL: ±.05
DO NOT SCALE DRAWING

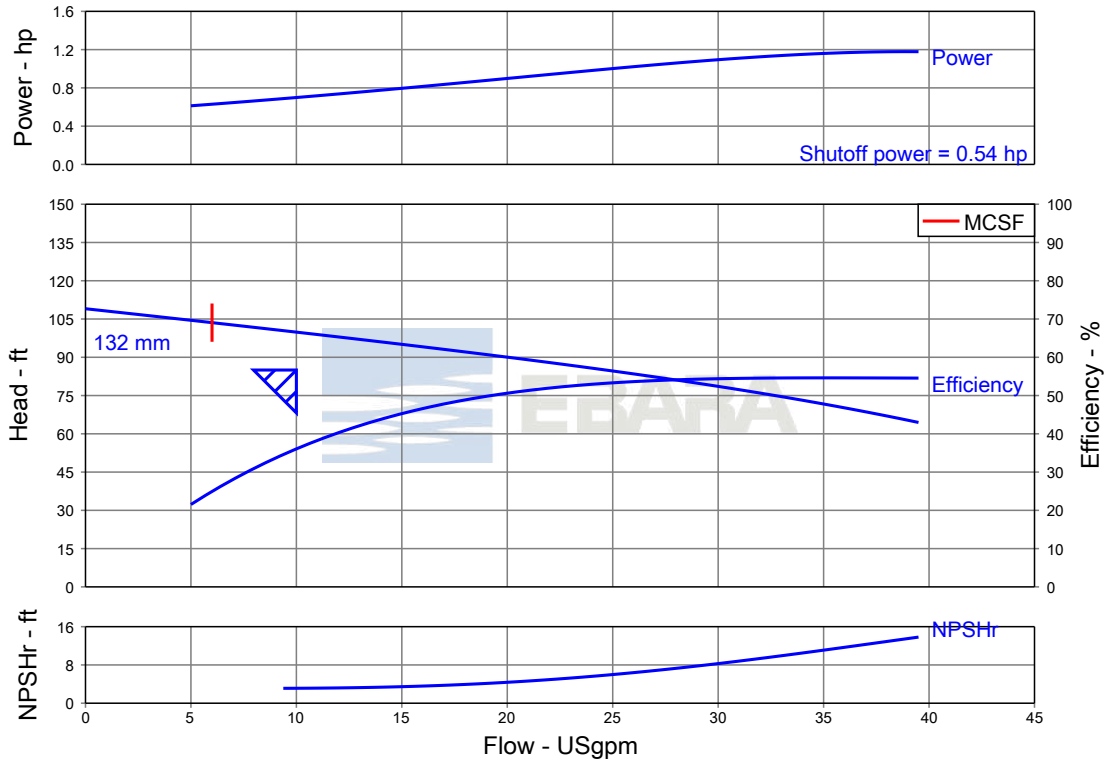
DRAWN: AK | DATE: 4/10/2020

TITLE: **TRANSFER PUMP**
PROJECT: UG 100
LEVEL: 100% Build
PART NO: 1C-NJ-NF-1
JOB: | SIZE: B | SCALE: NTS | SHEET: 1 OF 1 | REV:

Item number	: Default	Product Description	: ACDU70/3-1.5HP
Service	:	Stages	: 1
Quantity	: 1	Based on curve number	: CD-C602-9309
Quote number	:	Basic model number	: -
		Date last saved	: 10 Apr 2020 4:26 PM

Operating Conditions	
Flow, rated	: 10.00 USgpm
Differential head / pressure, rated (requested)	: 85.00 ft
Differential head / pressure, rated (actual)	: 99.86 ft
Suction pressure, rated / max	: 0.00 / 0.00 psi.g
NPSH available, rated	: Ample
Frequency	: 60 Hz
Performance	
Speed, rated	: 3450 rpm
Impeller diameter, rated	: 132 mm
Impeller diameter, maximum	: 132 mm
Impeller diameter, minimum	: 132 mm
Efficiency	: 36.06 %
PEI (CL)	: 0.98
NPSH required / margin required	: 3.12 / 0.00 ft
Ns (imp. eye flow) / Nss (imp. eye flow)	: 829 / 3,356 US Units
MCSF	: 6.00 USgpm
Head, maximum, rated diameter	: 109.0 ft
Head rise to shutoff	: 9.18 %
Flow, best eff. point	: 35.02 USgpm
Flow ratio, rated / BEP	: 28.56 %
Diameter ratio (rated / max)	: 100.00 %
Head ratio (rated dia / max dia)	: 100.00 %
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Selection status	: Near miss

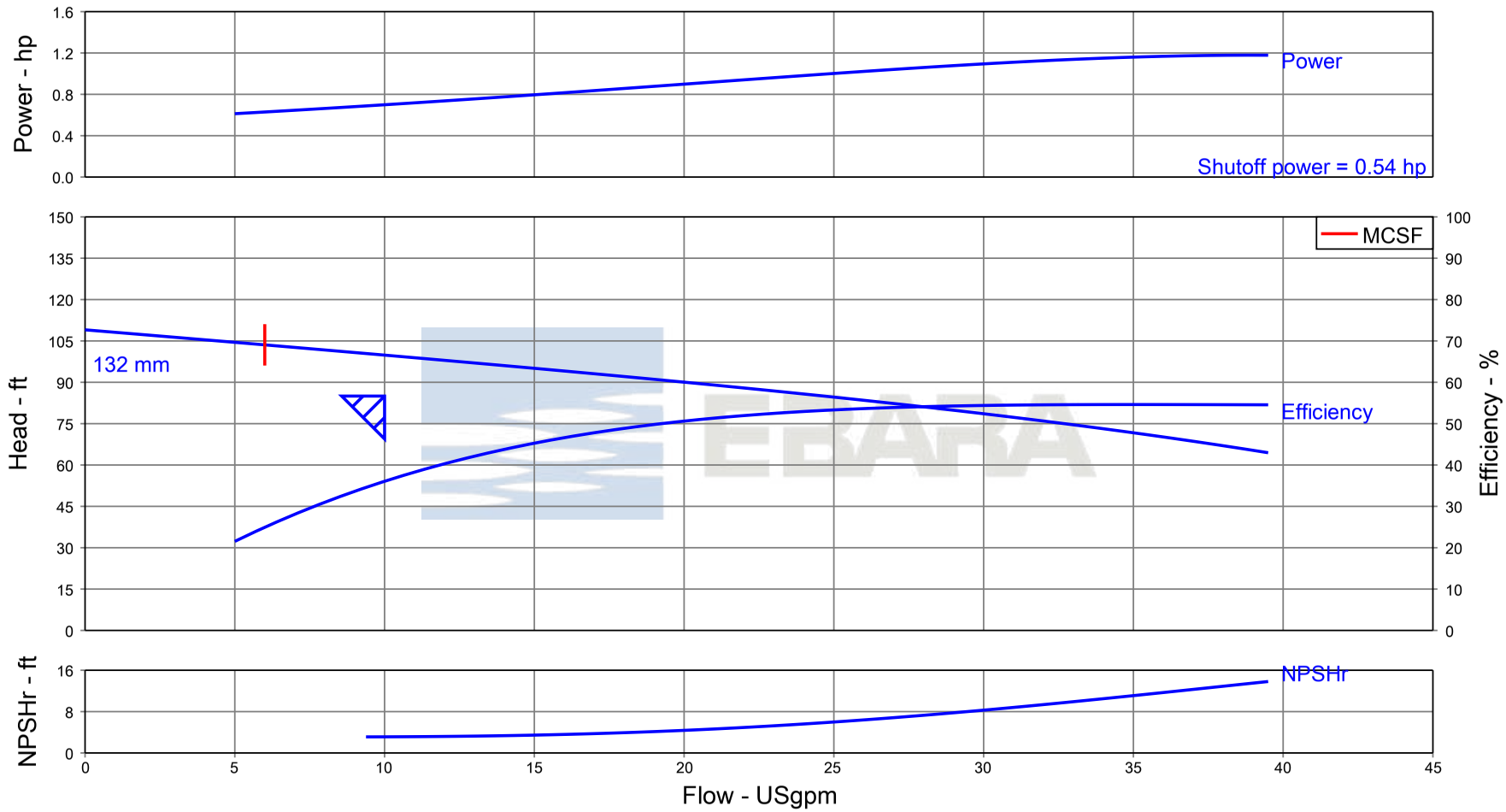
Liquid	
Liquid type	: Water
Additional liquid description	:
Solids diameter, max	: 0.00 mm
Solids concentration, by volume	: 0.00 %
Temperature, max	: 68.00 deg F
Fluid density, rated / max	: 1.000 / 1.000 SG
Viscosity, rated	: 1.00 cP
Vapor pressure, rated	: 0.00 psi.a
Material	
Material selected	: Stainless Steel
Pressure Data	
Maximum working pressure	: 47.20 psi.g
Maximum allowable working pressure	: 125.0 psi.g
Maximum allowable suction pressure	: N/A
Hydrostatic test pressure	: N/A
Driver & Power Data (@Max density)	
Driver sizing specification	: Rated power
Margin over specification	: 0.00 %
Service factor	: 1.00
Power, hydraulic	: 0.25 hp
Power, rated	: 0.70 hp
Power, maximum, rated diameter	: 1.18 hp
Minimum recommended motor rating	: 1.50 hp / 1.12 kW (Fixed)



Customer :
Reference :

Pump Performance Curve

Ebara Quotation System 20.0.5



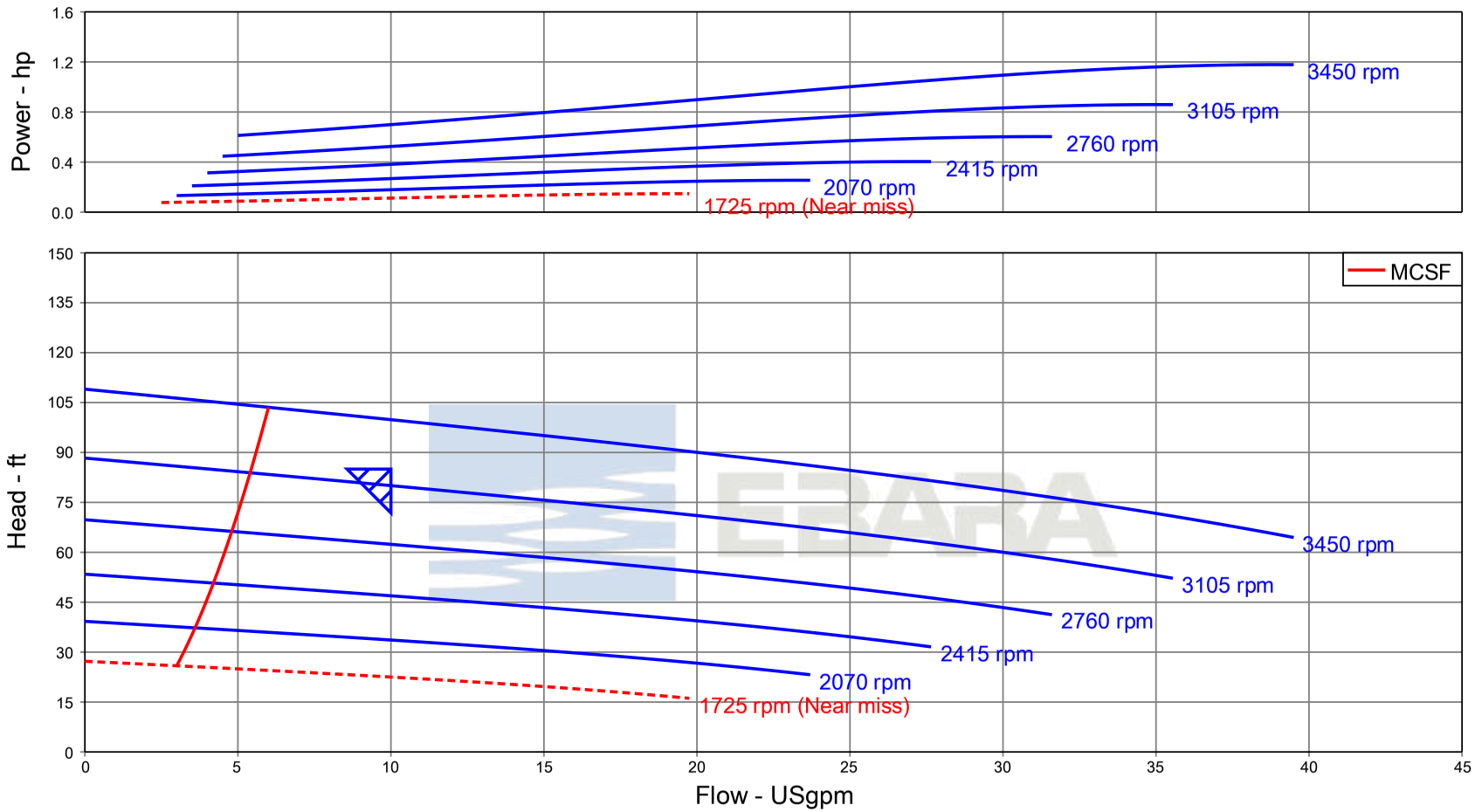
Item number	: Default	Product Description	: ACDU70/3-1.5HP	Flow, rated	: 10.00 USgpm
Service	:	Stages	: 1	Differential head / pressure, rated	: 85.00 ft
Quantity	: 1	Speed, rated	: 3450 rpm	NPSH required	: 3.12 ft
Quote number	:	Based on curve number	: CD-C602-9309	Fluid density, rated / max	: 1.000 / 1.000 SG
Date last saved	: 10 Apr 2020 4:26 PM	Basic model number	: -	Viscosity	: 1.00 cP
		Efficiency	: 36.06 %	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
		PEI (CL)	: 0.98		
		Power, rated	: 0.70 hp		

Ebara Pumps Americas Corporation
1651 Cedar Line Dr, Rock Hill, South Carolina 29730 USA
Tel: (803) 327-5005 Fax: (803) 327-5097 www.pumpsebara.com

Customer :
Reference :

Multi-Speed Performance Curve

Ebara Quotation System 20.0.5



Item number	: Default	Product Description	: ACDU70/3-1.5HP	Flow, rated	: 10.00 USgpm
Service	:	Stages	: 1	Differential head / pressure, rated	: 85.00 ft
Quantity	: 1	Efficiency	: 36.06 %	Speed, rated	: 3450 rpm
Quote number	:	PEI (VL)	: -	Impeller diameter, rated	: 132 mm
Based on curve number	: CD-C602-9309	Power, rated	: 0.70 hp	Fluid density, rated / max	: 1.000 / 1.000 SG
		NPSH required	: 3.12 ft	Viscosity	: 1.00 cP
Basic model number	: -	Frequency	: 60 Hz	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Date last saved	: 10 Apr 2020 4:26 PM	Nominal speed	: 3450 rpm		

Ebara Pumps Americas Corporation
1651 Cedar Line Dr, Rock Hill, South Carolina 29730 USA
Tel: (803) 327-5005 Fax: (803) 327-5097 www.pumpsebara.com

CATALOG

ABB micro drives

ACS255, 0.25 to 20 hp / 0.37 to 15 kW

ACS255 IP20 micro drive

Data sheet

Performance features	Control modes	115 VAC: V/Hz and open loop vector 600 VAC: V/Hz and open loop vector
	Operator interface module	Integral drive mounted
	Display lines	6-character LED display
	Programmable preset speeds	Four
	Analog output: one	One (0-10 VDC)
	Auto restart	Yes – up to 5 attempts
	Frequency avoidance	One band
	Fault history	Last four faults
	Digital inputs: four	Two programmable digital inputs, two user selectable analog/digital inputs
	Digital inputs type	Pull-up
Drive specifications	Analog inputs: two	0-10 VDC, 4 to 20mA
	Relay output: one	Built-in form C relay
	Analog output / digital outout	0-10 VDC: one analog usable for meter (freq., current, voltage) or digital output
	Overload capacity	Drive output 150% for one minute and 175% for 2 seconds
	Maximum load	1.5 HP @ 120 V In/230 V Out, 20 HP @ 600 V In/Out
	Input voltage ranges	115 VAC (99-126); 600 VAC (450-660)
	Rated input frequency	50-60 Hz (±5%)
	Carrier frequency	4-32 kHz (8 kHz default)
	Operating temperature	-10° to 50°C
	Snubber (dynamic braking)	Built-in transistor (frames 2 and 3)
	Dynamic braking external	Up to 150% dynamic braking with appropriately sized resistor
	DC injection braking	Included
	Volts/Hz	Linear V/Hz, user defined, energy optimizer & boost function
	Sensorless vector	Speed and torque with autotune for AC induction and permanent magnet motors
	Frequency control range	0-500 Hz
	Accel/decel:	Independently adjustable accel. & decel. ramps
	Time range	0.00 to 600.0 Seconds
	Keypad speed control	Yes
	Sink/source inputs	Source, 24 VDC logic
	Electronic overload trip	Electronic motor overload inverse 150% for 1 minute or 175% for 2 seconds
	Communications	Built-in Modbus-RTU (RS-485) communications
	PI control	Built-in
Protective features	Under voltage	Level depends on voltage class
	Output short circuit	Phase-to-phase on drive output
	Over temperature	Heat sink monitor
	DC bus overvoltage	DC bus level trip
	Drive overload	Exceed drive rating of 150% for one minute or 175% for 2 seconds
	Over current	Over-current/short-circuit protection
	Output phase	Trips on open output phase
	Loss of reference	Trips on loss of speed command signal
	Communication error	Detects a communication error (fault)
Agency certifications		UL, cUL, CE, C-tick, gost
Service conditions	Altitude	1,000 m (3,300 ft.), derate by 1% per 100M up to 2,000 on maximum
	Ambient temperature	-10°C (14°F) to 50°C (102°F)
	Storage temperature:	-40°C (-40°F) to 60°C (140°F)
	Relative humidity	10% to 95%, non-condensing

ACS255 IP20 micro drive

Ratings and types

Type designation
This is the unique reference number (shown above and in the first column, below) that clearly identifies your drive by power rating and frame size. Once the drive's type designation has been selected, the frame size (column 7) can be used to determine the drive dimensions, shown on the next page.

Voltages
ACS255 is available in two voltage ranges:
1 = 110 to 120 V
6 = 500 to 600 V

Insert either "1" or "6", depending on your chosen voltage, into the type designation shown above.

Construction
"01U" within the type designation (shown above) varies depending on the drive phase and EMC filtering. Choose below the one you need.

01 = 1-phase
03 = 3-phase
U = No EMC filter

Type code	Braking chopper (included)	P_N	P_N	Output current I_{2N}	Weight	Frame size
		HP	kW	A	lbs	
1-phase supply voltage 110 to 120 V, +/-10%, 3-phase output 200 to 240 V						
ACS255-01U-02A3-1	---	0.5	0.37	2.3	2.2	E1
ACS255-01U-04A3-1	---	1	0.75	4.3	2.2	E1
ACS255-01U-05A8-1	STD	1.5	1.1	5.8	3.75	E2
3-phase supply voltage 500 to 600 V, +/-10%						
ACS255-03U-02A1-6	STD	1	0.75	2.1	4.0	P2
ACS255-03U-03A1-6	STD	2	1.5	3.1	4.0	P2
ACS255-03U-04A1-6	STD	3	2.2	4.1	4.0	P2
ACS255-03U-06A5-6	STD	5	4.0	6.5	4.0	P2
ACS255-03U-09A0-6	STD	7.5	5.5	9	4.0	P2
ACS255-03U-12A0-6	STD	10	7.5	12	7.7	P3
ACS255-03U-17A0-6	STD	15	11	17	7.7	P3
ACS255-03U-22A0-6	STD	20	15	22	7.7	P3

Notes:

I_{2N}: continuous base current with 110% overload for 1 minute / 10 minutes.
P_N: Typical motor power for most 4-pole NEMA motors in normal use.

ACS255 IP66 micro drive

Ratings and types

Type designation
This is the unique reference number (shown above and in the first column, below) that clearly identifies your drive by power rating and frame size. Once the drive's type designation has been selected, the frame size (column 7) can be used to determine the drive dimensions, shown on the next page.

Voltages
ACS255 is available in two voltage ranges:

1 = 110 to 120 V
2 = 200 to 240 V
4 = 380 to 480 V
6 = 500 to 600 V

Insert either "1", "2", "4" or "6", depending on your chosen voltage, into the type designation shown above.

Construction
"01U" within the type designation (shown above) varies depending on the drive phase and EMC filtering. Choose below the one you need.

01 = 1-phase
03 = 3-phase
U = No EMC filter
F278 = Operator controls: Disconnect, FWD/ REV/OFF selector, Speed Potentiometer

Type code	Braking chopper (included)	P_N HP	P_N kW	Output current I_{2N} A	Weight lb	Frame size
1-phase supply voltage 110 to 120V, +/-10%, 3-phase output 200 to 240 V						
ACS255-01U-02A3-1+B063(+F278)	-	0.5	0.37	2.3	6.5	E1
ACS255-01U-04A3-1+B063(+F278)	-	1.0	0.75	4.3	6.5	E1
ACS255-01U-05A8-1+B063(+F278)	X	1.5	1.1	5.8	9.3	E2
1-phase supply voltage 200 to 240V, +/-10%, 3-phase output 200 to 240 V						
ACS255-01U-02A3-2+B063(+F278)	-	0.5	0.37	2.3	6.5	E1
ACS255-01U-04A3-2+B063(+F278)	-	1.0	0.75	4.3	6.5	E1
ACS255-01U-06A1-2+B063(+F278)	-	1.5	1.1	6.1	6.5	E1
ACS255-01U-07A0-2+B063(+F278)	-	2.0	1.5	7.0	6.5	E1
ACS255-01U-10A5-2+B063(+F278)	X	3.0	2.2	10.5	9.3	E2
ACS255-01U-15A3-2+B063(+F278)	X	5.0	3.7	15.3	17.0	E3
3-phase supply voltage 200 to 240 V, +/-10%						
ACS255-03U-02A3-2+B063(+F278)	-	0.5	0.37	2.3	6.5	E1
ACS255-03U-04A3-2+B063(+F278)	-	1.0	0.75	4.3	6.5	E1
ACS255-03U-06A1-2+B063(+F278)	-	1.5	1.10	6.1	6.5	E1
ACS255-03U-07A0-2+B063(+F278)	X	2.0	1.5	7.0	9.3	E2
ACS255-03U-10A5-2+B063(+F278)	X	3.0	2.2	10.5	9.3	E2
ACS255-03U-18A0-2+B063(+F278)	X	5.0	4.0	18.0	17.0	E3
3-phase supply voltage 380 to 480 V, +/-10%						
ACS255-03U-01A2-4+B063(+F278)	-	0.5	0.37	1.2	6.5	E1
ACS255-03U-02A2-4+B063(+F278)	-	1.0	0.75	2.2	6.5	E1
ACS255-03U-03A3-4+B063(+F278)	-	1.5	1.1	3.3	6.5	E1
ACS255-03U-04A1-4+B063(+F278)	-	2.0	1.5	4.1	6.5	E1
ACS255-03U-05A8-4+B063(+F278)	X	3.0	2.2	5.8	9.3	E2
ACS255-03U-09A5-4+B063(+F278)	X	5.0	4.0	9.5	9.3	E2
ACS255-03U-14A0-4+B063(+F278)	X	7.5	5.5	14.0	17.0	E3
ACS255-03U-18A0-4+B063(+F278)	X	10.0	7.5	18.0	17.0	E3
3-phase supply voltage 500 to 600 V, +/-10%						
ACS255-03U-02A1-6+B063(+F278)	X	1.0	0.75	2.1	10.6	P2
ACS255-03U-03A1-6+B063(+F278)	X	2.0	1.5	3.1	10.6	P2
ACS255-03U-04A1-6+B063(+F278)	X	3.0	2.2	4.1	10.6	P2
ACS255-03U-06A5-6+B063(+F278)	X	5.0	4.0	6.5	10.6	P2
ACS255-03U-09A0-6+B063(+F278)	X	7.5	5.5	9.0	10.6	P2
ACS255-03U-12A0-6+B063(+F278)	X	10.0	7.5	12.0	16.1	P3
ACS255-03U-17A0-6+B063(+F278)	X	15.0	11.0	17.0	16.1	P3

P_N for kW = Typical motor power in 400 V at normal use
P_N for hp = Typical motor power in 460 V at normal use
I_{2N} for A = Continuous rms current. 50% overload is allowed for one minute in ten minutes.

Valworx

Electric Actuated Ball Valves

PVC Body, Teflon/EPDM Seals
1/2 to 4 inch Pipe

SERIES
5654

Features

- Industrial grade True Union full port ball valve
- Visual valve position indicator
- Rugged aluminum Type 4X weatherproof enclosure
- Anti-condensation heater
- Manual override with end of travel mechanical stops
- Two auxiliary limit switches (on-off models)
- Union nut locking device prevents back-off
- Energized PTFE ball seats for lower torque and longer life
- Leak free dual stem seal design
- EPS - Electronic Positioner System models available
- Actuator CSA listed per UL429 and CSA C22.2
- Valve certified per NSF372/ NSF61 for potable/drinking water

Applications

Industrial quality full port electric actuated PVC ball valves are typically used for control of water and other media compatible with the materials of construction (not suitable for compressed air or gas). Ideal for industrial applications and where NSF approved construction is required for potable drinking water. Optional EPS positioner is available for controlling flow using an analog input control signal. Rugged actuator designed for 70% duty cycle.

Operation

Electric actuated valve uses power-to-open and power-to-close, stays in the last known position with loss of power. On receipt of a continuous voltage signal, the motor runs and via a rugged all metal gear system rotates the ball 90°. The motor is automatically stopped by internal cams striking limit switches. On receipt of a reversing continuous signal, the motor turns in the opposite direction reversing the valve position. Valves with EPS positioners use an analog input signal to control the position of the ball (flow). Wiring is directly to a terminal strip via supplied cable connector, or optional 1/2 inch NPT conduit adapters.

Construction

Valve Body	PVC cell class 12454 per ASTM D1784 (dark gray)
Ball/Stem	PVC cell class 12454 per ASTM D1784
Ball Seats	PTFE (Teflon) energized with EPDM
Stem Seals	Dual EPDM seals
Gear Drive	Heavy duty alloy steel and aluminium bronze worm
Actuator Enclosure	Aluminum polyester powder coated, Type 4X, IP67
Visual Valve Position Indicator	Clear polycarbonate cover, red/yellow open-closed
Fasteners	Stainless Steel
Auxiliary Limit Switches on-off models	2 x SPDT 3A@125/250VAC, 30VDC resistive load

Description

Electric actuated PVC ball valves offer a variety of advanced features in a wide range of pipe sizes. Energized PTFE ball seats are designed for low torque and extended cycle life. Dual stem seals and adjustable ball seat carrier contribute to a leak free design. Union nut locking device prevents back off due to vibration or thermal cycling. Rugged Type 4X corrosion resistant actuator includes a manual override, valve position confirmation switches (on-off models), thermostatically controlled anti-condensation heater and over-torque protection.

Approvals

Actuators

- CSA Listed to:
  - UL429 and CSA C22.2 no 139
  - Type 4X, IP67 weatherproof enclosure
- CE conformance
  - ISO5211 Mounting

Valves

- NSF International certified to:
  - NSF/ANSI 61 G
  - NSF/ANSI 372 Drinking Water
- ANSI B1.20.1
- ASTM D1784, cell class 12454

Valworx

Electric Actuated Ball Valves

PVC Body, Teflon/EPDM Seals
1/2 to 4 inch Pipe

SERIES
5654

Construction Features

Auxiliary Limit Switches(2) for confirming valve position, on-off versions

Heavy duty integral motor design significantly reduces physical size of actuator

Rugged polyester powder coated aluminum enclosure, Type 4X weatherproof and corrosion resistant.

Leak free dual stem seals

Energized PTFE ball seats for reduced torque and extended cycle life

Anti-Condensation Heater

Terminal Box, wire directly to terminal strip via 1/2" NPT conduit connection or use included cable connector

Manual Override with protective cover

Self-locking all metal gear drive, no additional brake required

Union nut locking device prevents back-off from vibration or thermal cycling

NSF

Certified per NSF61G and NSF372 for potable/ drinking water

Pressure-Temperature

Pressure Rating*: 232 PSI (16 Bar) at 73°F (23°C)
Vacuum 29inHg

Valve Temperature Rating*: 32 to 140ºF (0 to 60ºC)

Actuator Temperature Rating: -22 to +140º F (-30 to 60º C)

*See P/T chart

Visual Valve Position Indicator

Pressure/Temperature Chart

P/T Chart (PSI/°F)							
PSI	232	232	232	180	150	100	35
°F	32	50	70	90	110	120	140

P/T Chart (BAR/°C)							
Bar	16	16	16	12	10	7	2.4
°C	0	10	21	32	43	49	60

Valworx

SERIES
5654

Specifications: Electric PVC Valves On-Off Version (English units)

Stock Number	Pipe Size (inch)*	Pipe O.D. (inch)	Cv Flow Factor	Pressure Max. (PSI)**	Cycle Time/90° (seconds) +/-10%	Voltage	Current F.L. Amps	Electrical Wiring Drawing
120 VAC ELECTRIC PVC BALL VALVE TEFLON/EPDM: ON-OFF version								
565404A	1/2	0.84	14	232	10/8	110 VAC, 50/60Hz	0.27	B
565406A	3/4	1.05	27	232	10/8	110 VAC, 50/60Hz	0.27	B
565408A	1	1.32	54	232	10/8	110 VAC, 50/60Hz	0.27	B
565410A	1-1/4	1.66	77	232	10/8	110 VAC, 50/60Hz	0.27	B
565412A	1-1/2	1.90	123	232	10/8	110 VAC, 50/60Hz	0.27	B
565416A	2	2.38	238	232	20/17	110 VAC, 50/60Hz	0.27	B
565417A	2-1/2	2.88	368	232	20/17	110 VAC, 50/60Hz	0.27	B
565418A	3	3.50	497	232	30/25	110 VAC, 50/60Hz	0.64	B
565419A	4	4.50	665	232	30/25	110 VAC, 50/60Hz	0.73	B
24 VDC ELECTRIC PVC BALL VALVE TEFLON/EPDM: ON-OFF version								
565446A	1/2	0.84	14	232	20	DC24	1.28	G
565447A	3/4	1.05	27	232	20	DC24	1.28	G
565449A	1	1.32	54	232	20	DC24	1.28	G
565450A	1-1/4	1.66	77	232	20	DC24	1.28	G
565451A	1-1/2	1.90	123	232	20	DC24	1.28	G
565452A	2	2.38	238	232	20	DC24	1.28	G
565453A	2-1/2	2.88	368	232	20	DC24	1.28	G
565454A	3	3.50	497	232	30	DC24	2.03	G
565455A	4	4.50	665	232	30	DC24	3.57	G

Cv is the GPM of water at 60° F that will pass through the valve with 1 PSI pressure drop

*Valve sizes 1/2 to 2 inch include both IPS glue sockets and NPT end connectors, sizes 2-1/2 to 4 inch include IPS glue sockets only

** Maximum pressure at 73° F, pressure decreases as temperature increases (see P/T chart)

On-Off Electric Actuated Valves

Valworx electric actuated valves use power-to-open and power-to-close, stays in the last known position with loss of power. The actuator will rotate the output drive 90° to open or close the ball valve. Limit switches automatically stop the motor drive in either the open or closed position as required. Two auxiliary limit switches are provided as standard with on-off actuators to confirm valve open or closed position.

Rugged primary gear drive system is made of heat treated alloy steel for high strength, excellent wear resistance and high torque. Final stage aluminium bronze worm gear drive is self-locking, no motor brake required. A manual override is provided for use in setup or power failure situations.

The override is operated with a standard hex wrench (included). The standard 4 watt thermostatically controlled anti-condensation heater will help prevent failures due to condensation buildup inside the actuator.

Robust aluminium alloy housing is corrosion-resistant, polyester powder coated, and weatherproof. The housing is rated Type 4X (IP67) and certified by CSA. Heavy duty motor is integral to the actuator housing providing the smallest physical size to power ratio of typical actuators on the market.

Electrical wiring is directly to a terminal strip via included cable connectors, or optional 1/2" NPT conduit adapters.

Valworx

SERIES
5654

Specifications: Electric PVC Valves with EPS Positioner (English units)

Stock Number	Pipe Size (inch)*	Pipe O.D. (inch)	Cv Flow Factor	Pressure Max. (PSI)**	Cycle Time/90° (seconds) +/-10%	Voltage	Current F.L. Amps	Electrical Wiring Drawing
120 VAC ELECTRIC PVC BALL VALVE TEFLON/EPDM: EPS POSITIONER 4-20mA INPUT								
565457A	1/2	0.84	14	232	20/17	110 VAC, 50/60Hz	0.27	E
565458A	3/4	1.05	27	232	20/17	110 VAC, 50/60Hz	0.27	E
565459A	1	1.32	54	232	20/17	110 VAC, 50/60Hz	0.27	E
565460A	1-1/4	1.66	77	232	20/17	110 VAC, 50/60Hz	0.27	E
565461A	1-1/2	1.90	123	232	20/17	110 VAC, 50/60Hz	0.27	E
565462A	2	2.38	238	232	20/17	110 VAC, 50/60Hz	0.27	E
565463A	2-1/2	2.88	368	232	20/17	110 VAC, 50/60Hz	0.27	E
565464A	3	3.50	497	232	30/25	110 VAC, 50/60Hz	0.73	E
565465A	4	4.50	665	232	30/25	110 VAC, 50/60Hz	0.73	E
24 VDC ELECTRIC PVC BALL VALVE TEFLON/EPDM: EPS POSITIONER 4-20mA INPUT								
565467A	1/2	0.84	14	232	30	DC24	1.00	GE
565468A	3/4	1.05	27	232	30	DC24	1.00	GE
565469A	1	1.32	54	232	30	DC24	1.00	GE
565470A	1-1/4	1.66	77	232	30	DC24	1.00	GE
565471A	1-1/2	1.90	123	232	30	DC24	1.00	GE
565472A	2	2.38	238	232	30	DC24	1.00	GE
565473A	2-1/2	2.88	368	232	30	DC24	1.00	GE
565474A	3	3.50	497	232	30	DC24	1.70	GE
565475A	4	4.50	665	232	30	DC24	1.70	GE

Cv is the GPM of water at 60° F that will pass through the valve with 1 PSI pressure drop

*Valve sizes 1/2 to 2 inch include both IPS glue sockets and NPT end connectors, sizes 2-1/2 to 4 inch include IPS glue sockets only

** Maximum pressure at 73° F, pressure decreases as temperature increases (see P/T chart)

EPS - Electronic Positioning System

Valworx electric actuators with EPS- Electronic Positioning System provide an accurate valve positioning function whereby the movement of the actuator is controlled by a 4-20mA input control signal. Any change in the control input signal results in a corresponding and proportional change in the position of the actuator (valve). The EPS module is fully potted to help protect the electronics from vibration and moisture resistance. An internal microprocessor on the EPS circuit board continuously monitors the analog input and output signals and compares them to the physical position via a precision potentiometer feedback system, moving the actuator as required to balance the signals.

The EPS system is self-calibrating which virtually eliminates "hunting". The following functions are standard:

- Position monitoring output signal in same format as input. Ex: 4-20mA input, 4-20mA output
- Adjustable forward or reversing action
- Sensitivity, Zero and Span adjustments
- Selectable fail mode: fail closed, fail open or stop in place (with loss of 4-20mA input command signal).
- Electric manual control with onboard selector switches
- Fault LED lights indicate valve jam or signal loss
- Electronic brake function

Valworx

SERIES
5654

Specifications: Electric PVC Valves On-Off Version (English units)

Stock Number	Pipe Size (inch)*	Pipe O.D. (mm)	Kv Flow Factor	Pressure Max. (Bar)**	Cycle Time/90° (seconds) +/- 10%	Voltage	Current F.L. Amps	Electrical Wiring Drawing
120 VAC ELECTRIC PVC BALL VALVE TEFLON/EPDM: ON-OFF version								
565404A	1/2	21.34	12	16	10/8	110 VAC, 50/60Hz	0.27	B
565406A	3/4	26.67	23	16	10/8	110 VAC, 50/60Hz	0.27	B
565408A	1	33.53	46	16	10/8	110 VAC, 50/60Hz	0.27	B
565410A	1-1/4	42.16	66	16	10/8	110 VAC, 50/60Hz	0.27	B
565412A	1-1/2	48.26	106	16	10/8	110 VAC, 50/60Hz	0.27	B
565416A	2	60.45	205	16	20/17	110 VAC, 50/60Hz	0.27	B
565417A	2-1/2	73.15	317	16	20/17	110 VAC, 50/60Hz	0.27	B
565418A	3	88.90	427	16	30/25	110 VAC, 50/60Hz	0.64	B
565419A	4	114.3	572	16	30/25	110 VAC, 50/60Hz	0.73	B
24 VDC ELECTRIC PVC BALL VALVE TEFLON/EPDM: ON-OFF version								
565446A	1/2	21.34	12	16	20	DC24	1.28	G
565447A	3/4	26.67	23	16	20	DC24	1.28	G
565449A	1	33.53	46	16	20	DC24	1.28	G
565450A	1-1/4	42.16	66	16	20	DC24	1.28	G
565451A	1-1/2	48.26	106	16	20	DC24	1.28	G
565452A	2	60.45	205	16	20	DC24	1.28	G
565453A	2-1/2	73.15	317	16	20	DC24	1.28	G
565454A	3	88.90	427	16	30	DC24	2.03	G
565455A	4	114.3	572	16	30	DC24	3.57	G

*Valve sizes 1/2 to 2 inch include both IPS glue sockets and NPT end connectors, sizes 2-1/2 to 4 inch include IPS glue sockets only

** Maximum pressure at 23° C, pressure decreases as temperature increases (see P/T chart)

Valworx

SERIES
5654

Specifications: Electric PVC Valves with EPS Positioner (Metric units)

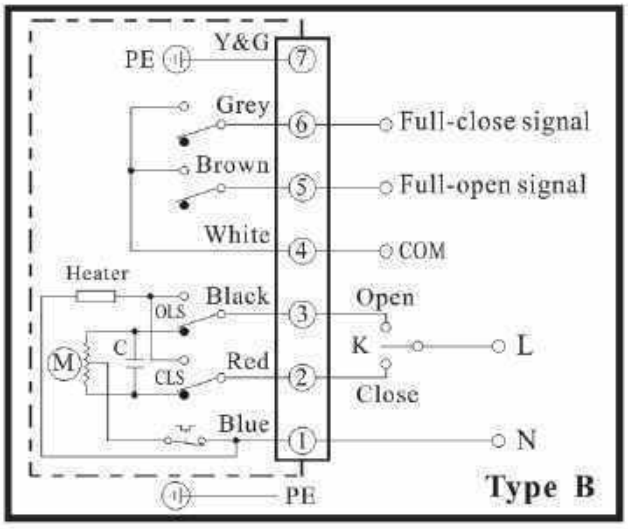
Stock Number	Pipe Size (inch)*	Pipe O.D. (mm)	Kv Flow Factor	Pressure Max. (Bar)**	Cycle Time/90° (seconds) +/- 10%	Voltage	Current F.L. Amps	Electrical Wiring Drawing
120 VAC ELECTRIC PVC BALL VALVE TEFLON/EPDM: EPS POSITIONER 4-20mA INPUT								
565457A	1/2	21.34	12	16	20/17	110 VAC, 50/60Hz	0.27	E
565458A	3/4	26.67	23	16	20/17	110 VAC, 50/60Hz	0.27	E
565459A	1	33.53	46	16	20/17	110 VAC, 50/60Hz	0.27	E
565460A	1-1/4	42.16	66	16	20/17	110 VAC, 50/60Hz	0.27	E
565461A	1-1/2	48.26	106	16	20/17	110 VAC, 50/60Hz	0.27	E
565462A	2	60.45	205	16	20/17	110 VAC, 50/60Hz	0.27	E
565463A	2-1/2	73.15	317	16	20/17	110 VAC, 50/60Hz	0.27	E
565464A	3	88.90	427	16	30/25	110 VAC, 50/60Hz	0.73	E
565465A	4	114.3	572	16	30/25	110 VAC, 50/60Hz	0.73	E
24 VDC ELECTRIC PVC BALL VALVE TEFLON/EPDM: EPS POSITIONER 4-20mA INPUT								
565467A	1/2	21.34	12	16	30	DC24	1.00	GE
565468A	3/4	26.67	23	16	30	DC24	1.00	GE
565469A	1	33.53	46	16	30	DC24	1.00	GE
565470A	1-1/4	42.16	66	16	30	DC24	1.00	GE
565471A	1-1/2	48.26	106	16	30	DC24	1.00	GE
565472A	2	60.45	205	16	30	DC24	1.00	GE
565473A	2-1/2	73.15	317	16	30	DC24	1.00	GE
565474A	3	88.90	427	16	30	DC24	1.70	GE
565475A	4	114.3	572	16	30	DC24	1.70	GE

*Valve sizes 1/2 to 2 inch include both IPS glue sockets and NPT end connectors, sizes 2-1/2 to 4 inch include IPS glue sockets only

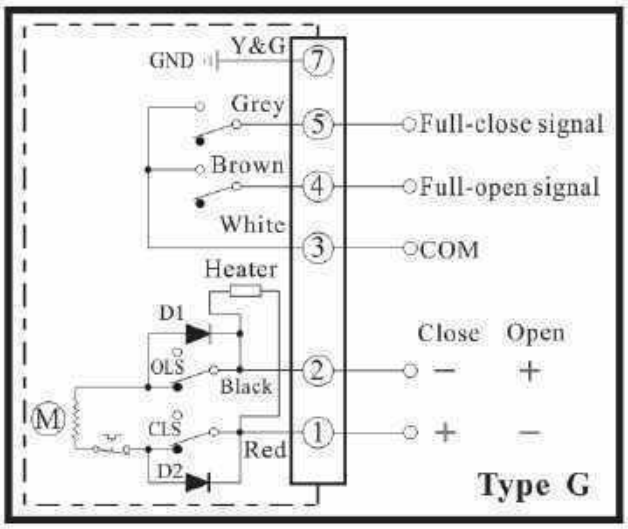
** Maximum pressure at 23° C, pressure decreases as temperature increases (see P/T chart)

Electrical Wiring Diagrams

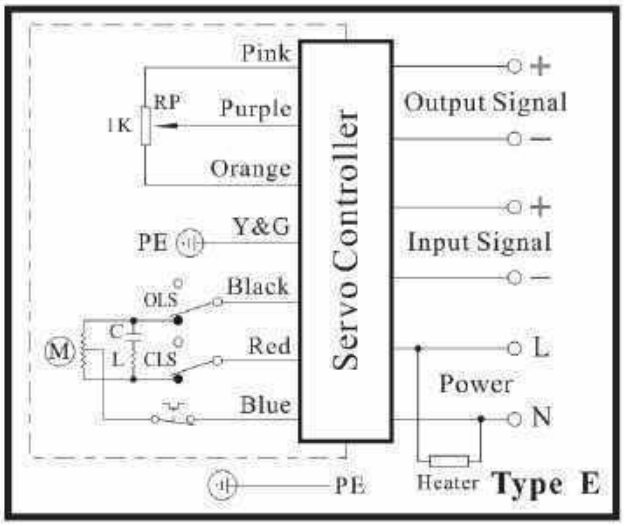
ON-OFF Valves
AC Voltages



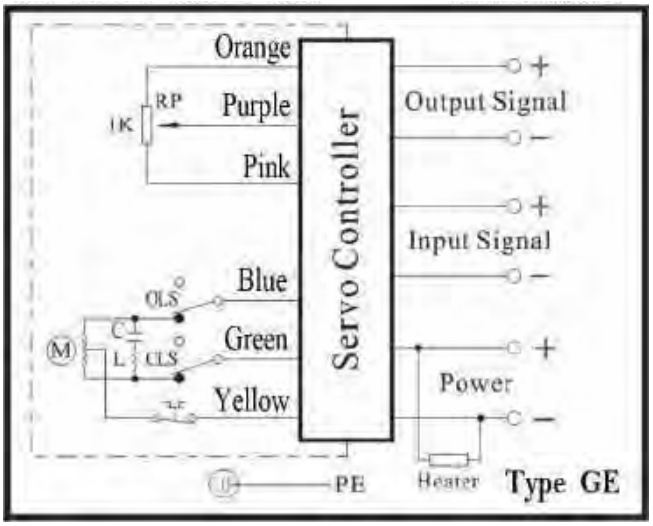
ON-OFF Valves
DC Voltages



Valves with EPS Positioners
AC Voltages



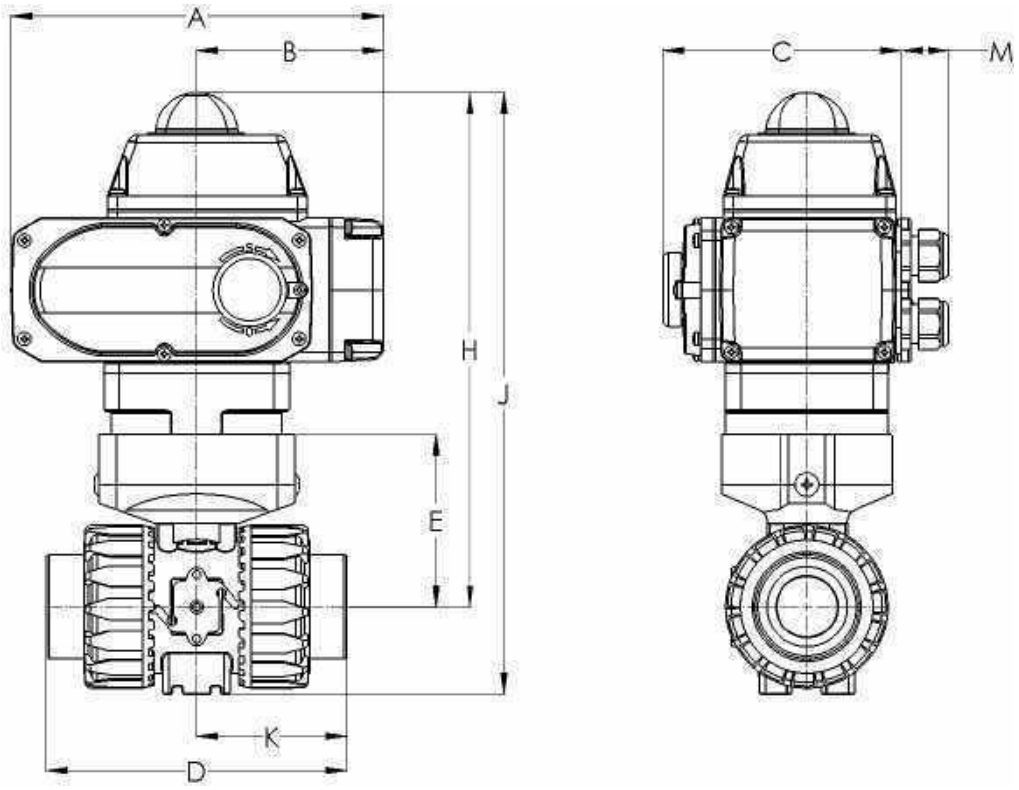
Valves with EPS Positioners
DC Voltages



Valworx

SERIES
5654

Dimensions:



Pipe Size (inch)		A	B	C	D	E	H	J	K	M	Weight (AC/DC)
1/2	inch	6.34	3.07	4.65	4.61	2.28	7.67	10.51	2.31	0.98	7.0 / 9.0 lb
	mm	161	78.1	118	117	57.9	194.7	266.9	58.8	25	3.2 / 4.3 kg
3/4	inch	6.34	3.07	4.65	5.08	2.74	9.82	11.17	2.57	0.98	7.3 / 9.8 lb
	mm	161	78.1	118	129	69.5	249.5	283.8	65.2	25	3.3 / 4.4 kg
1	inch	6.34	3.07	4.65	5.59	2.91	10	11.53	2.81	0.98	7.5 / 10.0 lb
	mm	161	78.1	118	142	74	254	293	71	25	3.4 / 4.5 kg
1-1/4	inch	6.34	3.07	4.65	6.38	3.58	10.67	12.48	3.13	0.98	8.1 / 11 lb
	mm	161	78.1	118	162	91	271	317	79.5	25	3.7 / 4.8 kg
1-1/2	inch	6.34	3.07	4.65	6.77	3.83	10.91	12.96	3.39	0.98	9.0 / 11.5 lb
	mm	161	78.1	118	172	97.2	277.2	329.2	86	25	4.1 / 5.2 kg
2	inch	6.34	3.07	4.65	7.83	4.45	11.54	13.98	3.51	0.98	10.6 / 13.1 lb
	mm	161	78.1	118	199	113.1	293	355	99.5	25	4.8 / 5.9 kg
2-1/2	inch	6.34	3.07	4.65	9.25	4.97	11.81	15.2	4.63	0.98	16.2 / 18.7 lb
	mm	161	78.1	118	235	126.28	300	387	117.5	25	7.3 / 8.5 kg
3	inch	10.08	5.33	6.32	10.63	5.16	13.66	17.8	5.31	0.98	36.6 / 34.6 lb
	mm	256	135.5	160.5	270	131.1	347	452	135	25	16.9 / 15.7 kg
4	inch	10.08	5.33	6.32	12.13	5.87	14.37	18.58	6.06	0.98	46.0 / 45.3 lb
	mm	256	135.5	160.5	308	149	365	472	154	25	20.9 / 20.5 kg

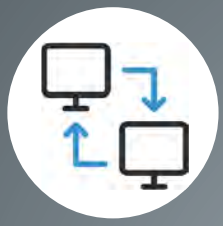
Silver Bullet WATER TREATMENT

TREATING WATER. BETTER.

SUSTAINABLE WATER TREATMENT TECHNOLOGY & SOLUTIONS

OPTIMIZE YOUR OPERATION WITH THE SILVER BULLET SMART AOP

The Silver Bullet SMART AOP is a fully integrated water treatment platform. This patented, non-chemical oxidation technology is used to enhance plant growth, reduce maintenance and safeguard regulatory compliance. When applicable, this technology is combined with other treatment processes, monitoring and controls, to further tailor solutions to the grower's budget and water quality needs.



Performance Reporting allows for data to be tracked and developed into useable information.

Remote Notifications and alarm functions to safe guard operations.

Filtration options to remove unwanted solids, minerals and organics.

Monitoring of treatment performance and water quality.

UV Disinfection for redundant microbial control while still ensuring treatment compatibility.

Automated Dosing for pH, sanitation, or additional additives.

Every application we treat is unique. From the facility layout to the water quality to the end products, the needs and goals of our customers require custom designs, specific components and a flexible, modular solution. Silver Bullet TREATS WATER BETTER through our commitment to developing and offering Green Chemistry water treatment technologies and solutions.

(303) 552-2383 | 16025 TABLE MOUNTAIN PARKWAY GOLDEN, CO 80403 | WWW.SILVERBULLETCORP.COM | INFO@SILVERBULLETCORP.COM

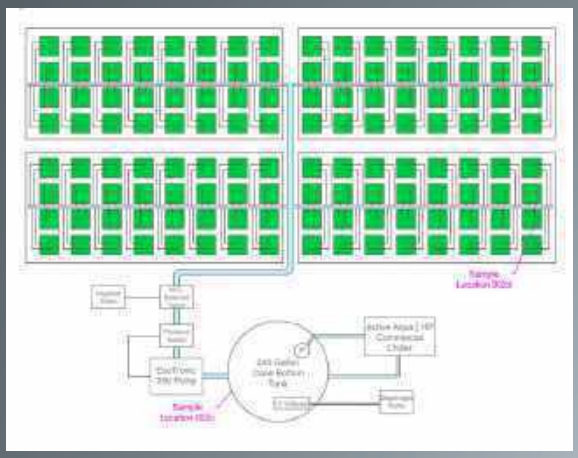
Silver Bullet WATER TREATMENT

TREATING WATER. BETTER.™

SUSTAINABLE WATER TREATMENT TECHNOLOGY & SOLUTIONS

COMPREHENSIVE WATER TREATMENT APPLICATIONS

- Make up water
- Irrigation water
- Condensate recapture
- Evaporative wetwalls
- Runoff recycle



CUSTOMIZED TREATMENT SOLUTIONS

- Nutrient compatible
- Scalable
- A variety of power options
- Single & three phase power options
- Professionally engineered

COMMITMENT TO SAFETY

- Professionally installed and maintained
- No toxic chemicals in the air or water
- Safe for use in controlled grow environments

LIFETIME SERVICE PROGRAM

- Service and maintenance options
- Warranty on all parts and components
- Microbial and mineral water analysis programs
- Performance reporting

PURCHASE AND LEASE OPTIONS TO FIT YOUR BUSINESS

(303) 552-2383 | 16025 TABLE MOUNTAIN PARKWAY GOLDEN, CO 80403 | WWW.SILVERBULLETCORP.COM | INFO@SILVERBULLETCORP.COM

Diaphragm Valve
Type 514, 515, 517, 519

General

- **Size**: ½"–2"
- **Material**: PVC, CPVC, PROGEF® Standard® PP, PROGEF® Natural PPn, ABS, SYGEF® Standard PVDF, SYGEF® Plus PVDF-HP
- **Diaphragm**: EPDM, FPM, NBR, PTFE/EPDM, PTFE/FPM, PTFE-HP/EPDM, PTFE-HP/FPM
- **End Connection**: Solvent cement socket, threaded, flanged, fusion spigot union, fusion socket union, fusion spigot
- **Top Works**: Threaded connection to valve body
- **Position Indicator**: Integrated, graduated
- **Handle**: Lockable
- **Mounting**: Stainless steel inserts

Key Certifications

- **FDA CFR 21 177.1520**: PP and PVDF
- **FDA CFR 21 177.2600**: EPDM and FPM
- **FDA CFR 21 177.1550**: PTFE
- **USP Class VI (physiological non-toxic)**: EPDM, FPM, PTFE, PP and PVDF

Sample Specification

The 5-Series Diaphragm Valve family shall include the Type 514, 515, 517 and 519. The Type 514 body shall be true union. The Type 515 body shall be spigot. The Type 517 body shall be spigot and the end connection shall be flanged. The Type 519 body shall be lateral style spigot. All 5-Series Diaphragm Valves shall be bidirectional. The bonnet to body connection shall be threaded. The handle shall be lockable. The diaphragm material shall be indicated by a color specific insert. The stroke shall be indicated by a graduated indicator. Type 517 ANSI versions shall meet ANSI B16.5 150lb standards. All 5-Series Diaphragm Valves with PTFE diaphragms shall have a non-bonded elastomeric backing and utilize FPM face seals if required. All valves shall be tested in accordance to ISO9393 and designed to ISO16138 standards. All valves shall be manufactured under ISO9001 for Quality and ISO14001 for Environmental Management. Following assembly, every valve shall be tested and certified bubble tight exceeding Class VI standards.

Material Specification

PVC valves shall meet ASTM D1784 cell classification 12454 standards. CPVC valves shall meet ASTM D1784 cell classification 23447-B standards. PP valves shall meet ASTM D5847-14 cell classification PP0510B66851 standards. ABS valves shall meet ASTM D3965 cell classification 42222 standards. PVDF valves shall be type 1, grade 2 according to ASTM D3222 standards. Valves of all materials shall be RoHS compliant.

Optional Features

- **Actuation**: Pneumatic
- **Limit Switches**: Mechanical, inductive
- **Top Works**: Atmospheric bonnet seal
- **High Pressure**: 232 psi max PVC, CPVC, PVDF (water only applications)
- **End Connection**: Alternatives available upon request
- **Face Seals**: Alternatives available upon request
- **Cleaned**: Silicone free/oil free

Definition of Valve Type

Type 514
True Union

Type 515
Spigot

Type 517
Flanged

Type 519
Zero Static

Components

Valve Components

Part	Description	Material
1	Valve body	PVC, CPVC, PP, PPn, or PVDF
2	Valve end	PVC, CPVC, PP, PPn, PE, or PVDF
3	Valve nut	PVC, CPVC, PP, PPn, or PVDF
4	Diaphragm	EPDM, FPM, NBR or PTFE
5	Diaphragm pin	Brass
6	Compressor	Glass-filled PP
7	Spindle	Brass/SS304
8	Spindle housing	Glass-filled PP
9	Position indicator	Glass-filled PP
10	Bonnet nut	Glass-filled PP
11	Bonnet	Glass-filled PP
12	Handle	Glass-filled PP
13	Handle lock	Glass-filled PP

Key Design Features

Threaded Bonnet

The 5-Series Diaphragm Valve utilizes several unique design features. The bonnet to valve body connection is threaded whereas a traditionally designed diaphragm valve utilizes metal body bolts. However, when a valve is used in hot line applications, the components of the valve thermally expand and contract. The thermal expansion rate of metal is significantly less than plastics, meaning the metal body bolts of a traditionally designed diaphragm valve need to be retorqued after hot line shut downs. The bonnet to body mechanical connection of the 5-Series Diaphragm Valve is completely plastic, thus eliminating the need for retorquing.

The elimination of body bolts is ideal for applications in which corrosive chemicals are present in the atmosphere. Traditionally designed valves in these applications typically rely on exotic and expensive metal bolts to deter corrosion, when the body bolts are eliminated, this added cost is as well.

Key Design Features

True Zero Dead Leg

The Type 519 Diaphragm Valve is a truly revolutionary thermoplastic zero static valve. The peak of the weir is molded nearly directly on the inner diameter of the main. This design virtually eliminates dead space when the branch port is closed.

Type 519 valves are available in PP, PPn and PVDF. Polypropylene versions are available in size ranges from d20xd20 to d63xd32 and PVDF versions are available in size ranges from d20xd20 to d110xd63.

Chemical Applications: Optional Features

Permeation Barrier

The 5-Series Diaphragm Valve utilizes several design features that are beneficial in chemical process applications. A commonly used diaphragm material in these applications is PTFE. All GF PTFE diaphragms are installed with a non-bonded elastomeric backing, either EPDM or FPM. The FPM backing is impregnated with approximately 15% PTFE. These diaphragms are available with all 5-Series Diaphragm Valve body materials. The backing material completely covers the PTFE diaphragm with the exception of the diaphragm pin.

One concern with diaphragm valves in chemical process applications is permeation. The 5-Series diaphragm is designed to protect against damage commonly caused by permeation. The FPM/PTFE backing provides a chemically resistant barrier to protect the mechanical components inside the bonnet. The backing protects nearly the entire PTFE diaphragm to provide maximum protection against component corrosion.

Bonnet Seal

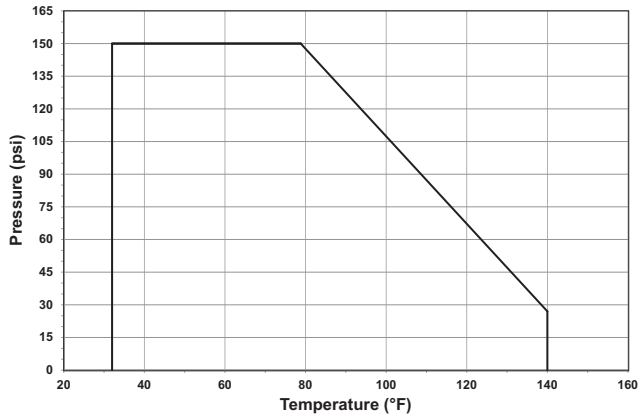
Corrosive environments can be detrimental to valve components that are not exposed to media. This is addressed with the 5-Series Diaphragm Valve in the bonnet seals. The bonnet seal is available with all varieties of 5-Series Valves and utilizes three o-rings. One on the position indicator, one on the spindle housing and one on the bonnet nut. The combination of these o-rings seals the inner works of the valves from the atmosphere. The result of this is that there is no exposed metal to the atmosphere with the exception of the threaded mounting inserts on the base of the valve.

Technical Data

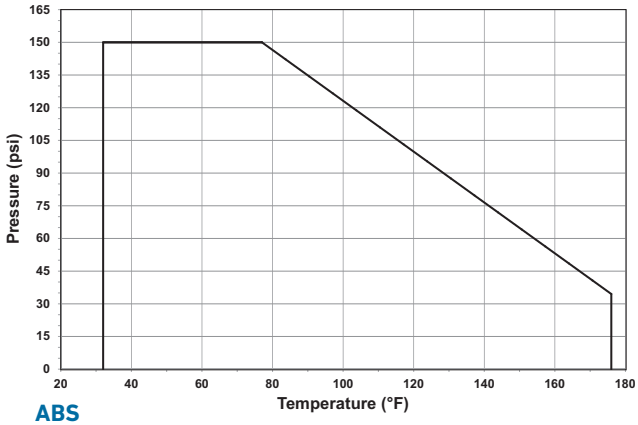
Pressure Temperature Curves

The following graphs are based on a 25 year lifetime water or similar media application

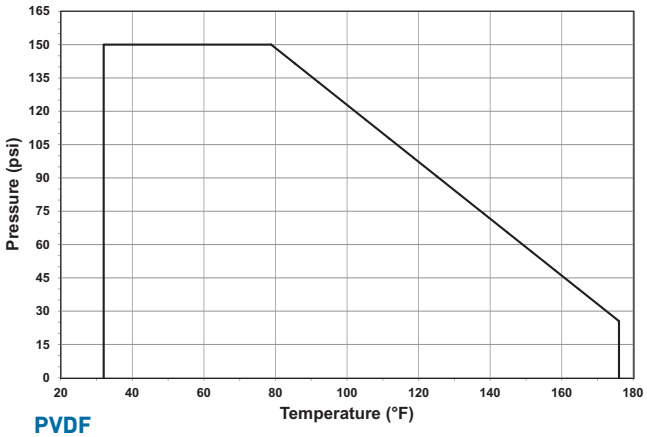
PVC



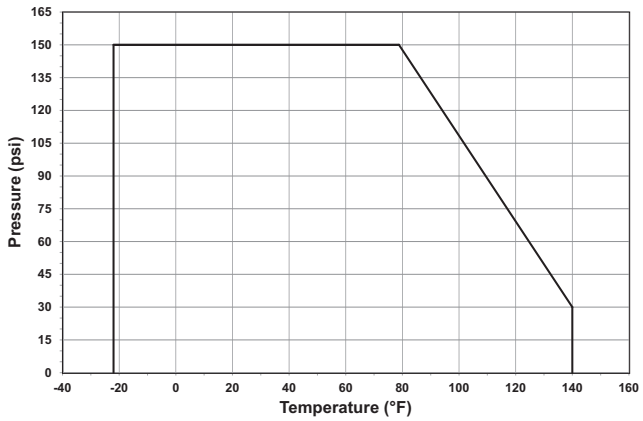
CPVC



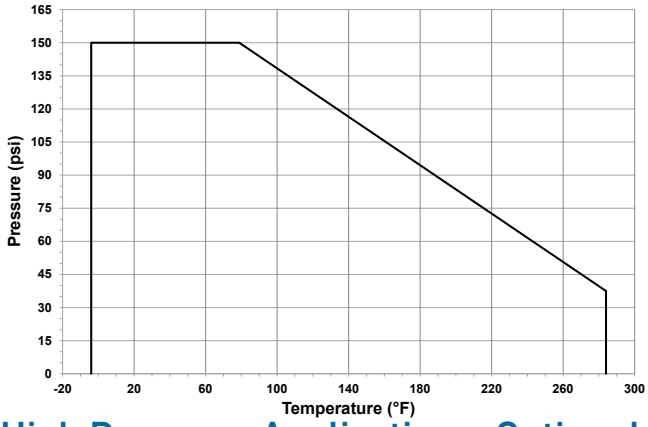
PP/PPn



ABS



PVDF



Pressure-Temperature

Material	Temperature Range (°F)	Max Pressure (psi)
PVC*	32 to 140	150
CPVC*	32 to 176	150
PP/PPn	32 to 176	150
ABS	-40 to 140	150
PVDF*	-4 to 284	150

Vacuum Service

5-Series Diaphragm Valve with an elastomeric diaphragm are rated for full vacuum service, maximum differential pressure of 15psi at 122°F. 5-Series Diaphragm Valves with a PTFE diaphragm are not rated for full vacuum service, maximum differential pressure of 8.7psi at 122°F.

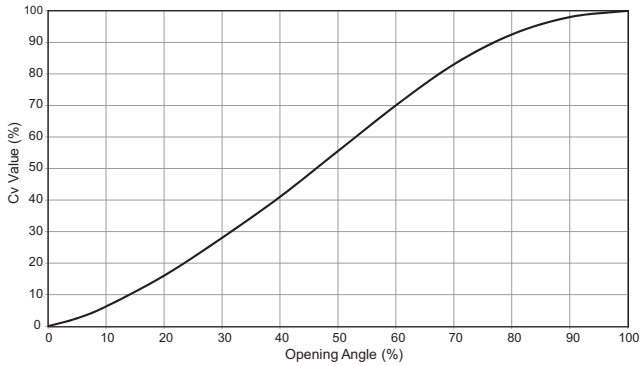
High Pressure Applications: Optional Feature

The 5-Series diaphragm valve is available with a glass-filled black PPS bonnet. This high-strength, rigid material increases the rated pressure to 232psi. It is available with PVC, CPVC and PVDF bodies with EPDM, FPM or PTFE diaphragms. GF recommends that all valves fitted with this bonnet be used in water applications only.

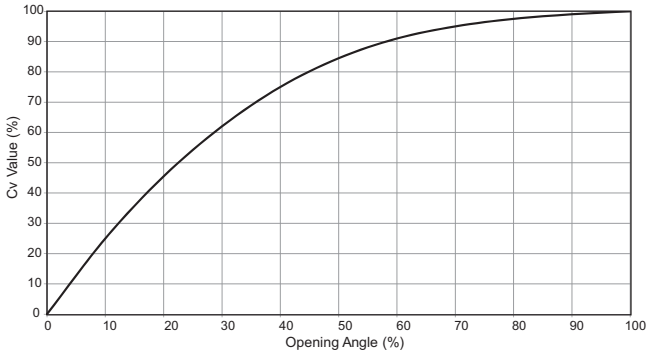
Flow

The following information is based on water applications at 68° F

Flow Characteristics Type 514–517



Flow Characteristics Type 519



Cv Value Type 514-517

Size (inch)	d (mm)	Cv (gal/min)
½	20	8.4
¾	25	18.3
1	32	32.5
1¼	40	51.3
1½	50	85.3
2	63	116.8

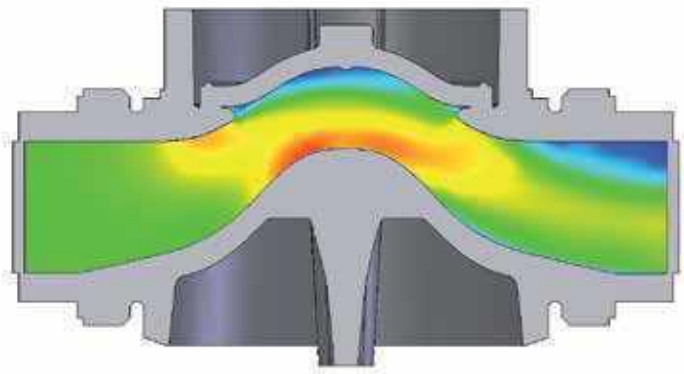
Cv Value Type 519

Main (mm)	Branch (mm)	Cv (gal/min)
20	20	3.9
25	20	6.0
25	25	8.0
32	20	5.4
32	25	7.1
32	32	15.6
40	20	5.7
40	25	8.0
40	32	10.3
40	40	12.6
50	20	5.8
50	25	10.8
50	32	13.9
50	40	35.4
50	50	45.1
63	20	5.7
63	25	10.1
63	32	12.4
63	40	31.8
63	50	41.2
63	63	50.5
90	20	5.7
90	25	7.2
90	32	9.0
90	50	43.6
90	63	48.7
110	20	5.5
110	25	7.2
110	32	9.2
110	50	42.3
110	63	46.3

Key Design Features

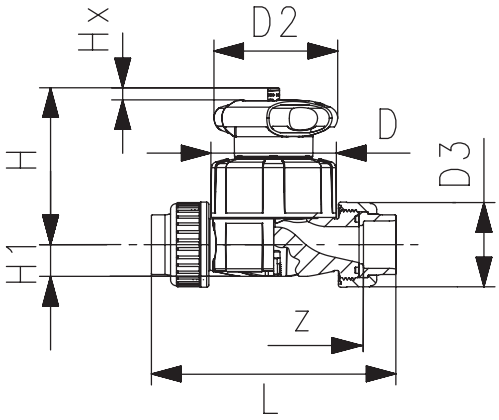
Weir Design

The threaded bonnet design also eliminated the need for valve body bolt holes. This allowed GF engineers to decrease the grade of the weir and design a valve with an optimized flow path. This significantly increases the Cv value when comparing the 5-Series Valve to traditionally designed diaphragm valves.

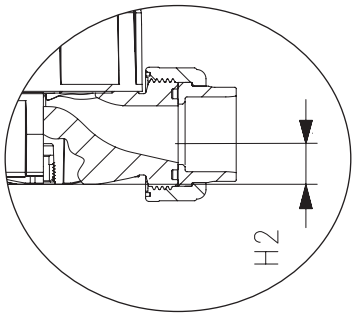


Dimensions

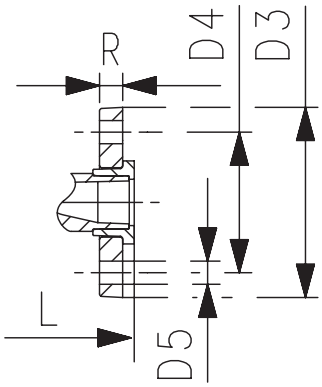
The following tables are shown in millimeters unless otherwise specified



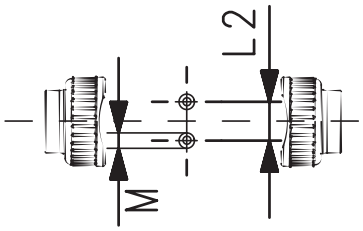
Type 514 Socket



All 5-Series Mounting



Type 517



All Types Mounting Base

All Types

Size (inch)	d (mm)	D	D2	D3	L2	H	H1	H2	M	Hx
½	20	65	65	43	25	73	14	12	M6	7
¾	25	80	65	51	25	81	18	12	M6	10
1	32	88	87	58	25	107	22	12	M6	13
1¼	40	101	87	72	45	115	26	15	M8	15
1½	50	117	135	83	45	148	32	15	M8	19
2	63	144	135	100	45	166	39	15	M8	25

Type 514 PVC/CPVC

Size (inch)	IPS Socket		Threaded NPT	
	L	z	L	z
½	136	96	128	94
¾	160	114	152	116
1	176	122	166	122
1¼	198	140	192	143
1½	232	160	222	176
2	268	190	266	218

Type 517 PVC/CPVC

Size (inch)	ANSI Flanged				
	L	D3 (inch)	D4 (inch)	D5 (inch)	R (inch)
½	130	3.74	2.36	0.63	0.63
¾	150	4.13	2.76	0.63	0.67
1	160	4.53	3.11	0.63	0.71
1¼	180	5.51	3.5	0.63	0.63
1½	200	5.91	3.86	0.63	0.71
2	230	6.5	4.76	0.75	0.71

Type 514 ABS

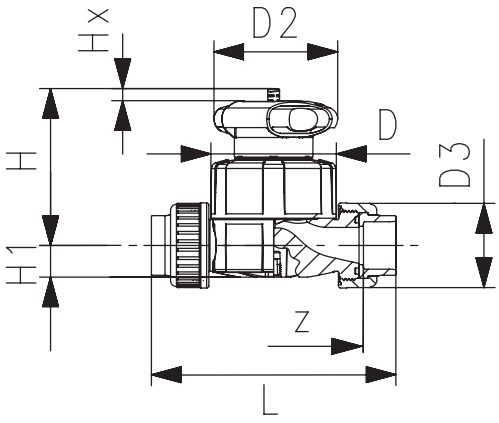
d(mm)	Metric Socket	
	L	z
20	128	96
25	152	114
32	166	122
40	192	140
50	222	160
63	266	190

Type 517 ABS

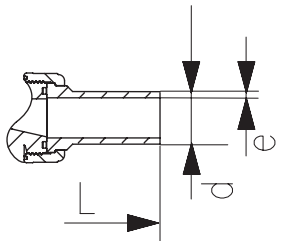
Size (inch)	ANSI Flanged				
	L	D3 (inch)	D4 (inch)	D5 (inch)	R (inch)
½	130	3.74	2.36	0.63	0.63
¾	150	4.13	2.76	0.63	0.67
1	160	4.53	3.11	0.63	0.71
1¼	180	5.51	3.5	0.63	0.63
1½	200	5.91	3.86	0.63	0.71
2	230	6.5	4.76	0.75	0.71

Dimensions

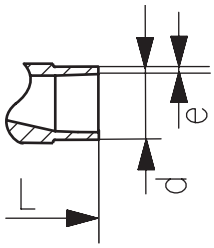
The following tables are shown in millimeters unless otherwise specified



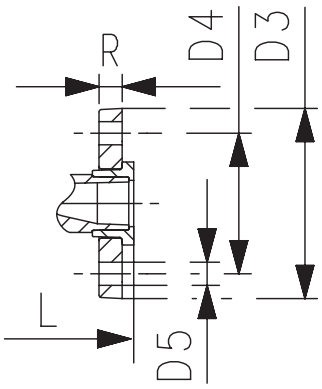
Type 514 Socket



Type 514 IR/Butt



Type 515 IR/Butt



Type 517

Type 514 PP

d(mm)	Metric IR/Butt		Metric Socket		Threaded NPT	
	L	e	L	z	L	z
20	196	1.9	128	100	132	98
25	221	2.3	150	118	154	118
32	234	2.9	162	126	172	128
40	260	3.7	184	144	196	148
50	284	4.6	210	164	222	176
63	321	5.8	248	194	266	218

Type 515 PP

d(mm)	Metric IR/Butt	
	L	e
20	124	1.9
25	144	2.3
32	155	2.9
40	176	3.7
50	193	4.6
63	223	5.8

Type 517 PP

Size (inch)	ANSI Flanged				
	L	D3 (inch)	D4 (inch)	D5 (inch)	R (inch)
½	130	3.74	2.36	0.63	0.63
¾	150	4.13	2.76	0.63	0.67
1	160	4.53	3.11	0.63	0.71
1¼	180	5.51	3.5	0.63	0.63
1½	200	5.91	3.86	0.63	0.71
2	230	6.5	4.76	0.75	0.71

Type 517 PVDF

Size (inch)	ANSI Flanged				
	L	D3 (inch)	D4 (inch)	D5 (inch)	R (inch)
½	130	3.74	2.36	0.63	0.63
¾	150	4.13	2.76	0.63	0.67
1	160	4.53	3.11	0.63	0.71
1¼	180	5.51	3.5	0.63	0.63
1½	200	5.91	3.86	0.63	0.71
2	230	6.5	4.76	0.75	0.71

Type 514 PVDF

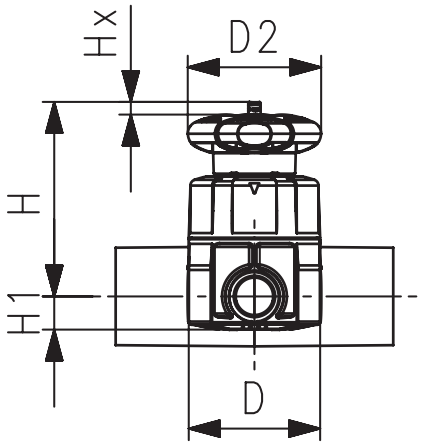
d(mm)	Metric IR/Butt		Metric Socket		Threaded NPT	
	L	e	L	z	L	z
20	196	1.9	128	100	132	98
25	220	1.9	150	118	154	118
32	234	2.4	162	126	172	128
40	258	2.4	184	144	196	150
50	284	3.0	210	164	222	176
63	320	3.0	248	194	266	218

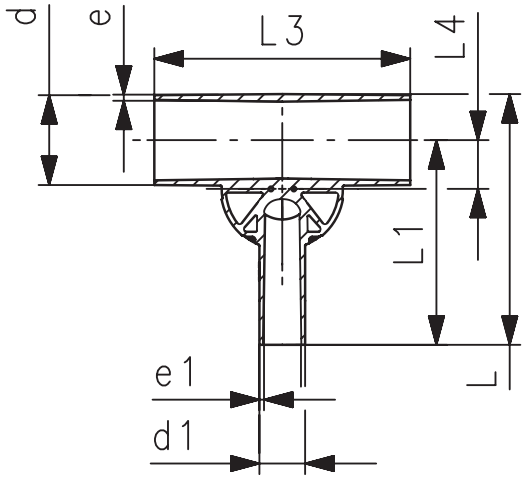
Type 515 PVDF

d(mm)	Metric IR/Butt	
	L	e
20	124	1.9
25	144	1.9
32	155	2.4
40	176	2.4
50	193	3.0
63	223	3.0

Dimensions

The following tables are shown in millimeters unless otherwise specified





Type 519 Zero Static

d-d1 (mm)	Valve (mm)	D	D2	L	L1	L3	L4	H	H1	Hx	e PVDF	e1 PVDF	e PP/ PPn	e1 PP/ PPn
20-20	20	65	65	117	96	162	12	75	14	7	1.9	1.9	1.9	1.9
25-20	25	80	65	133	108	162	16	80	18	10	1.9	1.9	2.3	1.9
25-25	25	80	65	133	108	162	16	80	18	10	1.9	1.9	2.3	2.3
32-20	25	80	65	142	120	162	19	84	22	10	2.4	1.9	2.9	1.9
32-25	25	80	65	142	120	162	19	84	22	10	2.4	1.9	2.9	2.3
32-32	32	88	87	145	120	160	19	107	22	13	2.4	2.4	2.9	2.9
40-20	32	88	87	149	128	180	23	115	22	13	2.4	1.9	3.7	1.9
40-25	32	88	87	149	128	180	23	115	22	13	2.4	1.9	-	-
40-32	32	88	87	149	128	180	23	115	22	13	2.4	2.4	-	-
40-40	32	88	87	174	153	180	23	115	22	13	2.4	2.4	3.7	3.7
50-20	25	80	65	160	134	180	27	97	18	10	3.0	1.9	4.6	1.9
50-25	32	88	87	160	134	180	28	120	22	13	3.0	1.9	4.6	2.3
50-32	32	88	87	160	134	180	28	120	22	13	3.0	2.4	4.6	2.9
50-40	63	144	135	209	169	209	33	164	32	25	3.0	2.4	-	-
50-50	63	144	135	209	169	209	33	164	32	25	3.0	3.0	-	-
63-20	25	80	65	177	144	180	33	104	18	10	3.0	1.9	5.8	1.9
63-25	32	88	87	177	144	180	35	127	22	13	3.0	1.9	5.8	2.3
63-32	32	88	87	177	144	180	35	127	22	13	3.0	2.4	5.8	2.9
63-40	63	144	135	225	192	220	39	170	39	25	3.0	2.4	-	-
63-50	63	144	135	225	192	220	39	170	39	25	3.0	3.0	-	-
63-63	63	144	135	225	192	220	39	170	39	25	3.0	3.0	-	-
90-20	32	88	87	205	159	190	47	140	22	13	4.3	1.9	-	-
90-25	32	88	87	205	159	190	47	140	22	13	4.3	1.9	-	-
90-32	32	88	87	205	159	190	47	140	22	13	4.3	2.4	-	-
90-50	63	144	135	254	207	250	51	184	39	25	4.3	3.0	-	-
90-63	63	144	135	254	207	250	51	184	39	25	4.3	3.0	-	-
110-20	32	88	87	227	171	190	56	149	22	13	5.3	1.9	-	-
110-25	32	88	87	227	171	190	56	149	22	13	5.3	1.9	-	-
110-32	32	88	87	227	171	190	56	149	22	13	5.3	2.4	-	-
110-50	63	144	135	276	219	250	60	194	39	25	5.3	3.0	-	-
110-63	63	144	135	276	219	250	60	194	39	25	5.3	3.0	-	-

RV Series
Sediment Strainers

Product Data Sheet

< STANDARDS >

ASTM D1784
ASTM F441
ASTM D2464
ASTM D2466
ASTM D2467
ASTM F437
ASTM F439
ASTM F1498

ANSI B1.20.1
ANSI B16.5

IPEX RV Sediment Strainers protect critical pipeline components by removing solids and suspended impurities. Clear PVC construction allows for inspection of the screen while in service, whereas the bottom-entry design permits maintenance on the valve while in-line. This Y-pattern strainer is also available in Corzan® CPVC. RV RV Sediment Strainers are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

VALVE AVAILABILITY

Body Material	PVC, CPVC
Size Range	1" – 4"
Pressure	232 psi (1/2" to 1"), 150 psi (1-1/4" to 2"), 60 psi (3" to 4")
Seals	EPDM or FPM
End Connections	Socket (IPS), Threaded (FNPT), Flanged (ANSI 150)

RV Series
Sediment Strainers

Product Data Sheet

Sample Specification

1.0 Sediment Strainers – RV

1.1 Material

- The valve body, end connectors, and unions shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The valve body, end connectors, and unions shall be made of Corzan® CPVC compound which shall meet or exceed the requirements of 23447 according to ASTM D1784.

1.2 Seals

- The o-ring seals shall be made of EPDM.

or The o-ring seals shall be made of FPM.

1.3 Mesh Screen

- The mesh screen shall be made of PVC compound which shall meet or exceed the requirements of cell classification 12454 according to ASTM D1784.

or The mesh screen shall be made of stabilized PP homopolymer compound, also containing a RAL 7032 pigment, which shall meet or exceed the requirements of Type I Polypropylene according to ASTM D4101-86.

or The mesh screen shall be made of corrosion resistand 304 stainless steel.

2.0 Connections

2.1 Socket style

- The IPS socket PVC end connectors shall conform to the dimensional standards ASTM D2466 and ASTM D2467.

or The IPS socket CPVC end connectors shall conform to the dimensional standard ASTM F439.

2.2 Threaded style

- The female NPT threaded PVC end connectors shall conform to the dimensional standards ASTM D2464, ASTM F1498, and ANSI B1.20.1

or The female NPT threaded CPVC end connectors shall conform to the dimensional standards ASTM F437, ASTM F1498, and ANSI B1.20.1.

2.3 Flanged style

- The ANSI 150 flanged PVC end connectors shall conform to the dimensional standard ANSI B16.5.

or The ANSI 150 flanged CPVC end connectors shall conform to the dimensional standard ANSI B16.5

3.0 Design Features

- Strainers shall be Y-pattern in style.
- Sizes 1/2" through 2" shall have true union ends.
- Sizes 3" and 4" shall have solid threaded or socket ends.
- It shall be possible to service the valve without removing it from the line.
- PVC strainers shall have a transparent body for evaluation of filter screen condition.
- The filter screens shall be available in ASTM 18, 20, 30, 35, and 50 mesh sizes.

3.1 Pressure Rating

- PVC valve sizes 1/2" through 1" shall be rated at 232 psi at 73°F.
- CPVC valve sizes 1/2" through 2" shall be rated at 232 psi at 73°F.
- PVC valve sizes 1-1/4" through 2" shall be rated at 150 psi at 73°F
- PVC valve sizes 3" through 4" shall be rated at 60 psi at 73°F.
- All sizes of flanged valves shall be rated at no greater than 150 psi at 73°F.

3.2 Markings

- All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.

3.3 Color Coding

- All PVC valves shall have transparent bodies with end connections color-coded dark gray.

or All CPVC valves shall be color-coded light gray.

4.0 All valves shall be Xirtec® 140 or Corzan® by IPEX or approved equal.

RV Series
Sediment Strainers

Product Data Sheet

Valve Selection

Size (inches)	Body Material	O-ring Material	IPEX Part Number IPS Socket	IPEX Part Number FNPT Threaded	IPEX Part Number ANSI Flanged	Pressure Rating
1/2	PVC	EPDM	053261		053935	232 psi
		FPM	053233		053941	
	CPVC	FPM	053334		n/a	
3/4	PVC	EPDM	053262		053936	
		FPM	053234		053942	
	CPVC	FPM	053335		n/a	
1	PVC	EPDM	053263		053937	
		FPM	053235		053943	
	CPVC	FPM	053336		n/a	
1-1/4	PVC	EPDM	053264		053938	150 psi
		FPM	053236		053944	
	CPVC	FPM	053337		n/a	232 psi
1-1/2	PVC	EPDM	053265		053939	150 psi
		FPM	053237		053945	
	CPVC	FPM	053338		n/a	232 psi
2	PVC	EPDM	053266		053940	150 psi
		FPM	053238		053946	
	CPVC	FPM	053339		n/a	232 psi
3	PVC	EPDM	053211	053267	n/a	60 psi
		FPM	054012	053239	n/a	
4	PVC	EPDM	053212	053268	n/a	
		FPM	054013	053240	n/a	

Note: Standard screens are 35 mesh PVC for PVC strainers and 30 mesh PP for CPVC strainers

Body Material:

☐ PVC ☐ CPVC

Size (inches):

☐ 1/2 ☐ 1-1/2
☐ 3/4 ☐ 2
☐ 1 ☐ 3
☐ 1-1/4 ☐ 4

Seals:

☐ EPDM
☐ FPM

End Connections:

☐ Socket (IPS)
☐ Threaded (FNPT)
☐ Flanged (ANSI 150)

IPEX Part Number:

_____

RV Series
Sediment Strainers

Product Data Sheet

Valve Selection

Mesh Availability

ASTM Mesh Size	Hole Pitch (in)	Material		
		PVC	PP	304 SS
18	0.098	✓	-	-
20	0.060	-	✓	-
30	0.079	✓	-	-
35	0.060	✓	-	-
35	0.028	-	-	✓
50	0.040	✓	-	-

PVC 18 Mesh

Strainer Size	Part Number
1/2	053947
3/4	053948
1	053949
1-1/4	053950
1-1/2	053951
2	053952
3	053953
4	053954

PVC 20 Mesh

Strainer Size	Part Number
1/2	053971
3/4	053972
1	053973
1-1/4	053974
1-1/2	053975
2	053976
3	053977
4	053978

PVC 30 Mesh

Strainer Size	Part Number
1/2	053955
3/4	053956
1	053957
1-1/4	053958
1-1/2	053959
2	053960
3	053961
4	053962

PP 20 Mesh

Strainer Size	Part Number
1/2	053332
3/4	053340
1	053341
1-1/4	053342
1-1/2	053343
2	053344

PVC 35 Mesh

Strainer Size	Part Number
1/2	053963
3/4	053964
1	053965
1-1/4	053966
1-1/2	053967
2	053968
3	053969
4	053970

304 SS 35 Mesh

Strainer Size	Part Number
1/2	053979
3/4	053980
1	053981
1-1/4	053982
1-1/2	053983
2	053984
3	053985
4	053986

Strainer Size (inches):

- ☐ 1/2
- ☐ 3/4
- ☐ 1
- ☐ 1-1/4
- ☐ 1-1/2
- ☐ 2
- ☐ 3
- ☐ 4

Screen Material:

- ☐ PVC
- ☐ 304 SS
- ☐ PP

Mesh Size:

- ☐ ASTM 18
- ☐ ASTM 30
- ☐ ASTM 20
- ☐ ASTM 35
- ☐ ASTM 50

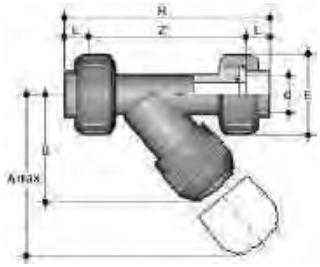
IPEX Part Number:

_____

RV Series
Sediment Strainers

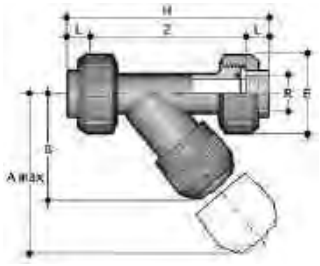
Product Data Sheet

Dimensions



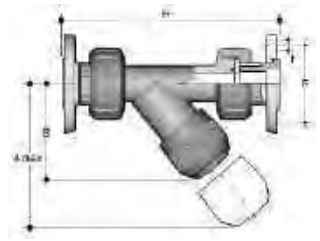
IPS Socket Connections – Dimension (inches)

Size	d	L	Z	H	E	B	AMAX
1/2	0.84	0.63	4.06	5.31	2.17	2.83	4.92
3/4	1.05	0.75	4.72	6.22	2.60	3.31	5.71
1	1.32	0.87	5.20	6.93	2.95	3.74	6.50
1-1/4	1.66	1.02	6.10	8.15	3.43	4.37	7.48
1-1/2	1.90	1.22	7.13	9.57	3.94	4.72	8.27
2	2.38	1.50	8.72	11.73	4.72	5.47	9.45



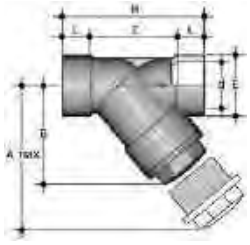
Female NPT Threaded Connections – Dimension (inches)

Size	R	L	Z	H	E	B	AMAX
1/2	1/2-NPT	0.59	4.45	5.63	2.17	2.83	4.92
3/4	3/4-NPT	0.64	5.02	6.30	2.60	3.31	5.71
1	1-NPT	0.75	5.70	7.20	2.95	3.74	6.50
1-1/4	1-1/4-NPT	0.84	6.74	8.43	3.43	4.37	7.48
1-1/2	1-1/2-NPT	0.84	7.57	9.25	3.94	4.72	8.27
2	2-NPT	1.01	9.20	11.22	4.72	5.47	9.45



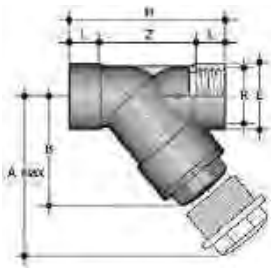
ANSI 150 Flanged (Vanstone) Connections – Dimension (inches)

Size	# holes	f	F	H	B	AMAX
1/2	4	5/8	2-3/8	7.13	2.83	4.92
3/4	4	5/8	2-3/4	8.16	3.31	5.71
1	4	5/8	3-1/8	9.05	3.74	6.50
1-1/4	4	5/8	3-1/2	10.34	4.37	7.48
1-1/2	4	5/8	3-7/8	12.07	4.72	8.27
2	4	3/4	4-3/4	14.48	5.47	9.45



IPS Socket Connections – Dimension (inches)

Size	R	L	Z	H	E	B	AMAX
3	3.50	2.01	6.30	10.31	4.57	7.56	12.80
4	4.50	2.40	7.99	12.80	5.43	9.09	15.16



Female NPT Threaded Connections – Dimension (inches)

Size	R	L	Z	H	E	B	AMAX
3	3-NPT	1.31	7.69	10.31	4.57	7.56	12.80
4	4-NPT	1.55	9.70	12.80	5.43	9.09	15.16

RV Series
Sediment Strainers

Product Data Sheet

Screen Data

Valve Size	Filter Surface Area (in^2)
1/2	152
3/4	232
1	342
1-1/4	445
1-1/2	652
2	1271
3	1594
4	2555

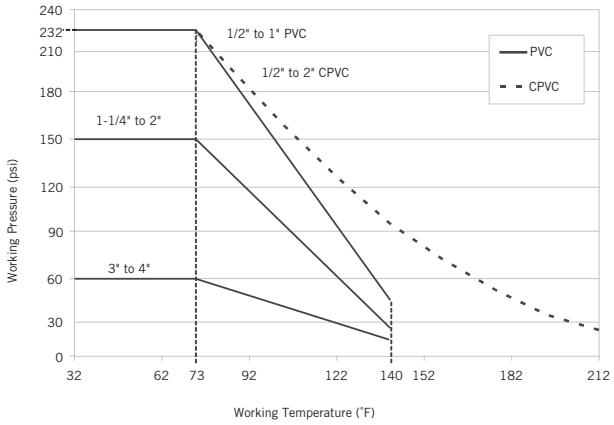
ASTM Mesh Size	Hole Pitch (in)	# Holes per in^2	Equivalent Hole Diameter (mm)	Screen Material
18	3/32	226	900	PVC
30	5/64	387	600	PVC
30	1/16	645	600	PP
35	1/32	645	500	PVC
35	1/32	1548	500	304 SS
50	3/64	1226	300	PVC

Weights

Approximate Weight (lbs)

Size (in)	PVC			CPVC	
	IPS Socket	FNPT Threaded	ANSI Flanged	IPS Socket	FNPT Threaded
1/2	0.47	0.46	0.87	0.51	0.51
3/4	0.79	0.78	1.37	0.86	0.86
1	1.16	1.15	1.94	1.27	1.27
1-1/4	1.62	1.64	2.62	1.77	1.79
1-1/2	2.41	2.44	3.61	2.64	2.67
2	4.06	4.13	5.94	4.45	4.52
3	6.56	6.54	n/a	n/a	n/a
4	10.16	9.71	n/a	n/a	n/a

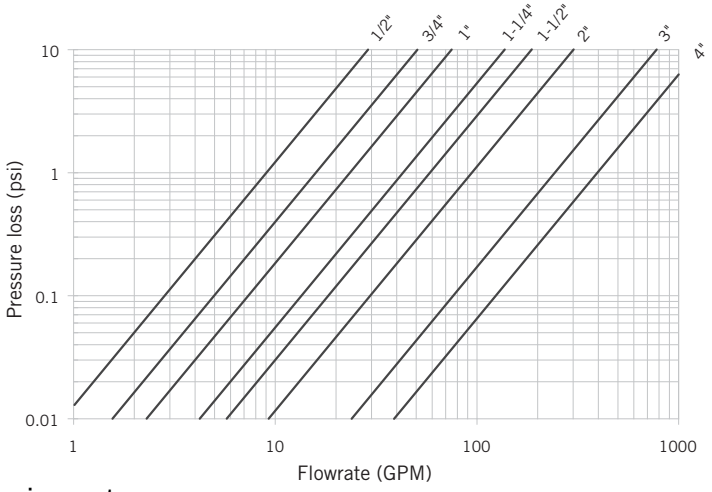
Pressure – Temperature Ratings



Flow Coefficients

Size	CV
1/2	2.80
3/4	4.90
1	7.21
1-1/4	13.2
1-1/2	17.9
2	28.7
3	73.5
4	119

Pressure Loss Chart

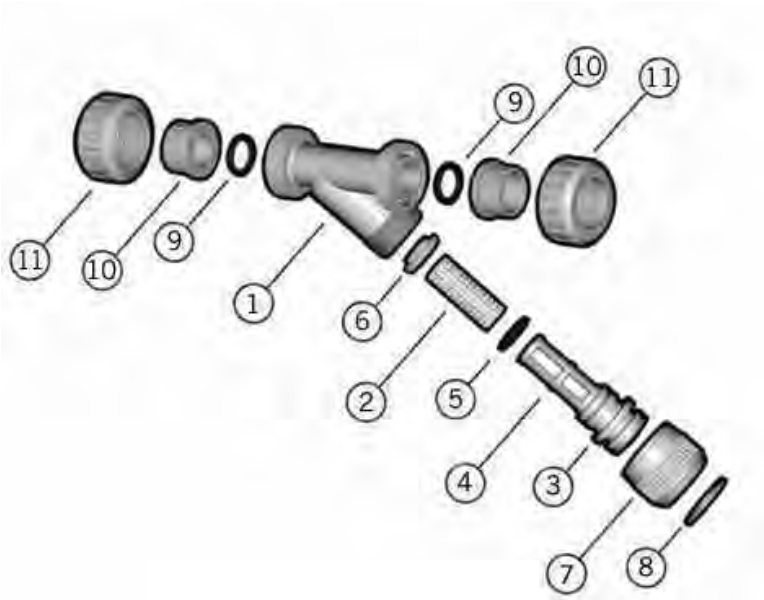


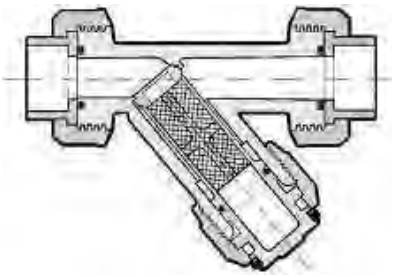
RV Series
Sediment Strainers

Product Data Sheet

Components

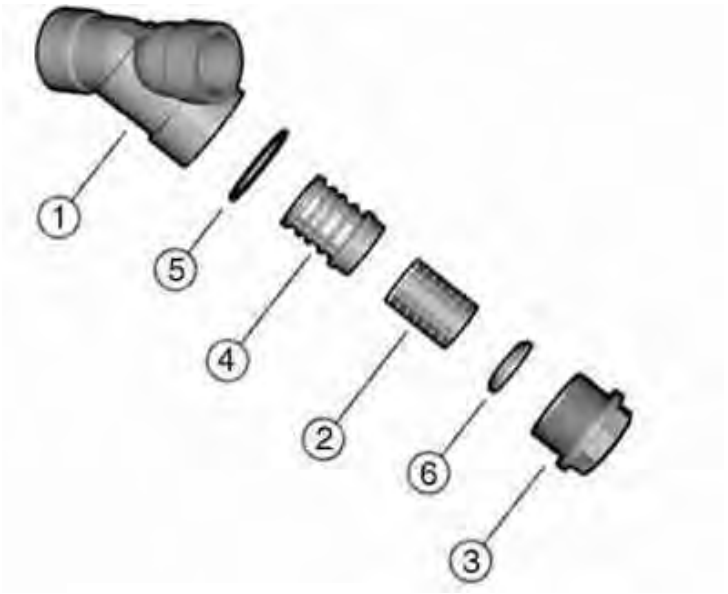
Sizes 1/2" – 2"

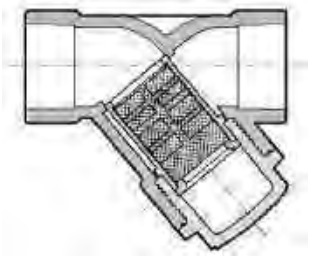




#	Component	Material	Qty
1	body	PVC / CPVC	1
* 2	screen mesh	PVC / PP / 304 SS	1
* 3	bonnet	PVC / CPVC	1
* 4	screen support	PVC / CPVC	1
* 5	o-ring seal	EPDM or FPM	1
* 6	retaining ring	PVC / CPVC	1
* 7	lock nut	PVC / CPVC	1
* 8	split ring	PVC / CPVC	1
* 9	socket o-ring	EPDM or FPM	2
* 10	end connector	PVC / CPVC	2
* 11	union nut	PVC / CPVC	2

Sizes 3"





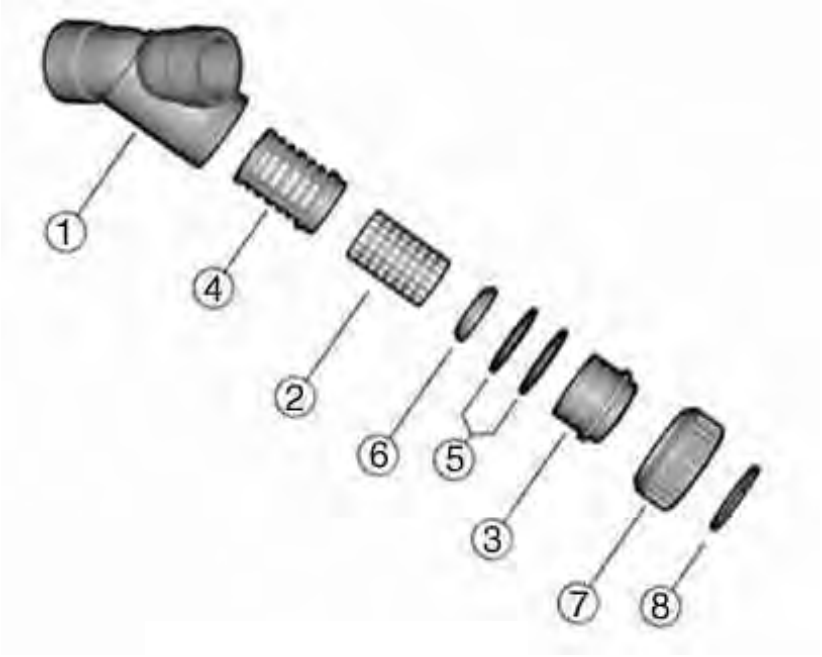
#	Component	Material	Qty
1	body	PVC / CPVC	1
* 2	screen mesh	PVC / 304 SS	1
* 3	bonnet	PVC	1
* 4	screen support	PVC	1
* 5	o-ring seal	EPDM or FPM	1
* 6	retaining ring	PVC	1

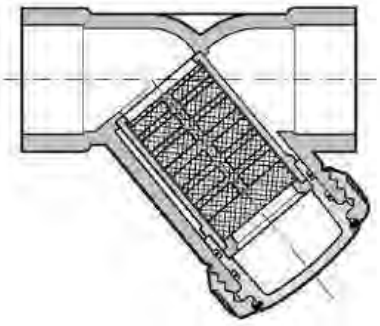
RV Series
Sediment Strainers

Product Data Sheet

Components

Size 4"





#	Component	Material	Qty
1	body	PVC / CPVC	1
* 2	screen mesh	PVC / 304 SS	1
* 3	bonnet	PVC	1
* 4	screen support	PVC	1
* 5	o-ring seal	EPDM or FPM	1
* 6	retaining ring	PVC	1
* 7	lock nut	PVC	1
* 8	split ring	PVC	1

RV Series
Sediment Strainers

Product Data Sheet

Installation Procedures

True Union Style

1. For socket and threaded style connections, remove the union nuts (part #11 on previous pages) and slide them onto the pipe. For flanged connections, remove the union nut / flange assemblies from the valve.
2. Please refer to the appropriate connection style sub-section:
   a. For socket style, solvent cement the end connectors (10) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Be sure to allow sufficient cure time before continuing with the valve installation**.
   b. For threaded style, thread the end connectors (10) onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
   c. For flanged style, join the union nut / flange assemblies to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. Ensure that the valve is in the correct orientation (the bonnet should be suspended in a downward direction), and that the socket o-rings (9) are properly fitted in their grooves. Carefully place the valve in the system between the two end connections.
4. Tighten both union nuts and the lock nut (7). Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the nut, and may even cause the nut to crack**.

Non True Union Style

1. Please refer to the appropriate connection style sub-section:
   a. For socket style, ensure that the valve is in the correct orientation (the bonnet should be suspended in a downward direction) then solvent cement the end connections of the valve body (1) to the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods – Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". Ensure that no excess solvent runs into the body as this would cause severe damage to internal components and render the strainer inoperative. Be sure to allow sufficient cure time before continuing with the valve installation.
   b. For threaded style, ensure that the valve is in the correct orientation (the bonnet should be suspended in a downward direction) then thread the pipe ends into the valve body (1). For correct joining procedure, please refer to the section entitled, "Joining Methods – Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
   c. For flanged style, ensure that the valve is in the correct orientation (the bonnet should be suspended in a downward direction) then join to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods – Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".

2. Ensure that the bonnet (3, size 3") or lock nut (7, size 4") is sufficiently tightened. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the nut, and may even cause the nut to crack**.

RV Series
Sediment Strainers

Product Data Sheet

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the system. **Be sure to depressurize and drain the isolated branch and valve before continuing**.
2. For true union style, loosen both union nuts (11) and drop the valve out of the line. If retaining the socket o-rings (9), take care that they are not lost when removing the valve from the line.
3. For sizes 1/2" through 2" and 4":
   a. Loosen the lock nut (7) – bonnet (3) assembly and remove from the valve body (1).
   b. Remove the split ring (8) to separate the lock nut from the bonnet.
   c. Remove the retaining ring (6) and slide the screen mesh (2) out of the screen support (4).
   d. Remove the o-ring seal(s) (5) from the bonnet.
4. For size 3":
   a. Loosen the bonnet (3) and remove from the valve body (1).
   b. Remove the retaining ring (6) and slide the screen mesh (2) out of the screen support (4).
   c. Remove the o-ring seal(s) (5) from the groove on the valve body.
5. The valve components can now be checked for problems and/or replaced.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities**.

1. For sizes 1/2" through 2" and 4":
   a. Properly fit the o-ring seal(s) (5) onto the bonnet (3).
   b. Insert the screen mesh (2) into the screen support (4) and fasten with the retaining ring (6).
   c. Place the lock nut (7) over the bonnet then fit the split ring (8) in the groove to lock in position.
   d. Insert the screen and lock nut – bonnet assembly into the valve body (1) and tighten.
2. For size 3":
   a. Properly fit the o-ring seal (5) onto the bonnet (1).
   b. Insert the screen mesh (2) into the screen support (4) and fasten with the retaining ring (6).
   c. Insert the screen assembly into the valve body.
   d. Tighten the bonnet (3) into the valve body.
3. For true union style, ensure that the socket o-rings (9) are properly fitted in their grooves, place the end connectors (10) into the union nuts (11), then tighten onto the valve body.

RV Series
Sediment Strainers

Product Data Sheet

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system**.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.
- **To eliminate any possible damage to the filter screen, the design of the system should ensure that reverse flow conditions cannot occur**.
- **Transparent PVC strainers:**
    - Allow light into the process flow facilitating the growth of micro-organisms.
    - Are not protected against UV radiation, reducing its lifetime in open air use.
    - Must be protected against vibrating stresses in proximity to pumping stations.
- Always check the cleanliness of the filtering screen.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

RV Series
Sediment Strainers

About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the world's largest and most comprehensive product lines. All IPEX products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have established a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, ABS, PEX, FR-PVDF and PE pipe and fittings (1/4" to 48")
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- PE Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems

POLYETHYLENE TUBING

FINEST LOW DENSITY POLYETHYLENE RESIN AVAILABLE

PRODUCT ADVANTAGES

- Made from the highest quality low density resins.
- Excellent Ultra-Violet (UV) and acid resistance.
- Available in black or bright white color, standard coil lengths or large diameter reels to meet your specific needs.
- Bright white tubing is opaque to prevent algae growth, withstand heat and harsh chemicals while producing cooler water temperatures.
- Every reel undergoes a battery of tests to insure high quality manufacturing standards are met.
- Available with pre-punched holes at various spacings.

POLYETHYLENE TUBING ACCESSORIES

VINELINE CLIP

Pre-installed Adjustable Clip

Easily adjustable - clip moves from one end of the tubing to the other preventing water migration. Economical option saves labor. Available for tubing with .670", .780" or .790" outside diameters.

ON-LINE DRIPPERS

Pressure Compensating or Non-Compensating

Designed with a large flow path allowing particles to pass freely through for long-term efficient operation. Can be installed anywhere along the tubing. Available in pressure compensating or non-compensating options with multiple flow rates.

APPLICATIONS

- Tree, vine, permanent row crop and greenhouse or nursery
- Subsurface, surface and suspension from vine
- For use with riser lines

NETAFIM OFFERS THE INDUSTRY'S LONGEST WARRANTY

Blank Polyethylene Tubing is warranted to be free from original defects in materials and workmanship for a period of seven (7) years and ten (10) years for environmental stress cracking (surface or subsurface applications). This warranty applies only to products with a wall thickness of 35 mil or greater.

AGRICULTURAL APPLICATIONS

PE Tubing with On-Line Drippers in Vineyard

PE Tubing with SuperNet Sprinkler in Orchard

GREENHOUSE & NURSERY APPLICATIONS

PE Tubing with On-Line Drippers in Nursery

PE Tubing with Multi-Outlet Drippers for Containers

POLYETHYLENE TUBING

ORDERING AND TECHNICAL INFORMATION - BLACK POLYETHYLENE TUBING

NOMINAL DIAMETER INSIDE	OUTSIDE	NOMINAL WALL THICKNESS	NOMINAL DIAMETER (MM)	COIL LENGTH	MAXIMUM WORKING PRESSURE (psi)	MODEL NUMBER
0.400″	0.490″	0.045″	10.2 x 12.5	1,000′	75	14040049
0.520″	0.620″	0.050″	13.2 x 15.8	500′	66	14052062-05
0.520″	0.620″	0.050″	13.2 x 15.8	1,000′	66	14052062
0.520″	0.630″	0.055″	13.2 x 16.0	1,000′	72	14052063
0.570″	0.660″	0.045″	14.5 x 16.8	500′	55	14057066-05
0.570″	0.660″	0.045″	14.5 x 16.8	1,000′	55	14057066
0.600″	0.700″	0.050″	15.2 x 17.8	500′	58	14060070-05
0.600″	0.700″	0.050″	15.2 x 17.8	1,000′	58	140060070
0.620″	0.710″	0.045″	15.8 x 18.0	500′	51	14062071-05
0.620″	0.710″	0.045″	15.8 x 18.0	1,000′	51	14062071
0.690″	0.790″	0.050″	17.5 x 20.1	1,000′	51	14069079
0.700″	0.800″	0.050″	17.8 x 19.96	500′	50	14070080-05
0.700″	0.800″	0.050″	17.8 x 20.3	1,000′	50	14070080
0.720″	0.820″	0.050″	18.3 x 21.1	1,000′	49	14072082
0.720″	0.830″	0.055″	18.3 x 21.3	1,000′	53	14072083
0.720″	0.840″	0.060″	18.8 x 21.3	1,000′	58	14072084
0.740″	0.840″	0.050″	18.8 x 21.3	1,000′	48	14074084
0.820″	0.930″	0.055″	20.8 x 23.6	500′	47	14082093
0.820″	0.930″	0.055″	20.8 x 23.6	1,000′	47	14082093-1000
0.820″	0.940″	0.060″	20.8 x 23.9	500′	51	14082094
0.820″	0.940″	0.060″	20.8 x 23.9	1,000′	51	14082094-1000
0.830″	0.940″	0.055″	21.1 x 23.9	500′	46	14083094
0.830″	0.940″	0.055″	21.1 x 23.9	1,000′	46	14083094-1000
1.060″	1.200″	0.070″	26.9 x 30.5	250′	47	14106120-25
1.060″	1.200″	0.070″	26.9 x 30.5	500′	47	14106120

ORDERING AND TECHNICAL INFORMATION - BRIGHT WHITE POLYETHYLENE TUBING

NOMINAL DIAMETER INSIDE	OUTSIDE	NOMINAL WALL THICKNESS	NOMINAL DIAMETER (MM)	COIL LENGTH	MAXIMUM WORKING PRESSURE (psi)	MODEL NUMBER
0.520″	0.620″	0.050″	13.2 x 15.8	500′	66	14BW052062-05
0.520″	0.620″	0.050″	13.2 x 15.8	100′	66	14BW052062-01
0.600″	0.700″	0.050″	15.2 x 17.8	500′	58	14BW060070-05
0.600″	0.700″	0.050″	15.2 x 17.8	100′	58	14BW060070-01
0.700″	0.800″	0.050″	17.8 x 20.3	1,000′	50	14BW070080
0.700″	0.800″	0.050″	17.8 x 19.96	500′	50	14BW070080-05
0.820″	0.940″	0.060″	20.8 x 23.9	100′	51	14BW082094-01
1.060″	1.200″	0.070″	26.9 x 30.5	100′	44	14BW106120-01

NOTE:
Select sizes are available in other coil lengths.
Not all products listed in these charts are stocking items.
Non-stock products are subject to a minimum order quantity.
Call Netafim USA Customer Service for additional details.

NETAFIM™
GROW MORE WITH LESS

NETAFIM USA
5470 E. HOME AVE.
FRESNO, CA 93727
CS 888 638 2346
www.netafimusa.com

JUSTICE GROWN
EWING, NJ

URBAN-GRO, INC.
1751 PANORAMA POINT, SUITE G
LAFAYETTE, CO 80026
(720) 390-3880

SILVER BULLET WATER TREATMENT
5025 TABLE MOUNTAIN PARKWAY, SUITE 300
GOLDEN, CO 80403
(303) 552-2383

SHEET INDEX

INSTRUMENTATION IDENTIFICATION LETTERS

	MEASURED VARIABLES													
	ANALYZER	CONDUCTIVITY	FLOW	FLOW TOTAL	HAND	POWER	TIME OR TIME SCHEDULE	LEVEL	MOISTURE OR HUMIDITY	PRESSURE	PRESSURE DIFFERENTIAL	SPEED	TEMPERATURE	MISCELLANEOUS
INSTRUMENT FUNCTION	A	C	F	FQ	H	J	K	L	M	P	PD	S	T	X
ALARM	AA	CA	FA	FQA	HA	JA	KA	LA	MA	PA	PDA	SA	TA	XA
ALARM LOW(L), MEDIUM(M), HIGH(H)	AAL	CAL	FAL	FQAL	HAL	JAL	KAL	LAL	MAL	PAL	PDAL	SAL	TAL	XAL
CONTROL	AC	CC	FC	FQC	HC	JC	KC	LC	MC	PC	PDC	SC	TC	XC
CONTROL VALVE	-	-	FCV	-	-	-	-	LCV	-	PCV	PDCV	-	TCV	XCV
INDICATOR	AI	CI	FI	FQI	HI	JI	KI	LI	MI	PI	PDI	SI	TI	XI
INDICATING CONTROLLER	AIC	CIC	FIC	FQIC	HIC	JIC	KIC	LIC	MIC	PIC	PDIC	SIC	TIC	XIC
INDICATING SWITCH	AIS	CIS	FIS	FQIS	HIS	JIS	KIS	LIS	MIS	PIS	PDIS	SIS	TIS	XIS
INDICATING TRANSMITTER	AIT	CIT	FIT	FQIT	-	JIT	KIT	LIT	MIT	PIT	PDIT	SIT	TIT	XIT
SWITCH	AS	CS	FS	FQS	HS	JS	KS	LS	MS	PS	PDS	SS	TS	XS
SWITCH LOW(L), MEDIUM(M), HIGH(H)	ASL	CSL	FSL	FQSL	HSL	JSL	KSL	LSL	MSL	PSL	PDSL	SSL	TSL	XSL
TRANSMITTER	AT	CT	FT	FQT	-	JT	KT	LT	MT	PT	PDT	ST	TT	XT
MISCELLANEOUS	AX	CX	FX	FQX	HX	JX	KX	LX	MX	PX	PDX	SX	TX	XX
DRIVE OR ACTUATOR	AZ	CZ	FZ	FQZ	HZ	JZ	KZ	LZ	MZ	PZ	PDZ	SZ	TZ	XZ

PROCESS LINES

PROCESS SUPPLY
FLEXIBLE HOSE

SIGNAL LINES

ANALOG
DIGITAL
AO ANALOG OUTPUT
AI ANALOG INPUT
DO DIGITAL OUTPUT
DI DIGITAL INPUT

INSTRUMENTATION

FIELD MOUNTED
PANEL/SCREEN MOUNTED
PANEL/SCREEN MOUNTED - PLC
ID Loop # Intrument Control / Instrument Location

VALVES

BALL VALVE
CHECK VALVE
BUTTERFLY VALVE
DIAPHRAGM VALVE
3 WAY VALVE
GATE VALVE
NEEDLE VALVE
GLOBE VALVE
PLUG VALVE
ANGLE VALVE

VALVE ACTUATORS

HANDLE
MOTOR
RELIEF
SOLENOID

MEASUREMENT

M MAGNETIC FLOWMETER
SINGLE ELEMENT SENSING PROBE
DUAL ELEMENT SENSING PROBE
BALL FLOAT

CONTROL VALVES

BACKPRESSURE REGULATOR INTERNAL TAP
PRESSURE RELIEF VALVE
PG PRESSURE REDUCING REGULATOR W/ GAUGE

PUMPS

METERING PUMP
C CENTRIFUGAL PUMP
SUBMERSIBLE PUMP
SUMP PUMP
PERISTALTIC PUMP

INLINE PIPING COMPONENTS

DIAPHRAGM SEAL
CONCENTRIC REDUCER
ECCENTRIC REDUCER
UNION
PIPE END CAP - SOCKET
SIMPLEX STRAINER
STRAINER
PIPE INSULATION
E PIPE INSULATION ELECTRIC TRACED

PROCESS EQUIPMENT

INLINE MIXER
VENTURI TUBE
MEDIA FILTER
BAG/CARTRIDGE FILTER
ACTIVATED CARBON FILTER
ION EXCHANGE FILTER
MEMBRANE FILTER
CHEMICAL HOLDING TANK
TANK VENT

REVISIONS 1 2 3 4 5 6 7 8

JUSTICE GROWN
EWING, NJ

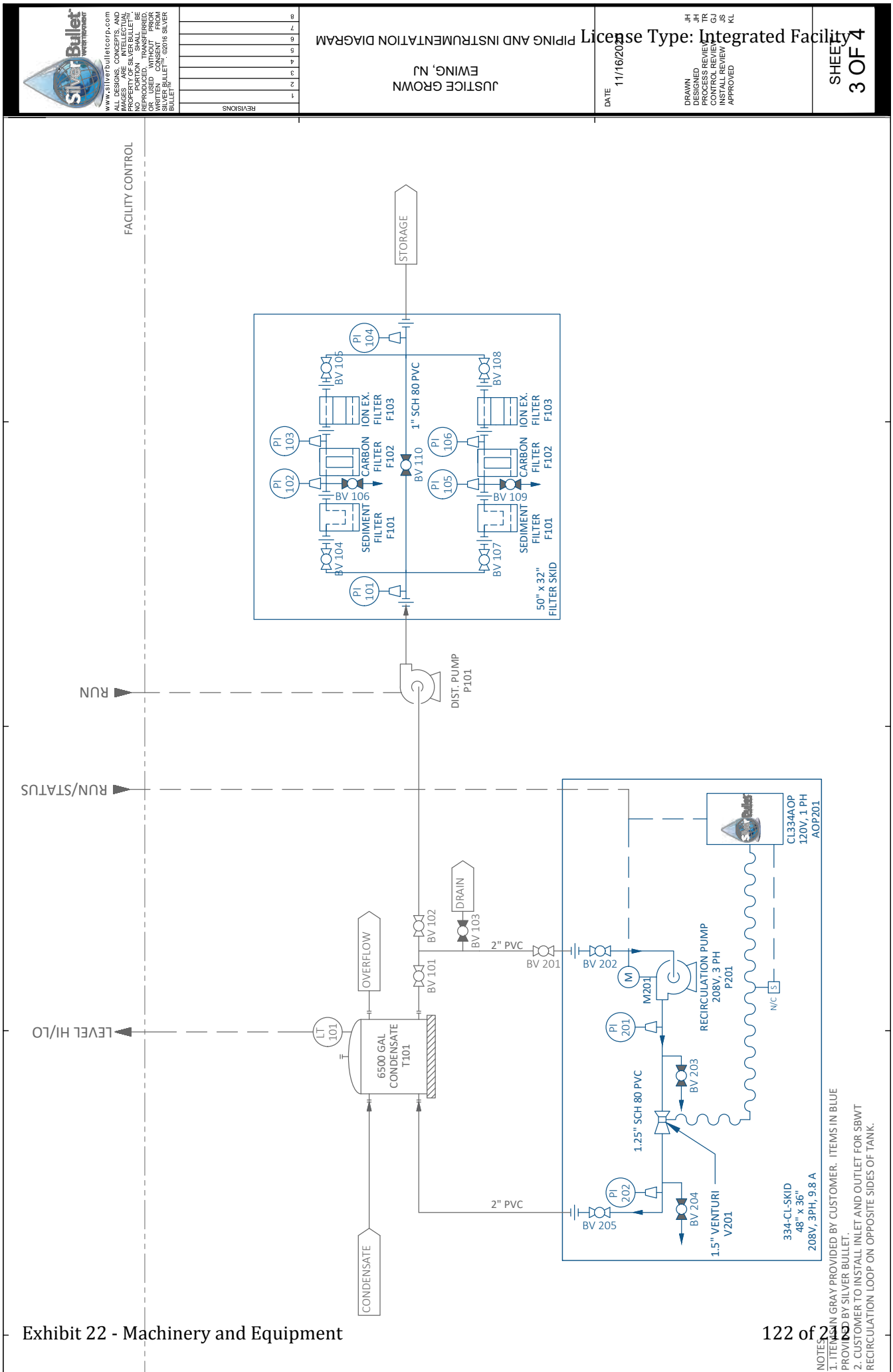
COVER AND LEGEND

DATE 11/16/2021

DRAWN	JH
DESIGNED	JH
PROCESS REVIEW	TR
CONTROL REVIEW	GJ
INSTALL REVIEW	JS
APPROVED	KL

SHEET 1 OF 4

License Type: Integrated Facility



Process Overview:

Justice Grown includes two (2) distinct water treatment application points: condensate reclaim storage treatment and condensate reclaim filtration. The storage treatment application point will be treated with an integrated SBWT Skid System which operates by recirculating the storage/application source, providing disinfection, and mixing in the process. The condensate storage tank will be treated with a SBWT CL 334 Skid System. The skid system integrates three primary electrical components described in the operational theory: the AOP disinfection system, recirculation pump, and solenoid valve to prevent water intrusion into the AOP when the system is off. A “Hand-Off-Auto” (HOA) toggle switch is used to select the mode of operation for the Skid System. The second treatment process is a condensate filtration skid system that utilizes sediment filtration, carbon filtration, and ion exchange resin to remove several contaminants from the condensate reclaim stream.

Operation Theory:

The AOP Skid System is designed to be operated by remote control. The “ALL-ON” / “ALL-OFF” operation is toggled by a single closed contact provided by a remote signal (from tank level control, facility master control unit, etc.). The motor is operated by this external signal when “AUTO” mode is selected via the HOA control switch. Alternatively, when “ON” is selected, the integrated pump, solenoid and AOP unit are activated (“ALL-ON”). When “OFF” is selected, the integrated pump, solenoid and AOP unit are deactivated (“ALL-OFF”). NOTE: Hand mode “ON” will bypass any associated safety shut offs. Customer is responsible for low level pump shutoff controls, sleeve status monitoring, distribution pump and controls, and any other controls necessary to integrate the skids into the facility. Customer shall install tank inlet and outlet on opposite sides of tank for SBWT recirculation loop to ensure adequate mixing of treated water.

REVISIONS
1
2
3
4
5
6
7
8

JUSTICE GROWN
EWING, NJ

CONTROL NARRATIVE

DATE
11/16/2021

DRAWN JH
DESIGNED JH
PROCESS REVIEW TR
CONTROL REVIEW GJ
INSTALL REVIEW JS
APPROVED KL

License Type: Integrated Facility

SHEET
4 OF 4

Silver Bullet Water Treatment
CL Series AOP Skid System Specifications

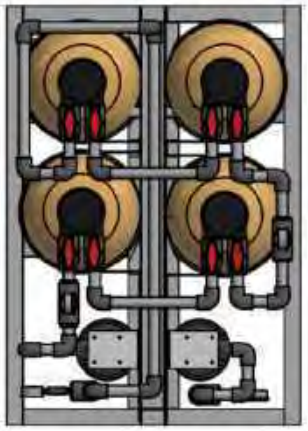
	CL 334 Series Skid System	CL 230 Series Skid System
Available Applications	Bubbled (Diffuser) - Venturi with Sump Pump - Venturi with Recirc Pump - Venturi with Booster Pump (Pressure Installations)	
Disinfection Method	Advanced Oxidation Process Generating Oxidant Gas from Ambient Air Feedstock	
Sleeve Configuration	4 Sleeves: 35.5 Inches Long; 1.5 Inches in Diameter	2 Sleeves: 35.5 Inches Long; 1.5 Inches in Diameter
Pump Type	Verttical/Horizontal Multistage Centrifugal Pump; Stainless Steel Parts In Contact With Pumped Liquid	
Pump Max Working psi	580 psig Depending On Application	
Pump Flow Range	3-750 gpm Depending On Application	
Pump Motor Power	1/2-20 hp Depending On Application	
Power Specifications	4-60A, 3PH, 208-230V	
Site Requirements	Electrical Disconnect Reccomended Siemens HF32IN, 3PH, 30A, 240-250V Class H, K, R Fuses Or Compatible	
Weight	250 lbs.	230 lbs.
Dimensions	36 Inches x 30 Inches x 55 Inches	36 Inches x 30 Inches x 48 Inches
Dimensions and Weight of Shipment Box	38 Inches x 32 Inches X 50 Inches; 190 lbs.	38 Inches x 32 Inches X 52 Inches; 190 lbs.
Footprint	60 Inches x 60 Inches	
Enclosure Type	NEMA 3R	
EPA Registration #	L_89983_COADR_03_27_2020	
Registered with UL International - verified for safe electrical operation	Yes	
UL International Registration #	E361672	
Certified by NSF/ANSI Standard 61: Drinking Water System Components - Health Effects	Yes	

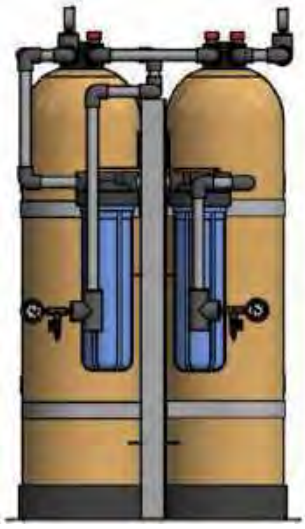
Silver Bullet Water Treatment
Filtration Skid System Specifications

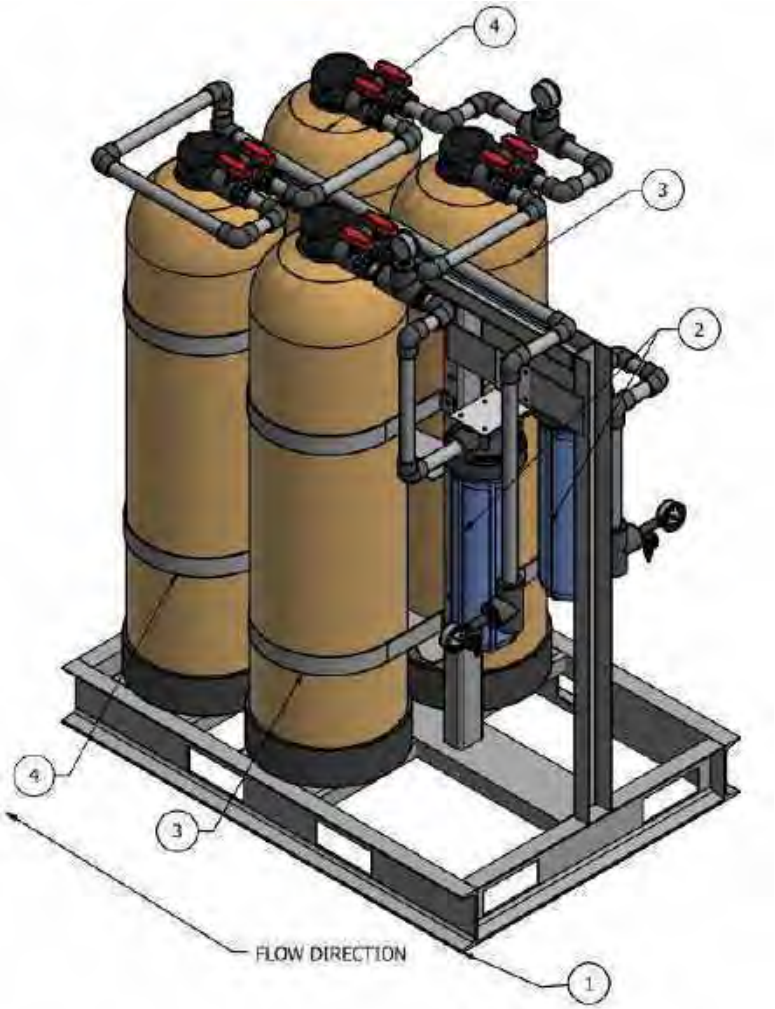
The Silver Bullet Water Treatment Filtration Skid System operates using sediment filtration, carbon filtration, and an ion exchange resin to remove contaminants from the incoming water. This system can filter various sources such as city, condensate, and well water.

Operational Specifications

1. Filter Skid Dimensions	4'-2" X 2'-11", H: X 5'-8" Skid Weldment
Material	A572/A36 Steel
Loading Capacity	1800 lbs. Approximate
Tanks	(4) - 14" Diameter, 47" H, Fiberglass Media Tanks with 1.5" Inlet/Outlets.
2. Sediment Filter Housing	Dual-gradient density spun polypropylene with filter size of 1 - 100 microns.
3. Carbon Filter Tank	Activated carbon with ANSI/NSF Standard 61 rating for use in potable water.
4. Ion Exchange Filter Tank	Hydrogen form cation resin with 1.8 eq/L exchange capacity.
Operating Pressure / Flow:	40 - 90 PSI / Up to 20 GPM







Note: Assembly is for reference and is subject to change.

Silver Bullet Water Treatment
Filtration Skid System Specifications

The Silver Bullet Water Treatment Filtration Skid System operates using sediment filtration, carbon filtration, and an ion exchange resin to remove contaminants from the incoming water. This system can filter various sources such as city, condensate, and well water.

Operational Specifications

Extensive Design for Optimum Filtration

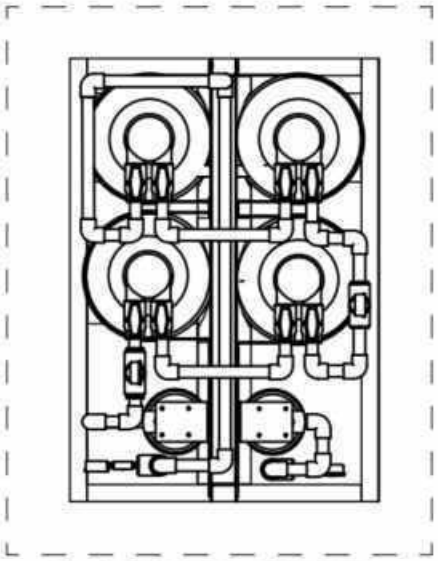
- **Sediment Filter** acts as a pre-treatment filtration, removing sand, silt, clay, loose scale, as well as other organic material that can cause cloudiness in the water.
- **Carbon Filtration** utilizes a bed of activated carbon to remove contaminants and impurities using chemical adsorption. It is most effective at removing chlorine, sediment, volatile organic compounds (VOCs), taste and odor from water.
- **Ion Filtration** is the final stage of filtration that uses a physical-chemical process that selectively removes contaminants from the water. It works by replacing unwanted ions in the water for other ions of similar charge fixed in the resin filter.

User-Friendly Installation and Maintenance

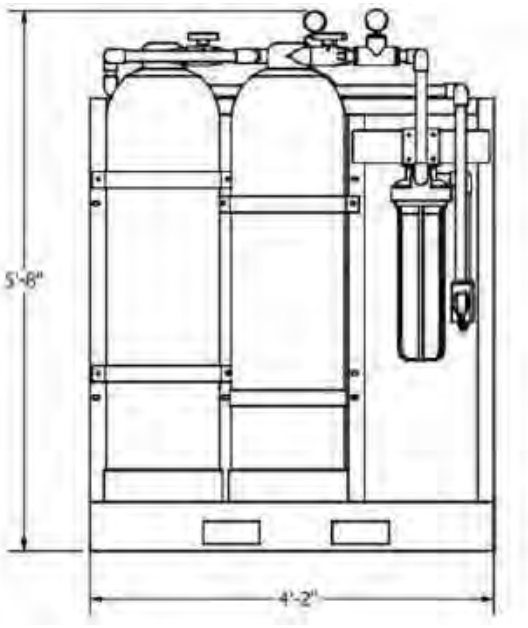
- Standard pallet jack slots on each side with a nominal width under 3 feet.
- Easily accessible inlet, outlet and drain ports for on-site installation.
- Ease of filter maintenance and replacement for servicing over time.

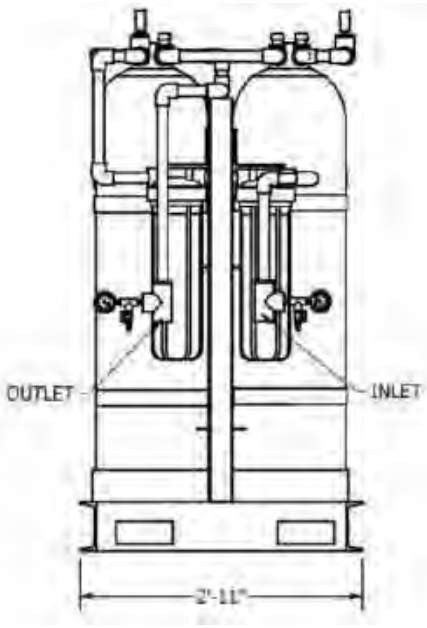
Customer-Specific Engineered Solution

- Designed as a compact, parallel-train system for increased capacity.
- Sight gauges for waterline pressure can be converted to pressure transmitters.
- Additional components, such as water flow, conductivity, pH sensors, distribution pump and tank level controls can be integrated into system.



5' X 4' OPERATIONAL FOOTPRINT





Note: Assembly is for reference and is subject to change.

SERIES 80 NYLON CONTROL VALVES

NOW AVAILABLE IN 3-WAY OR 2-WAY

QUICK REACTION AND DRIP-TIGHT CLOSURE FOR PRECISE AND ACCURATE IRRIGATION

1 ½" & 2" GLOBE/ANGLE 3-WAY PRESSURE REDUCING CONTROL VALVES

1 ½" & 2" GLOBE/ANGLE 3-WAY PRESSURE SUSTAINING CONTROL VALVES

¾" & 1" GLOBE 2-WAY ELECTRIC CONTROL VALVES

1 ½" & 2" GLOBE 2-WAY ELECTRIC CONTROL VALVES

1 ½" & 2" ANGLE 2-WAY ELECTRIC CONTROL VALVES

PRODUCT ADVANTAGES

- Flow control stem allows manual control from full closure up to maximum capacity.
- Suitable for dirty water applications with clog-free labyrinth inlet for command water.
- Quick reaction to opening and closing and a drip-tight seal for accurate irrigation.
- Available in multiple body configurations and control functions.
- Very low friction loss allows valve use with a wider range of flows.
- Durable, corrosion resistant materials for long life.

qdos 20, 30, 60 and 120

License Type: Integrated Facility

qdos Peristaltic Metering

Watson-Marlow Pumps

FEATURES AND BENEFITS

- Flow rates 0.1–2000ml/min (0.001–31.7USGPH) and up to 7 bar (100psi) RMS pressure
- ReNu pumphead provides accurate, linear and repeatable flow
- Process uptime is maximised with no gas-locking, no valve blocking and rapid no-tools pumphead replacement
- Fluid recovery ensures operator safety and avoids chemical waste
- Flow control up to 20000:1 with ±1% accuracy
- Manual, analogue, PROFIBUS or contact mode functionality available
- PROFIBUS Bus speed 9.6–1,500 kb/s
- Compatible with 12–24V DC

Watson-Marlow...Innovation in Full Flow

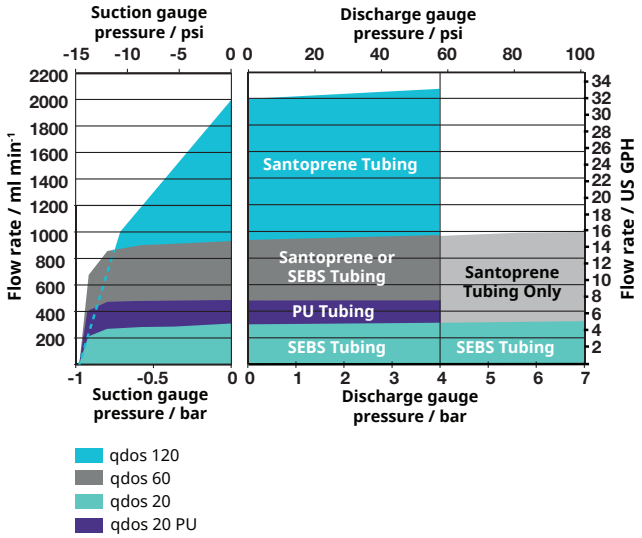
PERFORMANCE

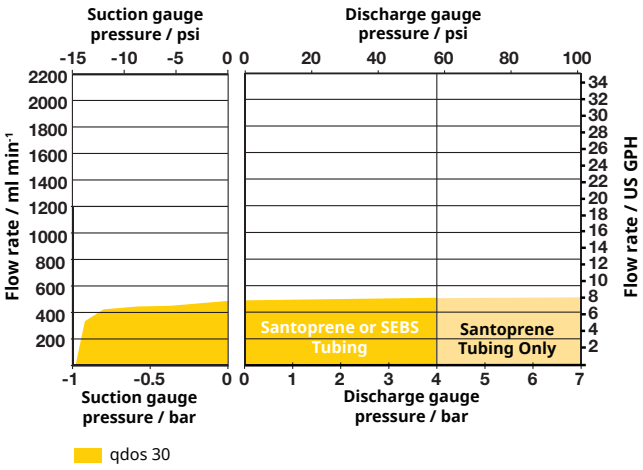
qdos pump typical flow rates

	qdos		qdos remote	
	Speed (rpm)	Flow ml/min (USGPH)*	Speed (rpm)	Flow ml/min(USGPH)*
qdos 20	0.017-55	0.1-333 (0.001-5.3)	0.034-55	0.2-333 (0.003-5.3)
qdos 20 PU	0.017-55	0.1-484 (0.001–7.67)	NA	NA
qdos 30	0.025-125	0.1-500 (0.001-7.93)	0.078-125	0.3-500 (0.005-7.93)
qdos 60	0.013-125	0.1-1000 (0.001-15.85)	0.078-125	0.6-1000 (0.01-15.85)
qdos 120	0.006-125	0.1-2000 (0.001-31.7)	0.078-125	1.25-2000 (0.02-31.7)

*accuracy ±1%, repeatability ±0.5%

Flow rate with discharge pressure for ReNu pumpheads





TECHNICAL SPECIFICATION

	qdos 20	qdos 30	qdos 60	qdos 120
Ingress rating	IP66			
Enclosure	Watertight / dustproof			
Humidity	Non-condensing 5%–95%			
Temperature (Santoprene)	N/A	5C–45C (41F–113F)		
Temperature (SEBS and PU)	5C–40C (41F–104F)			NA
Drive weight	4.6 kg (10lb 2oz)	4.1 kg (9lb 1oz)	4.6 kg (10lb 2oz)	
Pumphead weight	1.1kg (2lb 7oz)	0.95kg (2lb 2oz)	1.1kg (2lb 7oz)	
Control ratio ±1% accuracy	3330:1	5000:1	10000:1	20000:1
Control ratio (Remote)	1600:1			
Noise	< 70dB(A) at 1m			
Standard	CE, NSF 61, cETLus, IRAM S Mark, C-Tick, CSA			
Power supply options	Switch mode power supply ~100-240V 50-60Hz 190VA Country specific plug options			
	12-24V DC power supply Typical 12V current (100W) = 10A Typical 24V current (100W) = 5A Terminal connectors: M8 (5/16") studs (hole diameter 8.33mm (0.328")			

MATERIALS OF CONSTRUCTION

Component	Material			
	qdos 20	qdos 30	qdos 60	qdos 120
Keypad	Polyester			
Drive casework	20% Glass filled PPE/ PS			
Drive shaft	Stainless steel 440C			
Pumphead enclosure	30% Glass filled PPO/PS	40% Glass filled PPS	30% Glass filled PPO/PS	
Rotor	PP (qdos 20 PU) / Glass filled nylon	Glass filled nylon		
Rotor bearings	Steel, stainless steel (optional—contact Watson-Marlow applications)			
Tube*	PU (max 4 bar, 60 psi) / SEBS (max 7 bar, 60 psi)	Santoprene (max 7 bar, 100 psi) / SEBS (max 4 bar, 60 psi)		
Pumphead hydraulic ports	PVDF (SEBS or PU)	Polypropylene (Santoprene) or PVDF (SEBS)	Polypropylene (Santoprene) or PVDF (SEBS)	Polypropylene (Santoprene)
Hydraulic connectors	Polypropylene (standard) PVDF (optional)			
Lubricant*	PFPE based			

*It is the user's responsibility to comply with local health and safety regulations, including ensuring chemical compatibility between the duty fluid, the tube and lubricant contained in the ReNu Pumphead. For guidance refer to www.qdospumps.com.

TECHNICAL DATA

Operational modes	Manual	Remote	PROFIBUS	Universal	Universal+
Manual	•		•	•	•
PROFIBUS—bus speed 9.6–1,500 kb/s			•		
Contact				• L or R	• L or R
4-20mA		•		•	•
Fault reporting	•	•	•	•	•

Features	Manual	Remote	PROFIBUS	Universal	Universal+
Numerical flow display	•		•	•	•
Numerical speed display	•		•	•	•
Fluid level monitor	•		•	•	•
Max (prime)	•		•	•	•
Auto restart (after power restored)	•	•	•	•	•
Fluid recovery	•		•	•	•
Leak detection	•	•	•	•	•
3.5" (88.9mm) colour TFT display	•		•	•	•
LED Pump status icons		•			

TECHNICAL DATA - CONTINUED

Control methods	Manual	Remote	PROFIBUS	Universal	Universal+
Input/Output Options*		L	L	L, H or R	L, H or R
Manual control capability	•		•	•	•
4-20mA input		•		•	•
4-20mA input two point calibration					•
4-20mA output		•			•
Contact input (pulse/batch)				• L or R	• L or R
Run stop input		•		•	•
Run status output		•		•	•
Alarm output		•		•	•
Remote fluid recovery		•		•	•

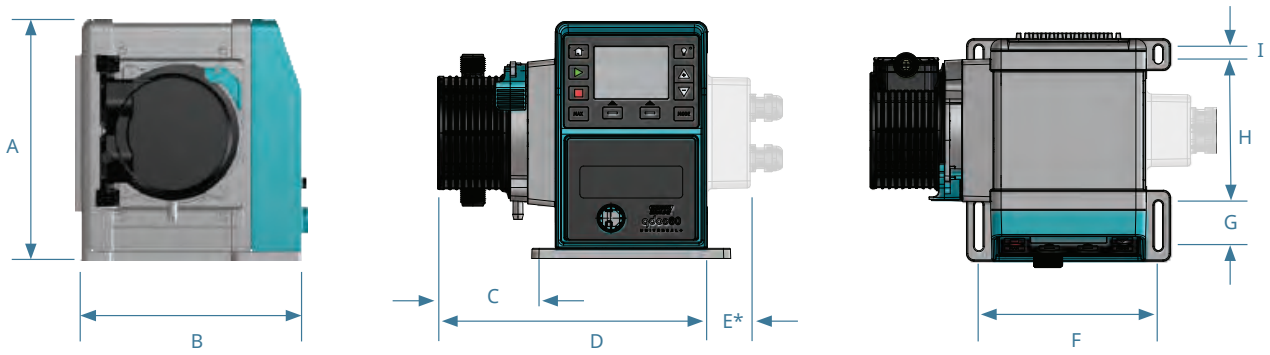
PROFIBUS	Manual	Remote	PROFIBUS	Universal	Universal+
Speed set point			•		
Speed feedback			•		
Flow calibration function			•		
Hours run			•		
Revolution counter			•		
Leak detection			•		
Low fluid level alarm			•		
Diagnostic feedback			•		

Security	Manual	Remote	PROFIBUS	Universal	Universal+
Keypad lock	•		•	•	•
PIN lock to protect set up	•		•	•	•

Power supply options	Manual	Remote	PROFIBUS	Universal	Universal+
12–24V DC	•	•		•	•
~100-240V AC	•	•	•	•	•

*Control options - Universal and Universal+ models	
Variant	**Standard pump (L)**
Input	5–24V DC
Output	Open collector
Variant	**Relay Module (H)**
Input	110V AC
Output	Contact rating 110V AC, 5A 30V DC, 5A
Variant	**Relay Module (R)**
Input	5–24V DC
Output	Contact rating 110V AC, 5A 30V DC, 5A

DIMENSIONS



Note: Pumphead appearance and fluid port positions may differ between models.

Model	A	B	C	D	E—Optional relay modules (H or R)	F	G	H	I
qdos 20	234mm (9.2″)	214mm (8.4″)	118mm (4.6″)	266mm (10.5″)	43mm (1.7″)	173mm (6.8″)	40mm (1.6″)	140mm (5.5″)	10mm (0.4″)
qdos 30	234mm (9.2″)	214mm (8.4″)	82.5mm (3.2″)	233mm (9.2″)	43mm (1.7″)	173mm (6.8″)	40mm (1.6″)	140mm (5.5″)	10mm (0.4″)
qdos 60	234mm (9.2″)	214mm (8.4″)	118mm (4.6″)	266mm (10.5″)	43mm (1.7″)	173mm (6.8″)	40mm (1.6″)	140mm (5.5″)	10mm (0.4″)
qdos 120	234mm (9.2″)	214mm (8.4″)	118mm (4.6″)	266mm (10.5″)	43mm (1.7″)	173mm (6.8″)	40mm (1.6″)	140mm (5.5″)	10mm (0.4″)

ORDER INFORMATION

0 M 0 . • • • • . G • •

Model
1: qdos 20
2: qdos 30
3: qdos 60
4: qdos 120

Tube material†
2: Santoprene
5: PU
8: SEBS

Model
1: Remote
3: Manual
4: Universal
5: Universal+
7: PROFIBUS

Digital I/O type

Manual, Remote and PROFIBUS models
L: Standard pump variant

Universal and Universal+ models
L: Open collector outputs, 5–24V DC inputs
H: Volt free 110V AC relay contacts, 110V AC inputs *(only available with US mains leads)*
R: Volt free 110V AC 30V DC relay contacts, 5–24V DC inputs

Pumphead orientation*
L = Left
R = Right

Plug options
A: US
E: European
U: UK
K: Australia
R: Argentina
C: Swiss
D: India/South Africa
V: 12–24V DC

† For guidance on chemical compatibility see www.qdospumps.com

* The pumphead side location is required when ordering. The left/right perspective assumes the user is looking at the front of the pump. The pump in the dimensions diagram is considered a pumphead located to the left.

Pumphead product codes	
Description	**Partcode**
ReNu 20 pumphead PU / PFPE 4 bar (60psi)	0M3.1500.PFP
ReNu 20 pumphead SEBS / PFPE 7 bar (100psi)	0M3.1800.PFP
ReNu 30 pumphead Santoprene / PFPE 7 bar (100psi)	0M3.2200.PFP
ReNu 30 pumphead SEBS / PFPE 4 bar (60psi)	0M3.2800.PFP
ReNu 60 pumphead Santoprene / PFPE 7 bar (100psi)	0M3.3200.PFP
ReNu 60 pumphead SEBS / PFPE 4 bar (60psi)	0M3.3800.PFP
ReNu 120 pumphead Santoprene / PFPE 4 bar (60psi)	0M3.4200.PFP

All flow rates shown were obtained pumping water at 20C (68F) with zero suction and delivery heads. qdos drives are not ATEX rated and should not be used within explosive atmospheres.

wmftg.com
info@wmftg.com
+44 (0) 1326 370370

Silver Bullet Water Treatment Case Study:

Drip Irrigation Runoff Collection and Reuse

The Grower's Need: Effective Microbial Control for Irrigation Water

A northern California indoor cultivation facility sought an effective and innovative treatment solution for both source water and irrigation reuse. The water treatment requirements of the facility are:

- Treatment of irrigation water for risk management of bacterial and fungal water borne pathogens;
- Ability to capture and reuse irrigation water to meet the business' resource savings goals and to comply with regulatory requirements; and
- Treatment technology that is compatible with hydroponic plant production, does not contribute to plant stress and mitigates crop loss.

"OUR SILVER BULLET UNITS PROVIDE US WITH A CONSISTENT LEVEL OF DISINFECTION, ENSURING US A QUALITY HARVEST EVERY TIME."

~ CUSTOMER TESTIMONIAL

The grower also desired a cost-effective water treatment system that could scale with long-term plans for the business.

Facility Profile

Incoming municipal source water is delivered and stored in four black poly tanks that are located indoors under controlled climate conditions. The facility uses reverse osmosis to treat all incoming source water.

Each flower room is designed with custom rolling grow tables. Plants are grown on stationary flood and drain tables and drip irrigated with a customized blend of nutrient fertilizers. The grow tables are fabricated to allow excess irrigation water that is not absorbed by the media, or taken up by the plant, to be gravity drained from the table. The leachate drain water is collected from each table and drains to a collection tank.

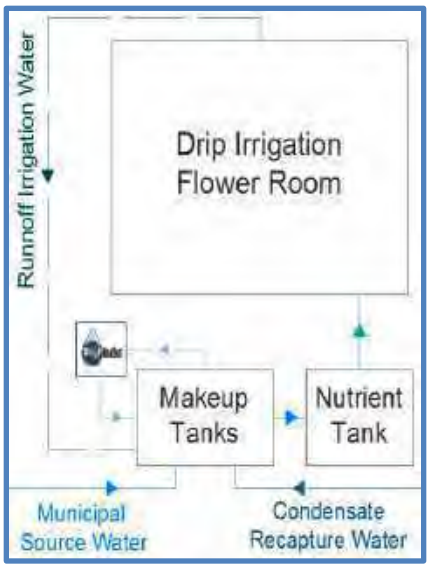
Competitively Priced, Sustainable and Professionally Serviced Water Treatment Solution Impresses Grower

Water management plays a critical role in the function of this facility. The grower chose Silver Bullet because of multiple benefits:

- A sustainable, "green chemistry"-based solution
- Proven bacterial and fungal control for other Silver Bullet customers;
- Professionally designed, engineered and installed water treatment system; and
- Silver Bullet's service, maintenance and water analysis program.

The Silver Bullet Solution: AOP and UV Combination System

To maximize the facility's water treatment program, Silver Bullet installed its Advanced Oxidation Process (AOP) System, paired with direct UV disinfection. The combined technologies provided redundancy in disinfection treatment. The AOP system ensures the recirculated, treated water has slight residual disinfectant properties, which further aids in keeping the storage tanks clean and free of microbiological growth.



The facility uses a closed-loop irrigation system, where the required water pressure is provided by means of a pump. In this closed-loop system, water from the municipal utility, the climate control system and irrigation run-off are blended together, treated and re-used as irrigation water.

Within each plant production room, irrigation water is delivered to two, vertical poly tanks. These tanks are continuously treated and conditioned using the Silver Bullet-UV Treatment System. Irrigation water is then pumped to a single poly tank that is used to mix nutrient fertilizers and condition the water prior to being delivered to the plants.

Silver Bullet Water Treatment Case Study:

Drip Irrigation Runoff Collection and Reuse

All run-off irrigation water is drained and collected in two holding tanks. Irrigation run-off is composed of several constituents that require disinfection and conditioning. Although this water allows for mineral nutrients not taken up by the plants to be recycled and reused, it also includes elevated levels of bacteria, unwanted organic content and suspended solids. Water from all three sources was continuously treated and blended into reliable irrigation water that is compatible with the facilities nutrient formula to prevent biological fouling.

Proven Microbial Control

Silver Bullet developed an intensive water monitoring program around the production schedule for two of the facility's plant production rooms to ensure the water treatment solution met customer expectations. For third-party validation of Silver Bullet's performance, samples were delivered to North Coast Laboratories, a respected, state-certified third-party laboratory located a short distance from the facility. Founded in 1975, North Coast Laboratories is a full service environmental laboratory with a national client base and a reputation for expertise in the analysis of organic chemicals in a variety of agricultural commodities.

The Silver Bullet treated water in make-up storage tanks for both Flower Rooms A and B showed an exemplary level of disinfection, while the untreated run-off water had significantly higher levels of bacteria. Analysis of Heterotrophic plate count (HPC) confirmed Silver Bullet's efficacy in managing microbiology in the water (Table 1).

Table 1. HPC 10-Week Average: Silver Bullet's Success Killing Microorganisms

	Untreated Run-Off Water *cfu/cc*	Silver Bullet Treated Run-Off Water *cfu/cc*	Avg. HPC Log Reduction
Flower Room A	359,000	30,700	1.07
Flower Room B	58,810,000	775,800	1.88

Source: North Coast Laboratories

On average, over the ten-week production cycle, Silver Bullet treated run-off water in Flower Room A had 328,300 cfu/cc lower HPC count than the untreated run-off water with a 1.07 average bacteria log reduction. Flower Room B's results were even more impressive with a 58,034,200 cfu/cc lower average HPC count with a 1.88 average bacteria log reduction rate.

The consistent log reduction for each sample demonstrates Silver Bullet's efficacy in managing microbiology over a multi-week period. Ongoing HPC monitoring since the end of this demonstration has resulted in continued grower satisfaction with microorganism levels.

Silver Bullet Contributes to Phytotoxicity Management Practices

Silver Bullet's water treatment solution helped the facility manage phytotoxicity effectively in the plants by eliminating or significantly limiting the use of harsh or hazardous chemicals, such as chlorine during the grow cycle. Phototoxicity usually occurs in plants that are overly sensitive to a wide variety of compounds, including trace metals, salinity, pesticides, phytotoxins or allelochemicals.

Clean, Silver Bullet Treated Re-Use Water Limits Facility Liquid Discharge

Effective treatment of the irrigation run-off water by the Silver Bullet water treatment solution has allowed the grower to eliminate their water discharge and reuse irrigation runoff water that otherwise would have been too contaminated to recycle.

Silver Bullet Earns the Grower's Trust and Endorsement

After meeting the facility's water quality expectations, Silver Bullet earned the endorsement of the grower. Because of this support, Silver Bullet is actively working with several industry consulting agencies and cultivators to expand the adoption of its treatment technology in similar applications.

If your business could benefit from improved water treatment methods, contact Silver Bullet Water Treatment for a complimentary evaluation of your water system.

COMBINATION AIR VENTS

PROVIDES MAXIMUM PROTECTION FOR AN IRRIGATION SYSTEM

PROVEN DESIGN PROVIDES MORE AIR RELEASE CAPACITY THAN OTHER VENTS OF SIMILAR SIZES

2" COMBINATION
Air/Vacuum and Continuous Acting Air Vent

1" COMBINATION
Air/Vacuum and Continuous Acting Air Vent

¾" & 1" AUTOMATIC
CONTINUOUS ACTING AIR VENT

PRODUCT ADVANTAGES

- Ensures maximum protection of irrigation system with proper sizing and placement.
- Aerodynamic float design ensures vent closure as water fills the system, remains open when air pressure reaches 12 psi.
- Large capacity vents dampen water hammer preventing pipes and fittings from cracking or bursting.
- Unique rolling seal feature allows gradual opening, closing and self-cleaning.
- Made of corrosion-resistant reinforced UV protected nylon - no metal parts to rust or corrode, no need for spare parts.

APPLICATIONS

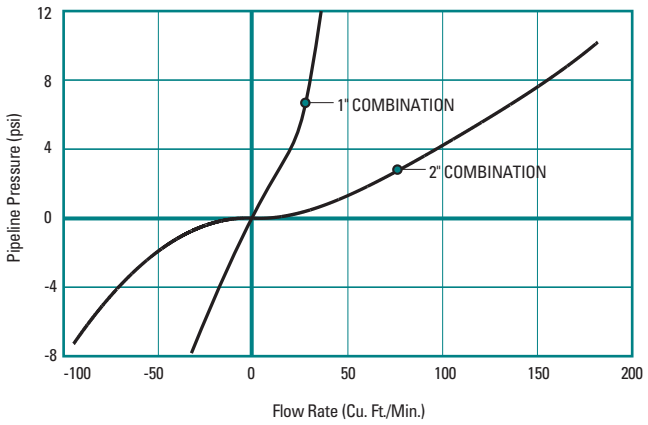
- **1" & 2" COMBINATION AIR/VACUUM AND CONTINUOUS ACTING AIR VENTS**
  - For discharge and intake of large volumes of air at pump and filter stations, along mains and at the end of mainlines.
  - For continuous air release at high points in pipe network or upstream of manifolds.
  - Every 1,500 feet along mainlines.
- **2" COMBINATION AIR RELEASE/VACUUM GUARD & CONTINUOUS ACTING AIR VENT**
  - Releases air at pump priming and maintains the prime by not allowing air intake in long and/or undulating suction lines to pump stations.
  - Releases entrapped air while ensuring continuous prime at centrifugal pumps.
  - Builds up siphons with air release, maintains the siphon by continuously releasing air and not allowing air intake.
- **¾" & 1" AUTOMATIC CONTINUOUS ACTING AIR VENTS**
  - For high spots where air accumulates.
- **¾" & 1" CONTINUOUS ACTING/VACUUM GUARD AIR VENT**
  - For release of entrapped air while ensuring continuous pump prime with no air intake in centrifugal pumps and pump suction lines.
  - Protects mechanical seals in vertical pumps by not allowing air to accumulate in the stuffing boxes.
  - Maintain siphons with continuous air release while not allowing air intake.

SPECIFICATIONS

- Maximum operating pressures:
  - 1", 2" Nylon Combination: 250 psi
  - 1", 2" Nylon Combination: 150 psi
  - ¾" & 1" Automatic: 250 psi
- Five year warranty

COMBINATION AIR/VACUUM AND CONTINUOUS ACTING AIR VENTS

AIR AND VACUUM FUNCTION



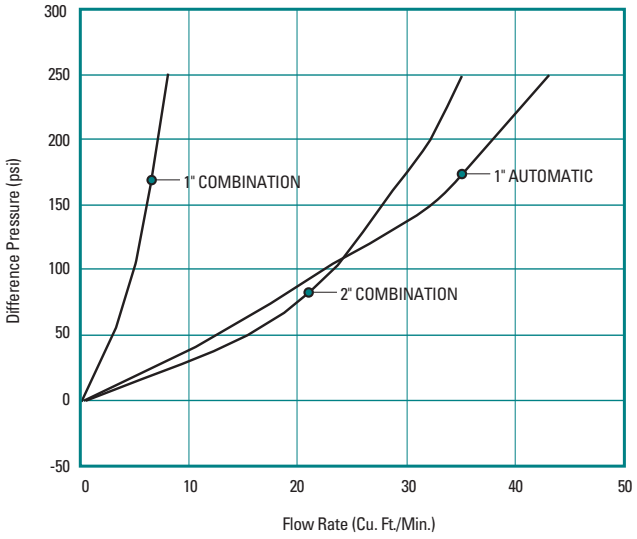
COMBINATION AIR/VACUUM AND CONTINUOUS ACTING AIR VENT
STAGES OF OPERATION

1. During start-up, the air vent discharges large volumes of air.
2. As the system builds pressure, the body fills with water, forcing the float upwards and closing the air vent.
3. While the system is pressurized, the "automatic" function continuously releases accumulated air.
4. At shutdown, the air vent's large opening allows air back into the system preventing the pipe and accessories from collapsing, and preventing suction of mud and debris.

AUTOMATIC CONTINUOUS ACTING AIR VENT
STAGES OF OPERATION

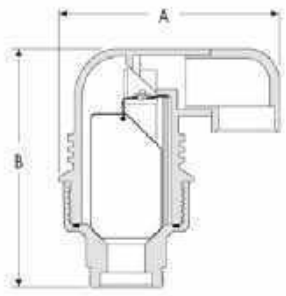
1. While the system is pressurized, air accumulates in the body, systematically dropping the rolling seal mechanism releasing the trapped air.
2. After air is released, water again enters the body and forces the float to close the air vent.

AIR RELEASE FLOW RATE

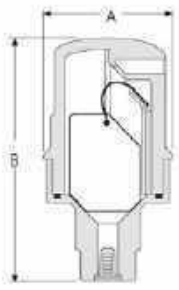


DIMENSIONS, WEIGHT AND ORDERING INFORMATION

	MODEL NUMBER	MAX. PSI	NOMINAL SIZE	DIMENSION A	DIMENSION B	WEIGHT	CONNECTION
2" Nylon Combination	65ARIB2	250	2"	7.09"	8.23"	2.35 lbs	2" NPT Male Thread
2" Nylon Combination (Brass Base)	65ARIB2-B	250	2"	7.09"	8.23"	4.75 lbs	2" NPT Male Thread
2" Nylon Combination	65ARIB2PP	150	2"	7.09"	8.23"	1.90 lbs	2" NPT Male Thread
2" Nylon Combination (Brass Base)	65ARIB2-BPP	250	2"	7.09"	8.23"	3.80 lbs	2" NPT Male Thread
2" Nylon Combination Vacuum Guard	65ARIB2VM	250	2"	8.09"	8.23"	2.50 lbs	2" NPT Male Thread
1" Nylon Combination	65ARIB1	250	1"	3.93"	5.51"	0.66 lbs	1" NPT Male Thread
1" Nylon Combination (Brass Base)	65ARIB1-B	250	1"	3.93"	5.51"	1.54 lbs	1" NPT Male Thread
1" Nylon Combination	65ARIB1-150	150	1"	3.93"	5.51"	0.65 lbs	1" NPT Male Thread
¾" Automatic	65ARIS075	250	¾"	3.20"	5.51"	0.56 lbs	¾" NPT Male Thread
¾" Automatic Vacuum Guard	65ARIS075VM	250	¾"	3.20"	5.51"	0.56 lbs	¾" NPT Male Thread
1" Automatic	65ARIS1	250	1"	2.95"	5.51"	0.65 lbs	1" NPT Male Thread
1" Automatic Vacuum Guard	65ARIS1VM	250	1"	3.20"	5.51"	0.66 lbs	1" NPT Male Thread



Combination Air Vents



Automatic Air Vents

NETAFIM™
GROW MORE WITH LESS

NETAFIM USA
5470 E. Home Ave.
Fresno, CA 93727
CS 888 638 2346
www.netafimusa.com

MOLEAER

ADVANCING NANOBUBBLE TECHNOLOGY

Neo_2 Nanobubble Generator

TYPICAL APPLICATIONS

- Deep Water Culture
- Shallow Water Culture
- NFT
- Drip Irrigation
- Water Tank Oxygenation
- Reservoir Oxygenation
- Algae Control
- Biofilm Control*

The patented Moleaer Neo_2 ™ Nanobubble Generator is a highly efficient gas-to-liquid injection technology that produces high purity oxygen nanobubbles and supersaturates water with high levels of dissolved oxygen (DO). Negatively charged, neutrally buoyant nanobubbles remain suspended in water for long periods of time, acting like an oxygen battery that delivers oxygen to the entire body of water. As oxygen is consumed, the nanobubbles continue to diffuse more oxygen into solution sustaining saturated levels of DO and providing a natural oxidant capable of reducing biofilm growth* and suppressing harmful pathogens, even in warm water. Moleaer's Neo_2 is an economical and highly effective tool that improves water quality, suppresses root disease and promotes the growth of healthy, resilient plants.

The Neo_2 comes with an integrated oxygen concentration system capable of producing oxygen with 93% purity, for reliable and convenient on-site oxygen generation; an energy efficient industrial-grade Gould pump with an open impeller; and a PLC controller that enables automation and control of the Neo_2 when not used in continuous operation. The system is quiet and corrosion-resistant with stainless steel components. The Neo_2 comes standard with an integrated low maintenance, optical DO sensor to allow real time monitoring. Available in 150 and 250 GPM flow rates, the Neo_2 is designed for durable operation and easy installation into any existing irrigation or water treatment system.

FEATURES & BENEFITS

- <200 nm-sized bubbles produced in excess of 1 billion nanobubbles / mL
- On-board oxygen generator for simple on-site oxygen generation (93% O_2)
- Improved water quality
- Oxygenation of any tank and any depth of water
- Enhanced nutrient absorption in plants
- Promotion of beneficial bacteria, suppression of pathogens
- Easy integration with fertigation systems and climate control systems
- Auto gas shut off if loss of prime feed
- Low feed gas pressure sensor and alarm
- Integrated real-time DO monitoring
- Corrosion resistant stainless steel frame and components

*Organic, bio-based nutrients may impact biofilm accumulation rates.

www.moleaer.com

MOLEAER

ADVANCING NANOBUBBLE TECHNOLOGY

MODELS	Neo 150 Oxygen Generation	Neo 250 Oxygen Generation
LIQUID FLOW CAPACITY		
Flow Rate, GPM	150	250
Indicated Gas Flow Range Recommended, L\min	0-4	0-7
OPERATING PARAMETERS		
Temperature Tolerance, °F	41-100	41-100
Standard Oxygen Transfer Efficiency	>90%	>90%
PUMP		
Pump Model	Gould ESH #02SH08A03E2A4	Gould ESH #2SH08D7HT4F2
Wetted Parts Materials	Buna-N/316 SS	Buna-N/316 SS
Pump Motor, hp	3	5
Voltage	460v	460v
Amps (460v)	4.2	6.7
Phase	3	3
Hz	60	60
SECONDARY RECOMPRESSOR		
Models	Gast 86R Single Cylinder	Gast 86R Single Cylinder
Voltage	120	120
Hz	60	60
HP	.125 HP	.125HP
Amps (120v)	1.4	1.4
OXYGEN GENERATOR		
Models	Airsep Topaz Ultra	Airsep Topaz Ultra
Voltage	120	120
Hz	60	60
Amps (120v)	6	6
Total Amperage Pull (460v)	11.6	14.1
CONTROLS		
Voltage	460V	460V
Power (Light)	On/Off DP	On/Off DP
Start Switch	On/Off (24V DC)	On/Off (24V DC)
Pressure Gauges (Water/Air)	Wika 2.5" (60/160)	Wika 2.5" (60/160)
Rotameter, L/min	0 - 9.4	0 - 14.1
Dissolved Oxygen (DO) Sensor	Optical, 0-50ppm (+/- 1.5ppm) 0-5mv	Optical, 0-50ppm (+/- 1.5ppm) 0-5mv
CONNECTIONS		
Inlet, in	2.5	3
Discharge, in	3	3
DIMENSIONS AND WEIGHT		
Height, in	42	42
Width, in	27	27
Length, in	42	42
Weight, lbs	220	224

AquaMetrix AS-series Conductivity Sensors

Model ASM
316SS electrodes

Model ASG
Graphite electrodes

Features

- CPVC shell
- 316 SS or Graphite Electrodes
- PT1000RTD Automatic Temperature Compensation Device
- Adjustable Insertion Length
- AM-HTC-AS Ball Valve "Hot Tap" Hardware Available
- Five Cell Constants to choose from: 0.01, 0.1, 1, 10 and 50
- Choice of four temperature devices for automatic compensation

Description

For years the MS series of epoxy body probes have been known as the most extensive conductivity probes on the market. The new AS series represent a major upgrade.

The AS conductivity probes feature a choice of 316 stainless steel (Model ASM) or graphite (Model ASG) electrodes and CPVC shells that will satisfy just about any industrial, power plant or laboratory application. This technology insures that, with reasonable maintenance, years of drift-free performance can be expected.

Five cell constants from 0.01 to 50 are available to cover any water sample between pure water and saline conditions. All types are designed with a safety stop shoulder on the cell.

Integral automatic temperature compensation PT1000RTD is standard on all types and provides compensation to 25°C when used with a compatible analyzer. Users can also choose between a PT100RTD , 300 NTC or 3k NTC thermistor option. Either element is place to give close thermal contact with the liquid being measured to assure fast response to changing temperature.

Flow-through mounting incorporates a special compression fitting which allows adjustable insertion length in 3/4 inch NPT piping or in the side of a tank. This design avoids the nuisance of disconnecting the cell cable when installing or removing the cell for cleaning.

Submersion mounting is achieved by reversing the direction of the compression fitting, allowing the cell to be threaded into the AM-ARM-AS mounting hardware. Mounting hardware is available which includes a 4 foot length of CPVC pipe and a simple but versatile adjustable bracket for hanging on the rim of the tank.

AM-HTC-AS hot tap ball valve mounting assembly with longer body sensor (HT version) permit removal of the cell from process piping or from tanks without shutting down the system.

Applications

- Cooling towers
- High purity water applications
- Pharmaceutical Applications
- Reverse osmosis systems
- Food and Beverage
- Aquaculture
- Agriculture

CE RoHS Compliant MADE IN AMERICA

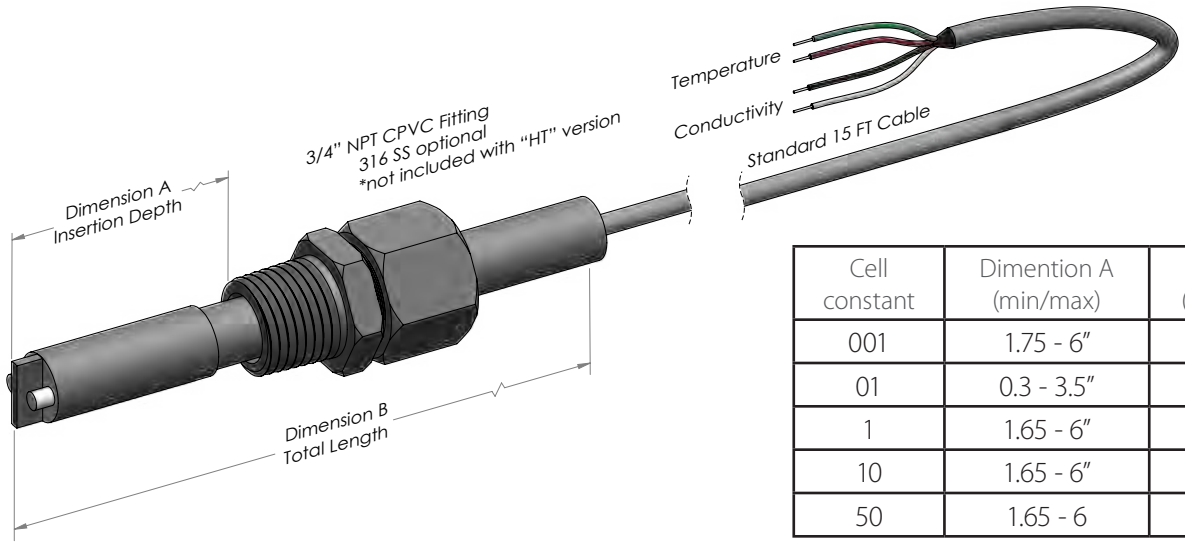
AquaMetrix by Water Analytics
100 School Street
Andover, MA 01810
978-749-9949
Toll free 855-pH Probe
(855-747-7623)
www.WaterAnalytics.net

AS-series Conductivity Sensors

Technical Data

Measuring Range (Depends on controller) For AM-2250:	k=001 0.2-10 µS/cm	k=01 10-500µS/cm	k=1 100-5000 µS/cm	k=10 5-250mS/cm	k=50 10-500mS/cm
Wetted Materials	CPVC, epoxy, EPDM, 316 Stainless Steel (for "ASM" sensors and/or "S" option for compression fitting) Optional: Graphite for ASG				
Insertion type	Variable insertion length, 3/4" NPT fitting				
Temperature Limits	23 to 176°F (-5 to 80°C) at amospheric pressure				
Maximum Pressure	100 psig at 150°F (65°C)				
Temperature Compensation	Standard PT1000Ω RTD. Other ATC devices available: 300NTC, PT100RTD, 3000NTC				
Sensor Cable	4-conductor, unshielded, 15 ft (4.5m) standard. Up to 50ft custom cable available				

Dimensions



Cell constant	Dimention A (min/max)	Dimention B (regular/Hot-Tap)
001	1.75 - 6"	7.25" / 11.9"
01	0.3 - 3.5"	5.8" / 10.5"
1	1.65 - 6"	5.8" / 10.5"
10	1.65 - 6"	7.35" / 12"
50	1.65 - 6	7.35" / 12"

Related Products

ANALYZERS

AM-2250	Multi-Parameter Controller
AM-2250TX	Multi-Parameter Transmitter

ACCESORIES

AM-JB1	NEMA 4X junction box
AM-HTC-AS	Ball Valve assembly for Hot-Tap insertion
AM-ARM-AS	Submersion mounting kit
AM-SFL-AS	1-1/2" Sanitary flange for AS sensor
AM-TEE-AS	1" Union Tee with 3/4" adapter
AM-CCF-AS	CPVC 3/4" compression fitting
AM-SCF-AS	316SS 3/4" compression fitting

CALIBRATION SOLUTIONS

AM-C010U-1P	10µS/cm, 1 pint (500 mL)
AM-C100U-1P	100µS/cm, 1 pint (500 mL)
AM-C001M-1P	1mS/cm, 1 pint (500 mL)

STAINLESS STEEL SENSORS

AM-series	Stainless steel contacting sensors

Ordering Information

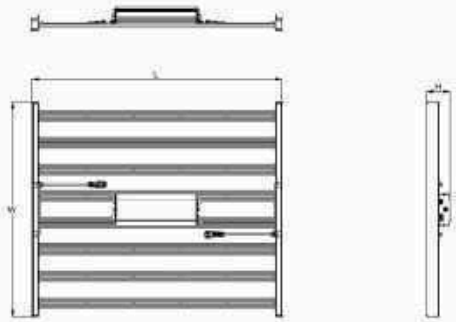
ASM1P1-015	Contacting CPVC conductivity sensor with stainless stell electrodes, cell constant k=1 for flow-through or submersion application. PT1000RTD temperature compensation device and 15 ft cable
ASM01P1-015	Contacting CPVC conductivity sensor with stainless stell electrodes, cell constant k=0.1 for flow-through or submersion application. PT1000RTD temperature compensation device and 15 ft cable
ASG10P1-015	Contacting CPVC conductivity sensor with graphite electrodes, cell constant k=10 for flow-through or submersion application. PT1000RTD temperature compensation device and 15 ft cable
ASM1HT1-015	Contacting CPVC conductivity sensor with cell constant k=1 for use in hot tap application. PT1000RTD temperature compensation device and 15 ft cable

Product Specification

Input voltage	100-277VAC / 277-480VAC 50/60Hz
Current	7.2-2.59A / 2.59-1.5A
Light Output PPF	2088μmol/s
Efficiency	2.9μmol/J
AC Input Power	0-720W (W/Boost)
Light Distribution	120°
Max. Ambient Temperature	95°F / 35°C
Dimming	0-10V 8 gear dimming (20%-40%-60%-80%-100%-Boost-Far-Red&UVA-EXT/OFF)
BTUs/Hour	1720
Ingress Protection	IP66
Lifetime	L90: > 50,000hrs
Certifications	UL 8800, UL 1598 Wet Location, DLC
Warranty	5 years
MAX LED Fixture allowed todaisy chain	3 units

Product Dimension

Product rated Power	Product dimensions(mm / in)			Product weight (kg / lb)
	L	W	H	
720W	1187/46.7	1017/40	110/4.3	22.5/49.6



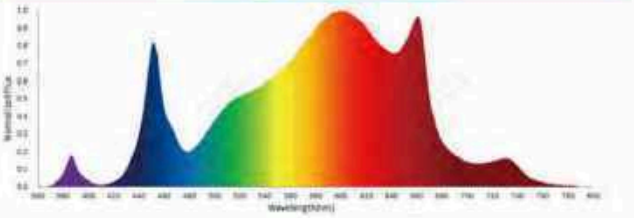
PPFD Value at 3ft Height - at 6'x4' Square Grid

691	705	756	798	854	894	910	925	925	910	890	859	798	749	702	688
728	726	790	833	898	946	969	987	988	970	943	896	837	777	721	725
736	736	792	836	897	943	964	981	982	965	940	893	838	781	731	732
762	759	825	869	942	986	1013	1031	1031	1013	982	935	875	813	754	758
769	771	835	880	953	999	1026	1043	1044	1026	995	948	883	823	766	768
773	775	839	885	958	1005	1032	1049	1050	1032	1001	953	887	827	770	768
772	775	838	884	957	1004	1031	1049	1049	1031	1000	952	886	826	769	767
768	770	834	879	951	998	1024	1042	1042	1024	994	947	881	821	764	763
761	764	821	865	936	982	1007	1026	1026	1007	977	931	866	808	749	754
736	740	790	840	896	945	964	981	981	964	941	892	842	777	733	726
726	723	780	828	887	935	957	976	976	957	931	883	830	765	715	712
687	701	749	791	847	886	902	917	917	902	882	843	791	740	693	681

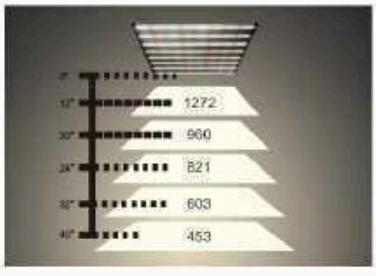
Product Characteristic

- Designed for commercial growers, full cycle spectra for rapid growth and complete plant development;
- High quality LED chip, high performance and stable power supply, high quality overall cooling structure,cast a long service life;
- Plug and Play installation, high PPF with less heat to help grow better.
- Certified with the ETL/DLC Mark and IP66 Rating.
- Accept customized spectrum.

Product Spectrum Report:



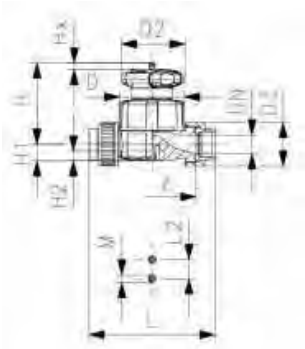
ELB



VisionTech Group, Inc.
Toll Free w/in USA: (888) 420-3694 Warehouse/Office (909) 468-0120 http://www.efinityusa.com
858 North Central Avenue Upland, CA 91786

Data sheet

valid from: 10/8/20



Diaphragm valve type 514 PVC-U
With solvent cement sockets JIS

Model:

- Double flow rate compared to predecessor
- One housing nut replaces four screws
- Handwheel with built-in locking mechanism
- For easy installation and removal
- Short overall length

Option:

- Individual configuration of the valve
- Self adjusting multifunctional module with integrated limit switches
- PN16 available as a configuration

* O-Ring material: FKM

Size (inch)	DN (mm)	PN (bar)	kv-value (Δp=1 bar) (l/min)	EPDM Code	SP	Weight (kg)	PTFE/ EPDM* Code	SP	Weight (kg)
½	15	10	125	**161 514 812**	1	0.433	**161 514 832**	1	0.548
¾	20	10	271	**161 514 813**	1	0.421	**161 514 833**	1	0.538
1	25	10	481	**161 514 814**	1	1.163	**161 514 834**	1	1.183
1 ¼	32	10	759	**161 514 815**	1	1.437	**161 514 835**	1	1.457
1 ½	40	10	1263	**161 514 816**	1	1.640	**161 514 836**	1	2.588
2	50	10	1728	**161 514 817**	1	2.530	**161 514 837**	1	3.453

Size (inch)	D (mm)	D2 (mm)	D3 (mm)	H (mm)	H1 (mm)	H2 (mm)	L (mm)	L2 (mm)	M	z (mm)	Lift = Hx (mm)
½	80	65	51	81	18	12	152	25	M6	120	10
¾	80	65	51	81	18	12	152	25	M6	114	10
1	88	87	58	107	22	12	166	25	M6	122	13
1 ¼	101	87	72	115	26	15	192	45	M8	140	15
1 ½	117	135	83	148	32	15	222	45	M8	160	19
2	144	135	100	166	39	15	266	45	M8	190	25

Georg Fischer Piping Systems Ltd, Postfach, CH-8201 Schaffhausen/Switzerland
Phone +41 -(0)52-631 1111
e-mail: info.ps@georgfischer.com
Internet: http://www.gfps.com

Signet 515/2536 Rotor-X Flow Sensors

3-0515.090 Rev. X 05/17

Operating Instructions

515 Sensor (with red cap)

8510 Integral Sensor

2536 Sensor (with blue cap)

8512 Integral Sensor

2536 Sensor (with grey cap)

- English
- Deutsch
- Français
- Español

Description

Operating Instructions for all versions of 515/8510 and 2536/8512

Simple to install with time-honored reliable performance, Signet 515 and 2536 Rotor-X Paddlewheel Flow Sensors are highly repeatable, rugged sensors that offer exceptional value with little or no maintenance.

Signet 515 and 2536 sensors measure liquid flow rates in full pipes and can be used in low pressure systems.

- The many material choices including PP, PVDF, and PVC (2536 only) make this model highly versatile and chemically compatible with many liquid process solutions.
- Sensors can be installed in DN15 to DN900 (½ to 36 in.) using Signet's comprehensive line of custom fittings, except the PVC 2536 version which can be installed in DN15 to DN100 (½ to 4 in) pipes using Signet's comprehensive line of custom fittings as well.
- These custom fittings, which include tees, saddles, and weldolets, seat the sensor to the proper insertion depth into the process flow.
- The sensors are also offered in configurations for wet-tap installation requirements except 2536 PVC version.

515/8510 Advantages:

- Flow rate range 0.3 to 6 m/s (1 to 20 ft/s)
- Installs into pipe sizes DN15 to DN900 (½ to 36 in.)
- Wide Turndown Ratio of 20:1
- Self-powered
- Highly repeatable output
- Chemically resistant materials
- Easy to replace rotor

2536/8512 Advantages:

- Flow rate range 0.1 to 6 m/s (0.3 to 20 ft/s)
- Installs into pipe sizes DN15 to DN900 (½ to 36 in.)
- The 2536 PVC version installs into pipe sizes DN15 to DN100 (½ to 4 in) for concentrated Sodium Hypochlorite 12.5% applications
- Wide Turndown Ratio of 66:1
- Open-collector output
- High resolution and noise immunity
- Chemically resistant materials
- Easy to replace rotor
- Sodium Hypochlorite transfer/injection/batching (3-2536-U0)

Warranty Information

Refer to your local Georg Fischer Sales office for the most current warranty statement.

All warranty and non-warranty repairs being returned must include a fully completed Service Form and goods must be returned to your local GF Sales office or distributor. Product returned without a Service Form may not be warranty replaced or repaired.

Signet products with limited shelf-life (e.g. pH, ORP, chlorine electrodes, calibration solutions; e.g. pH buffers, turbidity standards or other solutions) are warranted out of box but not warranted against any damage, due to process or application failures (e.g. high temperature, chemical poisoning, dry-out) or mishandling (e.g. broken glass, damaged membrane, freezing and/or extreme temperatures).

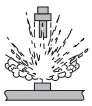
Product Registration

Thank you for purchasing the Signet line of Georg Fischer measurement products.
If you would like to register your product(s), you can now register online in one of the following ways:

- Visit our website **www.gfsignet.com.** Under **Service and Support** click on **Product Registration Form**
- If this is a pdf manual (digital copy), **click here**

Safety Information

1. Depressurize and vent system prior to installation or removal.
2. Confirm chemical compatibility before use.
3. DO NOT exceed maximum temperature or pressure specs.
4. ALWAYS wear safety goggles or faceshield during installation and/or service.
5. DO NOT alter product construction.
   Below are Safety Instructions from the pipe fittings instruction sheet:
6. Do not use this product for any purpose other than for which it was designed.
7. Use with liquids only.

	**Warning / Caution / Danger** Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, injury, or death
	**Personal Protective Equipment (PPE)** Always utilize the most appropriate PPE during installation and service of Signet products.
	**Pressurized System Warning** Sensor may be under pressure, take caution to vent system prior to installation or removal. Failure to do so may result in equipment damage and/or serious injury.
	**Hand Tighten Only** Overtightening may permanently damage product threads and lead to failure of the retaining nut.
	**Do Not Use Tools** Use of tool(s) may damage product beyond repair and potentially void product warranty.
	**Note / Technical Notes** Highlights additional information or detailed procedure.

Chemical Compatibility

Georg Fischer Signet products are manufactured in a variety of wetted materials to suit various liquids and chemicals.

All plastic materials including typical piping types (PVC, PVDF, PP and PE) are more or less permeable to contained media, such as water or volatile substances, including some acids. This effect is not related to porosity, but purely a matter of gas diffusion through the plastic.

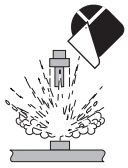
If the plastic material is compatible with the medium according to the application guidelines, the permeation will not damage the plastic itself. However, if the plastic encloses other sensitive components, as is the case with GF Signet plastic paddlewheel sensors, these may be affected or damaged by the media diffusing through the plastic body and rotor.

Failures of PVDF paddlewheel sensors when used in hot nitric acid applications have been reported. PVDF is known to allow for substantial permeation of nitric acid constituents without being damaged itself. No clear guideline can be given here, since the damaging effect to the sensor is highly dependent on temperature, pressure and concentration.

Utilizing sensors in applications with aggressive substances is possible. On special request GF Signet can provide sensors with a different internal resin encapsulation (potting) that will delay the damaging effect of acids to the sensors.

For all Special Product inquiries or to place an order, please email **signet-specialproduct@georgfischer.com.**

WARNING!



Paddlewheel Retaining Nuts:
Red (515), Blue (2536), and Gray (2536)

The retaining nuts of paddlewheel sensors are not designed for prolonged contact with aggressive substances. Strong acids, caustic substances and solvents or their vapor may lead to failure of the retaining nut, ejection of the sensor and loss of the process fluid with possibly serious consequences, such as damage to equipment and serious personal injury. Retaining nuts that may have been in contact with such substances, e.g. due to leakage or spilling, must be replaced.

Paddlewheel Maintenance:

Paddlewheel flow sensors are subject to wear and may require maintenance and replacement of mechanical parts (rotors, pin, O-rings, bearings, retainers, etc.). The frequency of recommended maintenance will vary based upon application specifications, characteristics of the measured fluid, and installation details. These can include, but are not limited to: process flowrate, occurrence of water hammer, fluid corrosiveness and abrasiveness, sensor installation relevant to other equipment.

GF Signet offers individual replacement parts and rotor replacement kits, which include replacement instructions, allowing customers to perform field maintenance and reduce application down-time. Please refer to the Paddlewheel Replacement section (page 5) or contact your local GF Sales Representative with any questions.

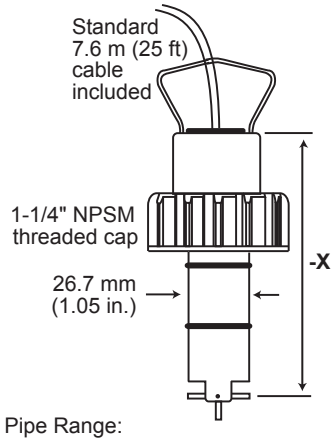
515, 2536, 8510, 8512, 2537 Only:

To support our customers, the GF Signet Repair Department offers services to recertify the plastic paddlewheel products to factory specification. Contact your distributor or visit **www.gfsignet.com** for more information.

Table of Contents

Dimensions

515/2536 Sensor

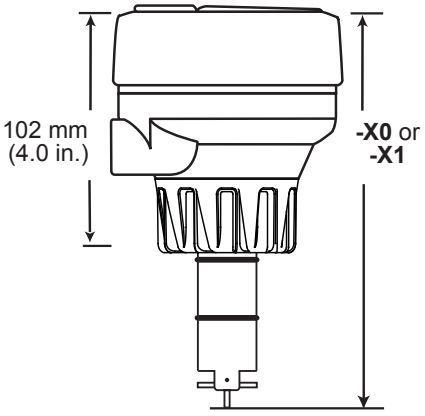


Pipe Range:

1/2 in. to 4 in.	**-X**0 = 104 mm (4.1 in.)
5 in. to 8 in.	**-X**1 = 137 mm (5.4 in)
10 in. and up	**-X**2 = 213 mm (8.4 in.)
1/2 in. to 4 in.	**-X**3 = 297 mm (11.7 in.)
5 in. to 8 in.	**-X**4 = 332 mm (13.1 in.)
10 in. and up	**-X**5 = 408 mm (16.1 in.)

Wet-tap Lengths

8510-XX/8512-XX Integral Sensor shown with Transmitter and Integral Adapter Kit (sold separately)



-X0 = 152 mm (6.0 in.)
-X1 = 185 mm (7.3 in.)

Specifications

General

Flow Rate Range:
- 515 ..... 0.3 to 6 m/s (1 to 20 ft/s)
- 2536 ..... 0.1 to 6 m/s (0.3 to 20 ft/s)

Pipe Size Range..... DN15 to DN900 (½ in. to 36 in.)
- PVC.....DN15 to DN100 (½ in. to 4 in)

Cable Length ..... 7.6 m (25 ft) standard
- 515 ..... 60 m (200 ft) maximum
- 2536 ..... 305 m (1000 ft) maximum

Cable type ..... 2-conductor twisted pair w/ shield (22 AWG)

Minimum Reynolds Number.. 4500

Materials:

Cap Material ..... Glass Filled Polypropylene
515: Red
2536: Blue
2536 (PVC): Gray

Wetted Materials:

Sensor Body..... Glass Filled Polypropylene (black) PVDF, or (gray) PVC

O-Rings ..... FKM (Std), EPR (EPDM) or FFKM optional

Pin ..... Titanium, Hastelloy-C or PVDF; optional Ceramic, Tantalum, or Stainless Steel

Rotor..... Black PVDF or Natural PVDF; optional ETFE with or without carbon fiber reinforced PTFE sleeve for rotor pin

Shipping Weight:
- -X0 ..... 0.454 kg (1 lb)
- -X1 ..... 0.476 kg (1.04 lbs)
- -X2 ..... 0.680 kg (1.50 lbs)
- -X3 ..... 0.794 kg (1.75 lbs)
- -X4 ..... 0.850 kg (1.87 lbs)
- -X5 ..... 1.0 kg (2.20 lbs)
- 3519..... 1.3 kg (2.86 lbs)

Performance

Linearity..... ±1% of maximum range @ 25 °C (77 °F)

Repeatability..... ±0.5% maximum range @ 25 °C (77 °F)

Electrical

515 Sensor

Frequency..... 19.7 Hz per m/s nominal (6 Hz per ft/s)

Amplitude..... 3.3 V p/p per m/s nominal (1V p/p per ft/s)

Source Impedance ..... 8 kΩ

2536 Sensor

Frequency..... 49 Hz per m/s nominal (15 Hz per ft/s nominal)

Supply Voltage..... 5 to 24 VDC ±10% regulated

Supply Current..... <1.5 mA @ 3.3 to 6 VDC
<20 mA @ 6 to 24 VDC

Output Type ..... Open collector, sinking

Output Current..... 10 mA maximum

Environmental Requirements

Pressure/Temperature Ratings

Standard and Integral Sensors:

Polypropylene Body:
- **515:** 1.7 bar (25 psi) max @ 90 °C (194 °F)
  12.5 bar (180 psi) max @ 20 °C (68 °F)
- **2536:** 1.7 bar (25 psi) max @ 85 °C (185 °F)
  12.5 bar (180 psi) max @ 20 °C (68 °F)

Operating Temperature..... -18 °C to 66 °C (0 °F to 150 °F)

PVDF Body :
- **515:** 1.7 bar (25 psi) max @ 100°C (212 °F)
  14 bar (200 psi) max @ 20 °C (68 °F)
- **2536:** 1.7 bar (25 psi) max @ 85 °C (185 °F)
  14 bar (200 psi) max @ 20 °C (68 °F)

Operating Temperature..... -18 °C to 100 °C (0 °F to 212 °F)

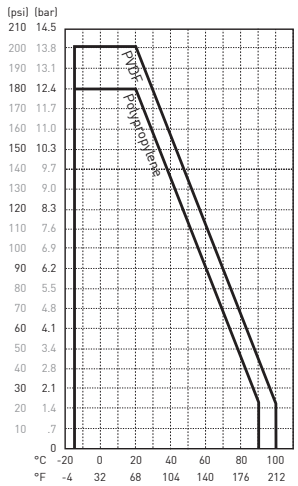
PVC Body:
- **2536:** 6.9 bar (100 psi) max @ 60 °C (140 °F)
  14 bar (200 psi) max @ 20 °C (68 °F)

Operating Temperature..... 0 °C to 50 °C (32 °F to 122°F)

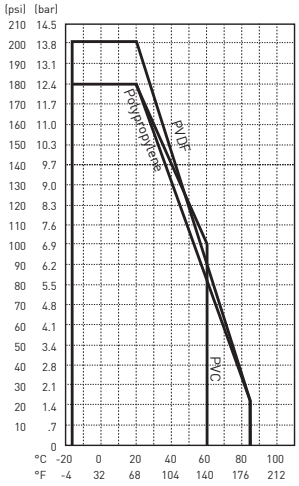
Polypropylene Wet-Tap Sensor Body:
- 7 bar (100 psi) @ 20 °C (68 °F) max
- Max Removal Rating..... 1.7 bar @ 22 °C (25 psi @ 72 °F)

Operating Temperature..... -18 °C to 66 °C (0 °F to 150 °F)

515 (8510) Sensor



2536 (8512) Sensor



Standards and Approvals
- RoHS Compliant
- China RoHS (Go to www.gfsignet.com for details)
- Manufactured under ISO 9001 for Quality, ISO 14001 for Environmental Management and OHSAS 18001 for Occupational Health and Safety.

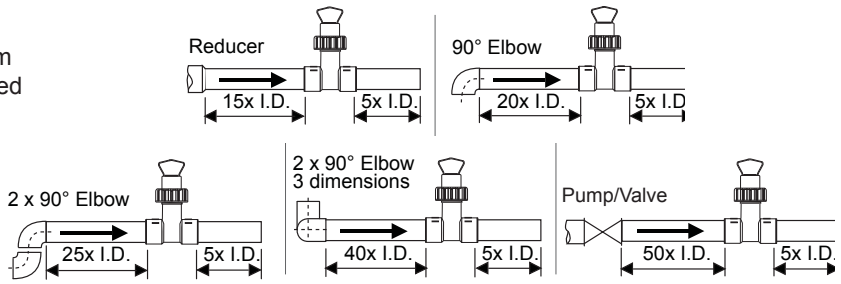
P51530
- NSF (P51530-PX versions only)
- Lloyd's Register Type Approval

2536
- NSF (3-2536-PX versions only)
- CE

Declaration of Conformity according to FCC Part 15
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

Location of Fitting

To ensure the fluid velocity profile is fully developed, without distortion from piping system components, please adhere to the recommended straight run geometry.

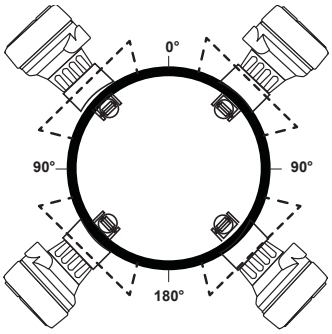


Sensor Mounting Position

Horizontal pipe Runs
To minimize adverse effects of air pockets, sediment, or excessive rotor wear (Paddlewheels), avoid mounting the flow sensor at the top of the pipe (0º), bottom of pipe (180º), or the sides (90º from vertical.)

Vertical Pipe Runs
Mount flow sensors in any direction. To ensure pipe is flowing full, with some back pressure, it's highly recommended the fluid flow is upward.

Gravity and Discharge Lines
It's recommended to install a trap to ensure pipe is full during flow conditions, and to minimize air pockets.



Standard Sensor Installation

- Lubricate O-rings with a non-petroleum based, viscous lubricant (grease) compatible with the system.
- Using an alternating/twisting motion, lower the sensor into the fitting, making sure the installation arrows on the black cap are pointing in the direction of flow, see Figure A.
- Engage one thread of the sensor cap then turn the sensor until the alignment tab is seated in the fitting notch.

Hand tighten the sensor cap.
DO NOT use any tools on the sensor cap or the cap threads and/or fitting flange threads will be damaged, see Figure B.

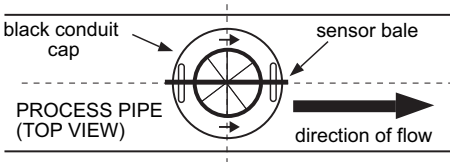


Figure A

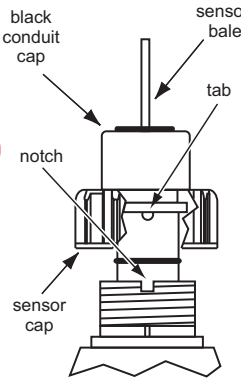
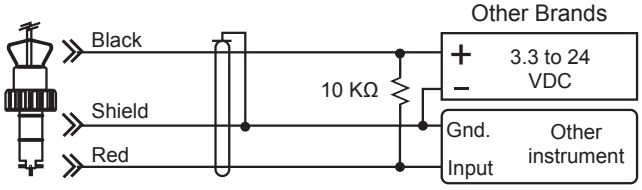


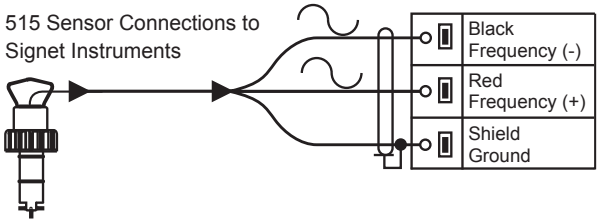
Figure B

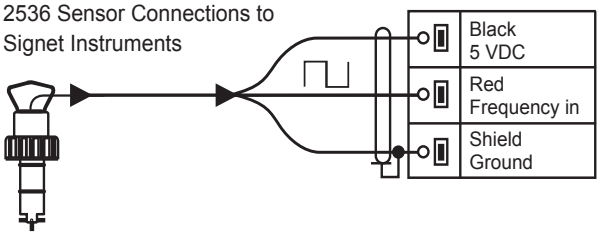
Sensor Wiring

Technical Notes
- Use 2-conductor shielded cable for cable extensions.
- Cable shield must be maintained through cable splice.
- Refer to your instrument manual for specific wiring details.



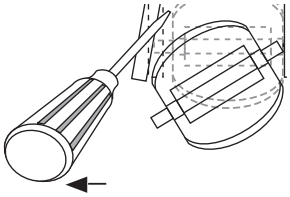
DC sensor power supplied from Signet instrument.
10 KΩ Pull-up resistor may be required for non-Signet brand instrument.





Rotor Replacement Procedure

- To remove the rotor, insert a small screwdriver between the rotor and the ear of the sensor.
- Twist the screwdriver blade to flex the ear outward enough to remove one end of the rotor and pin.
- DO NOT flex the ear any more than necessary! If it breaks, the sensor cannot be repaired.
- Install the new rotor by inserting one tip of the pin into the hole, then flex the opposite ear back enough to slip rotor into place.



K-Factors

A **K-Factor** is the number of pulses a sensor will generate for each engineering unit of fluid that passes the sensor. K-Factors for water are listed below in U.S. gallons and liters. For example, in a 1-inch PVC pipe, the 515 paddlewheel generates 172.07 pulses per gallon of water passing the rotor. K-Factors are listed for pipes up to 12 inches. For pipes over 12 inches, consult your Signet distributor.

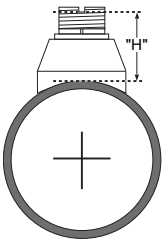
PIPE SIZE (IN.)	FITTING	515/8510-XX		2536/8512-XX	
		LITERS	U.S. GAL	LITERS	U.S. GAL
SCH 80 PVC TEES FOR SCH 80 PVC PIPE					
1/2	MPV8T005	137.42	520.12	271.37	1027.1
3/4	MPV8T007	78.61	297.52	154.08	583.19
1	MPV8T010	45.46	172.07	88.65	335.53
1-1/4	MPV8T012	24.19	91.54	47.24	178.79
1-1/2	MPV8T015	16.44	62.22	32.08	121.42
2	MPV8T020	9.60	36.32	18.87	71.44
SCH 80 PVC TEES FOR SCH 80 PVC PIPE					
2-1/2	PV8T025	5.7683	21.833	11.359	42.994
3	PV8T030	3.5775	13.541	7.0414	26.652
4	PV8T040	2.0147	7.6258	3.9645	15.006
SCH 80 CPVC TEES FOR SCH 80 CPVC PIPE					
1/2	MCPV8T005	137.42	520.12	271.37	1027.1
3/4	MCPV8T007	78.61	297.52	154.08	583.19
1	MCPV8T010	45.46	172.07	88.65	335.53
1-1/4	MCPV8T012	24.19	91.54	47.24	178.79
1-1/2	MCPV8T015	16.44	62.22	32.08	121.42
2	MCPV8T020	9.60	36.32	18.87	71.44
SCH 80 PVC SADDLES FOR SCH 80 PVC PIPE					
2	PV8S020	8.5812	32.480	17.633	66.739
2-1/2	PV8S025	5.7683	21.833	11.359	42.994
3	PV8S030	3.5775	13.541	7.0414	26.652
4	PV8S040	2.0147	7.6258	3.9645	15.006
6	PV8S060	1.0997	4.1623	2.1994	8.3246
8	PV8S080	0.6263	2.3705	1.3253	5.0164
10	PV8S100	0.4042	1.5300	0.808	3.0600
12	PV8S120	0.2801	1.0600	0.571	2.1600
SCH 80 PVC SADDLE ON SCH 40 PVC PIPE					
2	PV8S020	7.2259	27.350	14.452	54.700
2-1/2	PV8S025	4.9866	18.874	9.8175	37.159
3	PV8S030	3.3389	12.638	6.2608	23.697
4	PV8S040	1.7776	6.7282	3.5552	13.456
6	PV8S060	0.9854	3.7297	1.9708	7.4594
8	PV8S080	0.5688	2.1527	1.1966	4.5292
10	PV8S100	0.3567	1.3500	0.740	2.8000
12	PV8S120	0.2536	0.9600	0.523	1.9800

PIPE SIZE (IN.)	FITTING	515/8510-XX		2536/8512-XX	
		LITERS	U.S. GAL	LITERS	U.S. GAL
CARBON STEEL TEES ON SCH 40 PIPE					
1/2	CS4T005	97.808	370.20	199.74	756.00
3/4	CS4T007	56.027	212.06	115.90	438.69
1	CS4T010	37.289	141.14	75.768	286.78
1-1/4	CS4T012	16.025	60.655	32.026	121.22
1-1/2	CS4T015	11.982	45.350	24.079	91.139
2	CS4T020	7.0717	26.767	14.391	54.468
STAINLESS STEEL TEES ON SCH 40 PIPE					
1/2	CR4T005	94.838	358.96	193.98	734.20
3/4	CR4T007	53.530	202.61	108.88	412.10
1	CR4T010	33.590	127.14	66.764	252.70
1-1/4	CR4T012	16.357	61.910	33.849	128.12
1-1/2	CR4T015	10.676	40.410	20.428	77.320
2	CR4T020	5.8917	22.300	12.095	45.780
GALVANIZED IRON TEES ON SCH 40 PIPE					
1	IR4T010	27.619	104.54	56.277	213.01
1-1/4	IR4T012	16.639	62.979	33.751	127.75
1 1/2	IR4T015	12.335	46.688	24.941	94.401
2	IR4T020	7.7832	29.459	15.699	59.420
BRONZE TEES ON SCH 40 PIPE					
1	BR4T010	27.619	104.54	56.277	213.01
1-1/4	BR4T012	16.639	62.979	33.751	127.75
1-1/2	BR4T015	12.335	46.688	24.941	94.401
2	BR4T020	7.7832	29.459	15.699	59.420
COPPER TEE FITTINGS ON COPPER PIPE SCH K					
1/2	CUKT005	117.10	443.21	242.50	917.84
3/4	CUKT007	56.052	212.16	113.15	428.27
1	CUKT010	33.600	127.18	67.749	256.43
1-1/4	CUKT012	23.307	88.218	46.615	176.44
1-1/2	CUKT015	15.049	56.962	30.565	115.69
2	CUKT020	7.7595	29.370	16.746	63.385
COPPER TEE FITTINGS ON COPPER PIPE SCH L					
1/2	CUKT005	109.49	414.41	226.74	858.22
3/4	CUKT007	50.485	191.09	101.91	385.74
1	CUKT010	31.662	119.84	63.841	241.64
1-1/4	CUKT012	22.576	85.451	45.152	170.90
1-1/2	CUKT015	14.573	55.160	29.598	112.03
2	CUKT020	7.5575	28.605	16.310	61.74

PIPE SIZE (IN.)	FITTING	515/8510-XX		2536/8512-XX	
		LITERS	U.S. GAL	LITERS	U.S. GAL
STAINLESS STEEL WELDOLETS ON SCH 40 PIPE					
2-1/2	CR4W025	4.9670	18.800	9.9339	37.600
3	CR4W030	3.2153	12.170	6.4306	24.340
4	CR4W040	1.8388	6.9600	3.6777	13.920
5	CR4W050	1.3897	5.2600	2.8692	10.860
6	CR4W060	0.9749	3.6900	1.9868	7.5200
8	CR4W080	0.5627	2.1300	1.1466	4.3400
10	CR4W100	0.3567	1.3500	0.7292	2.7600
12	CR4W120	0.2536	0.9600	0.5125	1.9400
CARBON STEEL WELDOLETS ON SCH 40 PIPE					
2-1/2	CS4W025	4.9670	18.800	9.9339	37.600
3	CS4W030	3.2153	12.170	6.4306	24.340
4	CS4W040	1.8388	6.9600	3.6777	13.920
5	CS4W050	1.3897	5.2600	2.8692	10.860
6	CS4W060	0.9749	3.6900	1.9868	7.5200
8	CS4W080	0.5627	2.1300	1.1466	4.3400
10	CS4W100	0.3567	1.3500	0.7292	2.7600
12	CS4W120	0.2536	0.9600	0.5125	1.9400
COPPER/BRONZE BRAZOLETS ON SCH 40 PIPE					
2-1/2	BR4B025	4.9670	18.800	9.934	37.600
3	BR4B030	3.2153	12.170	6.431	24.340
4	BR4B040	1.8388	6.9600	3.678	13.920
5	BR4B050	1.3897	5.2600	2.869	10.860
6	BR4B060	0.9749	3.6900	1.987	7.5200
8	BR4B080	0.5627	2.1300	1.147	4.3400
10	BR4B100	0.3567	1.3500	0.729	2.7600
12	BR4B120	0.2536	0.9600	0.513	1.9400
SCH 80 IRON SADDLES ON SCH 80 PIPE					
2	IR8S020	8.5495	32.360	17.099	64.720
2-1/2	IR8S025	5.8705	22.220	11.223	42.480
3	IR8S030	3.5456	13.420	6.980	26.420
4	IR8S040	2.0238	7.6600	3.884	14.700
5	IR8S050	1.5482	5.8600	3.218	12.180
6	IR8S060	1.0806	4.0900	2.230	8.4400
8	IR8S080	0.6156	2.3300	1.295	4.9000
10	IR8S100	0.4042	1.5300	0.808	3.0600
12	IR8S120	0.2801	1.0600	0.571	2.1600
SCH 80 IRON SADDLE ON SCH 40 PIPE					
2	IR8S020	7.0859	26.820	14.172	53.640
2-1/2	IR8S025	4.9670	18.800	9.934	37.600
3	IR8S030	3.1678	11.990	6.135	23.220
4	IR8S040	1.8098	6.8500	3.503	13.260
5	IR8S050	1.4082	5.3300	2.917	11.040
6	IR8S060	0.9934	3.7600	1.913	7.2400
8	IR8S080	0.5627	2.1300	1.162	4.4000
10	IR8S100	0.3567	1.3500	0.740	2.8000
12	IR8S120	0.2536	0.9600	0.523	1.9800

H-Dimensions

The plastic sensor insert in the Weldolet fitting MUST be removed during the welding process. When reinstalled, it is important that the insert be threaded to the proper height ("H" dimension).

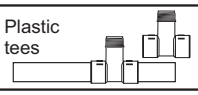


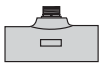
Weldolet	"H" dimension		Weldolet	"H" dimension	
part number	mm	inches	part number	mm	inches
CS4W020	60.45	2.38	CS4W240	105.66	4.16
CS4W025	62.99	2.48	CS4W360	104.14	4.10
CS4W030	62.73	2.47			
CS4W040	62.23	2.45	CR4W020	60.45	2.38
CS4W050	82.29	3.24	CR4W025	62.99	2.48
CS4W060	78.99	3.11	CR4W030	62.73	2.47
CS4W080	73.15	2.88	CR4W040	62.23	2.45
CS4W100	143.00	5.63	CR4W050	82.29	3.24
CS4W120	137.16	5.25	CR4W060	78.99	3.11
CS4W140	129.54	5.40	CS4W080	73.15	2.88
CS4W160	123.19	4.85	CR4W100	143.00	5.63
CS4W180	116.84	4.60	CR4W120	137.16	5.40
CS4W200	111.25	4.38			

K-Factors DIN Pipes

PIPE SIZE	FITTING	515/8510-XX		2536/8512-XX	
		LITERS	U.S. GAL	LITERS	U.S. GAL
POLYPROPYLENE FITTINGS (DIN/ISO AND BS AND ANSI)					
DN 15	PPMT005	127.23	481.55	251.75	952.87
DN 20	PPMT007	73.207	277.09	148.77	563.10
DN 25	PPMT010	37.300	141.18	77.042	291.60
DN 32	PPMT012	22.071	83.540	44.709	169.22
DN 40	PPMT015	13.544	51.265	27.450	103.90
DN 50	PPMT020	7.8193	29.596	16.060	60.789
PVDF FITTINGS (DIN/ISO AND BS AND ANSI)					
DN 15	SFMT005	111.19	420.87	218.56	827.26
DN 20	SFMT007	60.277	228.15	129.42	489.87
DN 25	SFMT010	36.116	136.70	74.915	283.55
DN 32	SFMT012	20.950	79.294	41.899	158.59
DN 40	SFMT015	11.490	43.490	22.980	86.980
DN 50	SFMT020	6.8450	25.908	13.312	50.385
PVC FITTINGS (DIN/ISO) - EUROPE ONLY					
DN 15	PVMT005	128.45	486.18	256.90	972.37
DN 20	PVMT007	64.160	242.85	128.32	485.69
DN 25	PVMT010	39.270	148.64	78.540	297.274
DN 32	PVMT012	22.490	85.125	44.980	170.249
DN 40	PVMT015	13.700	51.855	27.400	103.709
DN 50	PVMT020	7.8600	29.750	15.720	59.500

Signet Fittings

Type	Description
Plastic tees 	• 0.5 to 2 inch versions • MPVC or CPVC
PVC Glue-on Saddles 	• Available in 10 and 12 inch sizes only • Cut 2-1/2 inch hole in pipe • Weld in place using solvent cement
PVC Clamp-on Saddles 	• 2 to 4 inch, cut 1-7/16 inch hole in pipe • 6 to 8 inch, cut 2-1/8 inch hole in pipe
Iron Strap-on saddles 	• 2 to 4 inch, cut 1-7/16 inch hole in pipe • Over 4 inch, cut 2-1/8 inch hole in pipe • Special order 14 in. to 36 in.

Type	Description
Iron, Carbon Steel, 316 SS Threaded tees 	• 0.5 to 2 in. versions • Mounts on threaded pipe ends
Carbon steel & stainless steel Weld-on Weldolets 	• 2 to 4 inch, cut 1-7/16 inch hole • Over 4 inch, cut 2-1/8 inch hole in pipe
Fiberglass tees  FPT	• 1.5 in. to 2 in. PVDF insert
Metric Union Fitting 	• For pipes from DN 15 to 50 mm • PP or PVDF

Ordering Information

515/8510-XX

Mfr. Part No.	Code	Description
P51530-H0	198 801 659	Sensor, Polypropylene, Hastelloy-C, Black PVDF; 0.5 to 4 inch
P51530-P0	198 801 620	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black), 0.5 to 4 inch
P51530-P1	198 801 621	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
P51530-P2	198 801 622	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 10 to 36 inch
P51530-P3	198 840 310	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black), 0.5 to 4 inch
P51530-P4	198 840 311	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
P51530-P5	198 840 312	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 10 to 36 inch
P51530-S0	198 801 661	Sensor, polypropylene, PVDF (natural), Black PVDF; 0.5 to 4 inch
P51530-T0	198 801 663	Sensor, PVDF (natural), PVDF (natural) Rotor Pin, PVDF Rotor (nat.), 0.5 to 4 inch
P51530-T1	198 801 664	Sensor, PVDF (natural), PVDF (natural) Rotor Pin, PVDF Rotor (nat.), 5 to 8 inch
P51530-V0	198 801 623	Sensor, PVDF (natural), Hastelloy-C Rotor Pin, PVDF Rotor (natural), 0.5 to 4 inch
P51530-V1	198 801 624	Sensor, PVDF (natural), Hastelloy-C Rotor Pin, PVDF Rotor (natural), 5 to 8 inch
P51530-V2	198 801 625	Sensor, PVDF (natural), Hastelloy-C Rotor Pin, PVDF Rotor (natural), 10 to 36 inch
3-8510-P0	198 864 504	Sensor, Integral, PP, Titanium Rotor Pin, PVDF Rotor (black), 0.5 to 4 inch
3-8510-P1	198 864 505	Sensor, Integral, PP, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
3-8510-T0	159 000 622	Sensor, Integral, PVDF (nat.), PVDF (natural) Rotor Pin, PVDF Rotor (nat.), 0.5 to 4 inch
3-8510-V0	198 864 506	Sensor, Integral, PVDF (nat.), Hastelloy-C Rotor Pin, PVDF Rotor (nat.), 0.5 to 4 inch
3-3519/515-P3	159 000 819	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), 0.5 to 4 inch
3-3519/515-P4	159 000 820	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), 5 to 8 inch
3-3519/515-P5	159 000 821	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), 10 to 36 inch

Replacement Parts 515/8510

M1538-2	198 801 181	Rotor, PVDF Black
P51547-3	159 000 474	Rotor, PVDF Natural
M1538-4	198 820 018	Rotor, ETFE
P51550-3	198 820 043	Rotor and Pin, PVDF Natural
3-0515.322-1	198 820 059	Sleeved Rotor, PVDF Black
3-0515.322-2	198 820 060	Sleeved Rotor, PVDF Natural
3-0515.322-3	198 820 017	Sleeved Rotor, ETFE
P31542	198 801 630	Sensor Cap, Red (for use with 515)

Ordering Information

2536/8512-XX

Mfr. Part No.	Code	Description
3-2536-P0	198 840 143	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black), ½ to 4 inch
3-2536-P1	198 840 144	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
3-2536-P2	198 840 145	Sensor, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 10 to 36 inch
3-2536-P3	159 000 758	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black), ½ to 4 inch
3-2536-P4	159 000 759	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
3-2536-P5	159 000 760	Sensor, Wet-Tap, Polypropylene, Titanium Rotor Pin, PVDF Rotor (black) 10 to 36 inch
3-2536-V0	198 840 146	Sensor, PVDF (natural), Hastelloy-C Rotor Pin, PVDF Rotor (natural), ½ to 4 inch
3-2536-V1	198 840 147	Sensor, PVDF (natural), Hastelloy-C Rotor Pin, PVDF Rotor (natural), 5 to 8 inch
3-2536-T0	198 840 149	Sensor, PVDF (natural), PVDF (nat.) Rotor Pin, PVDF Rotor (natural), ½ to 4 inch
3-2536-U0	159 001 843	Sensor, PVC, Titanium Rotor Pin, ETFE Rotor, ½ to 4 inch
3-8512-P0	198 864 513	Sensor, Integral, PP, Titanium Rotor Pin, PVDF Rotor (black), ½ to 4 inch
3-8512-P1	198 864 514	Sensor, Integral, PP, Titanium Rotor Pin, PVDF Rotor (black) 5 to 8 inch
3-8512-T0	198 864 518	Sensor, Integral, PVDF (nat.), PVDF (nat.) Rotor Pin, PVDF Rotor (nat.), ½ to 4 inch
3-8512-V0	198 864 516	Sensor, Integral, PVDF (nat.), Hastelloy-C Rotor Pin, PVDF Rotor (nat.), ½ to 4 inch
3-3519/2536-P3	159 000 822	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), ½ to 4 inch
3-3519/2536-P4	159 000 823	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), 5 to 8 inch
3-3519/2536-P5	159 000 824	Sensor & Wet-Tap Assy., PP, Titanium Rotor Pin, PVDF Rotor (black), 10 to 36 inch

Replacement Parts 2536/8512

3-2536.320-1	198 820 052	Rotor, PVDF Black
3-2536.320-2	159 000 272	Rotor, PVDF Natural
3-2536.320-3	159 000 273	Rotor, ETFE
3-2536.321	198 820 054	Rotor and Pin, PVDF Natural
3-2536.322-1	198 820 056	Sleeved Rotor, PVDF Black
3-2536.322-2	198 820 057	Sleeved Rotor, PVDF Natural
3-2536.322-3	198 820 058	Sleeved Rotor, ETFE
P31542-3	159 000 464	Sensor Cap, Blue (for use with 2536)
3-2536.555	159 500 532	Sensor Cap, Gray (for use with 2536)

Accessories 515/8510 & 2536/8512

M1546-1	198 801 182	Rotor Pin, Titanium
M1546-2	198 801 183	Rotor Pin, Hastelloy-C
M1546-3	198 820 014	Rotor Pin, Tantalum
M1546-4	198 820 015	Rotor Pin, Stainless Steel
P51545	198 820 016	Rotor Pin, Ceramic
1220-0021	198 801 186	O-Ring, FKM
1224-0021	198 820 006	O-Ring, EPDM
1228-0021	198 820 007	O-Ring, FFKM
P31536	198 840 201	Sensor Plug, Polypropylene
P31934	159 000 466	Conduit Cap
P51589	159 000 476	Conduit Adapter Kit
5523-0222	159 000 392	Cable (per foot), 2 conductor with shield, 22 AWG
3-8050	159 000 184	Universal mount kit
3-8050-1	159 000 753	Universal junction box
3-8050.390-1	159 001 702	Retaining Nut Replacement Kit, NPT, Valox®
3-8050.390-3	159 310 116	Retaining Nut Replacement Kit, NPT, PP
3-8050.390-4	159 310 117	Retaining Nut Replacement Kit, NPT, PVDF
3-8051	159 000 187	Transmitter integral adapter (for 8510 and 8512)

+GF+

Georg Fischer Signet LLC, 3401 Aero Jet Avenue, El Monte, CA 91731-2882 U.S.A. • Tel. (626) 571-2770 • Fax (626) 573-2057
For Worldwide Sales and Service, visit our website: www.gfsignet.com • Or call (in the U.S.): (800) 854-4090
For the most up-to-date information, please refer to our website at www.gfsignet.com

3-0515.090 Rev. X 05/17 English

AquaMetrix 2250 / 2250 TX
Multi-Parameter Controller / Transmitter

Installation and Operation Manual

Contents

1 Introduction

1.1 Third in a Long History of Controllers

The 2250 multi-parameter controller is the third generation controller built on the 30-year AquaMetrix legacy of building durable and easy-to-use controllers. Many of the 2200 controllers sold those three decades ago are still in use today in some of the most hostile environments found in industry. Orders continue to come in today for 2200 pH, ORP or conductivity models, five years after they entered end-of-life status.

In 2006 the 2200 series of controllers were rolled into one multi-parameter controller, the Shark, and a transmitter version, the Shark TX. One Shark can handle a pH, ORP, conductivity or flow sensor with just a menu change. The Shark continued the 2200 tradition of providing near bulletproof performance in demanding industrial environments.

Water Analytics built on three decades of design experience and conversations with its customers to bring to market the 2250 controller and 2250 transmitter. Some of the design improvements over the Shark include:

- A form factor that enables better wall mounting.
- Large LCD screen—backlit in the 2250 version.
- An intuitive menu structure, which means reading this manual should not be necessary.
- An advanced conductivity measurement design that results in a ten-fold improvement in accuracy at low and high conductivity values.
- The ability to calibrate conductivity solutions in TDS units (mg/l).
- Three-point calibration for pH to give more accurate pH values over a wide pH range.
- Multi-point (<16) calibration routine for conductivity to enable acid and base concentration measurements.
- PID control.
- Easy-to-use screw-free probe connector.

1.2 Differences between the 2250 and 2250 TX

The 2250 is an AC-powered controller consisting of three relays and two 4-20 mA outputs. The 2250 TX is a transmitter version. It is loop-powered and does not contain the power-relay circuit board. Because of power constraints the LCD is not backlit.

2 Specifications

Probe Parameters				
	pH	ORP	Conductivity	Flow
Probe	6-wire differential or combination	6-wire differential or combination	2-electrode. Cell constants: 0.01, 0.1, 1.0, 10 and 50	Pulse output: Paddle-wheel Magnetic Flow
Temperature Elements	100, 1000 Ω RTD 300, 3000 Ω NTC	100, 1000 Ω RTD 300, 3000 Ω NTC	100, 1000 Ω RTD 300, 3000 Ω NTC	n/a
Sensor Input	-600 to 600 mV	-1999 to 1999 mV	Cond: 0 to 9999 Ω Temp: 0 to 9999 Ω	0 to 2000 Hz
Measurement Range	0 – 14 pH 0 – 100 ^{0}C	-1999 to 1999 mV	0.055 to 100,000 µS/cm, depending on cell constant	0 to 9999 in units: l, cm^3, ft^3, m^3 sec, min, hr
Temperature Compensation	Automatic 0 to 100 ^{0}C	n/a	Automatic or Manual	n/a
Calibration Mode	pH: Automatic Manual Temp: Manual	ORP: Manual Temp: Manual	Cond: Manual, Cell const. input Temp: Manual	K-factor input
Outputs				
Analog	2250: 2 x 4-20 mA, optically isolated 1-Process 2-Temperature or Process Scalable Max load: 800 Ω		2250TX: 4-20 mA – Process Optically isolated Scalable Max load: 800 Ω	
Digital	RS485 for diagnostic use only			
Relays	2250: 3 x 5A @ 120/240 VAC or 28 VDC NO or NC		2250TX: None	
Relay Modes	2250: Rising/Falling, Cycle On/Off, Relay Delay, Overfeed Timer, Override		2250TX: n/a	
Ratings				
Ingress Protection	NEMA 4X			
Electrical	UL, cUL and CE compliant and pending			
Max. Power Input	2250: 0.2 A @ 115 VAC or 15 W		2250 TX: 20 mA @ 24 VDC	
Temperature	-20 to 70 ^{0}C			
Humidity	0 to 90% Relative Humidity			
Physical				
Mounting	Wall mount, panel mount w. kit provided, DIN rail mount w. kit requested			
Dimensions	Front cover: 5.5”x5.5” (14 cm x 14 cm). Depth: 5” (13 cm)			
Power	2250: 120/240 VAC 60 or 50 Hz		2250TX: 12-24 VDC	
Weight	2 lbs			
Protection	NEMA 4X			

4 Probe Setup

When powering up the 2250 the first screen presents options for configuring sensors. When setting up the 2250 for the first time or when setting up the 2250 for a sensor type that is different from an existing one, the choose the Setup menu.

The top-level menu allows the user to configure the 2250 for a pH, ORP, conductivity or flow sensor. Note that flow sensors are those that output a square wave pulse whose frequency is proportional to the flow.

The Setup option in the top-level menu allows you to completely configure a new probe or change an existing one.

4.1 pH

1. Scroll down the top level menu to elect Setup and press the Enter key.
2. Press Probe Selection to choose the probe type, pH.
3. Press pH. It is the first item on the list of probes so it is already selected.
4. This selection automatically brings up the next menu for defining the configuration of the pH probe.
5. Type sets the probe as a Combination or Differential probe. The 2250 will accept just about any type of either. Entering a probe as the wrong type will simply result in an artificial offset at pH 7 and may not cause any noticeable reading or error. Combination probes may consist of only two wires for the process or reference or four wires, which includes two leads for the temperature element. Differential probes always have five or six wires—the 6th wire being an optional shield conductor. After selecting the type the next menu automatically appears to show the configuration of the probe
6. With the exception of the two-wire combination probe, the type of temperature element must be selected. Select Temp Element to bring up the choices of temperature elements:
    - ∞ 100 Ohm RTD
    - ∞ 1000 Ohm RTD
    - ∞ 300 Ohm NTC thermistor
    - ∞ 3000 Ohm NTC thermistor

    The default setting is the 300 Ohm RTD as that is the temperature element standard on AquaMetrix differential probes. Please note that RTD's show a positive correlation with temperature while thermistors display a negative one.
7. Select the preferred unitsµ of temperature (Temp Unit):
    - ∞ Celsius
    - ∞ Fahrenheit
    - ∞ Kelvin. The Kelvin scale is an absolute one, meaning that 0 K is absolute zero. It equals degrees Celsius plus 273.15.

4.2 ORP Probes

The setup for ORP probes is identical to that of pH probes. The output ORP probes that have temperature elements, which includes all differential probes, is NOT temperature compensated. The temperature is an independent reading.

4.3 Conductivity Probes

1. Scroll down the top level menu to elect Setup and press the Enter key.
2. Press Probe Selection to choose the probe type, Conductivity.

4.3.1 Cell constant

You must know the correct cell constant. It is typically written on a label attached to the conductivity probe.

For convenience the approximate conductivity range for each cell constant is displayed alongside the constant in the list of available constants. However, choosing the cell constant on the basis of the desired range will give you incorrect readings if the correct probe for that range was not properly chosen. For instance you may have a probe with a cell constant of 10—corresponding to a range of 1 to 50 mS/cm—yet you wish to measure conductivity values on the order of 0.1 mS/cm (or 100 µS/cm). If you choose a cell constant of 1 to encompass this range the 2250 will display values that are 10 times the correct values. **Choose the cell constant for the probe, not the cell constant that has the desired conductivity range.**

4.3.2 Temperature Element

Conductivity readings are strongly influenced by temperature so nearly all conductivity probes have temperature elements. The same choices for temperature element for pH and ORP are present for conductivity. The default temperature element for AquaMetrix AS series probes is the 3000 Ω NTC thermistor so that option is pre-selected. The default element for AquaMetrix AM series probes is the 1000 Ω RTD.

4.3.3 Temperature Unit

As in pH and ORP probes the choices for the temperature units are Celsius, Fahrenheit and Kelvin.

4.3.4 Conductivity Units

Conductivity values span a range of a million to one so one unit for representing values is impractical. The choices are:

- µS/cm. For clean, tap, surface or ground water this unit is the most common. RODI water typically has conductivity of 1 µS/cm or less. Tap water is around 300 µS/cm.
- mS/cm. Salt solutions, acid and bases use the higher range. 1 mS/cm = 1000 µS/cm. Confusion between the two is responsible for nearly all problems selecting conductivity sensors and setting up the correct range.

- MOhm-cm. For very pure water many workers prefer to report resistivity units in place of conductivity units. One is the inverse of the other, e.g. 1 µS/cm = MΩ-cm. Ultrapure water has a resistivity of 18.8 MΩ-cm. (Its finite resistance is the result of H^+ and OH^- ions.)

- TDS (mg/l). The correlation between total dissolved solids (TDS) and conductivity varies with every sample of water. In order to display conductivity in terms of TDS units one must choose a conversion factor. Selecting this option brings up a display where you select the conversion of TDS units to µS/cm units. The default value is 1 µS/cm = 0.65 mg/l. This is the value that most inexpensive pen-type TDS probes assume. The only way to assign a custom conversion factor is to measure the TDS value by evaporating the water from a sample and weighing the leftover solids.

- Temp Coefficient. Over a limited temperature range the variation of conductivity with temperature is linear. Conductivity values are always reported at the 25 ^{0}C. Therefore the correction between the conductivity at any given temperature (T) and the conductivity 25 ^{0}C at is:

$$\sigma(T) = \sigma(25^0C)[1+ \propto (T - 25^0C)]$$

  T is the temperature of the sample and α is the temperature coefficient. The default value for α is 2.00. You can change it to any value needed.

- Temp Compensation. For most applications temperature compensation should always be on. However for diagnostic purposes and some isolated cases where you need to know the actual conductivity (and not the value at 25^{0}C). For these isolated cases turn compensation off.

4.3.5 Flow

Any flow sensor that outputs a pulse will work with the 2250. The 2250 measures instantaneous flow and totalized flow. The latter is a running total of the volume and is equal to the flow integrated over time. Flow has unites of volume/time so there are two units to specify:

- Volume Units. Choices are gallons, ft^3, cm^3 and liters.

- Time Units. Choices are milliseconds, seconds, minutes and hours.

- Totalizer Reset. This function resets the totalized volume to zero.

5 Calibration

The 2250 only presents menu choices appropriate for the probe chosen. If the wrong menu choices for calibration appear then go back to the Setup menu and select the correct probe.

5.1 pH

5.1.1 About pH Calibration

Most pH analyzers allow the user to calibrate a probe with only two points. Nearly all pH calibration is done using two of three standard calibration solutions: pH 4, 7 and 10. For two-point calibration use the two standards that are closest to your expected process values. For example, if your process is mostly acidic (< pH 7) then calibrate using standards pH 4 and pH 7.

For measurements that span either side of neutral (i.e. pH 7) the 2250 offers the option of three-point calibration. Three-point calibration yields higher accuracy than using only two points, pH 4 and 10. An algorithm calculates the best fit slope through the three points using linear least squares fitting and is superior to algorithms that just interpolate between the two neighboring points.

A pH probe that operates according to theory outputs 59.16 mV at 25^0C for every change in pH. The actual change in output for a real probe is likely to be different and is the **slope** for that probe. An ideal probe in pH 7 solution (at 25^0C) outputs 0 volts. The actual output is likely to be different and is the **offset**. The slope yields the **efficiency** of the probe. A probe that outputs 59.16 mV at 25^0C is 100% efficient. If the probe outputs, say, 57.34 mV then the efficiency is 96.9% efficient.

When a probe leaves the AquaMetrix factory it is tested three times to insure that its efficiency is at least 90%. As probes age their efficiency decreases. Note that a probe with low efficiency will still be accurate but it will not be precise, i.e. its reading will have a large uncertainty. We recommend replacing a probe when its efficiency drops below 80%. (Before discarding a probe with low efficiency make sure it is clean. A probe whose process electrode is fouled will show a low efficiency but can be cleaned and restored to working at high efficiency.)

A probe that leaves our factory also has an offset that is within 59 mV, i.e. 1 pH unit, of 0. A changing offset usually indicates that the reference solution is contaminated.

5.1.2 2 points. As stated above, use the two calibration standards that encompass the pH range of your process.
There is a choice between auto and manual calibration.

5.1.2.1 Auto Calibration

In auto calibration the 2250 reads the probe output when it is in a buffer and judges whether the buffer is pH 4, 7 or 10. Ideal voltages for these buffers are 177, 0 and -177 mV. If the output of the probe is within 59.16 mV (1 pH unit) from any of these values auto calibration assumes it "knows" the calibration standard in which the probe is immersed. If the output is greater than 59 mV auto calibration will fail. There are several reasons why this can happen:

1. The offset from the expected reading at pH 4, 7 or 10 (i.e. 177, 0 and-177 mV) is greater than 59 mV.
2. You are using a non-standard buffer.
3. The buffer has aged and is no longer at its nominal pH.

To initiate auto calibration:

1. Select Auto Calib.
2. Follow the directions on the next screen and immerse the probe in the first calibration standard. A typical probe takes about 1 minute to calibrate. It helps to swirl the probe around in the solution. After a minute or longer press the Enter key as instructed. (If you press the Enter key too soon the analyzer will accept an inaccurate probe reading and the efficiency is likely to be lower that it should.)
3. The screen will display Calibrating for a few seconds as it reads the probe output and stores the probe value. The next screen will appear and will direct you to immerse the probe in the second calibration standard. (*Always rinse the probe in clean tap water when changing buffers.*) Again, wait at least one minute before pressing Enter to record the probe output value of the second calibration solution.
4. The screen will again display Calibrating for a few seconds and will display the results of the calibration. An example is:

   Slope = 53.47 mV/pH
   Efficiency = 90.38%
   Offset – 18.54 mV
   Press Enter to accept.
   Press Back to cancel.

   As the screen instructions state, press Enter to accept the calibration or Back to repeat it. Pressing Menu brings you back to the top menu.

5.1.2.2 Manual Calibration

As explained above manual calibration can be used if the probe has a very large offset, has low efficiency or is being calibrated with non-standard buffer solutions.

1. Select Manual Calib.
2. Place the probe in the first buffer. As opposed to auto calibration, it is okay to press Enter without waiting for the probe output to settle down. The next screen will displays the current output reading of the probe. The pH is calculated from the mV reading based on the operation of a perfect probe at 25 ^{0}C, i.e. pH 7= 0 mV and the voltage increment is 59.16 mV/pH.
3. When the reading settles down press Enter. The next screen allows you to change the value of the displayed pH value to correspond to the actual pH of the calibration solution. Use the up and

down arrows to change the value and the side arrows to change the cursor position. Press the Enter key to lock in the correct value.

4. The results of the calibration, identical to the one shown for auto calibration, will display.
5. Place the probe in the second buffer. Again, there is no need to wait for the probe reading to settle down prior to pressing Enter.
6. When the reading settles down press Enter. Change the pH reading to the pH of the calibration standard.

5.1.3 3-Point Calibration

The instructions for 3-point calibration are the same as for 2-point calibration with the obvious exception that three standards are used instead of two.

5.1.4 Temperature Calibration

Since all pH readings are temperature compensated, an accurate pH reading depends on an accurate temperature.

1. Select Temp Calibration.
2. The screen displays the current temperature reading. Make sure the temperature reading has settled down. Keep in mind that most temperature elements in pH probes are encapsulated inside the probe, which results in a temperature lag of several minutes for the element to equilibrate with the temperature of the solution.
3. Temperature calibration is similar to manual pH calibration. When the temperature reading settles down press Enter. The next screen allows you to change the temperature reading to the actual temperature. Press Enter when done or Menu to go back to the top menu.

5.2 ORP Calibration

ORP is a unique water quality parameter. For all other parameters a voltage, current or other electrical change corresponds to a value of the parameter in a manner that calibration determines. For instance, a pH probe generates a voltage that maps to a pH value in the manner described above. The ORP parameter is the actual voltage of the probe. No translation to a dependent parameter takes place. An ORP analyzer is just a voltmeter and no calibration is needed.

However all voltmeters need to be calibrated. The only practical way of doing so for an ORP analyzer is to measure the offset of the voltmeter. This is called a **standardization**. ORP calibration is therefore not a calibration at all but a standardization. *Nevertheless, this manual follows the loose practice of using the term "calibration" instead of "standardization."*

The process of standardization involves only one calibration standard. One immerses the ORP probe in a calibration standard and adjusts the reading of the analyzer until it matches the actual value of the solution.

There are no standard calibration solutions for ORP although Zobell's (XXX mV) and Light's (XXX mV) solutions are the most common. AquaMetrix makes its own versions of these two solutions that are nominally 200 and 600 mV. ORP solutions are not buffered which means that their ORP values are not as

stable as pH buffered standards are. Each calibration solution AquaMetrix carries an ORP value that may vary within 20 mV of the nominal 200 or 600 mV value. Furthermore these values will change so the chemicals in the solutions slowly oxidize. Therefore ORP solutions should be replaced at least every 6 months.

For reasons just stated, ORP calibration is a manual, one-point procedure.

1. Select ORP Calibration.
2. Place the probe in calibration standard and press Enter. As in all manual calibrations there is no need to wait prior to pressing Enter.
3. Observe the probe output reading and, when it has settled down, press Enter.
4. Adjust the value displayed in the next screen until it matches that of the calibration standard. Note that ORP standards can be negative so be careful to set the correct +/- sign.

5.3 Conductivity

As with ORP calibration there are no recognized standard calibration standards so there is no auto calibration option. Also as with ORP, conductivity calibration standards are not buffered and can change. Stability of the conductivity standard is only a problem for standards of very low conductivity, where introduction of impurities in the solution can induce large changes in conductivity. At conductivity standards below 5 µS/cm just carbon dioxide in the air can increase the actual conductivity.

In those cases where a conductivity standard is not available one may enter the cell constant of the probe as an approximate calibration. Obviously the calibration using the known cell constant is only as good as the cell constant is known. Usage of the probe can cause scaling or fouling of the electrode which will result in a reduced cell constant. Therefore calibration using real a real conductivity standard is always preferred.

Most conductivity analyzers employ a calibration routine that uses only one calibration standard. This is actually a 2-point calibration routine inasmuch as the other point is assumed to be zero, i.e. that the conductivity for a zero conductivity sample is zero. The 2250 allows as many as 16 points. Though one point is sufficient for most applications the ability to calibrate over several points allows one to use conductivity measurements to determine acid and base concentrations. As the figure below shows conductivity as a function of acid/base concentration is very non-linear and, therefore, several points are needed to construct the curved relationship.

(SHOW GRAPH OF CONDUCTIVITY VS. CONCENTRATION.)

5.3.1 Manual Calibration

The procedure for manual conductivity calibration is nearly the same as that for manual pH and ORP calibration. The only exception

1. Select Manual Calibration.
2. Select the number of calibration standards to be used. In most cases choose 1. For greater accuracy choose 2 or 3. Only for measuring acid and base concentrations are more points needed. Press Enter to accept the number of points.

3. Immerse the probe in the first (or only) calibration standard. Press Enter.
4. The display will show the current conductivity reading. Adjust the conductivity reading to correspond to the actual conductivity value of the standard.
5. Repeat for additional standards if there are any.
6. Press Enter to accept the calibration or Back to discard it.

5.3.2 Cell Constant

As explained above this procedure substitutes actual calibration with the input of the known cell constant. One might assume that this is the same cell constant value input during the Setup procedure. However, the actual cell constant of the probe is likely to be different from the nominal cell constant. For instance, the cell constant for a probe with nominal cell constant 1.0 cm^{-1} may actually be 1.05 cm^{-1}. If the actual cell constant is known then this calibration option allows one to input it.

1. Select Cell Constant.
2. In the next screen enter the cell constant. Possible values are 0.01 to 999 cm^{-1}.
3. Press Enter when done.
4. Press Enter to accept or Back to cancel.

5.3.3 Temperature

Temperature calibration for a conductivity sensor follows the same procedure as for pH (Section 5.1.4).

5.4 Flow

There is no actual calibration procedure for a flow sensor. The K-factor supplied by the manufacturer sets the conversion between each pulse and the corresponding volume. The pulse frequency is proportional to the velocity of water flowing past the sensor. However, by incorporating the diameter of the pipe, the flow sensor manufacturer is able to convert the fluid velocity (e.g. cm/sec) into a flow rate (e.g. cm^3/sec).

For most applications the K-factor supplied by the manufacturer is sufficient to yield accuracy of better than 5%. For greater accuracy one can determine the actual K-factor by measuring the time it takes to fill a container with a known volume of water.

To input the K-factor:

1. Select Manual. (It's the only choice but future firmware versions may allow the experimental determination of the K-factor though the container filling exercise mentioned above.)
2. Enter the K-factor. It's important that the flow units of the K-factor are the same as the units selected during setup. If they are not then go back to Setup and change the units. Alternatively one can perform unit conversion arithmetic to insure that the K-factor entered has the units selected during setup.
3. Press Enter to escape this screen.
4. Press Enter to accept the K-factor or Back to cancel.

6 Output (2250 only)

The 2250 has three output modes:

1. Three dry contact relays
2. Two isolated 4-20 mA current outputs
3. PID control.

When the 2250 is used for process control then one to three of the relays are configured. When the 2250 is used in conjunction with PLC's or SCADA systems then the 4-20 mA outputs are configured. PID control is used for fine control of a process using the 4-20 mA output on the main board.

6.1 Relays

The 2250 is equipped with three relays rated for 5 A @ 240 V. For safety reasons we strongly recommend that relays in the 2250 control a low current circuit that closes a second relay for the pump or other process control device. Three relays give users the capability of controlling a falling process, rising process and a physical alarm.

Note: All instructions assume a relay is wired as normally open (NO). If a relay is wired normally closed (NC) then activate or open should be reversed, i.e. deactivate or close.

It is important to distinguish between rising and falling processes. A rising process is one that triggers a relay (or alarm) when it rises above a set point. A falling process triggers a relay as it drops below a setpoint. For every alarm setpoint there is a second setpoint at which the relay deactivates. For instance, suppose you are controlling a process whose pH naturally rises. Let's suppose that, when your process reaches pH 9, a relay closes and starts a pump which dispenses acid to bring the pH back down. The pH value at which the relay opens again must be less than 9.0. If it is too close to 9.0, e.g. 8.9, you risk having the chemical dispenser cycle on and off too frequently. Even more problematic is that the relay changes state before the pH has a chance to equilibrate. The result is that the process is never stable and you waste more acid than necessary. For these reasons the relay deactivation must be sufficiently below the activation, e.g. pH 8.0 in this case.

The following description applies to all three relays.

6.1.1 Rising Process

1. Select On. A relay cannot be set for a rising process AND a falling process. If you previously set a relay for a falling process and you set it again for a rising process then the falling process automatically turns off.
2. Enter the value of the process variable (e.g. pH) at which the relay turns on (i.e. the setpoint). Press Enter to accept this value.
3. Enter the value of the process variable at which the relay turns off. Press Enter to accept this value. As explained above the off value must be lower than the on value. If your off value is higher, then a warning message appears (NOT YET).

6.1.2 Falling Process

The same process holds for a falling process except that the on setpoint must be lower than the off setpoint.

6.1.3 Cycle On/Off

The cycle on/off parameter is very useful in preventing overshoot of a process controlling action—usually the dispensing of a chemical via a pump. If the response time of the process to the added chemical is slow compared to the rate at which the chemical is being added then the process variable will overshoot its target (as described in Section6.1 for a rising process). Choosing set points for the activating and deactivating the relay is a first line defense against overshoot.

As a means to keep the two setpoints within a tight range, cycling the relay on and off is invaluable. As Figure 6-1 shows, the duty cycle is expressed as the duration over which the relay is activated divided by the total time of the complete on-off cycle. If the relay is on for 10 seconds and off for 30 seconds then the complete cycle is 40 seconds and the duty cycle is 25%. The slower the response time of the process to the added chemical (or other process control mechanism) the lower the duty cycle or time-on.

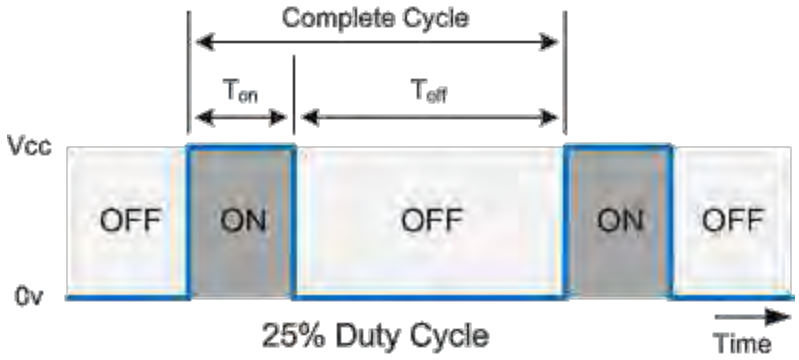


Figure 6-1 Duty cycle with the On cycle being ¼ of the complete cycle. An example of a duty cycle expressed in seconds is 10 seconds on and 30 seconds off.

1. Select On.
2. Enter the value for the amount of time, in seconds, the relay is on (activated). Press Enter to accept this value.
3. Enter the value for the amount of time, in seconds, the relay is off (deactivated). Press Enter to accept this value.

6.1.4 Relay Delay

There are instances in which a process value can initially spike upon addition of a chemical. An example is acid that is dispensed very close to a pH sensor such that, when the acid is first dispensed the probe pH drops precipitously and then rises as the acid is mixed. This is the opposite of a problem that occurs if the probe is far from the injection point such that there is a long delay in the change in pH and that calls for cycle on/cycle off control. Placing the sensor in the correct position would preempt the need for a relay delay but, for systems that are not easily modified, this option is a good solution.

1. Select On.
2. Enter the value for the amount of time, in seconds, for the delay. Press Enter to accept this value.
3. Enter the value for Relay-Off Delay, the amount of time the relay is off (deactivated), in seconds. Press Enter to accept this value.

6.1.5 Overfeed Timer

If a probe malfunctions it is possible for a relay to activate and stay permanently activated. Using the above example of a relay connected to an acid dispenser: The relay is programmed to activate at 9 and deactivate at 8. If the probe failed and remained stuck at pH 8 or higher, then the chemical pump that dispenses the acid would operate until it emptied out the entire container of acid. Perhaps worse is that the actual pH of the process would drop to a dangerously low level and cause serious damage to the processing equipment.

The overfeed timer option prevents this serious mishap. By specifying the maximum amount of time a relay can remain activated the damage caused by a faulty probe signal is contained. We strongly recommend always setting this option.

1. Select On.
2. Enter the value for the maximum time, in minutes, the relay can remain activated.
3. Press Enter to accept this value.

6.1.6 Relay Override

This simple control manually forces the relay on or off. It can be used as a switch to turn the process control function off and on and is normally used for either testing or emergency purposes.

The options are:

Auto: Disable override so that the relay behaves as set up.

On: Activate the relay.

Off: Deactivate the relay.

6.1.7 Summary

The Summary menu item lists the relay parameters described in this section. The list of parameters requires two screens of information. Press Enter to continue from the first screen to the second.

6.2 4-20 mA Output – Channel 1

The 2250 hosts two 4-20 mA outputs. Output #1 emanates from the main circuit board. Output #2 emanates from the power board and is thus not available in the 2250 TX. Output #1 always transmits the process variable while output #2 can transmit the temperature of a pH, ORP or conductivity probe. The latter sometimes transmits the process variable to a different destination or using a different scaling than output #1. Both outputs can be scaled so that the two process values corresponding to 4 mA and 20 mA may take on any value.

6.2.1 Channel 1 – [PV] – 4 mA

PV is the process variable—pH, ORP, conductivity or flow.

1. Enter the value of the process variable that corresponds to 4 mA.

    a. The default value is 0 for pH, conductivity and flow.

    b. For an ORP probe the 4 mA value default is -1000 mV.

    You may adjust the 4 mA value to the lowest value you expect to observe and defaults to 0. If, for instance, you are monitoring the pH of a process that never falls below 3 then change the 4 mA value to 3.

2. Press Enter to accept this value or Back to start over.

6.2.2 Channel 1 – [PV] – 4 mA

3. Enter the value of the process variable that corresponds to 20 mA. This is usually the highest value you expect to observe. Its default value depends on the setup parameters for the probe.

    a. For a pH probe it's 14.

    b. For an ORP probe it is 1000 mV.

    c. For a conductivity probe it is the upper limit for the cell constant chosen. For instance a probe with a cell constant of 10 will create a default 20 mA value of 50 mS/cm.

    You may adjust the 20 mA value to correspond to the highest value you expect to observe. If, for instance, you are monitoring the pH of a process that never rises below 10 then change the 20 mA value to be 10.

4. Press Enter to accept this value or Back to start over.

5. The next screen summarizes your choice of 4 and 20 mA values.

Note that the 4 mA value can be higher than the 20 mA value. This simply reverses the direction of the 4-20 mA signal as the process variable changes.

6.3 4-20 mA Output – Channel 2

The same instructions apply to Channel 2. For this channel you may set the output to follow either the process variable or temperature. That choice is made in the first menu item.

NOTE: The current firmware (V1.0.1) does not allow scaling of the temperature, i.e. 4 mA is always for 0 ^{0}C and 20 mA is always for 100 ^{0}C.

6.4 4-20 mA Output for Proportional Control

Some pumps, especially metering pumps, can be controlled by a continuously variable 4-20 mA input from a transmitter. This type of control is called **proportional control** because the magnitude of the current output is proportional to the difference between the target setpoint of the process variable and

the actual process variable, aka the **error**. Let's look at the case of a process whose pH naturally rises and is controlled by dispensing acid. For control by a relay described in Section 6.1.1 the relay-on pH value was set at 9.0 and the relay-off value was set at pH 8.0. The process would thus cycle between pH 8.0 and 9.0.

With 4-20 mA proportional control you can achieve a much narrow range of operation without risking overshoot. You might decide on a setpoint of 8.5. You would adjust the 4 mA value for 8.5. As the pH rises above 8.5 the error (e) would increase and the corresponding current output would increase proportionally. The output of the pump would accordingly vary according to the magnitude of the error and enable the process to be close to 8.5 at all times.

6.5 PID Control

PID control extends the concept of 4-20 mA proportional control to a high level. PID stands for Proportional-Integral-Derivative. PID control is a function of the following three components.

- **Proportional**. This component of the current output is proportional to the error, e(t), as described in the previous section. Mathematically it is
- **Integral**. This component of the current output is proportional to the integral of the error. This is roughly equivalent to the sum of the error going back in time. Mathematically it is:
  - $I(t) = \int_0^t e(\tau)d\tau$
- **Derivative**. This component of the current output is proportional to the instantaneous change in error. Mathematically it is:

$$D(t) = \frac{de(t)}{dt}$$

The total current output is the weighted sum:

$$I_{4-20}(t) = K_p e(t) + K_I I(t) + K_D D(t) = K_p e(t) + K_I \int_0^t e(\tau)d\tau + K_D \frac{de(t)}{dt}$$

The coefficients Kp, KI and KD are weighting factors for each of the three components. For purely proportional control KI = KD = 0.

To set up PID control requires setting values for the three coefficients:

1. Turn PID control On.
2. Set the value for K_P. Press Enter to accept it.
3. Set the value for K_I. Press Enter to accept it.
4. Set the value for K_D. Press Enter to accept it.
5. Set the value for the PID target, which is the desired value of the parameter (in the example above, 8.5).

Setting up PID control takes considerable skill and should not be done by "amateurs." Choosing the wrong PID parameters can cause a process to overshoot wildly and never reach equilibrium.

6.6 Manual Test

Manual Test allows you to insure that the outputs operate as intended without requiring the probe to deliver the actual output needed to test a relay or 4-20 mA output. For instance, if you set a relay for a rising process that activates when the pH reaches 9.0 you might test it by immersing it in pH 9.1 solution and verifying that the relay activates. With manual testing that is unnecessary. Simply dial in the pH value to 9.0 and observe the state of the relay on the screen.

The Manual Test screen also displays the 4-20 mA reading. In the example below Relay 1 was set to activate at pH 9.0. Relays 2 or 3 were either set to activate at a higher pH, a falling process below 9.0 or were not turned on at all. The Ch 1 4-20 mA corresponding to pH 9.1 is 14.3 mA (based on the 4-20 range corresponding to 0 to 14). The 4-20 Ch 2 mA corresponds to the temperature.

pH:	9.0 pH
Relay 1:	ON
Relay 2:	OFF
Relay 3:	OFF
Ch 1 4-20:	14.3 mA
Ch 2 4-20:	10.8 mA

Note that, in Version 1.0.1, Channel 2 does not allow scaling for the temperature output.

7 Diagnostics

The Diagnostics menu has four options.

7.1 Calibration Data

This menu has one screen, which displays the results of the latest calibration.

- **pH**. This includes the number of calibration points (2 or 3), slope, offset, efficiency and calibration temperature.
- **ORP**. This includes the offset and calibration temperature (not yet included).
- **Conductivity**. This includes the number of calibration points (1 – 16), actual cell constant (not yet included), calibration temperature and temperature coefficient.
- **Flow**. This includes the K-factor.

7.2 Sensor Output

This diagnostic displays the raw signal coming from a probe. It is invaluable for diagnosing probe problems.

- **pH**. A pH probe outputs a voltage. The temperature element (if present) outputs a resistance. For diagnosing a problematic pH probe the voltage output should be (7.0 – pH) x 59 mV within a tolerance of about 50 mV. A smaller value indicates low efficiency, which may be ameliorated by cleaning, changing the reference solution or changing the salt bridge. If the probe output does not change upon changing calibration standards then the probe is dead.

  The resistance of the temperature element should be close to the nominal resistance, which, depending on the element is either 100, 300, 1000 or 3000 Ω. A resistance reading far removed from its nominal value is indicative of a defective element.

- **ORP**. An ORP probe also outputs a voltage. The temperature element (if present) outputs a resistance. Unlike a pH probe the ORP value is not temperature compensated.

  The resistance of the temperature element should be close to the nominal resistance, which, depending on the element is either 100, 300, 1000 or 3000 Ω. A resistance reading far removed from its nominal value is indicative of a defective element.

- **Conductivity**. A conductivity sensor measures resistance (which is inversely proportional to conductance). The temperature element outputs resistance as well.

  The resistance of the temperature element should be close to the nominal resistance, which, depending on the element is either 100, 300, 1000 or 3000 Ω. A resistance reading far removed from its nominal value is indicative of a defective element.

- Flow. A paddle-wheel or magnetic flow meter outputs a pulse train. The raw output is the pulse frequency.

7.3 Rest User Cal

This feature will rarely be used. It resets calibration to factory defaults.

7.4 About

This feature displays the current firmware version and its release date. If you experience issues and contact us you will want to know which firmware version is running.

8 Preferences

The Preferences menu has three options that only affect the user experience.

8.1 Auto Return

This feature allows you to return the 2250 to Run mode if you walk away from the 2250 while exercising a menu item. The choices are

None, 5 min, 10 min, 30 min and 60 min.

If you choose “None” then the menu which was active when you left will be active indefinitely. If you choose one of the other options, e.g. 10 min, then the screen will revert to the run screen after 10 minutes of inactivity. This feature is invaluable if the 2250 is transmitting data to a PLC or SCADA. When a menu item is being exercised the controller ceases to send data, which can cause an undue alarm or relay at the PLC or SCADA.

8.2 Damping

Damping imposes signal averaging, which dampens fluctuating values. The choices are

1, 2, 4 and 8 sec.

As an example, if damping is set to 4 seconds, then the 2250 averages all data points within the preceding 4 seconds. Note that this is a rolling average, i.e. the average continuously discards the oldest data point and adds a new one. Both the reading on the display and the 4-20 mA output (IS NOT?) show averaged values.

8.3 Backlight (2250 only)

This feature allows you to change the brightness level of the LCD screen. This is useful for matching the screen brightness to the ambient brightness. For darkened interiors, turning down the brightness helps prevent eye strain.

OPERATING INSTRUCTION MANUAL

MODEL P/R60 & P/R65
DIFFERENTIAL PH & ORP PROBES

N116-19 REV. 10

Water Analytics, Inc.
100 School Street
Andover, MA 01810

Tel: (978) 749-9949
(855) 747-7623
Fax: (978) 749-9961
www.WaterAnalytics.net

TABLE OF CONTENTS

1.0 GENERAL INFORMATION

This manual covers all AquaMetrix P60, P65, R60 and R65 Series differential measurement pH and ORP probes.

All mounting configurations are described.

Both those probes with encapsulated preamplifiers and those with encapsulated two-wire transmitters are covered. If your probe has five wires it has an encapsulated preamplifier (P60 and R60). If your probe has two wires, or in the case of an ORP probe four wires, it has an encapsulated two-wire transmitter (P65 and R65).

The output from a two-wire transmitter type is non-isolated and un-calibrated. The system must provide 24 Vdc, with “low” isolated from earth ground, and a means of calibrating for offset and span.

NOTE: Do not discard the protective cap(s) that came with the sensor. If the sensor is removed from the process for an extended period of time, thoroughly clean the sensor, put a piece of cotton ball with few drops of water into the protective cap and replace it on the sensor. This keeps the junction from drying out which causes slow response when put back into operation or causes permanent damage to the sensor. **Sensors should not be left in dry lines or empty tanks for extended periods.**

Do not store the sensors in a dry or humid location. When storing, check the protective cap(s) regularly to make sure the cotton ball remains moist. Improper storage of sensors voids the warranty.

2.0 SPECIFICATIONS

MEASURING RANGES:
pH: 0 to 14.00 pH
ORP: R60: ±1999 mV
R65: 0-1000 mV / ±500 mV field selectable

FLOW RATE:
10 ft./sec max. Flow should be as low as possible in low conductivity water and in solutions with high suspended solids

WETTED MATERIALS:
P60/P65: CPVC, kynar/ceramic, glass, titanium palladium alloy and EPDM
R60/R65: CPVC, kynar/ceramic, glass, titanium palladium alloy, EPDM, and platinum

TRANSMISSION DISTANCE:
5-wire Probes: 900 meters (3000 ft.)
2-wire Probes: Limited only by cable resistance and voltage of power supply

SENSITIVITY: pH: Less than 0.005 pH
ORP: Less than 0.5mV

STABILITY: 0.03 pH / 2mV per day, non-cumulative

PRESSURE LIMIT: 100 psig @ 65°C
40 psig @ 95°C

TEMPERATURE LIMITS: -5 to 95°C (23 to 203°F)

POWER SUPPLY LIMIT:
24VDC ± 4V

PROBE CABLE: 15 ft. (4.6 m)

AUTOMATIC TEMPERATURE COMPENSATION:
-5 to 95°C (23 to 203°F)

P65C:
OUTPUT SPAN: 1.14mA / pH
OUTPUT OFFSET: 12mA @ 7pH ±1.14mA
MAX LOAD: 450 Ohms
R65C:
OUTPUT SPAN:
0-1000mV: 1.6mA / 100mV
±500mV: 1.6mA / 100mV
OUTPUT OFFSET:
0-1000mV: 12mA @ 500mV ±1mA
±500mV: 12mA @ 0mV ±1mA
MAX LOAD: 450 Ohms

3.0 INSTALLATION

3.1 General Instructions

3.1.1 Specific instructions for each type of probe are given in the following pages. Common to all probes are the following instructions:

a) If the distance between the probe and the instrument is such that a direct connection is not possible, the probe cable should be routed to a junction box with a terminal strip (AquaMetrix Part No. JB1). The box should be well sealed and away from corrosion danger. Be sure that you have sufficient slack cable to allow for probe removal for calibration and servicing.

b) Route the interconnect cable from the junction box to the instrument, preferably in metal conduit. Do not run the power cable or control cables in the same conduit with the probe interconnect cable.

c) Remove the protective plastic caps from the end of the probe before placing in service.

d) For best results probes should always be mounted vertically with electrodes down. If this is not possible, the probe must be at least 15° above horizontal.

3.2 ORP 4-20 mA Probes, R65

3.2.1 a) ORP 4-20 mA probes have four wires; black, red, green and white. The red wire is to be connected to the +24 Vdc terminal and the back wire to the 24 Vdc common terminal via the load in the loop.

b) For an instrument with a range of 0 to 1000 mV the green and white wires are to be shorted.

c) For an instrument with a range of –500 to 500 mV the green and white wires are to be isolated from each other.

3.3 Submersion Mounting Series 8 Differential Probes Refer to Dwg# N105-72

3.3.1 a) A submersion mounting kit, STC60L is available from Water Analytics which includes 4 ft. of 1” pipe, 1-1/2” x 1” reducer, a strain relief fitting and wire mounting bracket. Proceed as follows, either with the kit or with your own hardware.

b) Apply a thread sealant to the thread on the cable end of the probe and screw a 1-1/2” x 1” NPT reducer onto the probe. Route the sensor cable through an appropriate length of 1” pipe and using thread sealant, screw the pipe into the reducer. The cable end of the probe should not be exposed to the process. A cable strain relief fitting should be used on the upper end of the pipe. In the kits a wire bracket is provided to aid in supporting the assembly.

NOTE: An optional protective shroud, Part No. PROTECTOR-3 should be used on the electrode end of the probe to protect the electrodes from accidental contact with the tank bottom, sides or objects in the process.

3.4 Submersion Mounting Series 6 Differential Probes
Refer to Dwg# N105-73

3.4.1 a) A submersion mounting kit, STC60-6 is available from Water Analytics which includes 4 ft. of 1" pipe, 1-1/2" x 1" reducer and a strain relief fitting. Proceed as follows, either with the kit or with your own hardware:

b) Install the optional protective shroud, Part No. PROTECTOR-6 on the probe by threading the probe cable through it. The shroud will contact the shoulder on the probe.

c) Install the compression fitting components on the probe in the order shown in the drawing below so that the pipe thread is towards the cable end of the probe. If you are concerned that the shroud may get pushed up and expose the electrodes you can lock it down by the positioning of the fittings.

d) Snug up the nut of the compression fitting to locate it in the desired position. Hand tighten as much as possible, then turn 1/2 turn with a wrench.

e) Apply a thread sealant to the pipe thread portion of the compression fitting and screw a 1-1/4" x 1" NPT reducer to it.

f) Route the sensor cable through an appropriate length of 1" pipe and using thread sealant, screw the pipe into the reducer on the probe. The cable end of the probe should not be exposed to the process.

3.5 Flow-through tee mounting Series 8 Differential Probes
Refer to Dwg# N105-72

3.5.1 a) Apply pipe sealant to the electrode end of the probe and screw it into the AquaMetrix union tee w/ adaptor (Part No. AM-MH538N9A) or any standard 1-1/2" NPT tee.

3.6 Flow-through tee mounting Series 6 Differential Probes
Refer to Dwg# N105-73

3.6.1 a) Take the compression fitting apart. Apply pipe sealant to the 1-1/4" NPT thread and screw this part into a 1-1/4" tee. A larger tee with an appropriate reducer may be used.

b) Put the compression fitting components on the probe in the order shown in the drawing. They should be in such a position that the electrodes will be in the pipe stream but not touching the opposite side of the tee.

c) Remove the protective cap from the probe and place the probe in the tee. Now tighten the nut by hand as much as possible, then turn 1/2 turn with a wrench.

3.7 Sanitary Probe P60S, P65S, R60S, R65S

3.7.1 The P60S is designed with a stainless steel flange to mate with a Tri-Clover ferrule TL14AM7-2-1/2.

3.8 Insertion mounting Series 4 Differential Probes

3.8.1 Apply pipe sealant to the electrode end of the probe and screw it into the any standard 1-1/2" Male NPT.

3.9 Hot/Wet tap insertion mounting Series 7 Differential Probes Refer to Dwg# N106-79

3.9.1 a) A ball valve assembly, P60-HTC, is available from Water Analytics which includes the assembly and a safety shroud.

b) Mount the ball valve assembly in a desirable location. The assembly comes with a field selectable, 1-1/4 NPTF or socket adaptor. Make sure valve is in the close position before mounting.

c) Remove the union body by turning the union nut counter clockwise. Take the compression fitting apart as shown on the drawing. Insert the back end of the series 7 probe through the union body until safety notch on the probe aligns with the safety stop on the union body.

d) Place the union body, with the probe attached, back into the ball vale assembly and tighten union nut. Open ball valve & slide the probe into the process.

e) Put the compression fitting components on the probe in the order shown in the drawing and tighten the nut by hand as much as possible, then turn 1/2 turn with a wrench to keep probe in place.

f) Insert protective shroud as shown.

4.0 SERVICE AND MAINTENANCE

4.1 Probe Cleaning

4.4.1 a) The probe should be kept reasonably clean to avoid measurement errors. Frequency of cleaning can only be determined by experience. To clean proceed as follows:

b) Rinse with clean warm water.

c) Soak the end of the probe in warm water and dish detergent for 3 or 4 minutes.

d) Brush the end of the probe, particularly the three electrodes with a soft bristle brush such as a tooth brush. Take care not to scratch the glass electrode.

e) If the probe is still not clean, it may have to be cleaned with acid. *CAUTION: Do not acid clean probes used in processes containing cyanide solutions.* Some experimentation may be required to determine the most suitable acid for your process. Use the most dilute acid which is effective. Normally 10 parts of water to one part muriatic acid is sufficient. *Do not use hydrofluoric acid.*

f) Soak the probe for not more than 5 minutes in the chosen acid; then rinse thoroughly with clean warm water and soak in water for 3-5 minutes.

g) Calibrate the system in accordance with the instrument instruction manual.

4.2 Replacement of Salt Bridge for Series 4, 6, 7 & S Differential Probes

4.2.1 a) If the system cannot be calibrated after cleaning the probe, it may be necessary to replace the standard cell solution. A kit is available from Water Analytics for this purpose (Part No. C35-17K). Proceed as follows: Refer to DWG N106-60.

b) Hold the probe vertically with the sensor face up. Insert long nose pliers in the blind holes in the salt bridge and turn counter-clockwise taking care not to damage the glass electrode. Discard the used salt bridge.

c) Up-end the probe and pour out the contents of the standard electrode chamber. Flush the chamber with a small amount of pH 7 buffer or clean water.

d) Refill the chamber with 7pH buffer solution up to the tip of the electrode inside the chamber. DO NOT OVERFILL. It is important to leave space for the salt bridge thread and a small amount of air.

e) Screw the new salt bridge into the cavity until finger tight. Now turn 1/4 turn with long nose pliers. The front face of the salt bridge should be flush with the probe face.

4.3 Replacement of Salt Bridge for Series 8 Differential Probes

4.3.1 a) If the system can't be calibrated after cleaning the probe, it may be necessary to replace the standard cell solution. A kit is available from Water Analytics for this purpose (Part No. AM60-9765K). Proceed as follows: Refer to DWG N106-60.

b) Hold the probe vertically electrodes up. Remove the used salt bridge using a 9/16" socket wrench, turning counter-clockwise. Discard the used salt bridge.

c) Dispose of the used solution inside the bridge chamber and flush with pH 7 solution or distilled water.

d) Refill the chamber with 7pH buffer solution, up to the tip of the electrode, inside the chamber. DO NOT OVERFILL. It is important to leave space for the salt bridge thread and a small amount of air.

e) Screw the new salt bridge into the cavity until finger tight. Now perform a 1/4 turn with a 9/16" socket wrench. The salt bridge edges should be flush with the front of the probe face.

4.4 Storage

4.4.1 Do not discard the protective cap(s) that came with the sensor. If the sensor is removed from the process for an extended period of time, thoroughly clean the sensor, put a piece of cotton ball with few drops of water into the protective cap and replace it on the sensor. This keeps the junction from drying out which causes slow response when put back into operation or causes permanent damage to the sensor. **Sensors should not be left in dry lines or empty tanks for extended periods.**

Do not store the sensors in a dry or humid location. When storing, check the protective cap(s) regularly to make sure the cotton ball remains moist. Improper storage of sensors voids the warranty.

5.0 TROUBLESHOOTING AND SERVICE

5.1 Checking 5-wire Differential Probes P60 and R60

The probe can be checked by a few simple measurements. Two pH buffer solutions, 7 pH and either 4 pH or 10 pH, and a multimeter are required. For ORP probes two calibration solutions, 200 and 600 mV, are required. Millivolt solutions may be ±20% of nominal value. Actual value is noted on the bottle.

5.1.1 P60C pH probes

a) Clean the probe as described in Section 4.1. If the system cannot be calibrated, replace the salt bridge and 7pH buffer solution as described in 4.2. If the system still can't be calibrated check the probe as follows:

b) Disconnect red, green, yellow and black wires at the junction box. If you are not using a junction box, disconnect at the instrument after shutting off the power.

c) Place the probe in 7 pH buffer. Allow enough time for the temperature of the probe and buffer to stabilize at room temperature.

d) Measure the resistance between the yellow and black wires to check the probe's temperature compensator. The resistance should be between 250 and 350 ohms at 25°C. If the resistance is within specifications the probes thermistor is functioning correctly.

e) Reconnect the yellow and black wires and restore power to the instrument.

f) Measure the voltage between the red and green wires. If it is not within –50 to +50 millivolts with the probe in 7 pH buffer, the probe is defective. If the voltage is OK proceed to the next step.

g) Rinse the probe and place it in 4 pH or 10 pH buffer. Allow it to stabilize then check the voltage again between the red and green wires. If the voltage is between 100 and 230 millivolts (negative in 10 pH buffer, positive in 4 pH buffer) the probe is within specifications.

5.1.2 R60C ORP probes

a) Clean the probe as described in Section 4.1. If the system cannot be calibrated, replace the salt bridge and 7pH buffer solution as described in 4.2. If the system still can't be calibrated check the probe as follows:

b) Disconnect red, green, yellow and black wires at the junction box. If you are not using a junction box, disconnect at the instrument after shutting off the power.

c) Place the probe in 200 mV solution. Allow enough time for the temperature of the probe and solution to stabilize at room temperature.

d) Measure the resistance between the yellow and black wires to check the probe's temperature compensator. The resistance should be between 250 and 350 ohms at 25°C. If the resistance is within specifications the probes thermistor is functioning correctly.

e) Reconnect the yellow and black wires and restore power to the instrument.

f) Measure the voltage between the red and green wires. The reading should be between 160 and 240 mV; otherwise, the probe is defective. If the voltage is OK proceed to the next step.

g) Rinse the probe and place it in 600 mV solution. Allow it to stabilize then check the voltage again between the red and green wires. If the voltage is between 560 and 640 mV, the probe is within specifications.

5.2 Checking Probes P65 and R65 (4-20 mA output)

The operation of the 2-wire, 4-20 mA, probe can be checked by a few simple measurements. Two pH buffer solutions, 7 pH and either 4 pH or 10 pH, and a dc milliammeter are required.

5.2.1 P65C pH Probe

a) Disconnect the red wire at the instrument or power supply and connect it to the milliammeter (-) black.

b) Connect the milliammeter (+) red to the instrument or power supply red wire output terminal.

c) Rinse the probe and place it in 7 pH buffer. Allow the temperature of the buffer and probe to stabilize at room temperature.

d) Check the offset of the probe by reading the milliammeter. The reading should be between 11 and 13 mA. If not the probe is defective. If the offset is OK, note the exact reading and proceed to the next step.

e) Rinse the probe and place it in 4 pH or 10 pH buffer. Allow the temperature of the probe and buffer to stabilize at room temperature. Now check the span of the probe by reading the milliammeter. If the probe is in 4 pH buffer, the reading should be between 2.85 and 3.99 lower than the reading obtained in (d).
If the probe is in 10 pH buffer, the reading should be between 2.85 and 3.99 higher than the reading obtained in (d).
If this test is not satisfied the probe is defective.
If you wish to check the temperature compensator proceed to step (f).

If the span of the probe drops below 2.85mA than the probe still can be used adjustments will have to be made to the receiving device to compensate for the low span.

f) To check the operation of the temperature sensor in the probe, heat the buffer used in step (e) with the probe in it to about 50°C. The milliammeter reading should be within ±0.15 mA of the reading observed in step (e).

5.2.2 ORP Probes R65

a) Disconnect the red wire at the instrument or power supply and connect it to the milliammeter (-) black. Connect the milliammeter (+) red to the instrument or power supply red wire output terminal.

b) For a probe with range of –500 to 500 mV: (white and green wire open). Rinse the probe and place it in the 200 mV solution. The milliammeter should read between 14.4 and 16.0 mA.

Rinse the probe and place it in the 600 mV solution. The meter should read between 19.55 and 20.45 mA.

c) For a probe with range of 0 to 1000 mV: (white and green wire joined). Rinse the probe and place it in the 200 mV solution. The milliammeter should read between 6.4 and 8.0 mA.

Rinse the probe and place it in the 600 mV solution. The meter should read between 12.8 and 14.4ma.

5.3 Customer Service

5.3.1 If a problem has not been resolved with the above procedures, a telephone consultation with your AquaMetrix representative, or directly with Water Analytics will provide the answer.

Water Analytics Inc.
100 School Street
Newmarket, Ontario

Tel: (888) 749-9099
Tel: (978) 749-9949
Toll Free: (855) 747-7623
Fax: (978) 978-9961
Email: support@WaterAnalytics.net

5.4 Parts and Accessories

Description	*Part #*
Submersion Mounting Kit for Series –8 Probes	STC60L
Submersion Mounting Kit for Series –6 Probes	STC60-6
Protective shroud for Series –8 Probes	PROTECTOR-3
Protective shroud for Series –6 Probes	PROTECTOR-6
Hot/Wet tap Ball Valve Assembly for Series –7	P60-HTC
Union Mounting Tee w/ Adaptor for Series –8	AM-MH538N9A
500 mL pH 7 Buffer Solution	A35-14
4L pH 7 Buffer Solution	A35-118
500 mL pH 4 Buffer Solution	A35-13
4L pH 4 Buffer Solution	A35-117
500 mL pH 10 Buffer Solution	A35-24
4L pH 10 Buffer Solution	A35-119
500 mL 200mV Buffer Solution	A35-40
4L 200mV Buffer Solution	A35-115
500 mL 600mV Buffer Soltion	A35-41
4L 600mV Buffer Solution	A35-116
Salt bridge kit for Series –4, –6, –7 & –S (Package of 3, incl. salt bridge and cell solution)	C35-17(K)
Salt bridge kit for Series –8 (Package of 3, incl. salt bridge and cell solution)	AM60-9765(K)
Junction box with terminal strip	JB-1
50 ft. 5-wire Interconnect cable dressed both ends	C42-5P-050

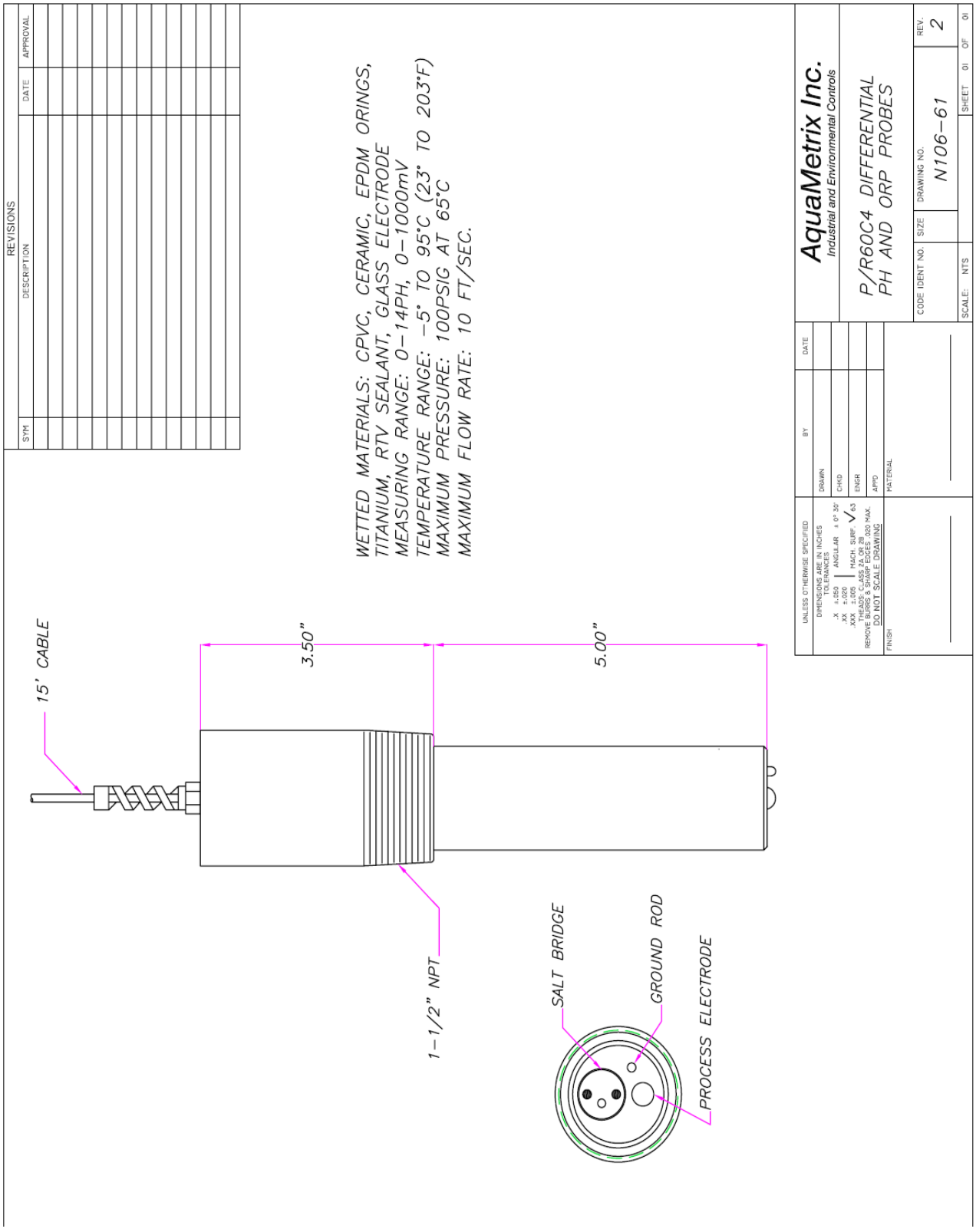
5.5 Probe Return

5.5.1 If you are returning a probe for inspection, enclose description of the problem. Pack the probe adequately to avoid damage to the glass electrode and ensure that it will not be exposed to temperatures below –5°C. Water Analytics cannot be responsible for shipping damage nor for damage due to frozen electrodes.

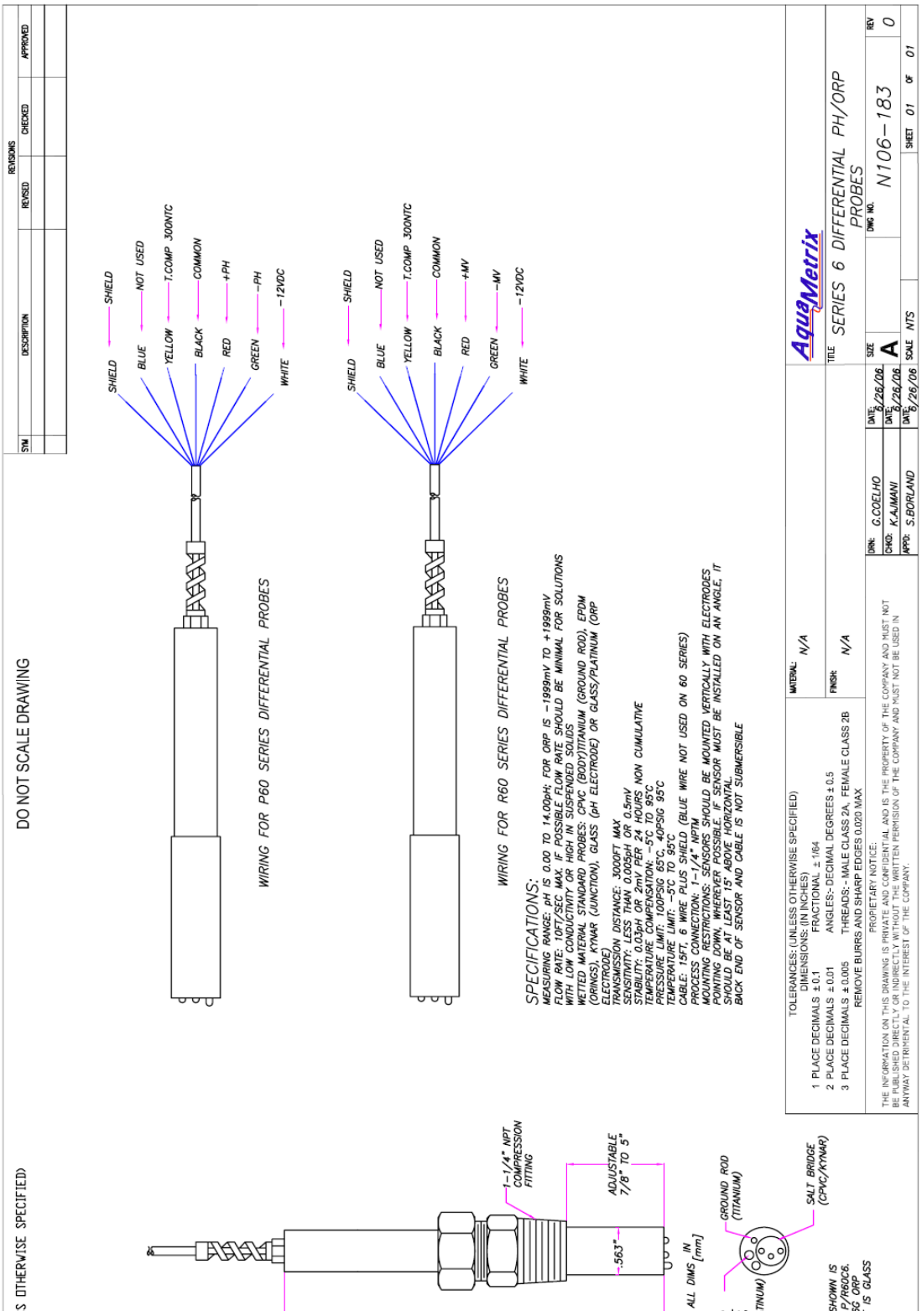
For safety reasons, Water Analytics cannot accept probes which have not been thoroughly cleaned to remove all process material.

6.0 DRAWINGS

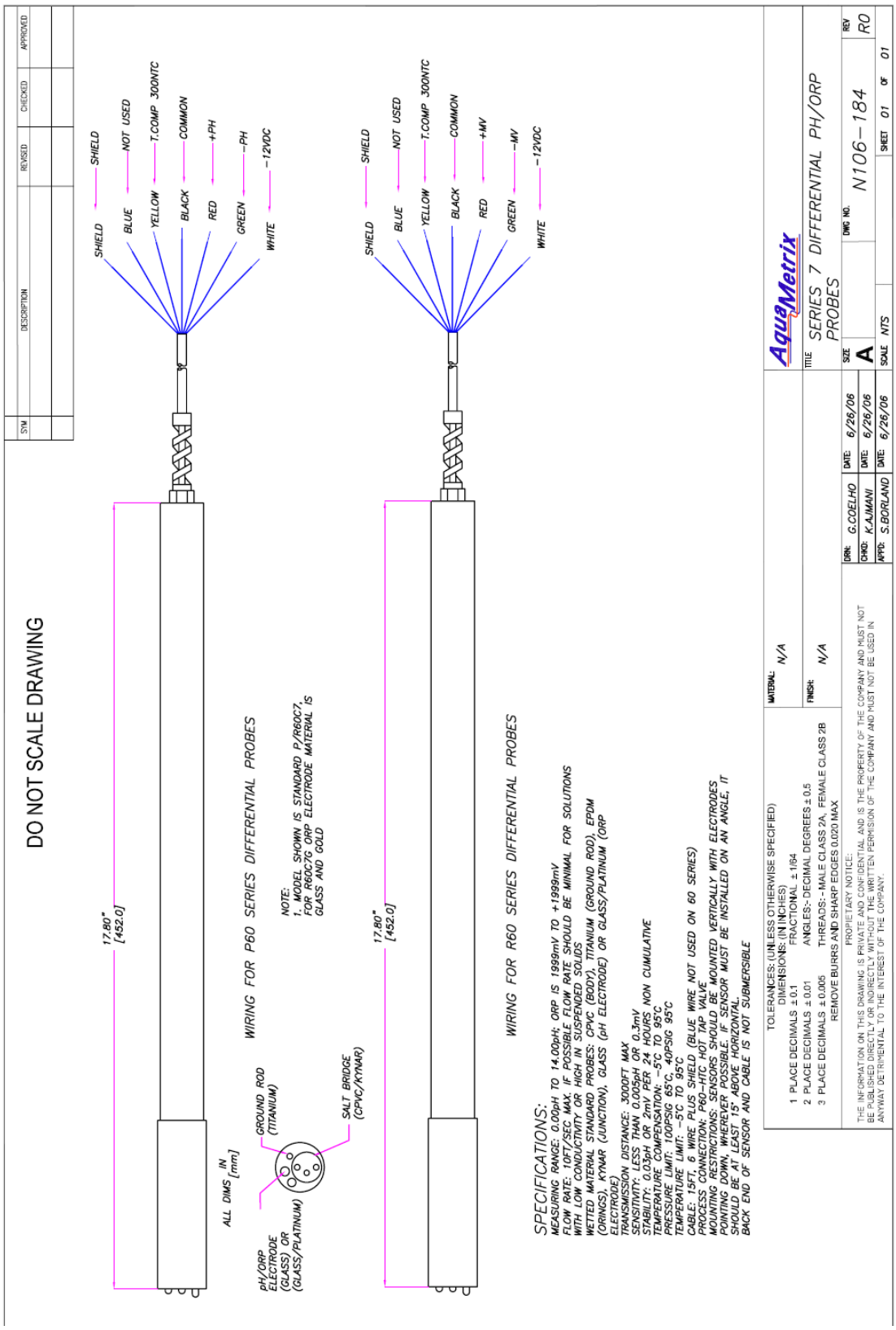
6.1 N106-61 SERIES 4 DIFFERENTIAL pH/ORP PROBES



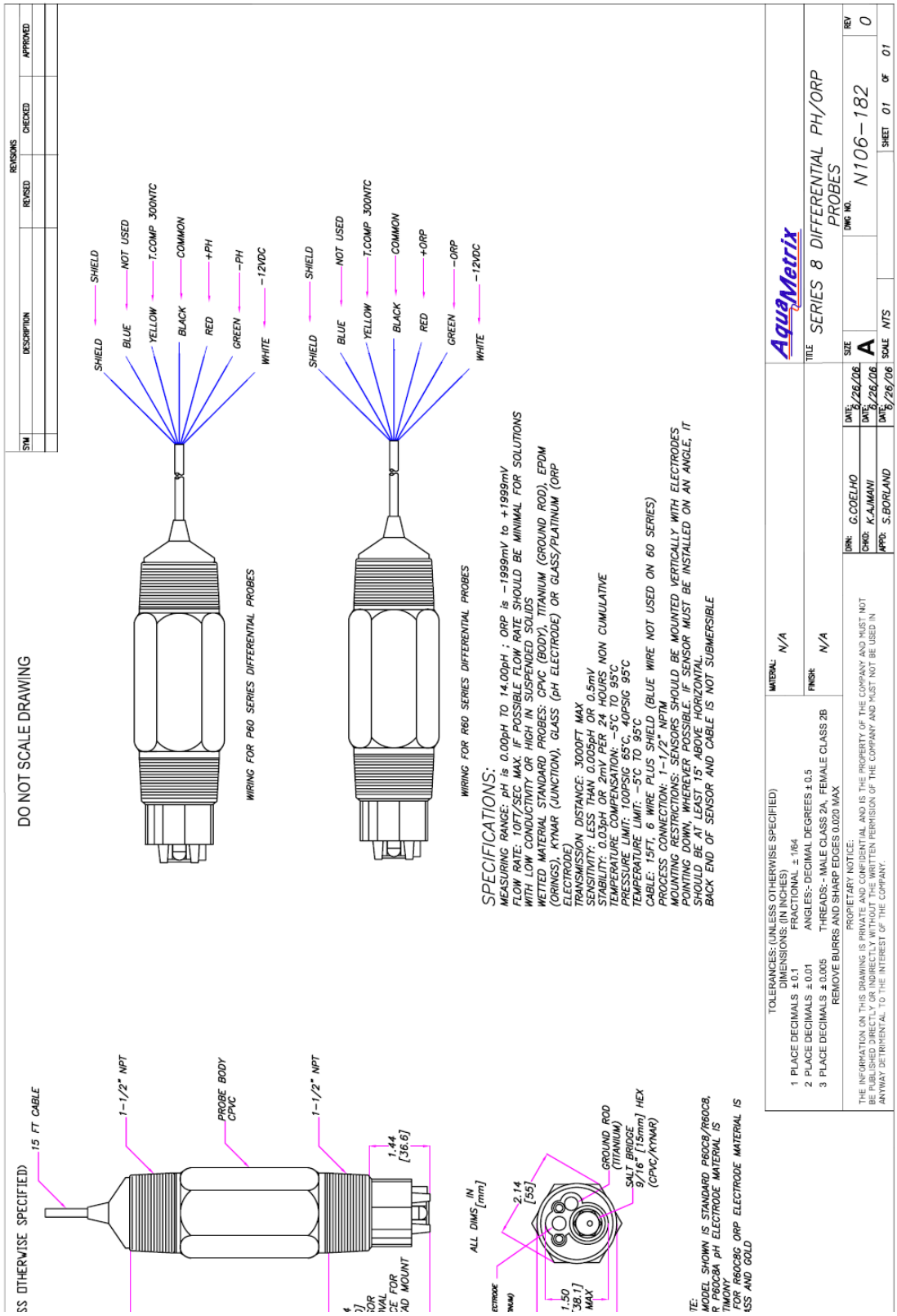
6.2 N106-183 SERIES 6 DIFFERENTIAL pH/ORP PROBES



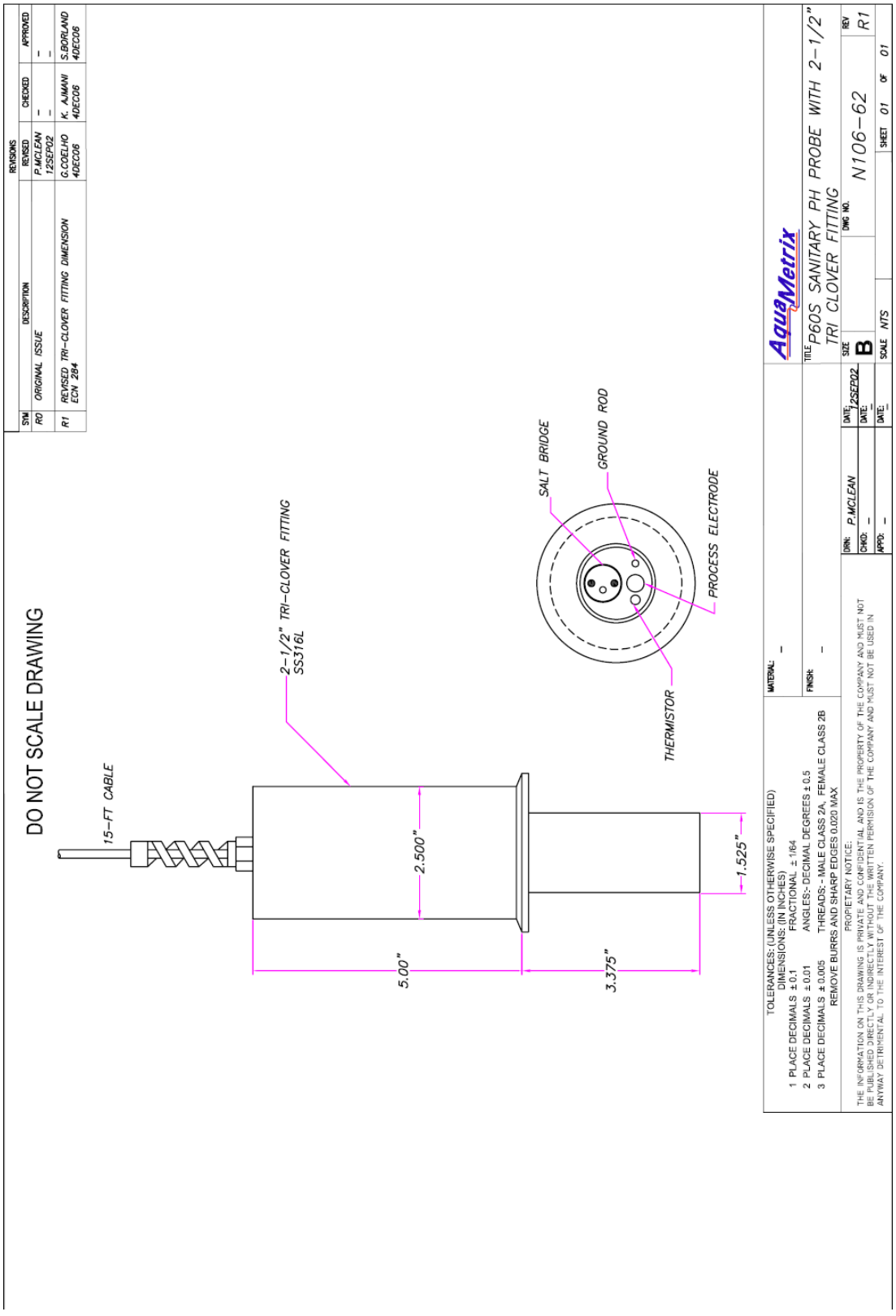
6.3 N106-184 SERIES 7 DIFFERENTIAL pH/ORP PROBES



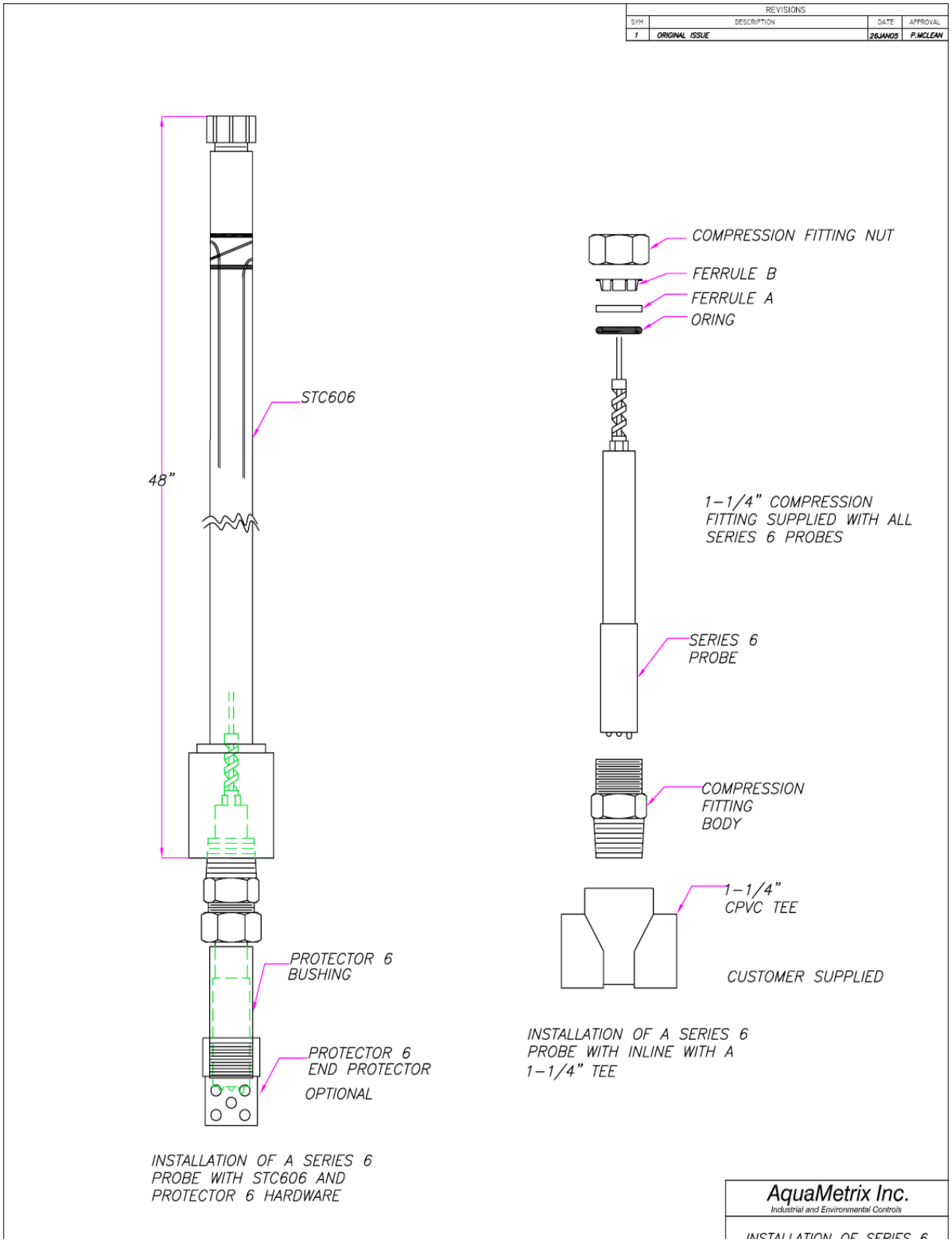
6.4 N106-182 SERIES 8 DIFFERENTIAL pH/ORP PROBES



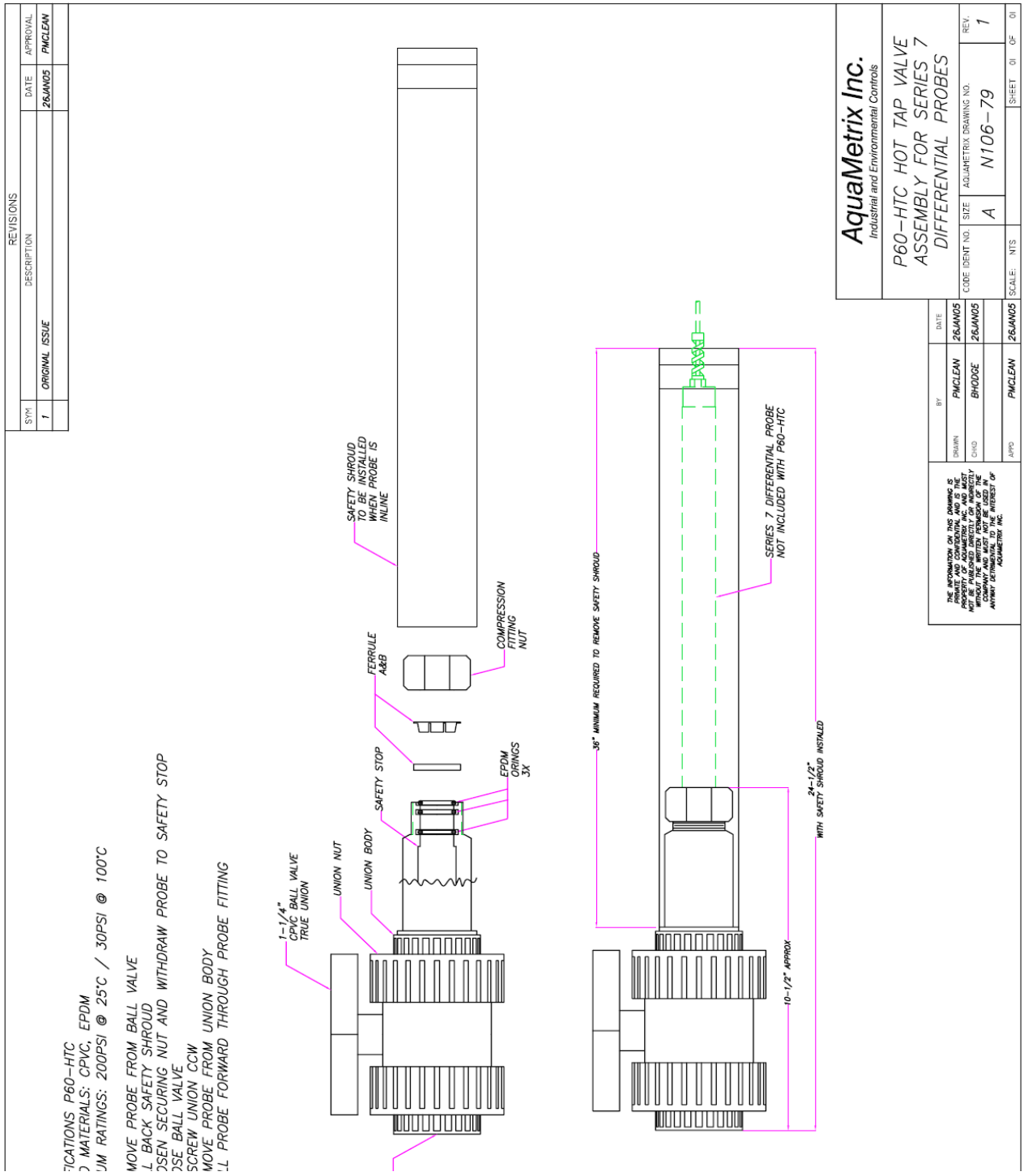
6.5 N106-62 SERIES S DIFFERENTIAL pH/ORP PROBES



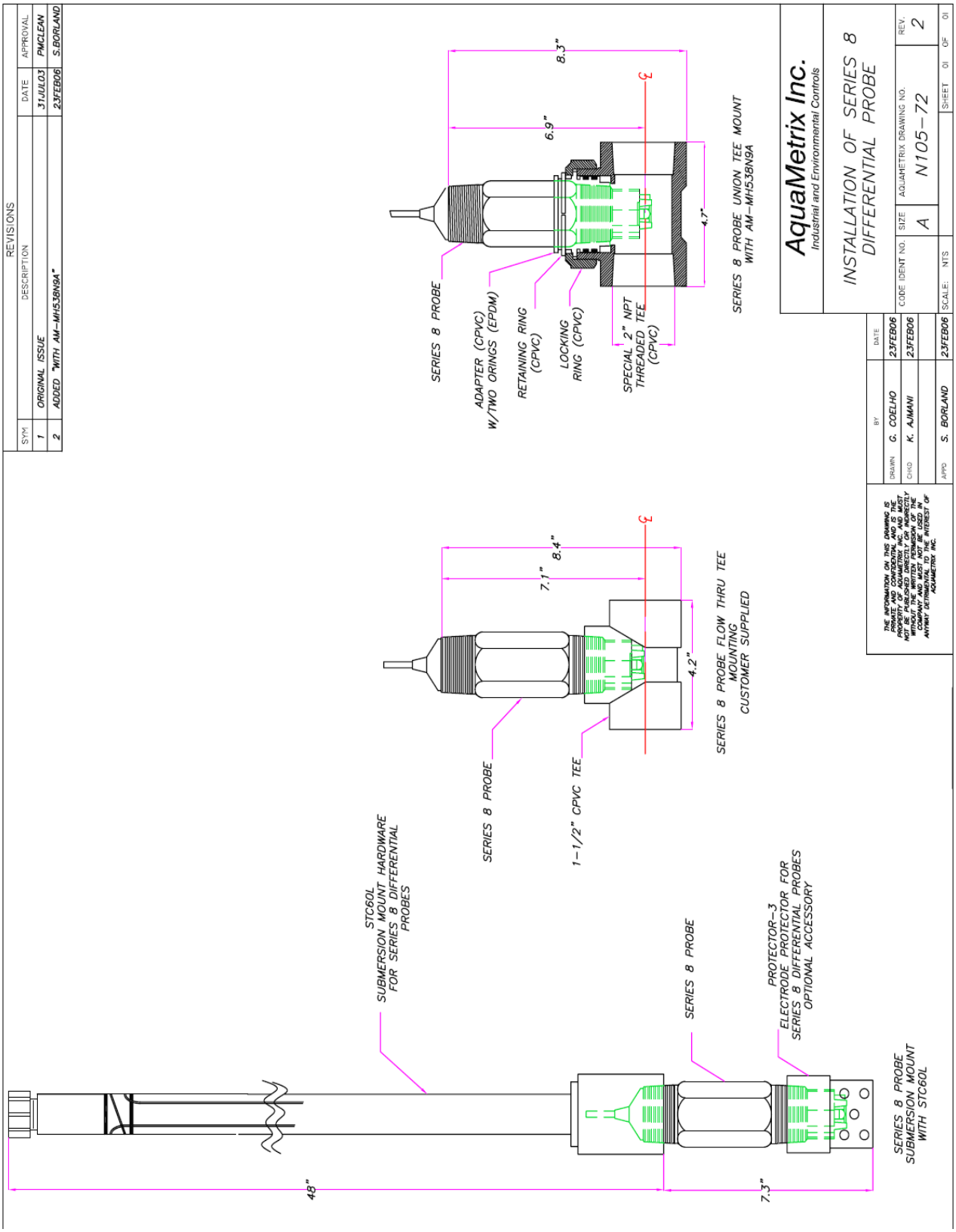
6.6 N105-73 INSTALLATION OF SERIES 6 DIFFERENTIAL PROBES



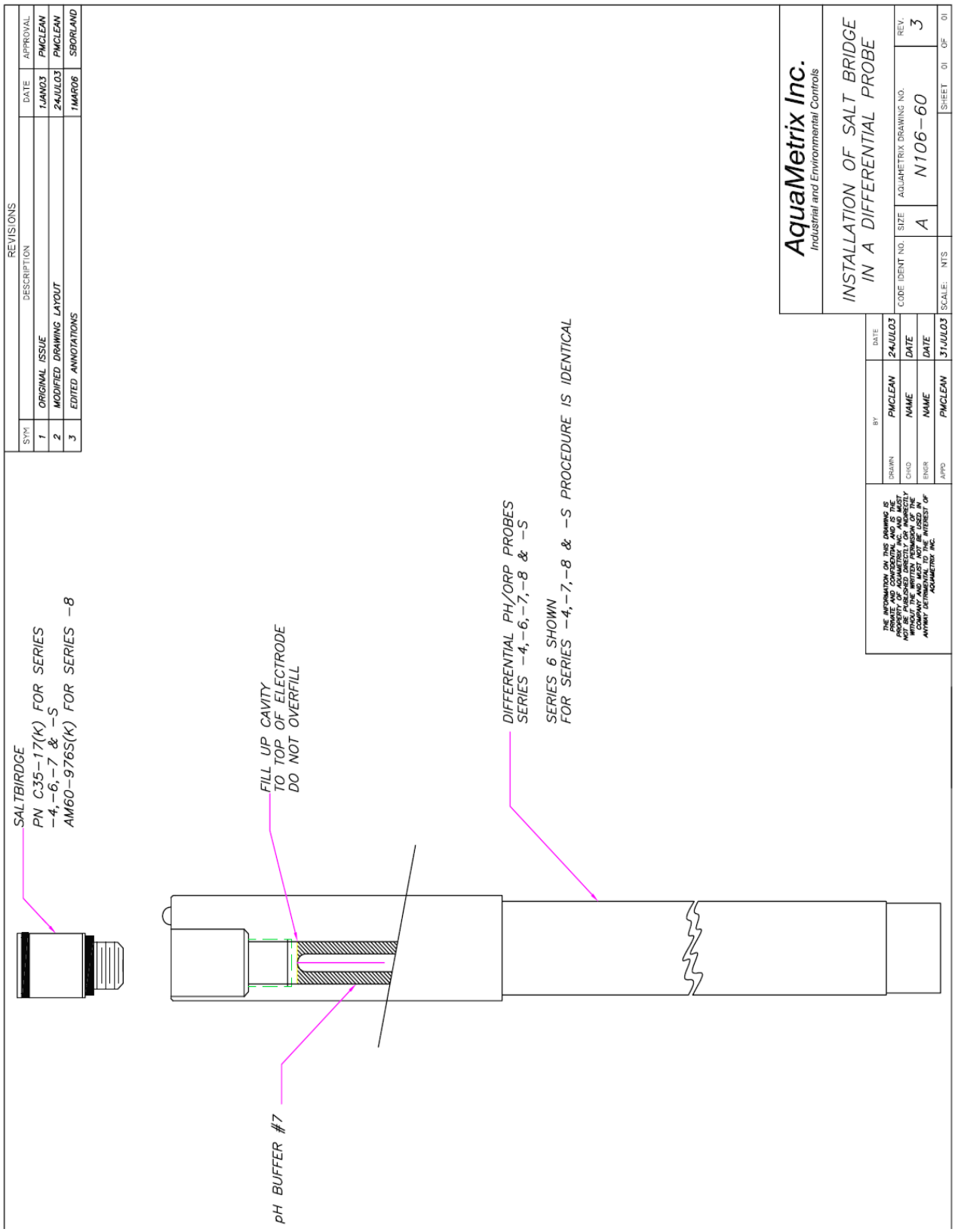
6.7 N106-79 INSTALLATION OF SERIES 7 DIFFERENTIAL PROBES



6.8 N105-72 INSTALLATION OF SERIES 8 DIFFERENTIAL PROBE



6.9 N106-60 INSTALLATION OF SALT BRIDGE IN A DIFFERENTIAL PROBE



License Type: Integrated Facility

Attachment B
Processing and Manufacturing
Machinery and Equipment

Unistat 825

Refrigerated Heating Circulator with air-cooled cooling machine and optical level indicator.Circulation pump made of stainless steel with cooled shaft seal with free shaft, without bearing in the liquid. Automatical switch-over and capacity adaption for heating and cooling machine. Copper soldered evaporator, moistened parts and housing made of stainless steel. As well as for externally closed and also externally open applications. With adjustable overtemperature protection according to DIN 12876. Powerful variable speed pump (soft start) with integrated pressure control with optional external pressure sensor.

Pilot ONE:
The new Pilot ONE controller with pioneering technology and advanced control functions brings numerous advantages to routine work. The extensive features list includes a brilliant 5,7“ TFT touchscreen display, USB and network connections, an integrated technical glossary and language support in 13 languages (EN, DE, FR, IT, ES, RU, CN, PT, JP, CZ, PL, KO, TR). The Pilot ONE has a convenient navigation system with easily remembered icons and menu categories which are colour sorted to make routine work simpler. Thanks to a favourites menu and One-Click operator guidance all important information is always just a few keystrokes away. Software wizards also help you to set up, ensuring correct settings. The USB port allows connection of the system to a PC or notebook. Together with the Spy software, requirements such as remote control or data transmission are easily achieved in a cost-effective manner. Network integration is easy with the internet port.

further functions:
E-grade Professional installed as standard, TAC (True Adaptive Control) - self optimising internal and cascade control, selectable temperature control mode (Internal/Process), programmer with 10 programs (max. 100 steps), ramp function (linear and non-linear), 5 point calibration, scalable graphic display, favourites menu, display resolution 0,01 K, integrated technical glossary, 2nd set point, user menus (Administrator level), calendar start, wallpaper selection.

3-2-2 warranty - registration required.

Technical data according to DIN 12876

Operating temperature range	-85...250 °C
Temperature stability at -10°C	0,01 K
temperature set point / display	5,7" colour Touchscreen
Resolution of display	0,01 K
Internal temperature sensor	Pt100
Sensor external connection	Pt100
Interface digital	Ethernet, USB (Host u. Device), RS232
digital input	ECS ONE
digital output	POKO ONE
Alarm message	optic, acoustic, relay
Safety classification	III / FL
Heating power	4 kW
Cooling power with	Thermooil
at 250°C	2,3 kW
at 200°C	2,3 kW
at 100°C	2,3 kW
Cooling power with	Ethanol
at 0°C	2,2 kW
at -20°C	2 kW
at -40°C	2 kW
at -60°C	1,4 kW
at -80°C	0,3 kW
at -85°C	0,2 kW
Refrigeration machine	air-cooled, CFC- and HCFC-free
Refrigerant (ASHRAE, GHS)	R452A (A1, H280)
Refrigerant quantity	1,8 kg
Refrigerant 2nd stage (ASHRAE, GHS)	R23 (A1, H280)
Refrigerant quantity 2nd stage	0,39 kg
Circulation pump:	
max. delivery	40 l/min
max. delivery pressure	0,9 bar
Delivery at 0,3 bar	27 l/min
Delivery at 0,5 bar	22 l/min

Order-No.: 1079.0004.01

Peter Huber Kältemaschinenbau AG Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/9603-0 Fax 0781/57211 www.huber-online.com

Delivery at 0,8 bar	9 l/min
Pump connection	M30x1,5 male
max. permissible kin. viscosity	50 mm²/s
min. filling capacity	2,9 l
Filling capacity expansion tank	3,6 l
Overall dimensions WxDxH **	460x604x1465 mm
Net weight	227 kg
Power supply factory configured (3 Phase)	460V 3~ 60Hz
max. current (3 Phase)	15,5 A
Fuse (3 phase)	3x16 A
Degree of Protection	IP20
min. ambient temperature	5 °C
max. ambient temperature	40 °C
from Serial-No.:	**471816** **1.1/22**

Technical details and dimensions are subject to change. No liability is accepted for errors or omissions. Illustrations can deviate from the original.

Included Accessories:
mini-USB cable #54949, E-grade "Professional" #9496,

Optional accessories:
E-grade "Explore" #10495, SpyLight-Software, Com.G@te Namur, PC-Com.G@te-cable, Holder for Com.G@te #10018, Com.G@te-extension cable: upon request, RS232 adapter cable #55018, Thermofluid, external pressure sensor, metal hoses, external sensor, connecting cable, isolation sleeve for external open applications, float switch in sight glass for extended security, further accessories, etc.: see catalog.

Note: Pump connections: Bore shape Y (60°) according to DIN 3863, pipework/flexible tempering hoses: Ball socket according to DIN 3863, sleeve nut according to DIN 3870.

Output data valid for: Room temperature 20°C. If the ambient temperature rises, the cooling capacity may drop.

in accordance with EN60034-1 the following voltage and frequency tolerances are valid:
Voltage + / - 5% with a simultaneous frequency tolerance of + / - 2%
Example -5% voltage and + 2% frequency -> not allowed!
-5% voltage and - 2% frequency -> allowed

Information to Electromagnetic compatibility:
Classification (disturbance) to EN55011: Class A, Group 1

Standard delivery conditions - Power cable configuration:
1. Single / two-phase devices (100V to 240V) --> with power cable and country-specific plug (please specify when ordering)
2. Three-phase devices with current consumption less than 63A --> with cable, without plug
3. Three-phase devices with current consumption greater than 63A --> without cable, without plug

This equipment is compliant to US-SNAP and all applicable EU laws. The US-SNAP end-use for this equipment is the industrial process refrigeration. Certification by a Notified Body upon request.

** Please respect space requirements. See operating conditions at www.huber-online.com

Peter Huber Kältemaschinenbau AG Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/9603-0 Fax 0781/57211 www.huber-online.com

Huber CS 100

Chiller with air-cooled refrigerating unit and circulation pump (stainless steel). Housing, atmospheric open tank and copper soldered evaporator made of stainless steel. With digital level indicator. Condenser in air-cooled design, performance-optimized by a built-in high-efficiency fan motor. Powerful feed pump with integrated overtemperature protection. The flow rate can be adjusted via the manual bypass valve on the backside of the chiller.

Control unit B400 / RB400:
Capacitive operating interface with OLED display and multi-coloured status notification for instant identification of the current operating status. Choice of eight different system languages (DE, EN, ES, FR, IT, PT, RU, TR). Separate operating option for the feed pump and the cooling unit with convenient adjustment of the desired setpoint. Operating of the system can be evaluated on a PC or notebook via an integrated RS232 interface.

Technical data according to DIN 12876

Operating temperature range	-20...+15 °C
Temperature stability at -10°C	±1.5 K
temperature set point / display	colour LED Touchscreen
Internal temperature sensor	Pt100
Interface digital	RS232
Safety classification	Class I / NFL
Cooling power	
at +15°C	18 kW
at +10°C	10 kW
at ±0°C	9,5 kW
at -10°C	7,5 kW
at -20°C	4,5 kW
Refrigeration machine	air-cooled, CFC- and HCFC-free
Refrigerant	R449A
Refrigerant quantity	4,5 kg
Gas warning sensor	without
Pressure pump	
max. delivery	83 l/min
max. delivery pressure	3,7 bar
Pump connection	G 3/4" male
Bath volume min.	160 l
Bath volume max.	175 l
sound pressure level +/- 4 dB(A)	70 dB(A)
Overall dimensions WxDxH **	800x850x1665 mm
Net weight	320 kg
Power supply requirement	208V 3~ or 460V 3~ 60Hz
max. current	35 A or 16 A
Fuse on power network side	3x 35 A or 3x 20A
Degree of Protection	IP20
max. ambient temperature	+32 °C
min. ambient temperature	+5 °C

Order-No.: VDH1100690

from Serial-No.: **2038 19** **1.0/20**

Huber USA Inc. http://www.huber-usa.com Tel 919-674-4266 Toll Free +1 800-726-4877 info@huber-usa.com

Technical details and dimensions are subject to change. No liability is accepted for errors or omissions. Illustrations can deviate from the original.

Accessories and periphery: 2pcs Hose nozzles ø20mm*, bath cover*, overpressure. Bypass valve*, Bypass valve*, drain valve, thermofluid, RS232 cable
* standard accessories

Output data valid for: Room temperature 20°C. If the ambient temperature rises, the cooling capacity may drop.

In accordance with EN60034-1 the following voltage and frequency tolerances are valid:
Voltage + / - 5% with a simultaneous frequency tolerance of + / - 2%
Example: 5% voltage and +2% frequency -> not allowed! -
5% voltage and - 2% frequency -> allowed

Information to Electromagnetic compatibility:
Classification (disturbance) to EN55011: Class A, Group 1

Recommended thermofluid: Water - Monoethylene Glycol 50:50

Standard delivery conditions - Power cable configuration:
1. Single-phase devices (115V) -> with cable and plug
2. Two-phase devices (208V) -> with cable, without plug
3. Three-phase devices (208V/460V) with current consumption less than 63A -> with cable, without plug
4. Three-phase devices (208V/460V) with current consumption greater than 63A -> with cable, without plug

** Please respect space requirements. See operating conditions at **www.huber-online.com**

CC-308B

Heating Circulator Bath with housing, bath and all moistened parts are made of stainless steel. With cooling coil for water-cooling (3/8"), pressure- and suction pump made of high-resistant plastic. With adjustable overtemperature protection according to DIN 12876.

Pilot ONE:
The new Pilot ONE controller with pioneering technology and advanced control functions brings numerous advantages to routine work. The extensive features list includes a brilliant 5,7“ TFT touchscreen display, USB and network connections, an integrated technical glossary and language support in 13 languages (EN, DE, FR, IT, ES, RU, CN, PT, JP, CZ, PL, KO, TR). The Pilot ONE has a convenient navigation system with easily remembered icons and menu categories which are colour sorted to make routine work simpler. Thanks to a favourites menu and One-Click operator guidance all important information is always just a few keystrokes away. Software wizards also help you to set up, ensuring correct settings. The USB port allows connection of the system to a PC or notebook. Together with the Spy software, requirements such as remote control or data transmission are easily achieved in a cost-effective manner. Network integration is easy with the internet port.

The range of functions can be expanded very easily via E-grade at any time by entering a unit specific upgrade code:

E-grade "Exclusive": TAC (True Adaptive Control) - self optimising internal and cascade control, selectable temperature control mode (Internal/Process), programmer with 3 programs (max. 15 steps), ramp function (linear), 5 point calibration, scalable graphic display, favourites menu, display resolution 0,01 K.

E-grade "Professional": Programmer with 10 programs (max. 100 steps), ramp function for temperature gradients (linear and non-linear), 2nd set point, user menus (Administrator level), calendar start.

3-2-2 warranty - registration required.

Technical data according to DIN 12876

Operating temperature range	28...300 °C
with water cooling	...300 °C
with refrigerator	-20...300 °C
Temperature stability at 70°C	0,02 K
temperature set point / display	5,7" colour Touchscreen
Absolute accuracy	setup for calibration
Internal temperature sensor	Pt100
Sensor external connection	Pt100
Interface digital	Ethernet, USB (Host u. Device), RS232
Safety classification	III / FL
Heating power at 240V	3 kW
Heating power at 230V	3 kW
Heating power at 220V	2,8 kW
Heating power at 208V	2,5 kW
Heating power at 200V	2,2 kW
Pressure pump	yes
max. delivery	25 l/min
Delivery pressure (head)	0,7 bar
Suction pump	yes
max. delivery (suction)	18,5 l/min
Delivery suction pressure (head)	0,4 bar
Pump connection	M16x1 male
max. permissible kin. viscosity	50 mm²/s
min. filling capacity	6 l
Bath volume	8,5 l
Bath capacity with displacement rack	5,2 l
Width bath opening WxD	130x110 mm
Bath depth	155 mm
Height of bath opening	194 mm
Overall dimensions WxDxH **	242x404x392 mm
Net weight	18 kg
Power supply requirement	200-240V 1~/2~ 50/60Hz
max. current	14 A
Fuse	16 A
Degree of Protection	IP20

Order-No.: 2006.0001.01

Peter Huber Kältemaschinenbau AG Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/9603-0 Fax 0781/57211 www.huber-online.com

min. ambient temperature	5 °C
max. ambient temperature	40 °C

from Serial-No.:	**393466**	**1.2/20**

Technical details and dimensions are subject to change. No liability is accepted for errors or omissions. Illustrations can deviate from the original.

Included Accessories:
mini-USB cable #54949, hose connector NW12 , blank plug , sleeve nuts thread ,

Optional accessories:
connecting hoses, drain valve , displacement insert, temperature control / - connection hoses, thermofluids, further accessories, etc.: see catalog.

Output data valid for: Room temperature 20°C

In accordance with EN60034-1 the following voltage and frequency tolerances are valid:
Voltage + / - 10%, as long as the frequency tolerance does not run in the opposite direction.
Example: -10% voltage and +3% frequency -> not allowed !
-10% voltage and -3% frequency -> allowed.

Information to Electromagnetic compatibility:
Classification (disturbance) to EN55011: Class A, Group 1

Standard delivery conditions - Power cable configuration:
1. Single / two-phase devices (100V to 240V) --> with power cable and country-specific plug (please specify when ordering)
2. Three-phase devices with current consumption less than 63A --> with cable, without plug
3. Three-phase devices with current consumption greater than 63A --> without cable, without plug

** Please respect space requirements. See operating conditions at www.huber-online.com

Peter Huber Kältemaschinenbau AG Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/9603-0 Fax 0781/57211 www.huber-online.com

KML-700M_J

LOW-PROFILE MODULAR CRESCENT CUBER

License Type: Integrated Facility

KML-700M_J
07/08/19
Item # 13400

Item #: _____

Project: _____

Qty: _____

AIA#: _____

W x D x H
30" x 27 3/8" x 26"

Shipping Dimensions
33 1/4" x 33 1/2" x 32"

KMEdge DESIGN

KML-700MAJ ★
Air-Cooled
Shown on optional bin B-500

KML-700MWJ
Water-Cooled

KML-700MRJ ★
Remote Air-Cooled

★ ENERGY STAR

Features

- **Individual crescent cube**
- **Stainless steel evaporator**
- **CycleSaver™ design**

- Up to 756 lbs. of ice production per 24 hours
- Durable stainless steel exterior
- Protected by H-GUARD Plus Antimicrobial Agent
- EverCheck™ alert system
- Removable air filters (Air-cooled model only)
- R-404A Refrigerant

Available on Bins:

B-250PF	B-800PF/SF	B-1150SS	B-1650SS*
B-500PF/SF	B-900PF/SF	B-1300SS	DB-200H
B-700PF/SF	B-1150SS	B-1500SS*	DM-200B

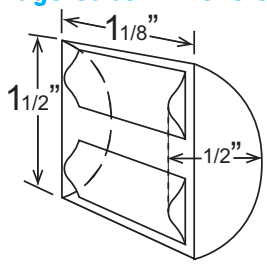
*Top kit may be required. See Bin Spec Sheets. *Two unit application only.*

Warranty:
3 Year Parts & Labor on entire machine. 5 Year Parts & Labor on Evaporator.
5 Year Parts on Compressor; air-cooled condenser coil.
Valid in United States, Canada, Puerto Rico and U.S. Territories. Contact factory for warranty in other countries.

FACTORY WARRANTY
Parts & Labor: 3 YR Ice Maker; 5 YR Evaporator
Parts: 5 YR Compressor

		ICE PRODUCTION		WATER USAGE		ELECTRICAL							
Condenser	Model	Air / Water Temp Lbs. per 24 hours 70°/ 50°F	90°/ 70°F	Potable Gal. per 100 lbs. 90°/ 70°F	Condenser Gal. per 100 lbs. 90°/ 70°F	kWh Used per 100 lbs. 90°/ 70°F	Max. Fuse Sz or HACR Circuit Bkr	Amperage	Voltage	Circuit Wires (including ground)	Heat Rejection BTU/hr.	Refrigerant Charge Amount	Net / Ship Weight (lbs.)
Air	KML-700MAJ	658	572	16.0	N/A	5.16	20A	14.2A	115V/60/1	3	11,300	2 lb. 10.3 oz.	200 / 220
Water	KML-700MWJ	756	730	16.0	111	3.61	20A	12.6A	115V/60/1	3	12,600	1 lb. 6 oz.	200 / 220
Remote	KML-700MRJ	742	643	16.0	N/A	4.70	20A	16.0A	115V/60/1	3	11,200	11 lb. 7.4 oz. (with condenser)	200 / 220

KM Edge Cube Dimensions*



* approximate size in inches, image not to scale

Operating Limits

- Ambient Temp Range 45 - 100°F
- Water Temp Range 45 - 90°F
- Water Pressure 10 - 113 PSIG
- Voltage Range 104 - 127V

Service

- Allow 6" (15 cm) clearance at rear, sides, and top for proper air circulation and ease of maintenance/service.
- Removable air filters (air-cooled model only).

Plumbing

- Icemaker Water Supply Line: Min. 1/4" Nominal ID Copper Water Tubing or Equivalent
- Icemaker Drain Line: Min. 3/4" Nominal ID Hard Pipe or Equivalent

Water-Cooled Model (Lines Must Be Independent of Icemaker)

- Condenser Water Supply Line: Min. 1/4" Nominal ID Copper Water Tubing or Equivalent
- Condenser Drain/Return Line: Min. 1/4" Nominal ID Hard Pipe (open drain system) or Copper Water Tubing (closed loop system) or Equivalent

Water Filter

Please refer to water filter spec sheet for recommended configurations.

 618 Hwy, 74 S., Peachtree City, GA 30269 | TEL 800-438-6087 | FAX 800-345-1325 | www.hoshizakiamerica.com

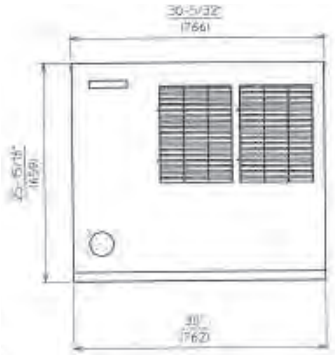
KML-700M_J

LOW-PROFILE MODULAR CRESCENT CUBER

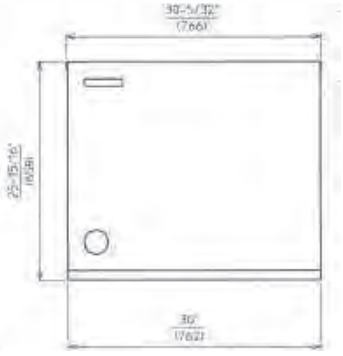
License Type: Integrated Facility

KML-700M_J
07/08/19
Item # 13400

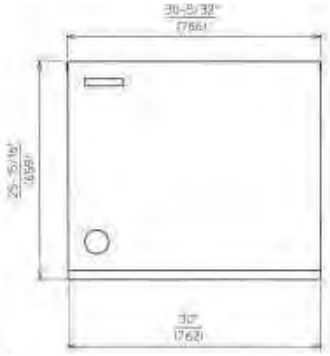
FRONT VIEW



AIR-COOLED

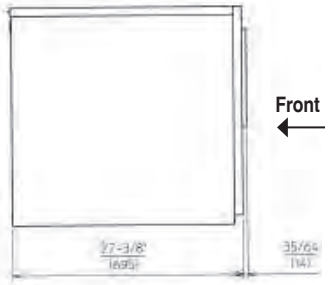


WATER-COOLED



REMOTE AIR-COOLED

SIDE VIEW

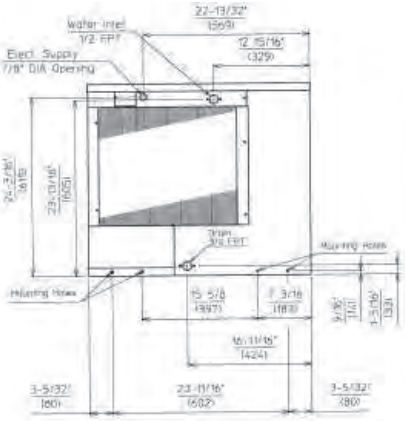


AIR-COOLED

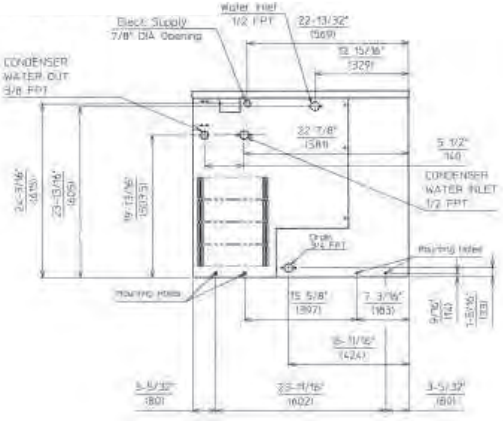
WATER-COOLED

REMOTE AIR-COOLED

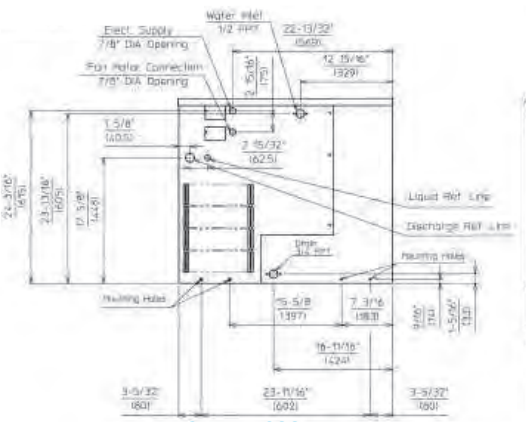
REAR VIEW



AIR-COOLED

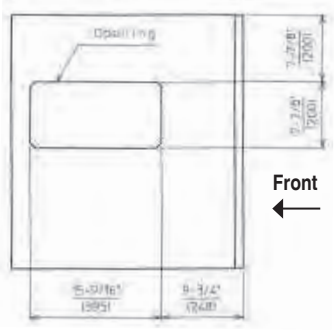


WATER-COOLED



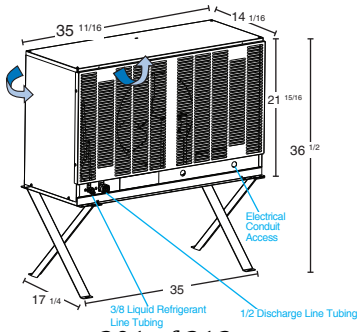
REMOTE AIR-COOLED

BOTTOM VIEW



AIR-COOLED
WATER-COOLED
REMOTE AIR-COOLED

URC-9F Remote Condenser (Sold Separately)
(W x D x H) 35 11/16 x 14 1/16 x 36 1/2
For Use with KML-700MRJ



Pre-Charged Tubing Kits
(Sold Separately)
20' R404-2068-2
35' R404-3568-2
55' R404-5568-2

Voltage supply for the URC Remote Condenser is supplied from the Ice Maker. No addtional circuit is required.

F3A-FS

Three Section Full Stainless Door Freezer

License Type: Integrated Facility

F3A-FS
09/18/19
Item # 13538

W x D x H
82.5” x 33.5” x 79.5”*
*with 4” casters

Item #: _____
Project: _____
Qty: _____
AIA#: _____

NATURAL REFRIGERANT

FACTORY WARRANTY *
Parts & Labor 3 YR Entire Machine
Parts 5 YR Compressor

Dimensions / Capacity	Three Section F3A-FS
Interior Storage Capacity (CF) (AHAM)	79.03 ft³
Overall Width x Depth	82.5” x 33.5”
Height (including 4” casters)	79.5”
Door Opening Width x Height	21.75” x 59.25”
Depth with Door Open at 90º	59.25”
Adjustable Shelves	9
Shelf Dimensions (W x D)	21.25” x 26”
Adjustable Center Shelf	6
Center Shelf Dimensions (WxD)	6” x 22.9”
Crated Shipping Weight	830 lbs
Crated Length x Width x Height	86” x 37.5” x 81”

Electrical / Refrigeration	Three Section F3A-FS
Voltage	230/60/1
HACR Breaker	20.0 Amps
Electrical Connection (NEMA)	L14-20P
Voltage Range	208-254
Ambient Temp. Range	45° to 100°F
Control Setpoint Range	-10° to 12°F
Amperage	11
Energy Consumption (kWh/day) @ASHRAE	17.02
Heat Rejection (BTU/Hr.) @NSF	1643
Approx. Nominal Compres. BTU/HR (HP)	1425(3/4HP) (Left) 1425(3/4HP) (Right)
Refrigerant / Charge Amount (oz)	R290 / (4.1 oz) (Left) R290 / (4.1 oz) (Right)

Options

- ☐ Additional epoxy shelves
- ☐ Stainless steel shelves
- ☐ Additional center shelves
- ☐ Tray/Pan slides
- ☐ Foot pedal door opener
- ☐ 6” Adjustable legs
- ☐ Condensate pan (HS-5462)

Warranty

* 3 Year - parts and Labor on entire machine.
5 Year - Parts on Compressor
Valid in United States, Canada, Puerto Rico and U.S. Territories. Contact factory for warranty in other countries.

Features

- **Maximum interior storage capacity with smallest external footprint**
- **Stainless steel interior with stainless steel exterior front, sides and top**
- **Unique ducted air distribution system**
- Refrigerant flow is controlled with thermostatic expansion valve
- Energy efficient interior LED light
- Environmentally friendly R290 hydrocarbon refrigerant
- Solid state digital controller with temperature alarms and LED display (Fahrenheit or Celsius)
- Cabinet and doors are insulated with 2-3/8” of CFC free,foamed in place polyurethane
- Stainless steel exterior and interior door come standard with locks
- Exclusive stepped door design to protect recessed door gasket
- Spring assisted self-closing doors with stay open feature
- Sturdy 8 gauge stainless steel hinge plate with welded hinge pin
- Extruded aluminum flush mount door handle
- Field reversible doors
- Evaporator coils are epoxy electrocoated (E-Coat) to help fight corrosion
- Energy efficient automatic hot gas condensate evaporator
- Top mount refrigeration comes standard with a condenser filter
- Stainless steel shelf supports
- (3) epoxy coated wire shelves are standard per section
- Standard with 4” casters (four with brakes)
- Stackable (two units high) to conserve warehouse floor space
- 10 ft. cord and plug

© HOSHIZAKI AMERICA, INC. 618 Hwy, 74 S., Peachtree City, GA 30269 | TEL 800-438-6087 | FAX 800-345-1325 | www.hoshizakiamerica.com

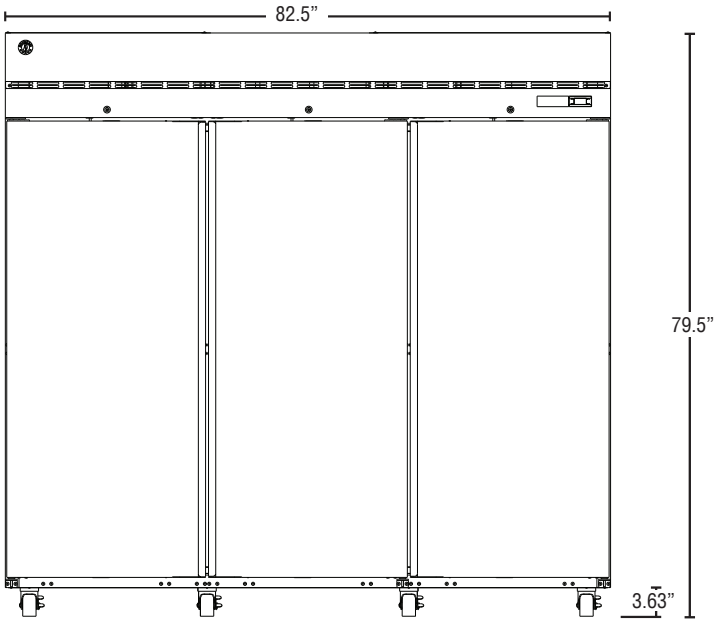
F3A-FS

Three Section Full Stainless Door Freezer

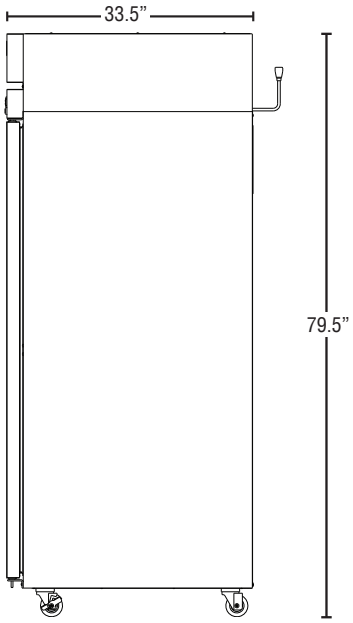
License Type: Integrated Facility

F3A-FS
09/18/19
Item # 13538

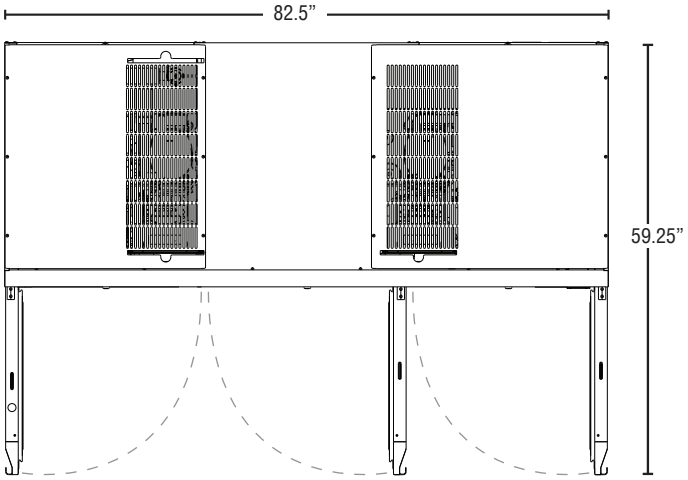
FRONT VIEW



SIDE VIEW



PLAN VIEW



Cabinet Construction

The exterior cabinet front, sides, and top are constructed of high quality stainless steel. The exterior back, and bottom are constructed of coated steel. The cabinet interior is constructed of stainless steel with a unique ducted air flow system. Three (3) heavy duty epoxy coated shelves per section are standard. Mounted on stainless steel pilasters shelves are adjustable in 1” increments. Cabinet walls and doors are insulated with 2-3/8” of environmentally friendly, CFC free, foamed in place polyurethane. Perimeter and mullion heaters prevent condensation from forming on the face of the cabinet. An interior LED light is automatically activated when doors are opened. 4” polyolefin, casters (four with brakes) are standard.

Door Construction

Doors are constructed of a high grade stainless steel exterior and interior and are standard with locks. Hoshizaki’s exclusive “stepped” design protects the recessed gasket while product is being removed from the cabinet. Doors are provided with a one piece, full length extruded aluminum flush mount handle and are mounted on eight (8) gauge stainless steel hinge plates with a welded hinge pin. Spring assisted self-closing doors are equipped with a stay open feature past 90 degrees. Snap-in magnetic door gaskets are easily removed for cleaning. Door hinging is field reversible.

Refrigeration System

The high efficiency refrigeration system is self-contained with an epoxy electrocoated (E-Coat) evaporator for extended life. Top mounted refrigeration system is easily accessible for service and includes a condenser filter with easy access from the top of the unit. The refrigeration system components are assembled on a high density expanded polypropylene platform that is removable from the main unit. A unique ducted air flow system achieves uniform air distribution within the cabinet to eliminate hot spots. Condensate removal is accomplished with a top mounted energy efficient non-electric evaporation system. A thermostatic expansion valve (TXV) controls the flow of environmentally friendly R290 refrigerant through the evaporator. Refrigeration system utilizes a time initiated heated defrost to eliminate any ice on the evaporator coil. Solid state digital controls monitor the operation and performance of the refrigeration system. The controls also provide visual high and low temperature and high and low voltage alarms. A LED display shows the cabinet temperature and is adjustable to Fahrenheit or Celsius. 115 volt units are equipped with a ten foot cord and plug (20.0 amps or less).

 618 Hwy, 74 S., Peachtree City, GA 30269 | TEL 800-438-6087 | FAX 800-345-1325 | www.hoshizakiamerica.com

KISS K6

Refrigerated Heating Bath with air-cooled refrigerating unit and KISS-Controller. Consisting of isolated cooling bath made of stainless steel with immersion thermostat. Powerful pressure and suction pump made of industrial plastic material. Wetted parts made from stainless steel or plastics. With adjustable overtemperature protection according to DIN 12876.

NEW: KISS controller:
KISS combines state-of-the-art technology with simple operation and stylish design. Models with KISS controller are suitable for routine tasks in research and industry and are convincing as practice oriented basic equipment:

* Large, bright OLED display
* Simple operation with menu navigation
* Simultaneous display of set point, internal temperature, Tmin and Tmax
* Status displays for pump, cooling and heating
* USB (Device) and RS232 interfaces
* Overtemperature protection, Safety class 3 (FL)
* Autostart function for power failure
* 3 colour versions available: grey (standard), blue, red

Option: Pt100 sensor connection #10688 to display (not control) e.g. of the process temperature (only available factory fitted, additional charge).

3-2-2 warranty - registration required.

Technical data according to DIN 12876

Operating temperature range	-25...200 °C
Temperature stability at 70°C	0,05 K
temperature set point / display	digital
Absolute accuracy	setup for calibration
Internal temperature sensor	Pt100
Interface digital	USB (Device), RS232 interfaces
Alarm message	optic, acoustic
Safety classification	III / FL
Heating power at 240V	2,1 kW
Heating power at 230V	2 kW
Heating power at 220V	1,8 kW
Heating power at 208V	1,6 kW
Cooling power	
at 20°C	0,2 kW
at 0°C	0,15 kW
at -10°C	0,1 kW
at -20°C	0,05 kW
Refrigeration machine	air-cooled, natural refrigerant
Refrigerant (ASHRAE, GHS)	R290 (A3, H220)
Refrigerant quantity	0,047 kg
Gas warning sensor	without
Pressure / Suction pump	
max. delivery	14 l/min
max. delivery pressure	0,25 bar
max. delivery (suction)	10,5 l/min
max. delivery pressure (suction)	0,17 bar
Pump connection	M16x1 male
Pump connection	NW8/12
Bath volume	4,5 l
Width bath opening WxD	140x120 mm
Bath depth	150 mm
Height of bath opening	376 mm
Overall dimensions WxDxH **	210x400x546 mm
Net weight	25 kg
sound pressure level +/- 4 dB(A)	57 dB(A)
Power supply requirement	208-240V 1~/2~ 50/60Hz
max. current immersion thermostat	10 A

Order-No.: 2008.0043.98

Peter Huber Kältemaschinenbau AG Werner-von-Siemens-Str. 1 D-77656 Offenburg Tel 0781/9603-0 Fax 0781/57211 www.huber-online.com

max. current refrigerated bath	1,4 A
min. Fuse	10A
max. Fuse	16A
Degree of Protection	IP20
min. ambient temperature	5 °C
max. ambient temperature	40 °C

from Serial-No.:	**393797**	**1.2/20**

Technical details and dimensions are subject to change. No liability is accepted for errors or omissions. Illustrations can deviate from the original.

Included Accessories:
hose connector NW12 #6087, sleeve nuts thread M16x1 #6089, blank plug #6088, bath cover #14451, data cable #9472.

Optional accessories:
drain valve #6839, temperature control / - connection hoses, thermofluids, further accessories, etc.: see catalog.

Output data valid for: Room temperature 20°C. If the ambient temperature rises, the cooling capacity may drop.

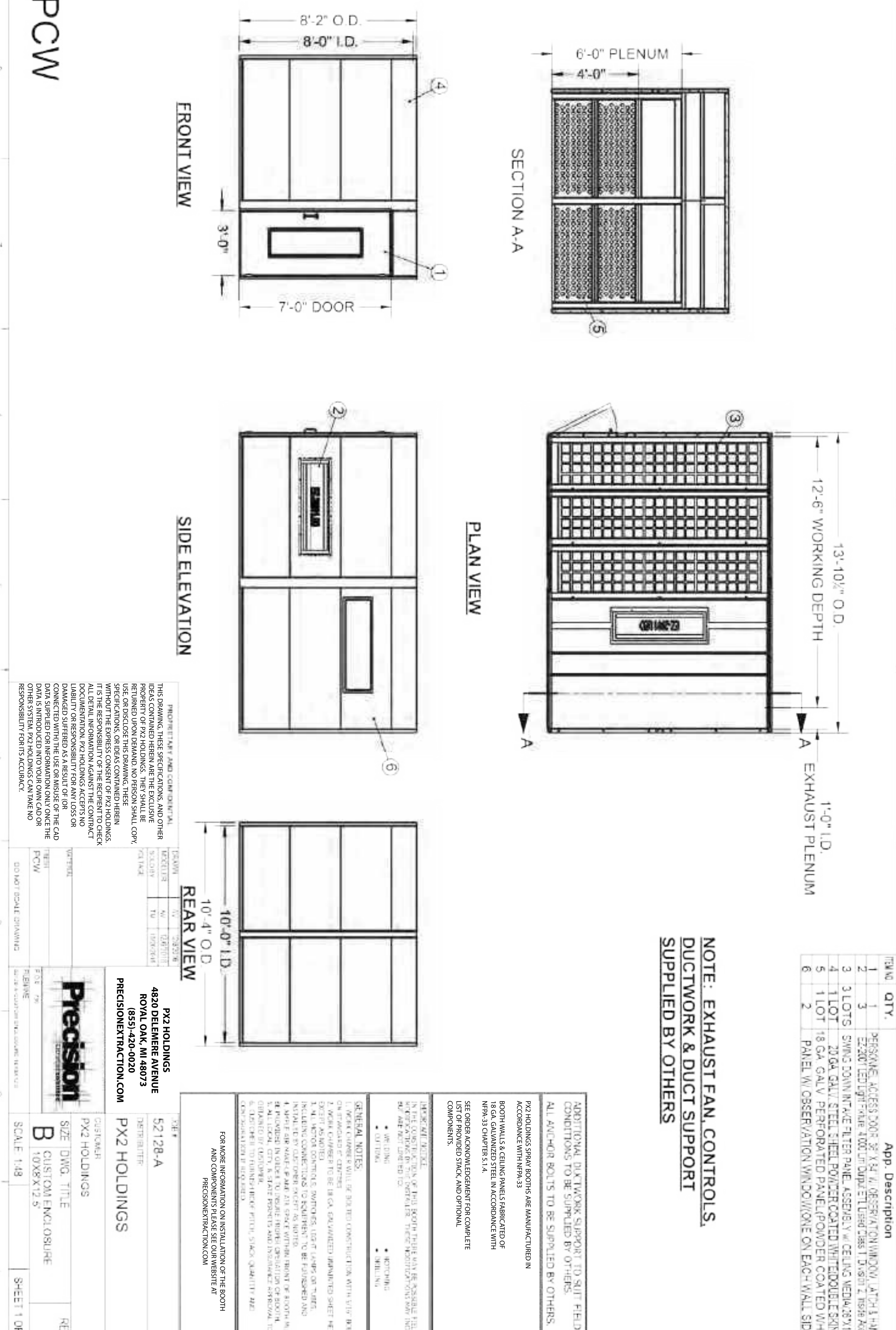
in accordance with EN60034-1 the following voltage and frequency tolerances are valid:
Voltage + / - 5% with a simultaneous frequency tolerance of + / - 2%
Example -5% voltage and +2% frequency -> not allowed!
-5% voltage and - 2% frequency -> allowed

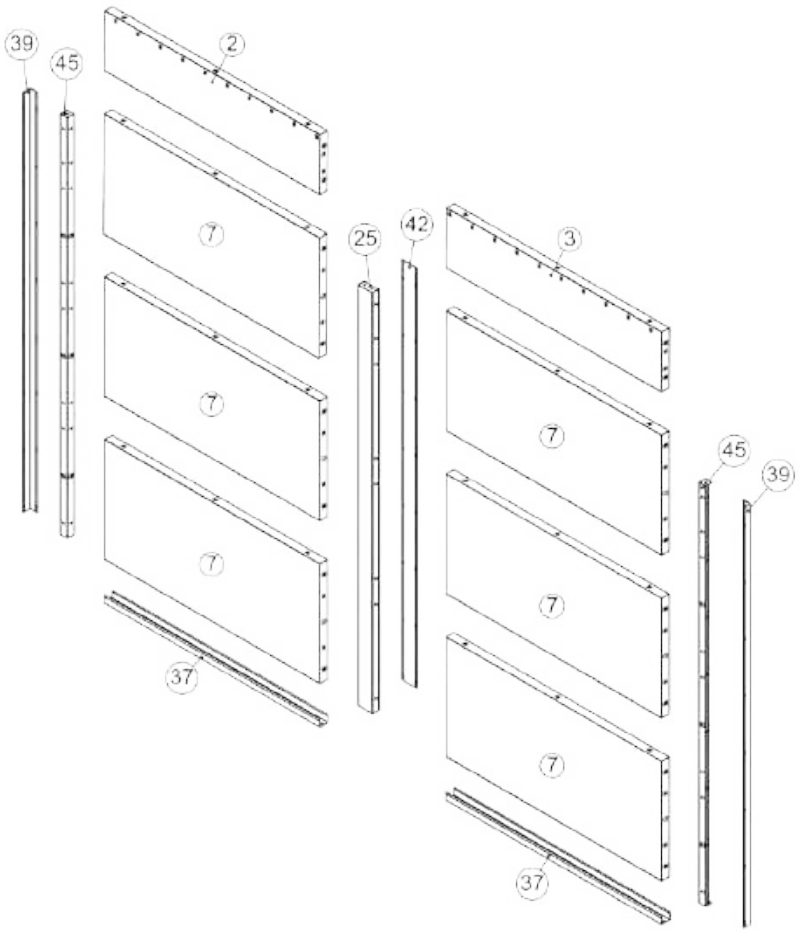
Information to Electromagnetic compatibility:
Classification (disturbance) to EN55011: Class A, Group 1
Special Case: Acetone and Polyglycol: The plastic pump is not resistant against acetone and polyglycols (depending on the manufacturer). It is recommended that water is mixed with either glysantine or ethylene glycol for freeze protection. A more resistant plastic is available on request at an additional cost.

Standard delivery conditions - Power cable configuration:
1. Single / two-phase devices (100V to 240V) --> with power cable and country-specific plug (please specify when ordering)
2. Three-phase devices with current consumption less than 63A --> with cable, without plug
3. Three-phase devices with current consumption greater than 63A --> without cable, without plug

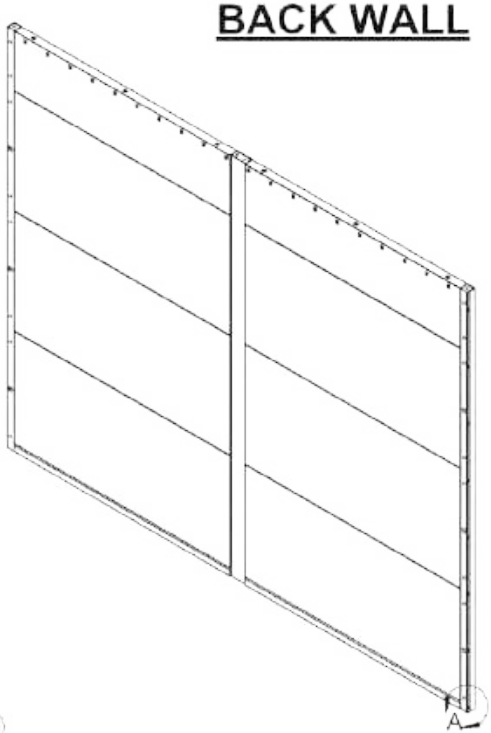
This equipment is compliant to US-SNAP and all applicable EU laws. The US-SNAP end-use for this equipment is the industrial process refrigeration. Certification by a Notified Body upon request.

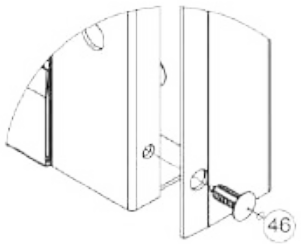
** Please respect space requirements. See operating conditions at www.huber-online.com


PCW
FRONT VIEW
8'-2" O.D.
8'-0" I.D.
3'-0"
7'-0" DOOR
SECTION A-A
6'-0" PLENUM
4'-0"
SIDE ELEVATION
PLAN VIEW
13'-10¾" O.D.
12'-6" WORKING DEPTH
1'-0" I.D.
EXHAUST PLENUM
REAR VIEW
10'-0" I.D.
10'-4" O.D.
NOTE: EXHAUST FAN, CONTROLS, DUCTWORK & DUCT SUPPORT SUPPLIED BY OTHERS
ITEM NO. QTY. App. Description
ADDITIONAL DUCTWORK SUPPORT TO SUIT FIELD CONDITIONS TO BE SUPPLIED BY OTHERS.
ALL ANCHOR BOLTS TO BE SUPPLIED BY OTHERS.
PX2 HOLDINGS SPRAY BOOTHS ARE MANUFACTURED IN ACCORDANCE WITH NFPA-33
BOOTH WALLS & CEILING PANELS FABRICATED OF 18 GA. GALVANIZED STEEL IN ACCORDANCE WITH NFPA-33 CHAPTER 5.1.4.
SEE ORDER ACKNOWLEDGEMENT FOR COMPLETE LIST OF PROVIDED STACK, AND OPTIONAL COMPONENTS.
GENERAL NOTES:
FOR MORE INFORMATION ON INSTALLATION OF THE BOOTH AND COMPONENTS PLEASE SEE OUR WEBSITE AT PRECISIONEXTRACTION.COM
PROPRIETARY AND CONFIDENTIAL
PX2 HOLDINGS
4820 DELEMERE AVENUE
ROYAL OAK, MI 48073
(855)-420-0020
PRECISIONEXTRACTION.COM
Precision
52128-A
PX2 HOLDINGS
CUSTOMER PX2 HOLDINGS
SIZE B
DWG. TITLE CUSTOM ENCLOSURE 10'X8'X12.5'
SCALE 1:48
SHEET 1 OF 7
DO NOT SCALE DRAWING



BACK WALL





PLASTIC PLUGS THRU ALL COVER PLATES
DETAIL A
SCALE 1 : 2

PCW

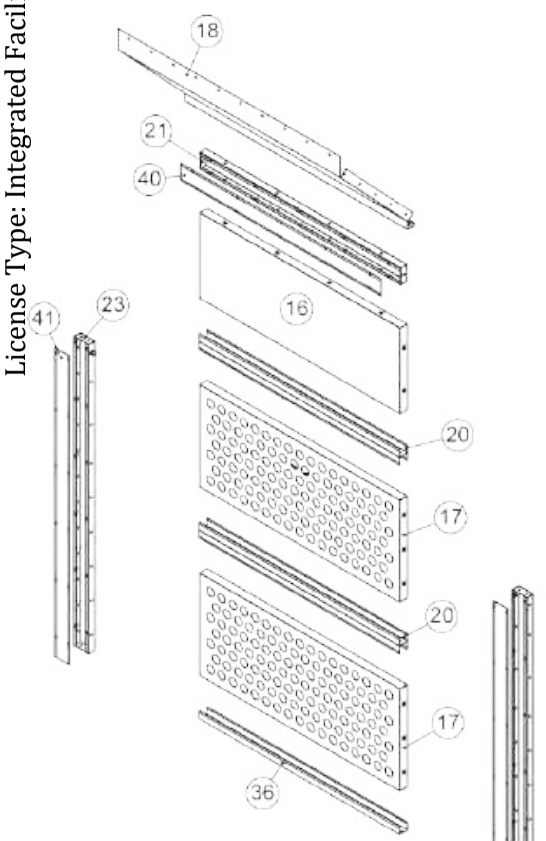
DRAWN	AV	12/6/2016
MODELER	AV	12/6/2016
SOLD BY	TM	11/23/2016
VOLTAGE		
MATERIAL		
FINISH	PCW	
	DO NOT SCALE DRAWING	

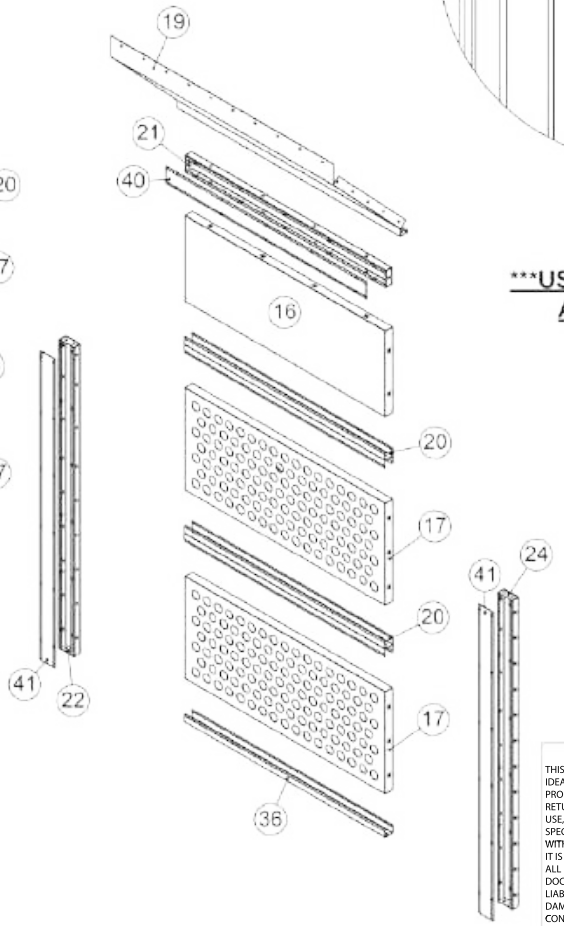
PX2 HOLDINGS
4820 DELEMERE AVENUE
ROYAL OAK, MI 48073
(855)-420-0020
PRECISIONEXTRACTION.COM

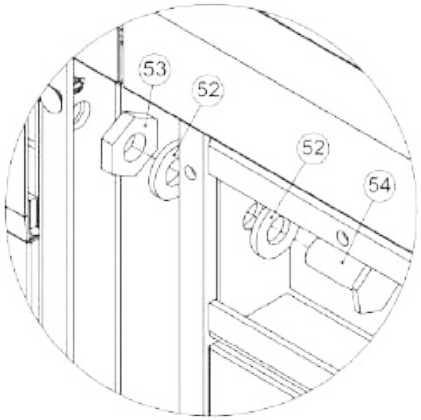
Precision

JOB #	52128-A
DISTRIBUTER	PX2 HOLDINGS
CUSTOMER	PX2 HOLDINGS
SIZE	B
DWG. TITLE	CUSTOM ENCLOSURE 10'X8'X12.5'
REV	
SCALE: 1:24	
SHEET 3 OF 7	

DIFFUSER PANEL WALL

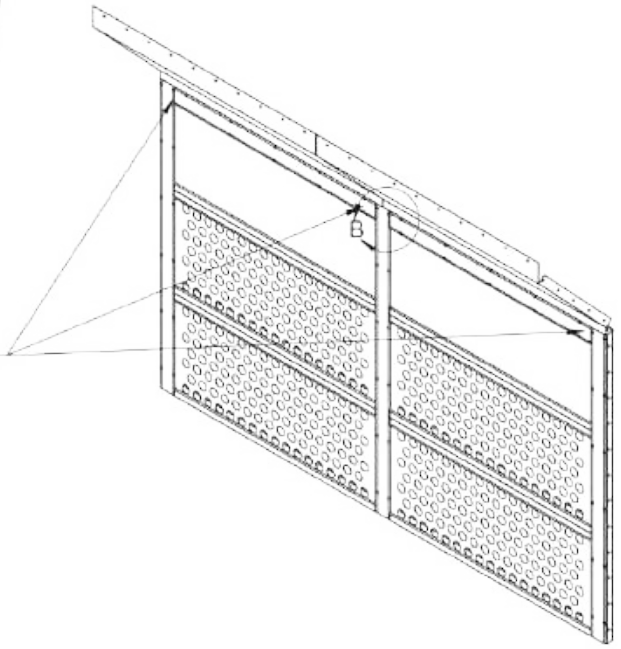






DETAIL B
SCALE 1 : 2

USE 1/2" HARDWARE
AT TOP SUPPORT
JUNCTIONS



PCW

DRAWN	AV	12/6/2016
MODELER	AV	12/6/2016
SOLD BY	TM	11/20/2016
VOLTAGE		
MATERIAL		
FINISH	PCW	

DO NOT SCALE DRAWING

PX2 HOLDINGS
4820 DELEMERE AVENUE
ROYAL OAK, MI 48073
(855)-420-0020
PRECISIONEXTRACTION.COM

Precision

JOB #
52128-A

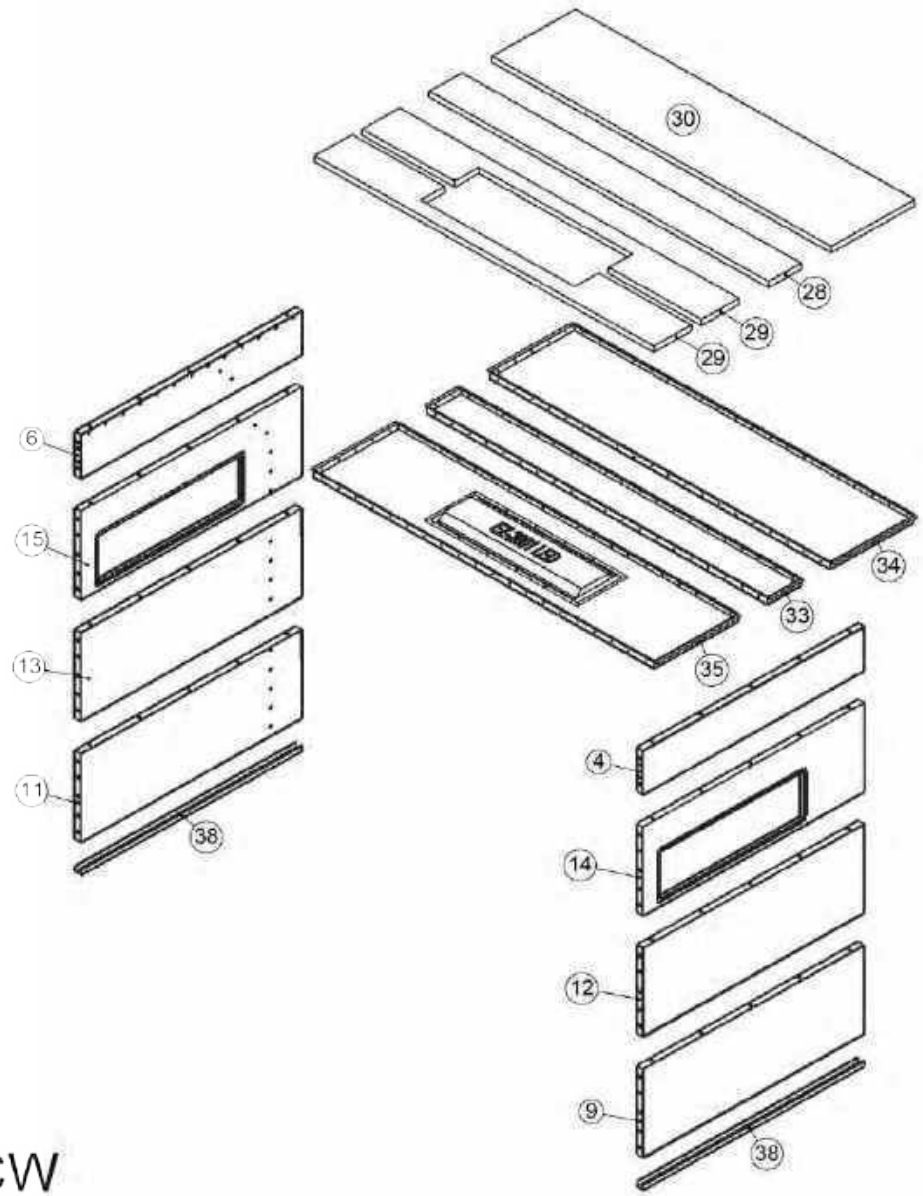
DISTRIBUTER
PX2 HOLDINGS

CUSTOMER
PX2 HOLDINGS

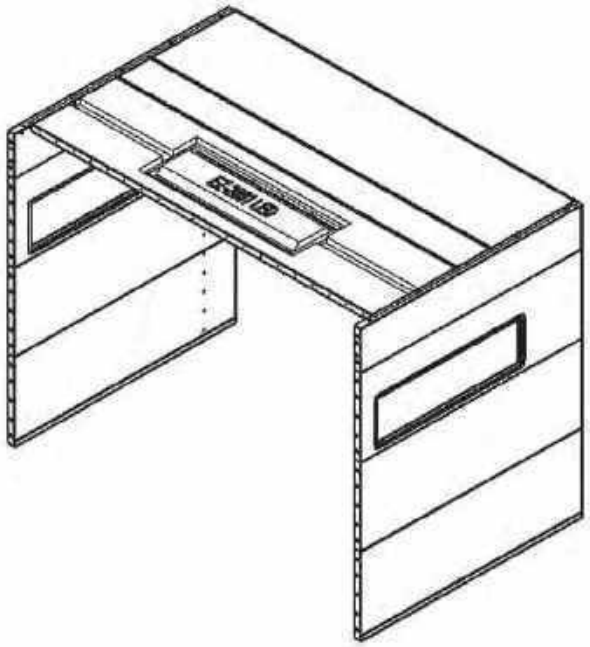
SIZE	DWG. TITLE	REV
B	CUSTOM ENCLOSURE 10'X8'X12.5'	

SCALE: 1:24

SHEET 4 OF 7



SECTION A



PCW

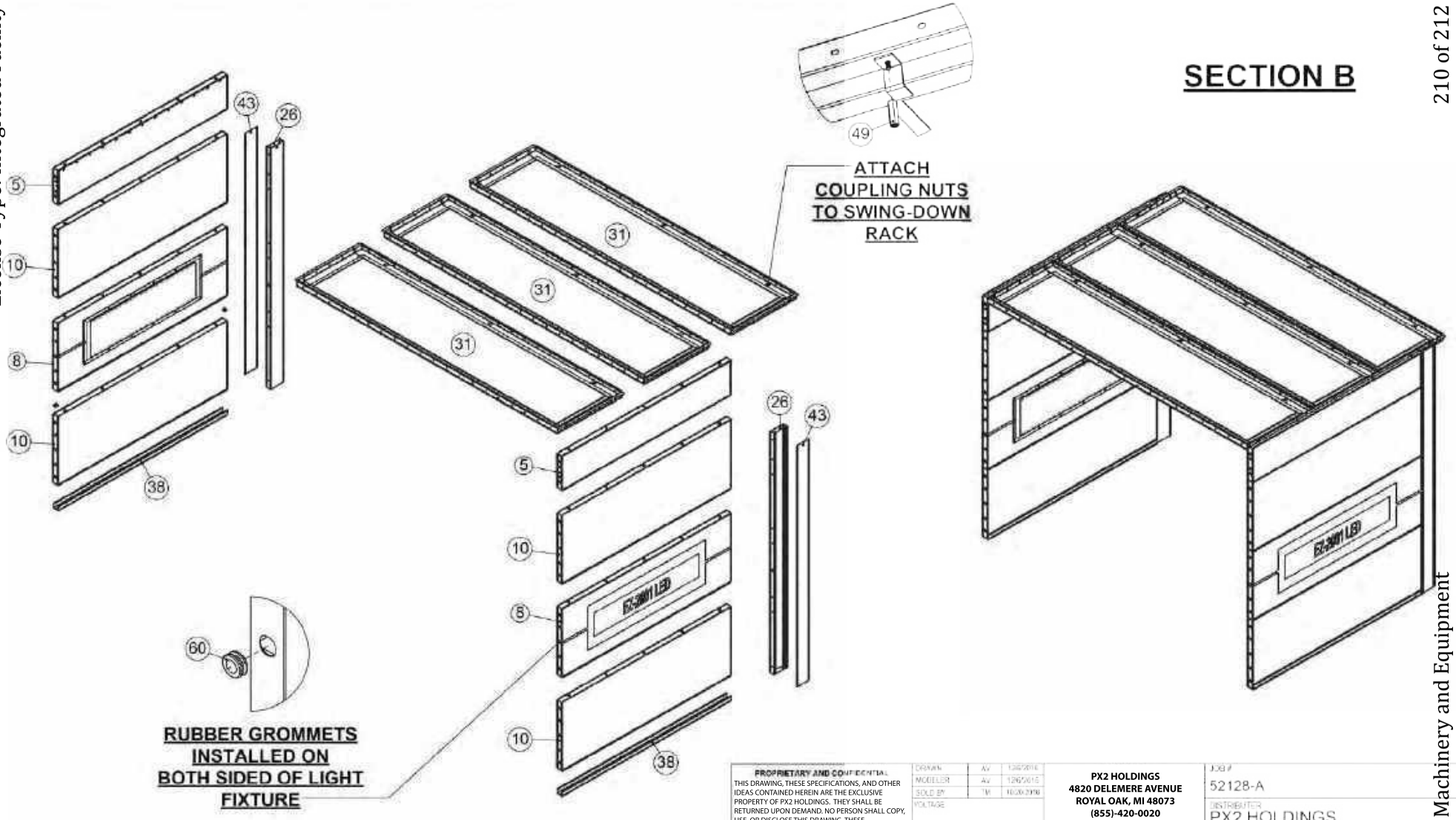
DRAWN	AV	12/6/2016
MODELER	AV	12/6/2016
SOLID BY	TM	12/25/2016
VOLTAGE		
MATERIAL		
FINISH	PCW	
	DO NOT SCALE DRAWING	

PX2 HOLDINGS
4820 DELEMERE AVENUE
ROYAL OAK, MI 48073
(855)-420-0020
PRECISIONEXTRACTION.COM

Precision

JOB #	52128-A
DISTRIBUTER	PX2 HOLDINGS
CUSTOMER	PX2 HOLDINGS
SIZE	B
DWG TITLE	CUSTOM ENCLOSURE 10'X8'X12.5'
REV	V
SCALE	1:32
SHEET	5 OF 7

SECTION B



PCW

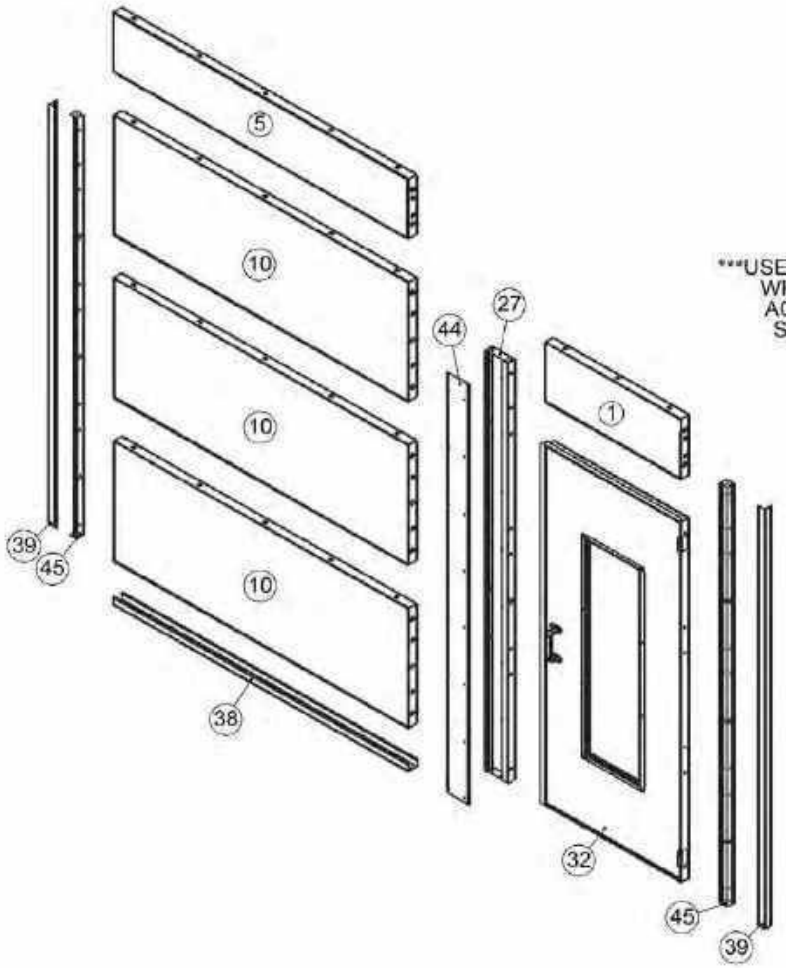
DRAWN	AV	12/8/2015
MODELER	AV	12/8/2015
SOLD BY	TM	10/20/2015
VOLTAGE		
MATERIAL		
FINISH	PCW	
	DO NOT SCALE DRAWING	

PX2 HOLDINGS
4820 DELEMERE AVENUE
ROYAL OAK, MI 48073
(855)-420-0020
PRECISIONEXTRACTION.COM

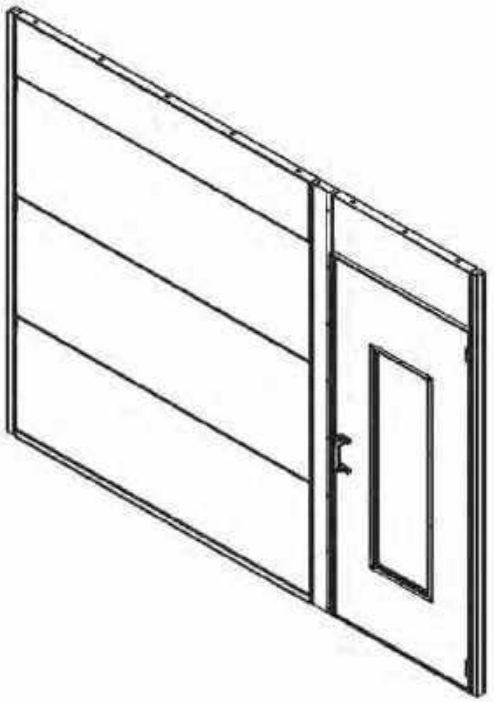
Precision

JOB #	52128-A
DISTRIBUTOR	PX2 HOLDINGS
CUSTOMER	PX2 HOLDINGS
SIZE	B
DWG. TITLE	CUSTOM ENCLOSURE 10'X8'X12.5'
SCALE: 1:31	SHEET 6 OF 7

FRONT WALL



USE 3/8"Ø HARDWARE
WHEN INSTALLING
ACCESS DOOR TO
SUPPORT STEEL



PCW

DRAWN	AV	12/6/2016
MODELER	AV	12/6/2016
SOLID B*	TM	12/6/2016

VOLTAGE

MATERIAL

FINISH
PCW

DO NOT SCALE DRAWING

PX2 HOLDINGS
4820 DELEMERE AVENUE
ROYAL OAK, MI 48073
(855)-420-0020
PRECISIONEXTRACTION.COM

Precision

P.O.#

FILENAME
52128-A CUSTOM ENCLOSURE 10'X8'X12.5'

JOB #
52128-A

DISTRIBUTOR
PX2 HOLDINGS

CUSTOMER
PX2 HOLDINGS

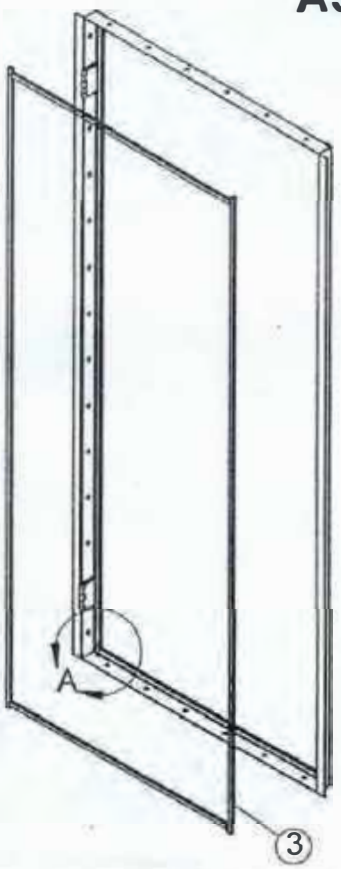
SIZE B | DWG. TITLE
CUSTOM ENCLOSURE
10'X8'X12.5'

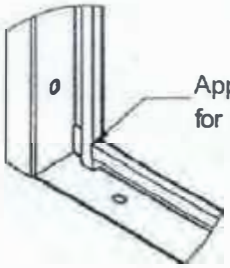
REV

SCALE 1:24

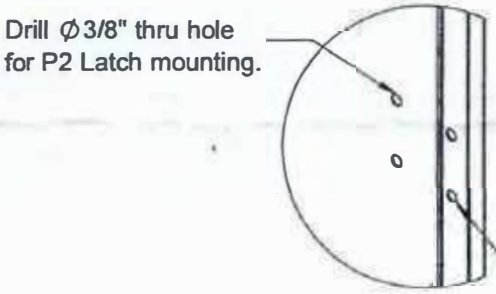
SHEET 7 OF 7

ACCESS DOOR HARDWARE ASSEMBLY INSTRUCTIONS

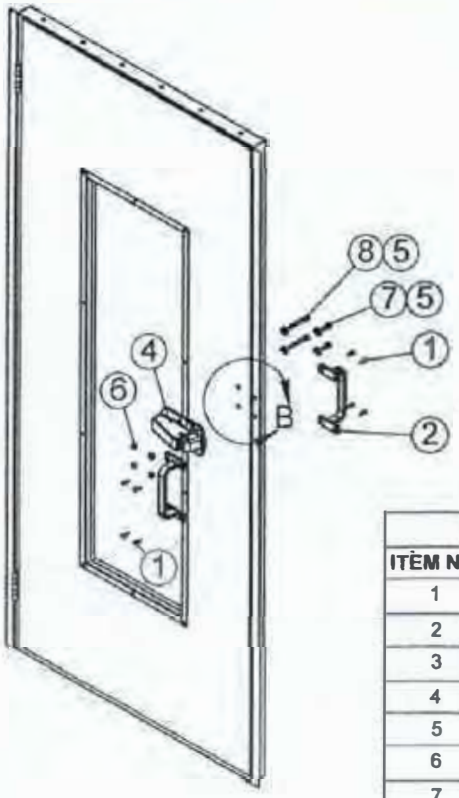




DETAIL A



DETAIL B



Assembly Note: When mounting to insulated panels replace Item 7 with Item 9. For standard installation Item 9 is discarded.

AD-3084-HDW-KIT			
ITEM NO.	QTY.	PartNo	DESCRIPTION
1	12	FAS-1810	Screw, #12-14 x 3/4", Hex, Self Drilling
2	2	FAS-1870	Door Pull, 6"
3	1	GSK-170	Gasket, 3/8"THK x 1/2"W x 30'L, Open Cell, Adhesive One Side
4	1	HDW-220-P2	Latch, P2
5	6	FAS-1370	Flat Washer, 5/16", Zinc (Included w/P2 Latch)
6	6	FAS-1440	Nut, 5/16"-18, Flange Hex, Zinc (Included w/P2 Latch)
7	2	FAS-1460	Bolt, 5/16"-18 x 3/4", Hex, Grade A, Zinc (Included w/P2 Latch)
8	2	FAS-1530	Bolt, 5/16"-18 x 2-1/2", Hex, Grade A, Zinc (Included w/P2 Latch)
9	2	FAS-1540	Bolt, 5/16"-18 x 3", Hex, Grade A, Zinc (Included w/P2 Latch)

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 23 – Receiving and Shipping Plan

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

Our company was formed by Alabama residents who have partnered with a very successful national cannabis company licensed and operating in multiple medical cannabis markets. As a cannabis company with experience in various highly regulated medical states, we have extensive experience in tracking, receiving, and shipping medical cannabis.

As an Integrated Facility, our Company will transport product internally from our cultivation site to our manufacturing site to our dispensaries. We will also receive product from other cultivators at our manufacturing and dispensary facilities, and ship product from our cultivation and manufacturing facilities to other dispensaries, and to a State Testing Laboratory. Finally, we will contract with Secure Transporters to transport product.

To ensure that all transport, shipping, and receiving is conducted in a safe, secure, and compliant manner, we have designed and implemented (in other states) a comprehensive Receiving and Shipping Plan that tracks every item from seed to sale. The system utilizes two types of labels: (1) a Compliance Label for all products coming into or out of a facility, which contains a QR code or barcode that reflects batch number, potency, harvest dates, shipping history, and the like; and (2) a Tamper Sticker on all finished products, which verifies that the product has not been modified after packaging.

Our inventory-tracking system is described in detail below:

23.1: Receiving Incoming Cannabis.

[redacted]

[redacted]

[redacted] [redacted]

23.2: Labeling and Recording Incoming Cannabis.

[redacted]

[redacted]

23.3: Receiving Cannabis with Manifest.

[redacted]

[redacted]

[redacted]

[redacted]

23.4: Labeling and Recording Incoming Cannabis.

[redacted]

23.5: Packaging and Labeling Outgoing Cannabis.

[redacted]

[redacted]

[redacted]

23.7: Shipping Outgoing Cannabis with Manifest.

[redacted]

[redacted]

23.8: Shipping Outgoing Cannabis with Manifest.

[redacted]

[redacted]

SALES INVOICE/ SHIPPING MANIFEST *PLEASE USE PERMANENT INK*

FOR ALL ITEMS

INVOICE/MANIFEST NUMBER:			
ATTACHED PAGE(S)?	**YES NO**	**# OF ATTACHED PAGES:**	

ACTUAL DATE AND TIME OF DEPARTURE:	/ /	**AM PM**
ESTIMATED DATE AND TIME OF ARRIVAL:	/ /	**AM PM**

SHIPPER INFORMATION

STATE LICENSE #	
TYPE OF LICENSE	
BUSINESS NAME	
BUSINESS ADDRESS	
CITY, STATE, ZIP CODE	
PHONE NUMBER	
CONTACT NAME	

RECEIVER INFORMATION

STATE LICENSE #	
TYPE OF LICENSE	
BUSINESS NAME	
DELIVERY ADDRESS	
CITY, STATE, ZIP CODE	
PHONE NUMBER	
CONTACT NAME	

DISTRIBUTOR INFORMATION

STATE LICENSE #			DRIVER'S NAME		
BUSINESS NAME			CA DRIVER'S LICENSE#		
STREET ADDRESS			VEHICLE MAKE		
CITY, STATE, ZIP			VEHICLE MODEL		
PHONE NUMBER			VEHICLE LIC. PLATE #		
CONTACT NAME			ACTUAL DATE AND TIME OF ARRIVAL	/ /	**AM PM**

PRODUCT SHIPPED DETAILS

SHIPPER COMPLETES ALL THE UNSHADED COLUMNS BELOW. RECEIVER COMPLETES ONLY THE SHADED COLUMNS BELOW (Please attach additional pages, if needed)

UID TAG NUMBER (IF APPLICABLE)	ITEM NAME AND PRODUCT DESCRIPTION (INCLUDE WEIGHT OR COUNT)	QTY ORDERED	QTY REC'D	UNIT COST	TOTAL COST	RETAIL ONLY	
						UNIT RETAIL VALUE	TOTAL RETAIL VALUE
	Synergy De-stemmed Comp (Frozen)	5322					
	Frozen Synergy (Fresh Cannabis Plant	26,844					
	Destemmed COMP Canteloupe Haze	126					

PRODUCT REJECTION

IF PRODUCTS ARE REJECTED, PLEASE CIRCLE THE ITEMS BEING REJECTED IN THE PRODUCT SHIPPED DETAILS SECTION ABOVE

REASON FOR REJECTION:	

PRODUCT RECEIPT CONFIRMATION

I CONFIRM THAT THE CONTENTS OF THIS SHIPMENT MATCH IN WEIGHT AND COUNT AS INDICATED ABOVE. I AGREE TO TAKE CUSTODY OF ALL ITEMS AS INDICATED RECEIVED ABOVE – AND WHICH ARE NOT CIRCLED. THE PRODUCTS CIRCLED ABOVE ARE REJECTED FOR DELIVERY AND REMAIN IN THE CUSTODY OF THE DISTRIBUTOR FOR RETURN TO THE SHIPPER AS INDICATED ON THIS FORM AND ALL ATTACHED PRODUCT DETAILS SHEET(S).

NAME OF PERSON RECEIVING AND/OR REJECTING PRODUCT:			PHONE NUMBER:	
SIGNATURE OF PERSON RECEIVING AND/OR REJECTING PRODUCT:			DATE SIGNED:	

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 24 – Secure Transport Vehicles

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/2023**
Signature of Verifying Individual	**Verification Date**

Our company was formed by Alabama residents who have partnered with a very successful national cannabis company licensed and operating in multiple medical cannabis markets. As a cannabis company with experience in various highly regulated medical states, we have extensive experience in transporting cannabis in medical markets. We also have ongoing relationships with insurance carriers familiar with cannabis transport. We will leverage those relationships and that experience to provide safe, secure, and compliant transportation for medical cannabis in Alabama.

24.1 Secure Transportation Vehicle Title or Lease

Our partner company has extensive experience with both outsourced and in-house secure cannabis transportation in medical markets. We have found that, at least in the first years of operation, in-house transport systems are safer, more compliant, and more reliable than outsourced solutions. Accordingly, we will provide our own vehicles and equipment and perform our own secure transport.

[redacted]

[redacted]

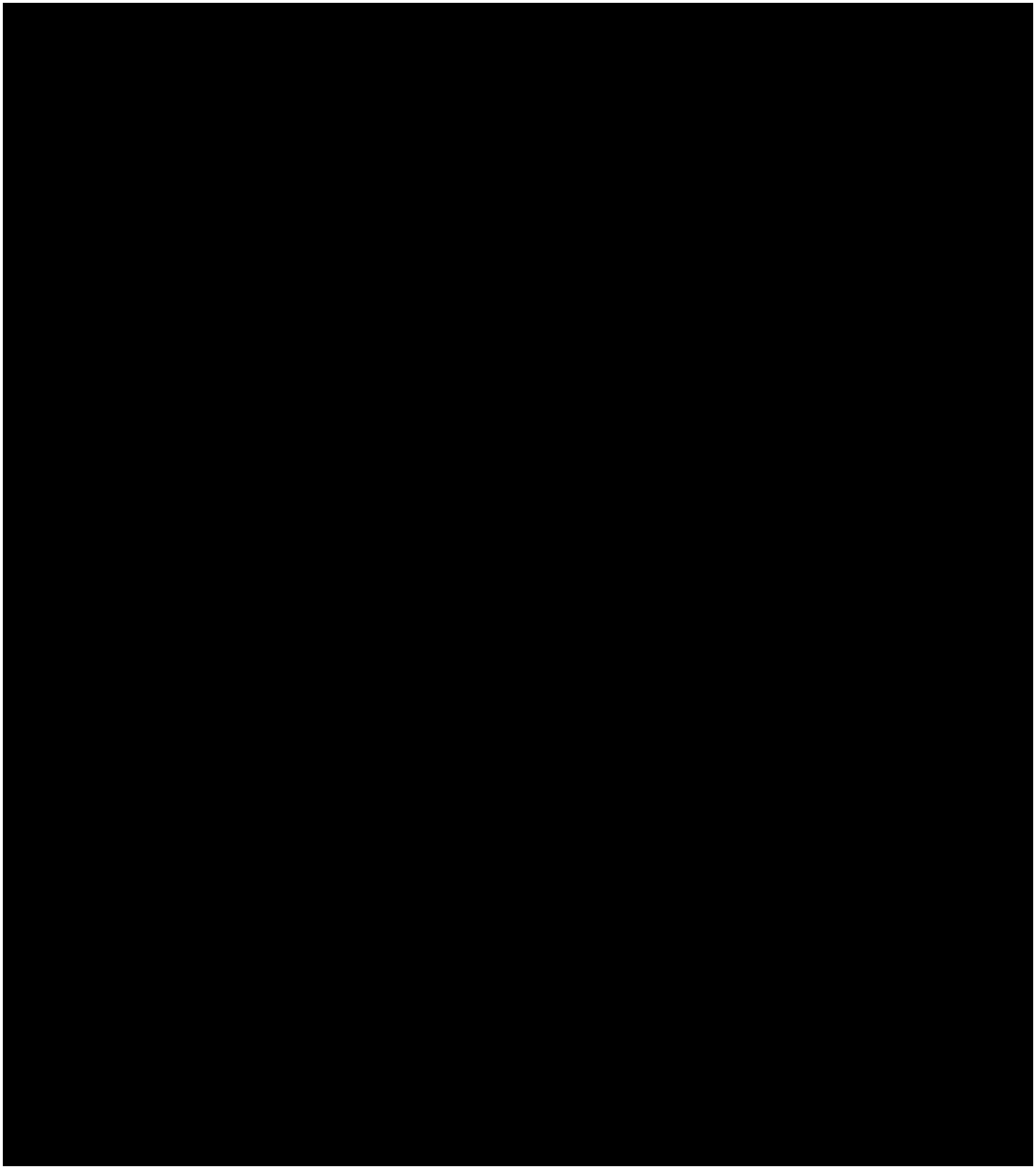
24.2 Secure Transportation Vehicle Insurance Policies

The declaration pages for both vans are included below as **Attachment B.**

24.3 Secure Transportation Vehicle License Plate and DOT Numbers

[redacted]

ATTACHMENT A



ATTACHMENT B

ATTACHMENT C

March 2, 2023

Dear [redacted],

We are pleased to confirm that [redacted] (a prospective Integrated Facility licensee) has selected [redacted] (a prospective Secure Transporter licensee) to provide secure transportation services in the event that both [redacted] are both awarded Medical Cannabis Licenses through the state of Alabama.

We support [redacted] efforts to provide secure transportation services and we offer our deepest gratitude for the opportunity to work with them in this exciting new venture.

We are thrilled to be working with [redacted] and look forward to a rewarding and enduring relationship that will increase our ability to offer Alabama patients medical cannabis products in a safe and secure manner.

Sincerely,

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 25 – Compliance with Alabama Public Service Commission Requirements

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

_____Jon Loevy_____	**_____Co-Owner_____**
Printed Name of Verifying Individual	**Title of Verifying Individual**
_____/s/ Jon Loevy_____	**_____3/23/23_____**
Signature of Verifying Individual	**Verification Date**

Our company was formed by Alabama residents who have partnered with a very successful national cannabis company licensed and operating in multiple medical cannabis markets. As a cannabis company with experience in various highly regulated medical states, we have extensive experience in transporting cannabis in medical markets. We also have ongoing relationships with insurance carriers familiar with cannabis transport. We will leverage those relationships and that experience to provide safe, secure, and compliant transportation for medical cannabis in Alabama.

Vehicles: Because our cannabis company has integrated cannabis operations in multiple states (including, for example, New Jersey and Pennsylvania) we currently own, operate, and insure a number of Secure Transport Vehicles. In Illinois, our factory is located far from the majority of the State's population, and we are presently transitioning our mode of transportation to rely on outside delivery services. Thus, if we are awarded a license in Alabama, our Secure Transport Vehicles presently in Illinois will be available to relocate to Alabama. These include the following:

Make	**Model**	**VIN**	**Plate No.**
Nissan	Cargo Van	[redacted]	[redacted]
Ford	Transit	[redacted]	[redacted]

Because we will be transporting our own cannabis intrastate in our own Secure Delivery Vehicles, our carriers are not subject to the requirements of the Alabama Public Service Commission requirements for motor carriers.

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 26 – Commercial Driver's License

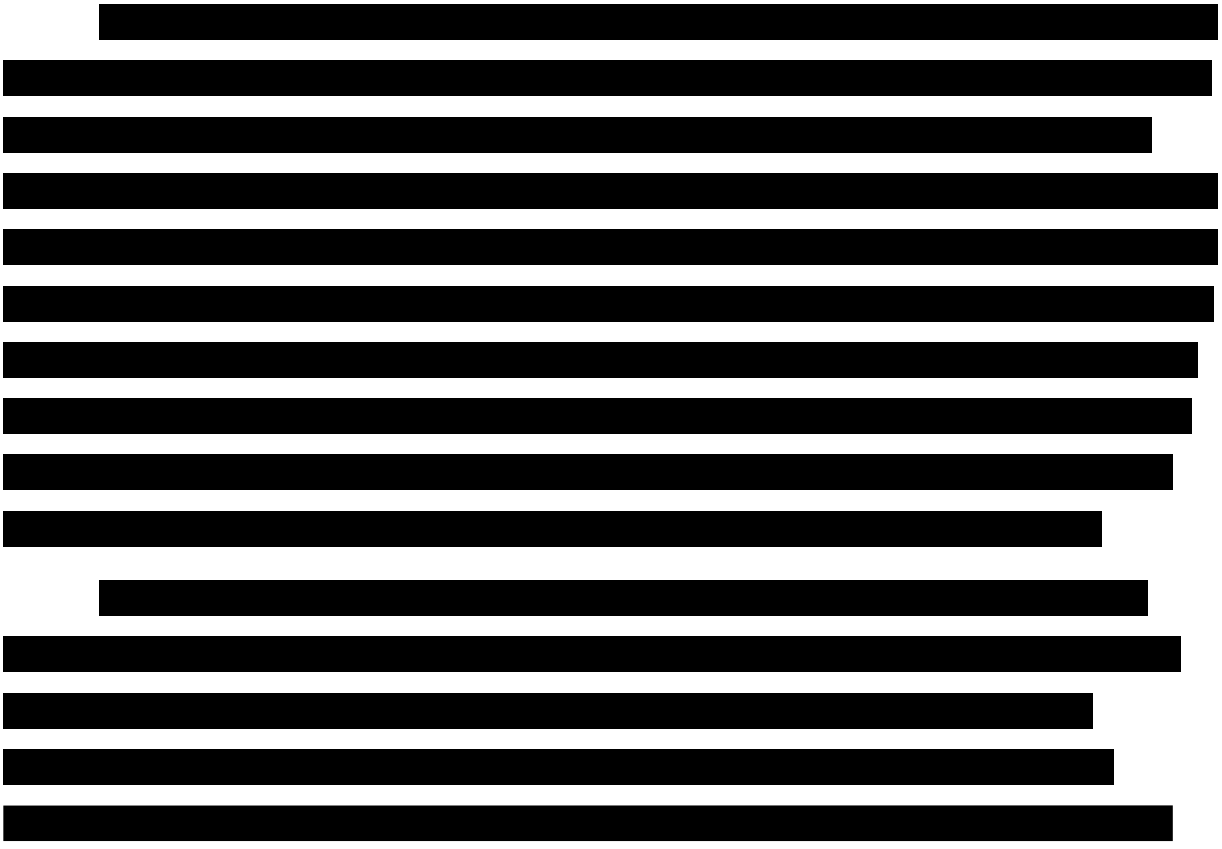
Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

Our company was formed by Alabama residents who have partnered with a very successful national cannabis company licensed and operating in multiple medical cannabis markets. As a cannabis company with experience in various highly regulated medical states, we have extensive experience in transporting cannabis in medical markets. We also have ongoing relationships with insurance carriers familiar with cannabis transport. We will leverage those relationships and that experience to provide safe, secure, and compliant transportation for medical cannabis in Alabama.

Because our cannabis company has integrated cannabis operations in multiple states (including, for example, New Jersey and Pennsylvania) we currently own, operate, and insure a number of Secure Transport Vehicles. In Illinois, our factory is located far from the majority of the State's population, and we are presently transitioning our mode of transportation to rely on outside delivery services. Thus, if we are awarded a license in Alabama, our Secure Transport Vehicles presently in Illinois will be available to relocate to Alabama.



[redacted]

Examples of Moving Violations include but are not limited to the following: speeding violations, aggressive driving violations, right-of-way violations, seat belt and other equipment violations, texting and certain administrative violations.

ACCEPTABLE	CONDITIONAL	UNACCEPTABLE
1-2 (or fewer) Moving Violations in the past three years	3 Moving Violations in the past 3 years	4+ Moving Violations in the past 3 years
0-1 At-Fault Crashes in the past 3 years	2 At-Fault Crashes in the last 3 years	3 or More At-Fault Crashes in the past 3 years
N / A	N / A	A single citation in the past 3 years for any of the following: -Alcohol or drug related driving offenses -Refusal to submit to a

blood alcohol test

-Operating a vehicle more than 30mph over the posted speed limit

-Leaving the scene of an accident

-Any felony crime committed

with a vehicle

In addition, all drivers are extensively trained on our Secure Cannabis Transport Protocol. That protocol is set forth below:

SECURE CANNABIS TRANSPORT PROTOCOLS

1.Transportation Vehicles

[redacted]

[redacted]

2.Transportation Staffing

[redacted]

3.Shipment Requests, Preparation for Transport, and Transportation Manifest

[redacted]

[redacted]

4.Prior to Transport

[redacted]

[redacted]

5. Transportation Route and Delivery Procedures

[redacted]

6. Arrival and Unloading Procedures

[redacted]

[redacted]

7. Records

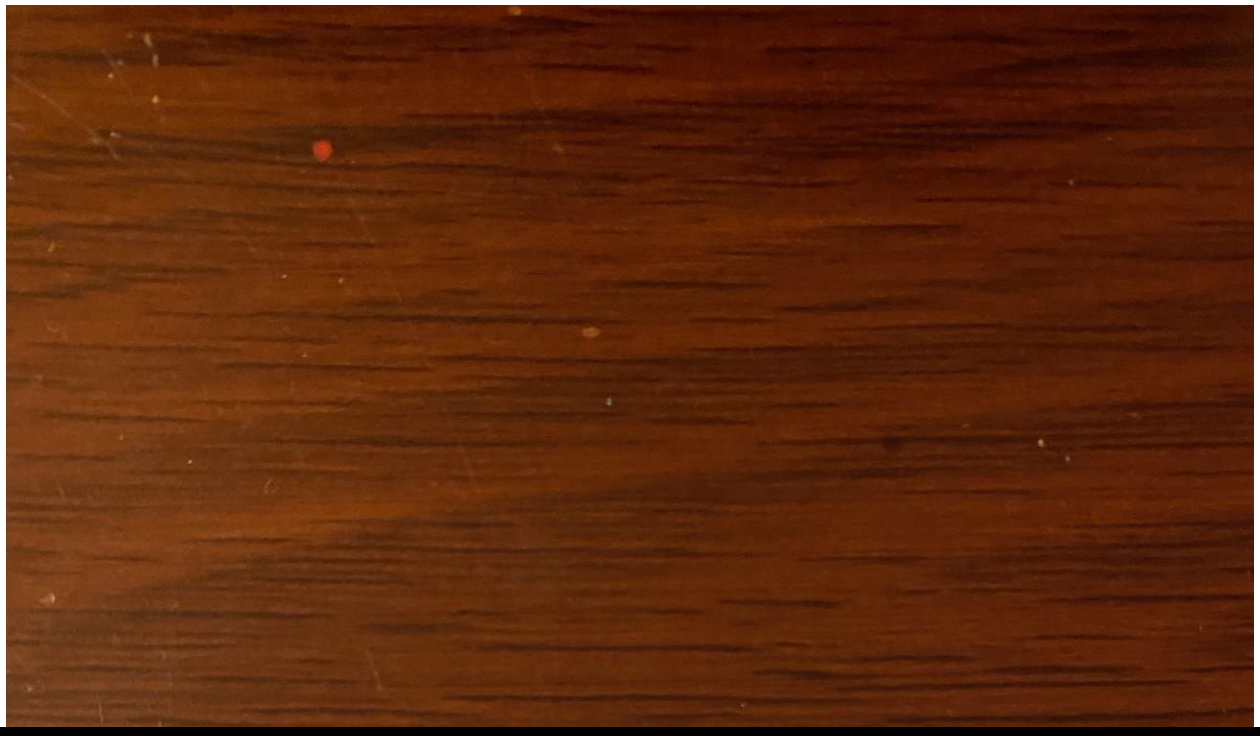
[redacted]

1. [redacted]

[redacted]

8. Reportable Incidents and Evidence of Adverse Loss

[redacted]



Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 27 – Fleet Summary

Verificati
on

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

_____Jon Loevy_____	**_____Co-Owner_____**
Printed Name of Verifying Individual	**Title of Verifying Individual**
_____/s/ Jon Loevy_____	**_____3/24/23_____**
Signature of Verifying Individual	**Verification Date**

Our company was formed by Alabama residents who have partnered with a very successful national cannabis company licensed and operating in multiple medical cannabis markets. As a cannabis company with experience in various highly regulated medical states, we have extensive experience in transporting cannabis in medical markets. We also have ongoing relationships with insurance carriers familiar with cannabis transport. We will leverage those relationships and that experience to provide safe, secure, and compliant transportation for medical cannabis in Alabama.

Because our cannabis company has integrated cannabis operations in multiple states (including, for example, New Jersey and Pennsylvania) we currently own, operate, and insure a number of Secure Transport Vehicles. In Illinois, our factory is located far from the majority of the State's population, and we are presently transitioning our mode of transportation to rely on outside delivery services. Thus, if we are awarded a license in Alabama, our Secure Transport Vehicles presently in Illinois will be available to relocate to Alabama. These include the following:

Make	**Model**	**VIN**	**Plate No.**
Nissan	Cargo Van	[redacted]	[redacted]
Ford	Transit	[redacted]	[redacted]

We maintain strict safety standards for our Secure Transport Vehicles. All transportation vehicles undergo regular maintenance and are stored at our facility. Each vehicle will be cleaned before and after each use and will be maintained in a sanitary condition. We will ONLY transport cannabis infused products to a cannabis organization or an approved laboratory within the State of Alabama.

Each transportation vehicle will be equipped with a security alarm system and a [redacted]

[redacted]

Prior to using a transportation vehicle, we provide the Department with the vehicle's make, model, VIN, license plate number, insurance number, and Division of Motor Vehicle registration number. Our transportation team members will make our delivery vehicles available for inspection by the Department or its authorized agents, law enforcement, or other federal, state, or local government officials upon demand.

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 28 – Care and Maintenance of Vehicles

Verificati
on

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

Our company was formed by Alabama residents who have partnered with a very successful national cannabis company licensed and operating in multiple medical cannabis markets. As a cannabis company with experience in various highly regulated medical states, we have extensive experience in transporting cannabis in medical markets. We also have ongoing relationships with insurance carriers familiar with cannabis transport. We will leverage those relationships and that experience to provide safe, secure, and compliant transportation for medical cannabis in Alabama.

Vehicles: Because our cannabis company has integrated cannabis operations in multiple states (including, for example, New Jersey and Pennsylvania) we currently own, operate, and insure a number of Secure Transport Vehicles. In Illinois, our factory is located far from the majority of the State's population, and we are presently transitioning our mode of transportation to rely on outside delivery services. Thus, if we are awarded a license in Alabama, our Secure Transport Vehicles presently in Illinois will be available to relocate to Alabama. These include the following:

Make	**Model**	**VIN**	**Plate No.**
Nissan	Cargo Van	[redacted]	[redacted]
Ford	Transit	[redacted]	[redacted]

Safety Standards: We maintain strict safety standards for our Secure Transport Vehicles. All transportation vehicles undergo regular maintenance and are stored at our facility. Each vehicle will be cleaned before and after each use and will be maintained in a sanitary condition. We will ONLY transport cannabis infused products to a cannabis organization or an approved laboratory within the State of Alabama.

[redacted]

[redacted]

Prior to using a transportation vehicle, we provide the Department with the vehicle's make, model, VIN, license plate number, insurance number, and Division of Motor Vehicle registration number. Our transportation team members will make our delivery vehicles available for inspection by the Department or its authorized agents, law enforcement, or other federal, state, or local government officials upon demand.

Maintenance Standards: Each Secure Transport Vehicle will be inspected before and after each delivery for any damage or mechanical problems. Any vehicle experiencing mechanical problems will be placed out of service until repairs are completed.

Each Secure Transport Vehicle will be regularly serviced for ordinary maintenance. Each vehicle will be maintained in a clean and safe condition, and mileage will be carefully recorded each week.

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 29 - Route Plans

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**12/28/2022**
Signature of Verifying Individual	**Verification Date**

ROUTE PLAN

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 30 – Plan for Segregation of Processes Within and Transportation Between Facilities

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

[redacted]

Deliveries and Reception of Product

We will handle the receipt of cannabis products with extreme caution and comply with [redacted]

[redacted]

Security personnel will remain vigilant for any suspicious activity inside, outside, or in [redacted]

[redacted]

Daily Supply

[redacted]

[redacted]

Dispensing Cannabis and Cannabis Products

[redacted]

[redacted]

Storage After Hours

[redacted]

Vault Storage

[redacted]

[redacted]

Destruction and Disposal. (See Safety/Security Plan)

[redacted]

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 31 - Facilities

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/21/23**
Signature of Verifying Individual	**Verification Date**

The Applicant will operate a Cultivation, Manufacturing, and Processing Facility in Gadsden and five retail dispensary facilities in Gadsden, Phenix City, Alexander City, Montgomery, and Fairfield.

The materials for each facility are included in this Exhibit in the following order:

Facility Type	**Location**	**Attachment**
Cultivation, Processing, and Manufacturing	[redacted]	A
Retail Dispensary	[redacted]	B
Retail Dispensary	[redacted]	C
Retail Dispensary	[redacted]	D
Retail Dispensary	[redacted]	E
Retail Dispensary	[redacted]	F

Attachment A
Cultivation, Processing, and Manufacturing Facility

[redacted]

The City of [redacted] selected this parcel as the ideal location for a cultivation and manufacturing facility. It is conveniently located near the airport and has access to an ample electric and water supply to meet the needs of a high performance cultivation facility. The location has convenient access to [redacted]

31.1 Facility Name and Type

Name: [redacted]

Type: Cultivation, Processing, and Manufacturing Facility

31.2: Facility Location

[redacted]

31.3 Aerial Photograph

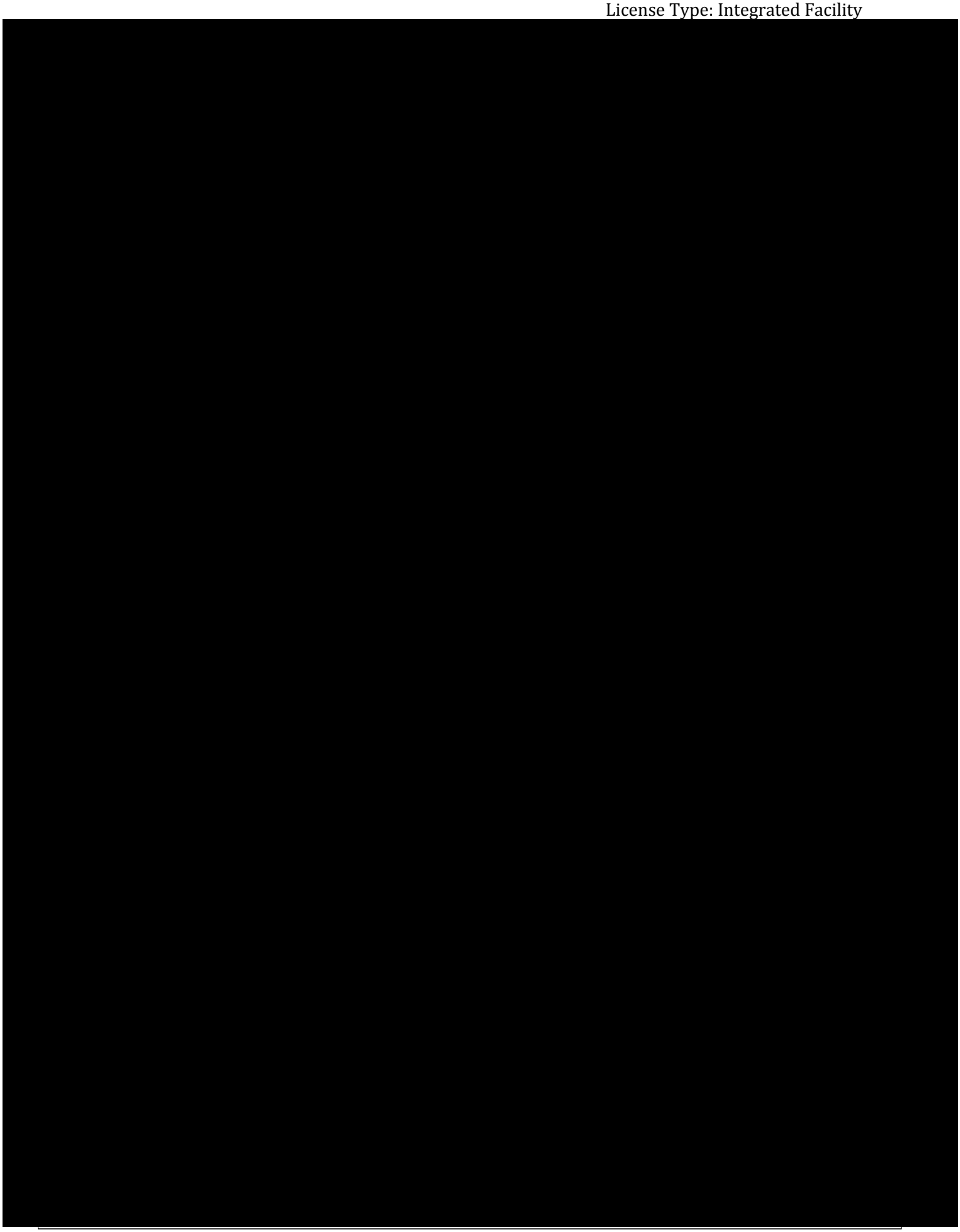
31.4: Property Authorization

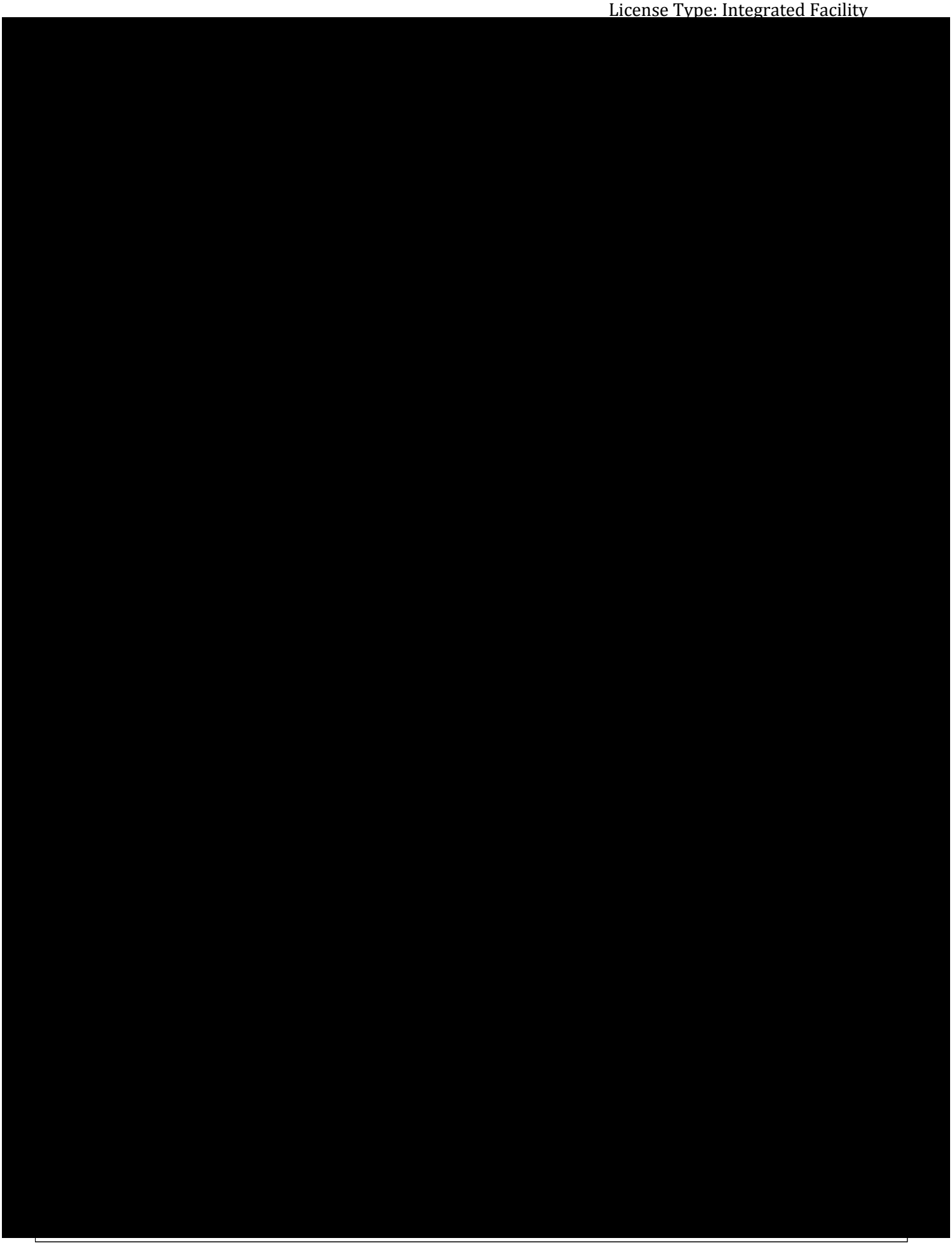
The parcel was gifted to the Applicant by the [redacted], AL, conditioned upon receipt of the license.

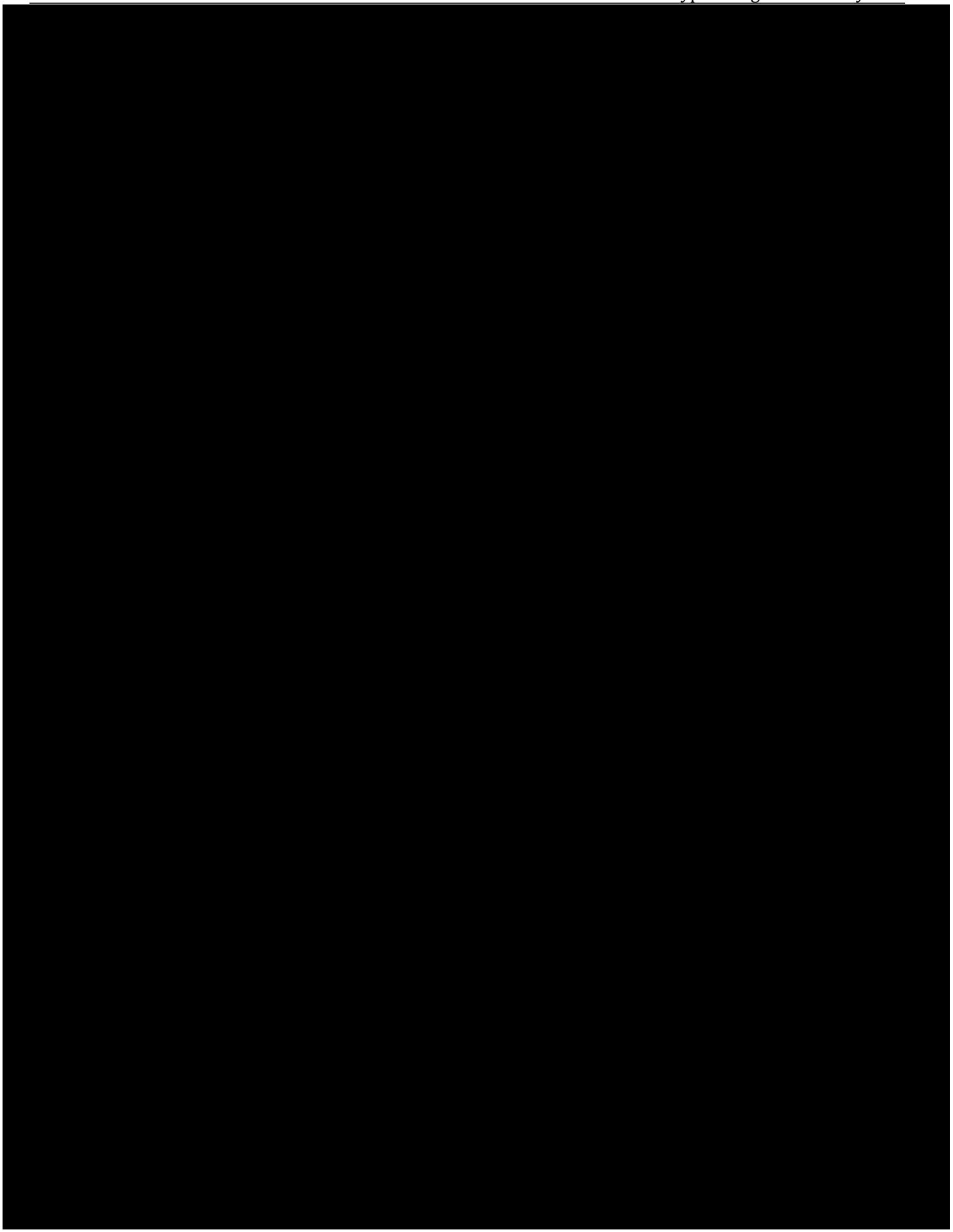
31.5: Zoning Approval

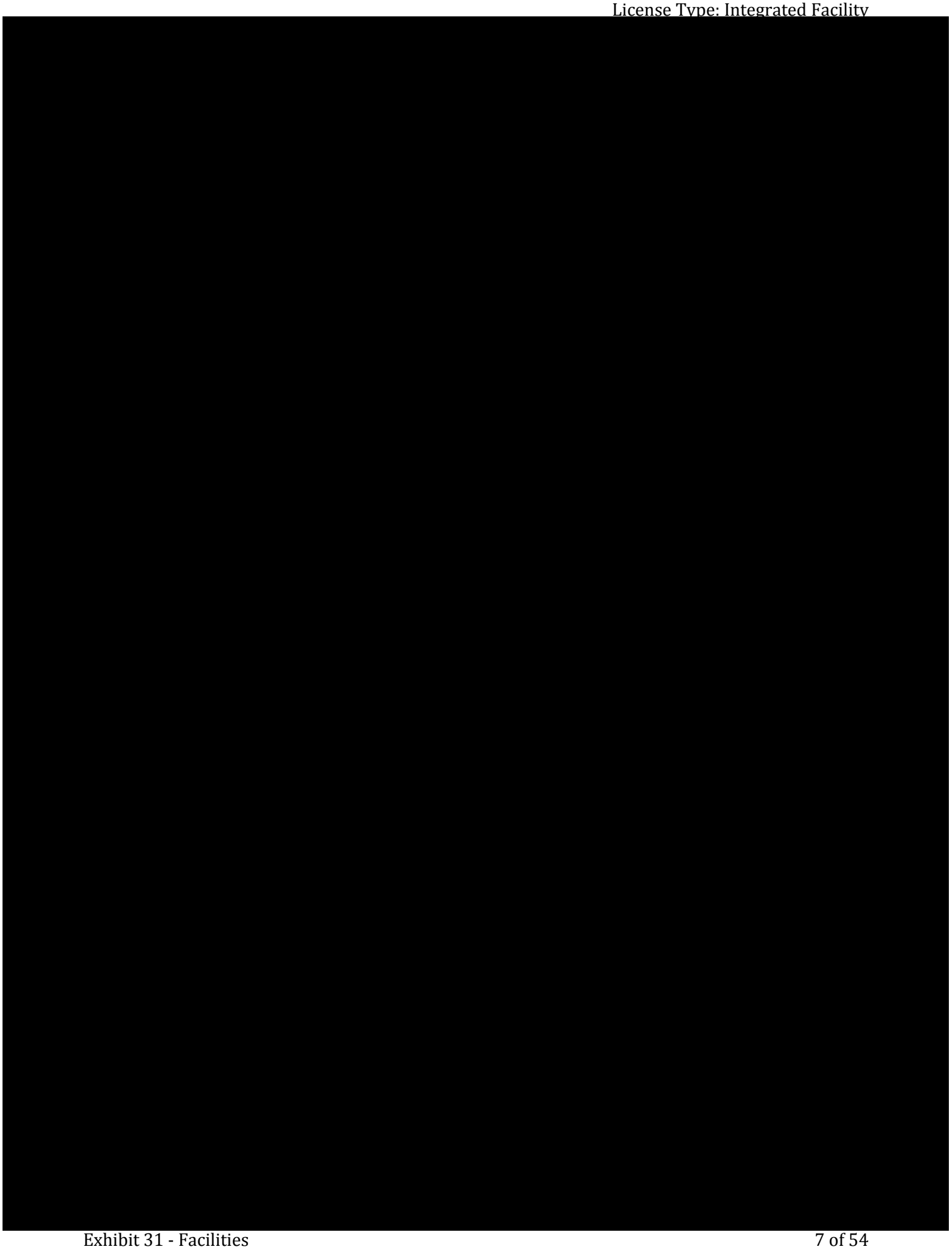
The property does not require zoning approval or permits, and the [redacted] AL has agreed to permit all necessary cannabis cultivation, processing, and manufacturing activities.

31.6 Blueprints/Schematics









31.7: Timetable for Completion and Operation

Construction of a cultivation facility is a much more lengthy and intricate process than building out a dispensary site. Construction typically takes between 12 and 18 months, depending on local weather, supply chain variables, and local regulatory procedures. Once the Applicant receives its license, we expect a partially operation facility, including flower grow rooms and extraction facilities, within 12 months. We anticipate full operation of all processes within 18 months.

31.8: Public Hours

To protect the employees, the plants, and the finished product, our Cultivation, Processing, and Manufacturing Facility will not be open to the public, with the exception of regulatory officials.

31.9: Hours of Occupation and Contact

The Cultivation, Processing, and Manufacturing Facility operates continuously, on a 24-hour basis. The bulk of the processing and manufacturing is done during business hours, but cultivation activities can be anytime. The hours during which employees will be present vary depending on the growth cycle of the plants. After-hours contact for management is as follows:

Attachment B
Retail Dispensary Facility

[redacted]

With our Alabama headquarters planned in the [redacted], we will have one dispensary located in a standalone former bank building on [redacted]. This building is ideally positioned on a corner of two notable intersections. It has ample parking and drive-thru capabilities. The former bank-vault will be used in designing our product vault that exceeds the state's requirements for secure product storage.

31.1 Facility Name and Type

[redacted]

Type: Dispensary

31.2: Facility Location

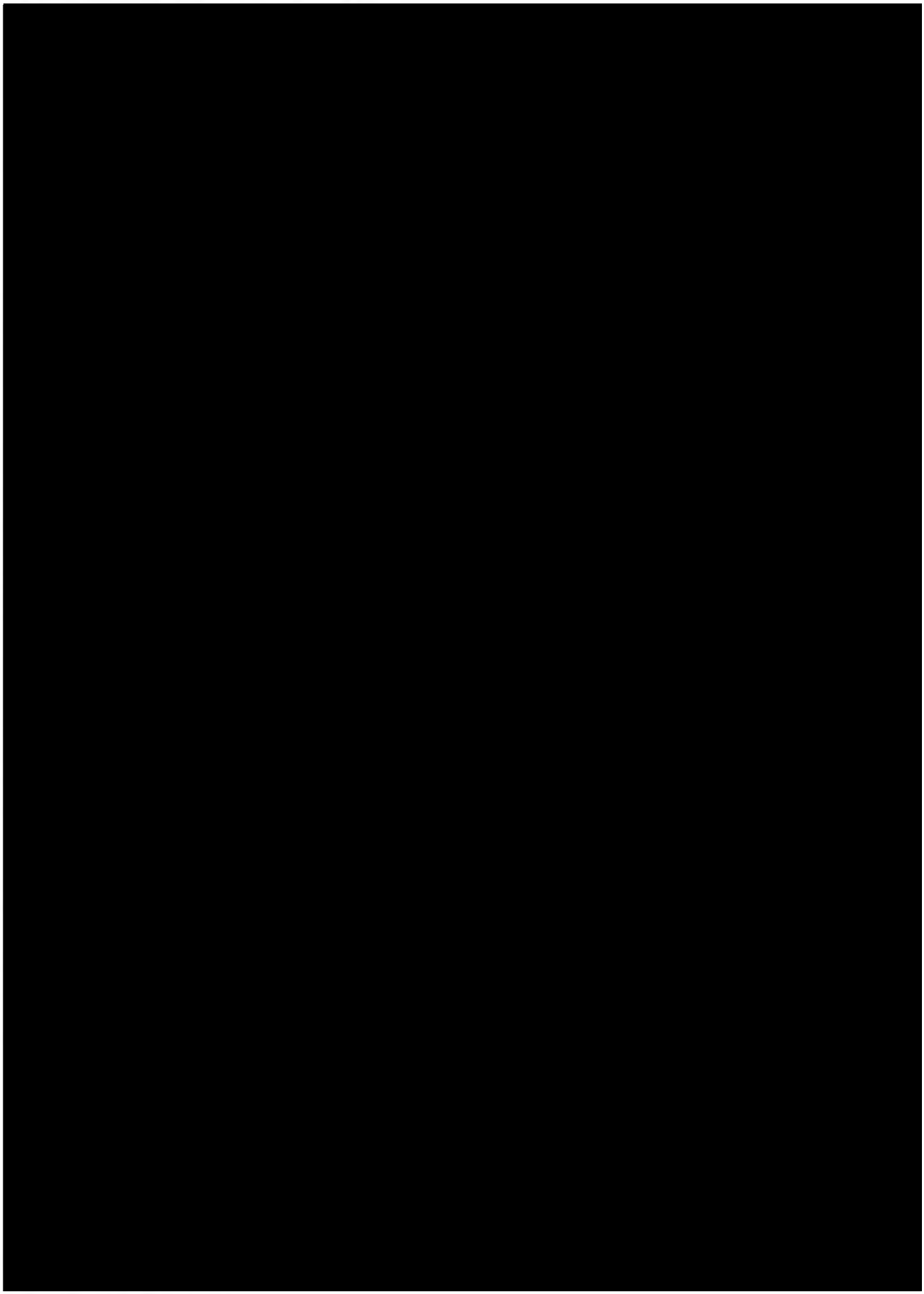
[redacted]

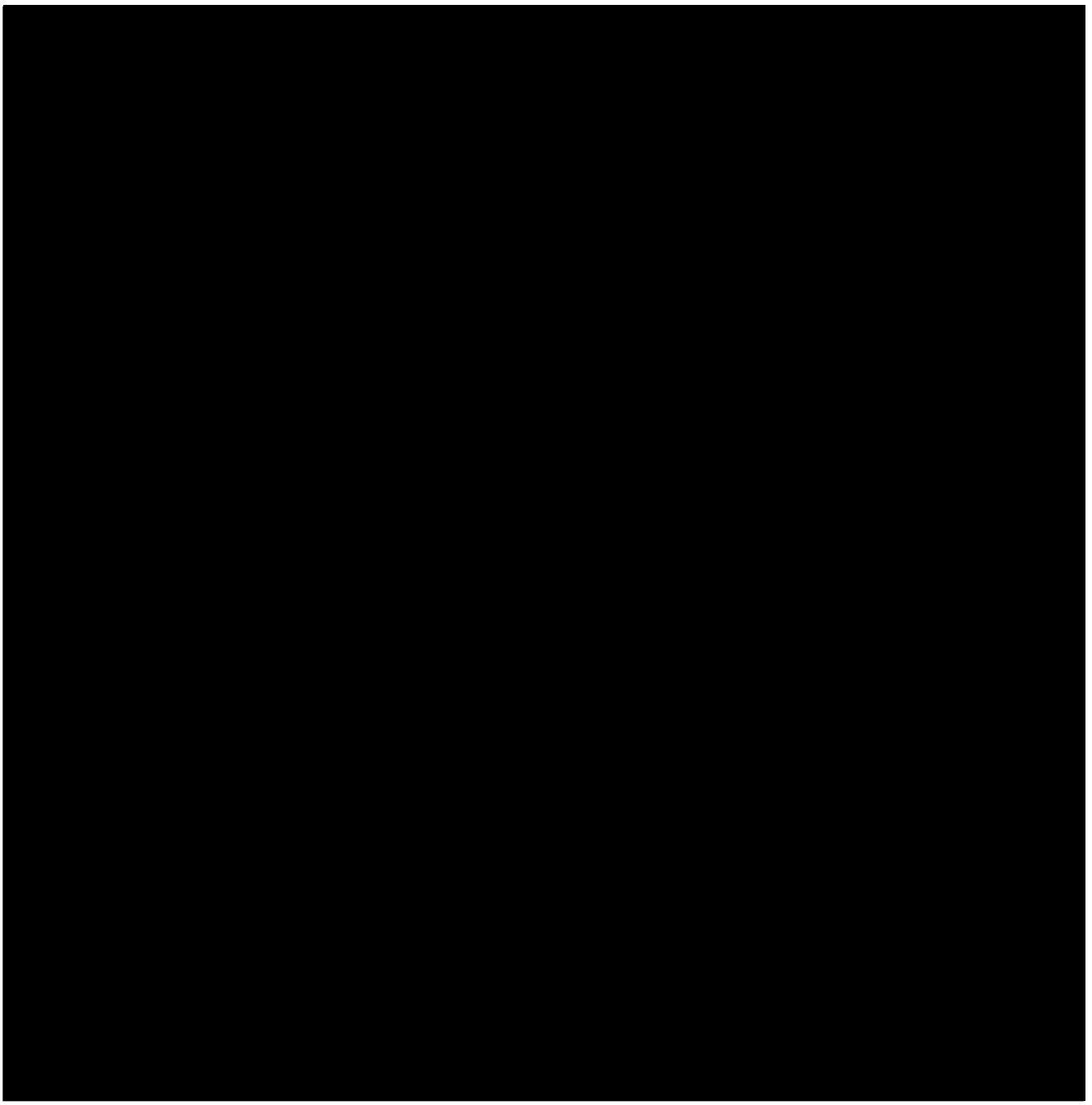
31.3 Aerial Photograph

31.4: Right to Real Property

The Applicant has engaged an agent, [redacted], which engagement is reflected in the Letter of Intent below. The agent has purchased the property from the owners of record. The Real Estate Purchase and Sale Agreement below reflects that sale.

LETTER OF INTENT WITH AGENT
REAL ESTATE PURCHASE AND SALE AGREEMENT

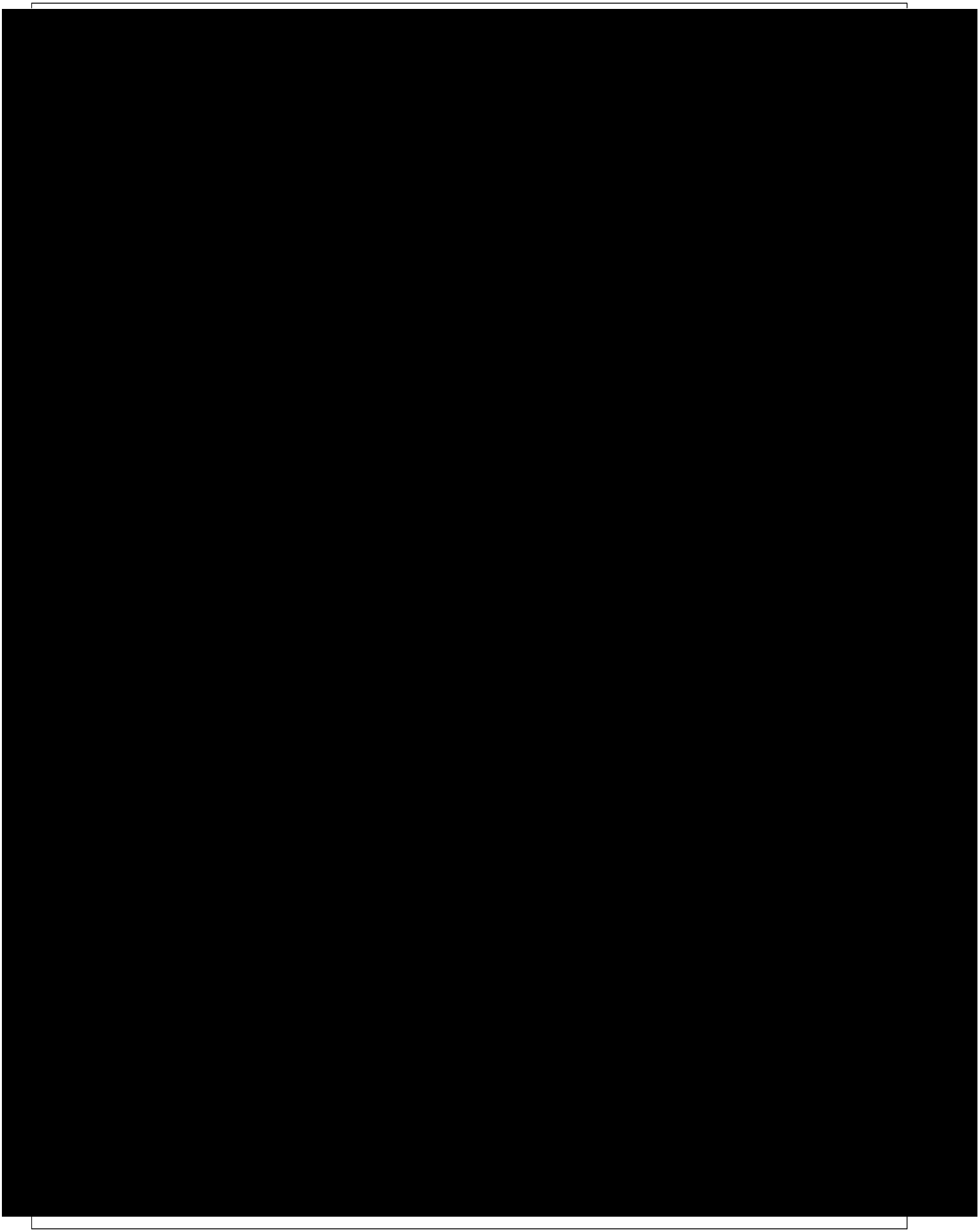


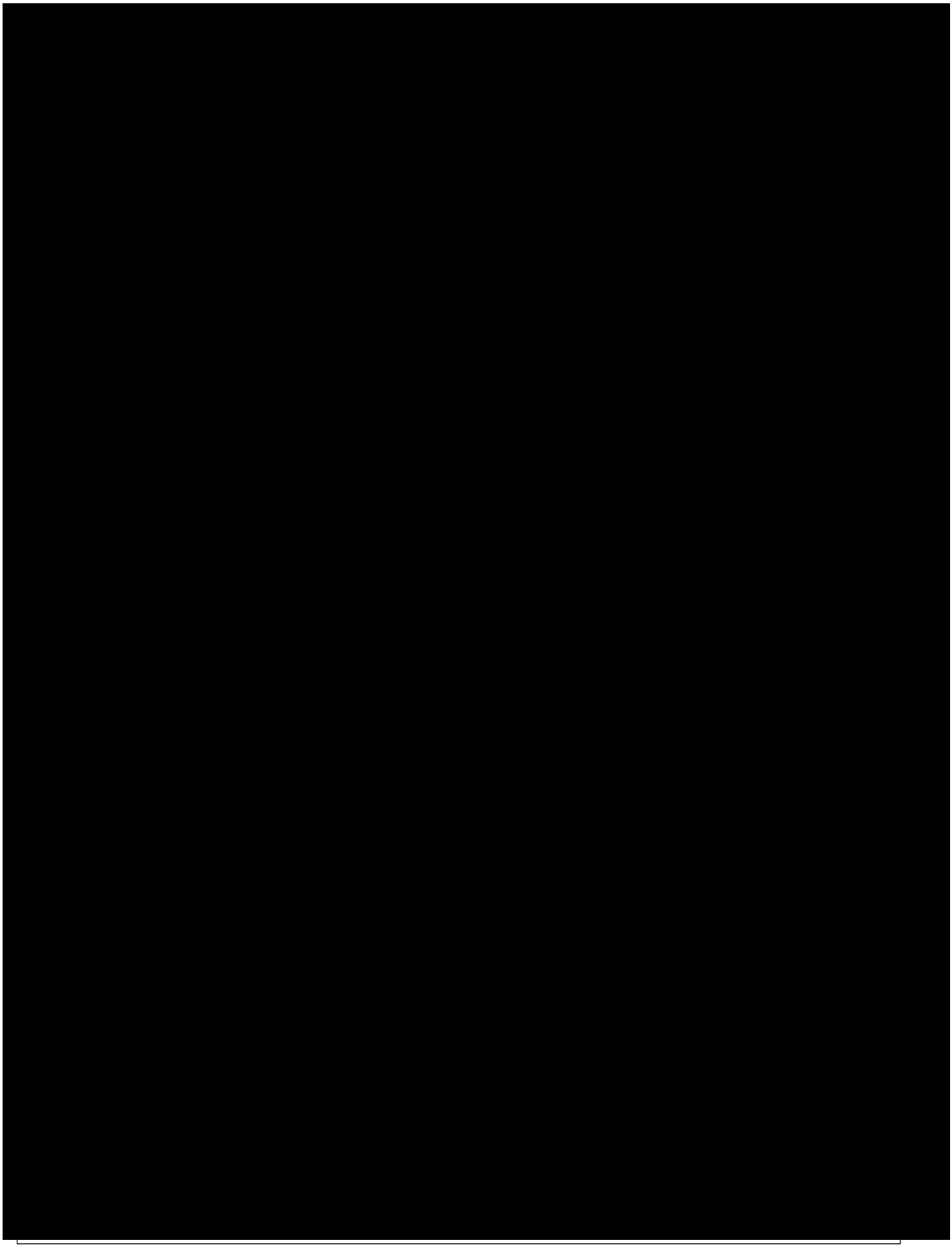


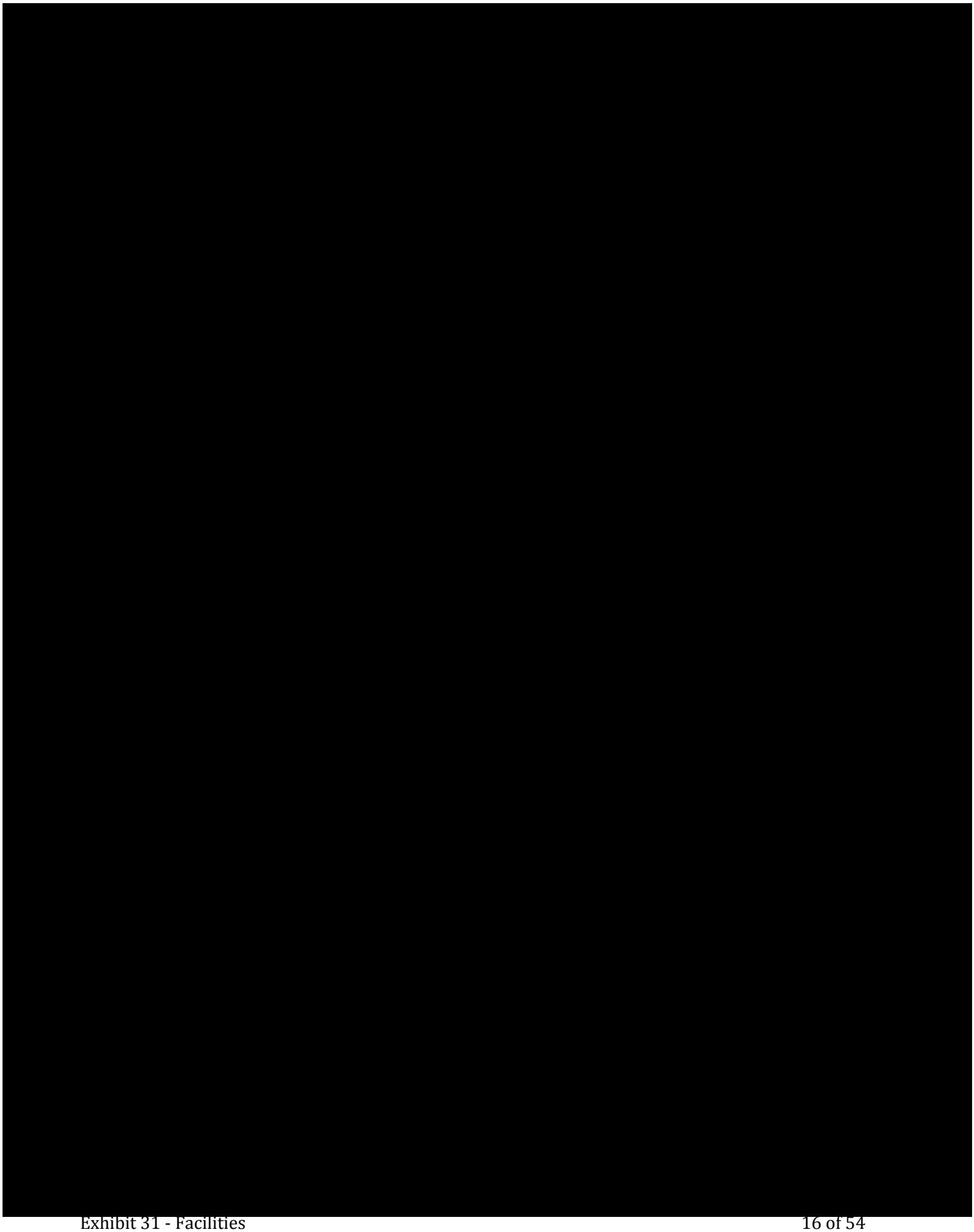
31.5: Zoning Approval

The property does not require zoning approval or permits, and the [redacted], AL has agreed to permit all necessary Cannabis Retail Dispensary activities.

31.6: Bluprint/Schematics







31.7: Timetable for Completion and Operation

Construction of a retail dispensary facility is faster than building a new grow. Build-out can typically be accomplished within six months.

Once the Applicant receives its license, we expect substantial completion of the retail dispensary within 6 months, and we will be open for business as soon thereafter as we receive local regulatory approval.

31.8: Public Hours

The Retail Dispensary Facility will be open to the public between 8 a.m. and 8 p.m. on weekdays, and 9 a.m. to 7 p.m. on weekends.

31.9: Hours of Occupation and Contact

The Retail Dispensary Facility will occupied by employees between 7:30 a.m. and 8:30 p.m. on weekdays, and between 8:30 a.m. and 7:30 p.m. on weekends. After-hours contact for management is as follows:

Attachment C
Retail Dispensary Facility

[redacted]

Located off the main road of [redacted], this location is convenient for patients due its large parking lot and easy-to-access location. The location provides a single-floor floor plan with ramp access to accommodate all customers.

31.1 Facility Name and Type

[redacted]

31.2: Facility Location

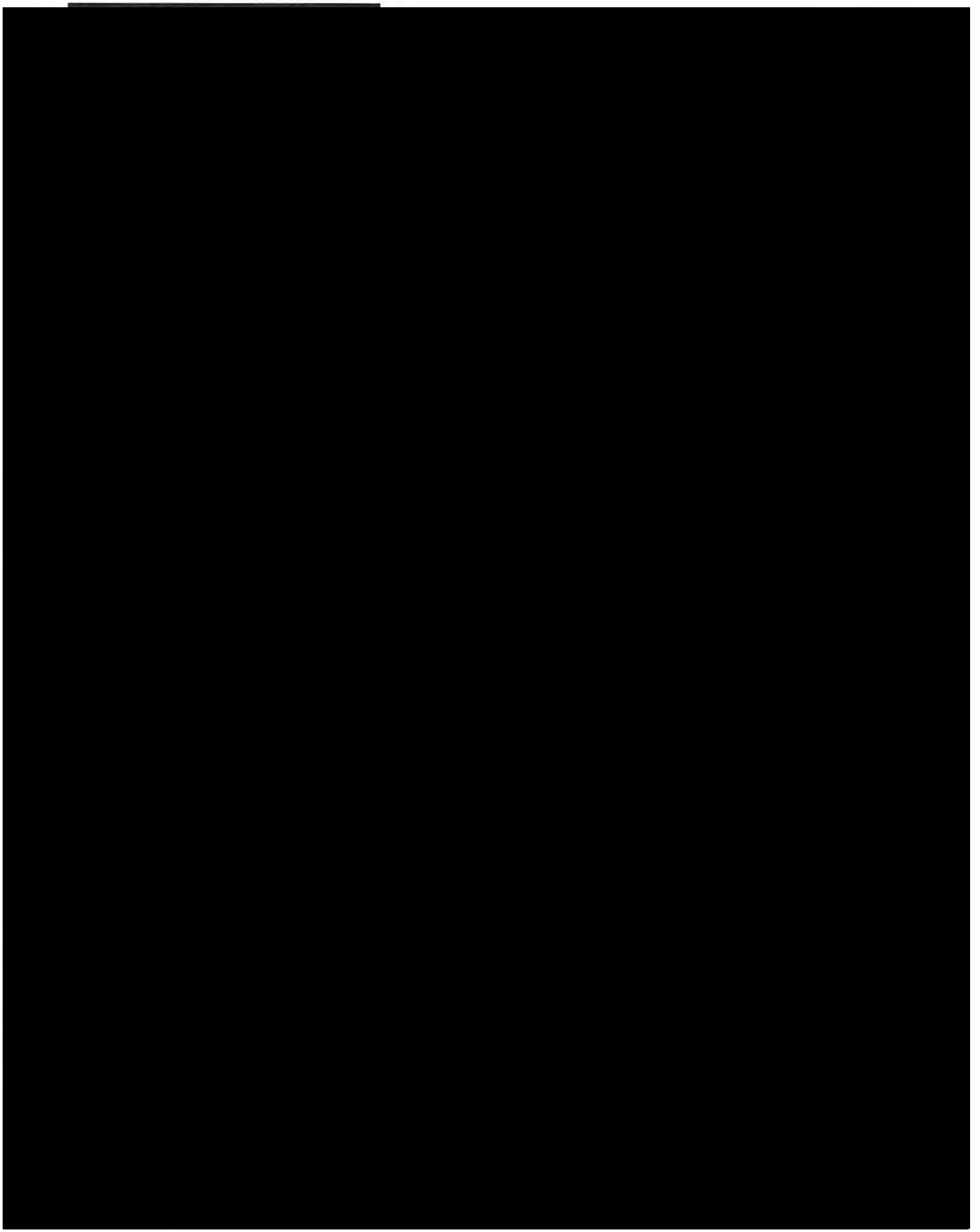
[redacted]

31.3 Aerial Photograph

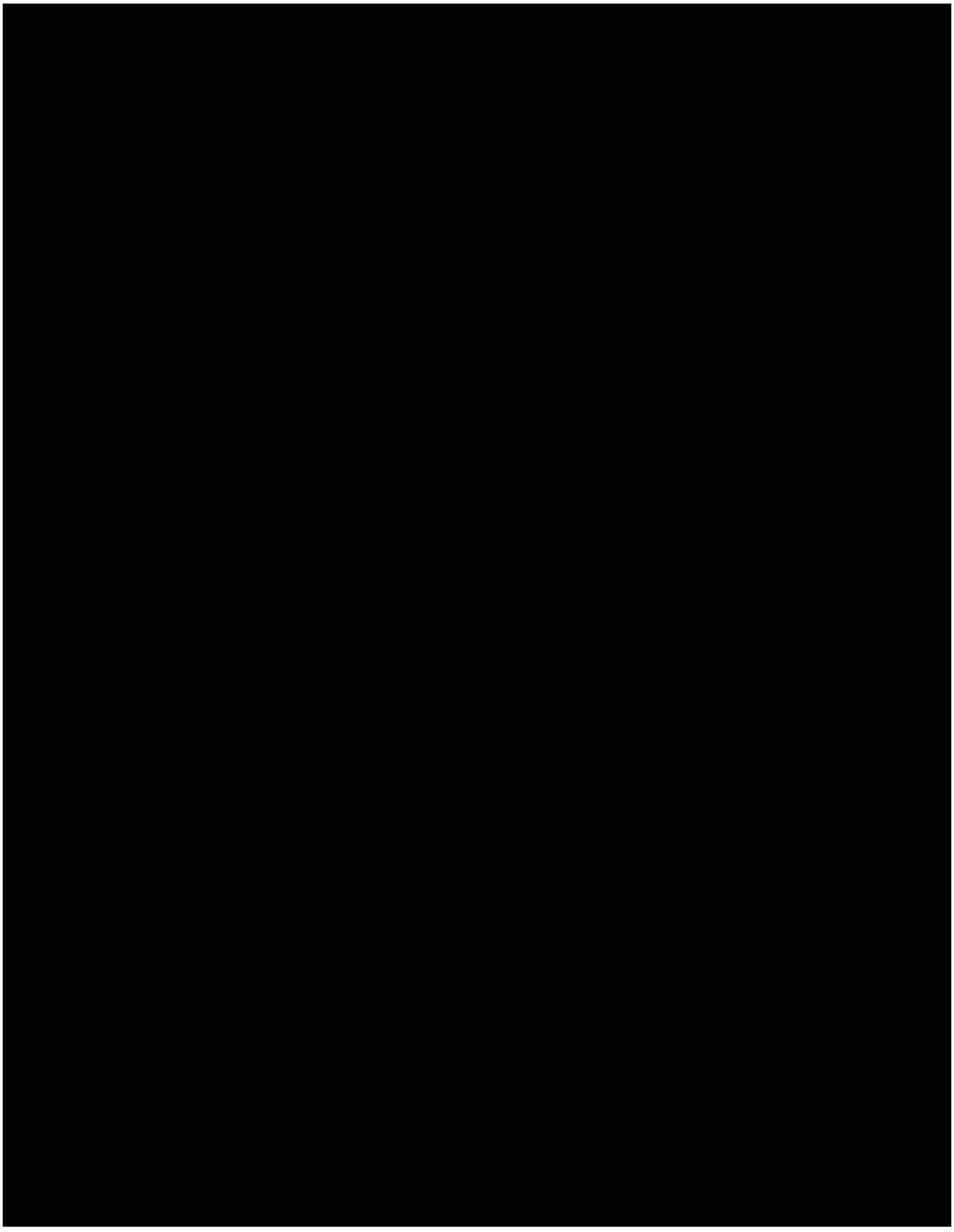
31.4: Right to Real Property

The Applicant has engaged an agent, [redacted] which engagement is reflected in the Letter of Intent below. The agent has purchased the property from the owners of record. The Real Estate Purchase and Sale Agreement below reflects that sale.

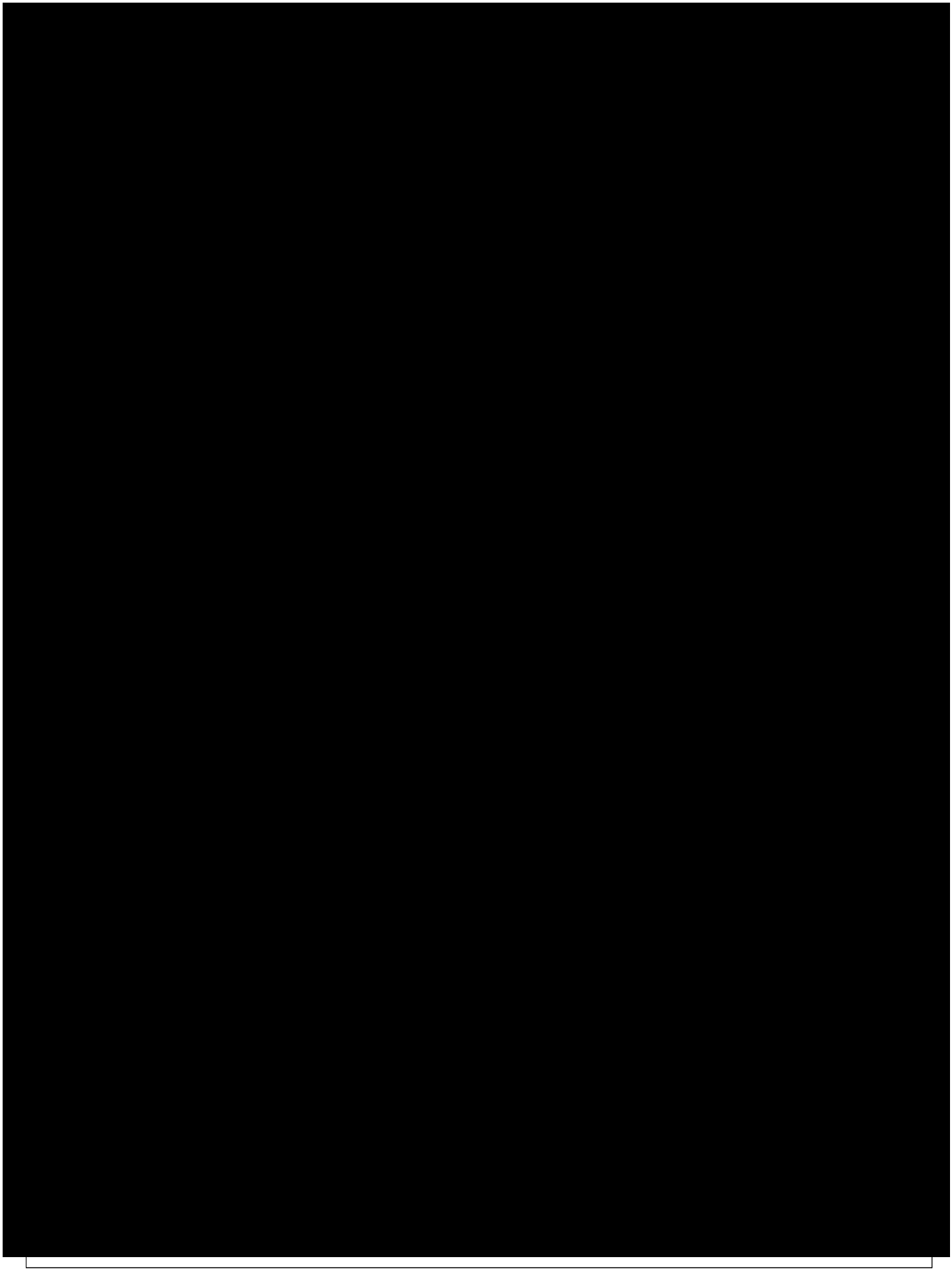
LETTER OF INTENT WITH AGENT
REAL ESTATE PURCHASE AND SALE AGREEMENT

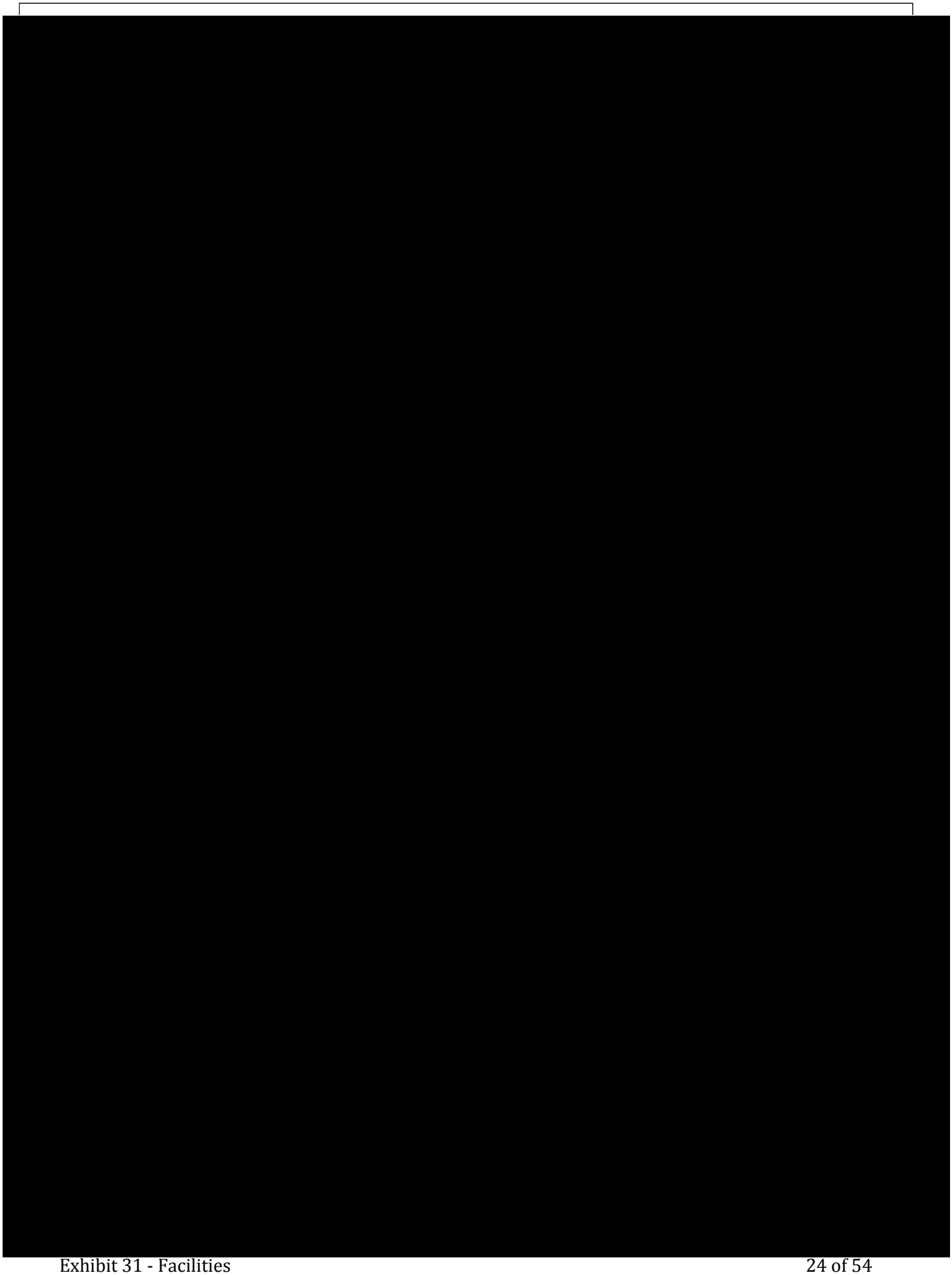


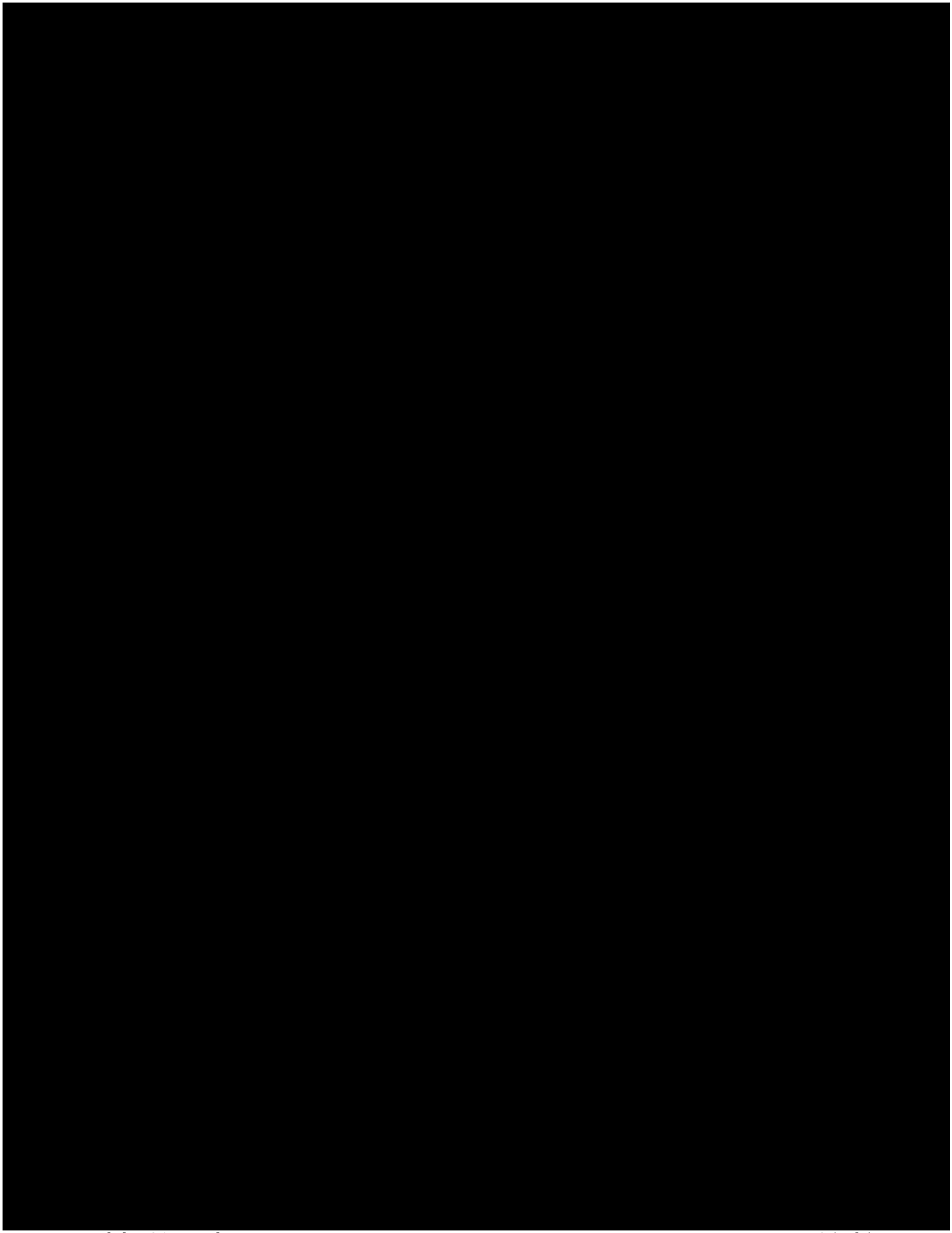
31.5: Zoning Approval



31.6: Blueprint/Schematics







31.7: Timetable for Completion and Operation

Construction of a retail dispensary facility is faster than building a new grow. Build-out can typically be accomplished within six months.

Once the Applicant receives its license, we expect substantial completion of the retail dispensary within 6 months, and we will be open for business as soon thereafter as we receive local regulatory approval.

31.8: Public Hours

The Retail Dispensary Facility will be open to the public between 8 a.m. and 8 p.m. on weekdays, and 9 a.m. to 7 p.m. on weekends.

31.9: Hours of Occupation and Contact

The Retail Dispensary Facility will occupied by employees between 7:30 a.m. and 8:30 p.m. on weekdays, and between 8:30 a.m. and 7:30 p.m. on weekends. After-hours contact for management is as follows:

Attachment D

Retail Dispensary Facility

[redacted]

Our [redacted] location is just off [redacted] and provides a large, welcoming environment for patients to access. With ample parking in the front, and overflow on the side of the building, this location will be able to adequately serve the nearly 15,000 residents of [redacted].

31.1 Facility Name and Type

[redacted]

31.2: Facility Location

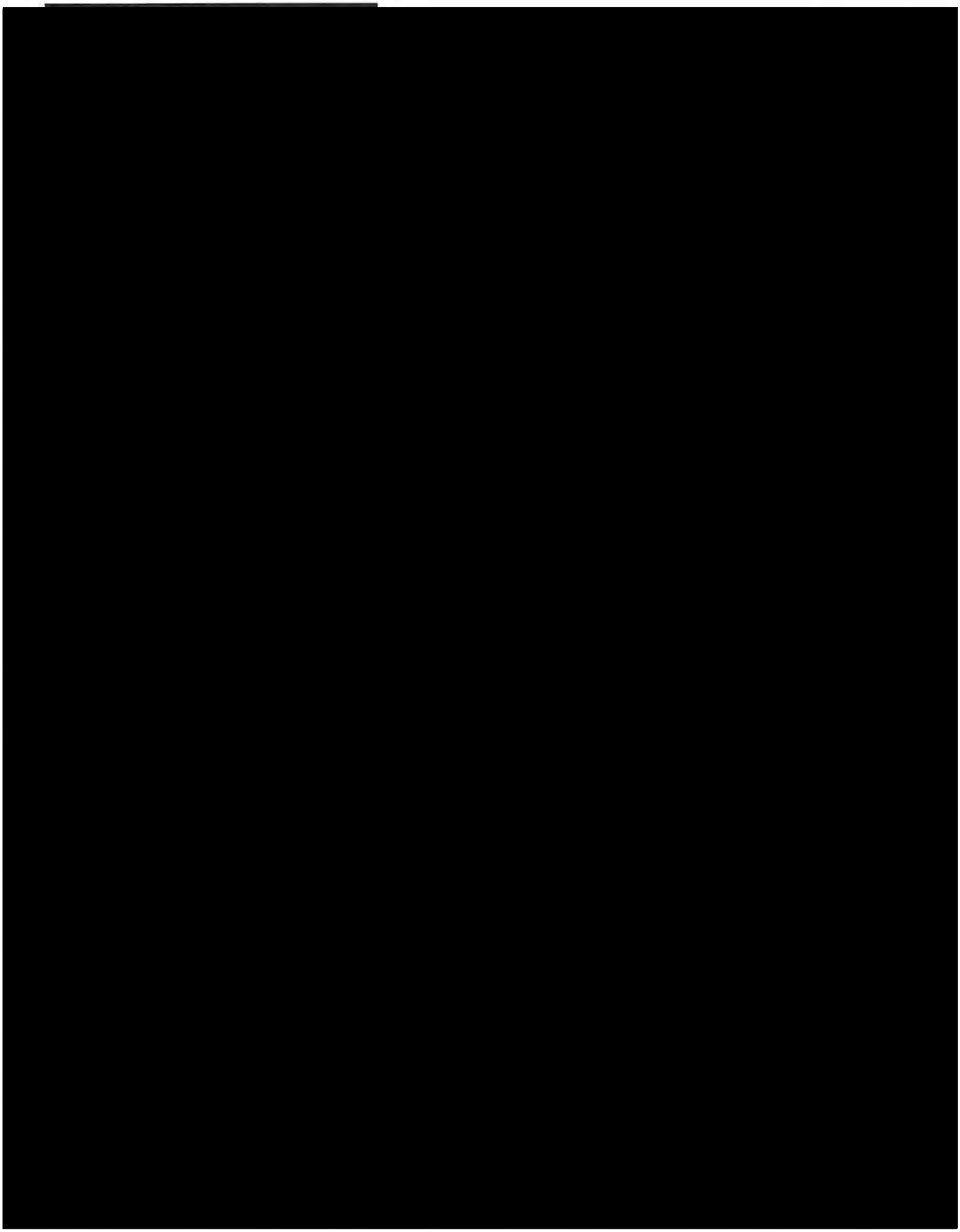
[redacted]

31.3 Aerial Photograph

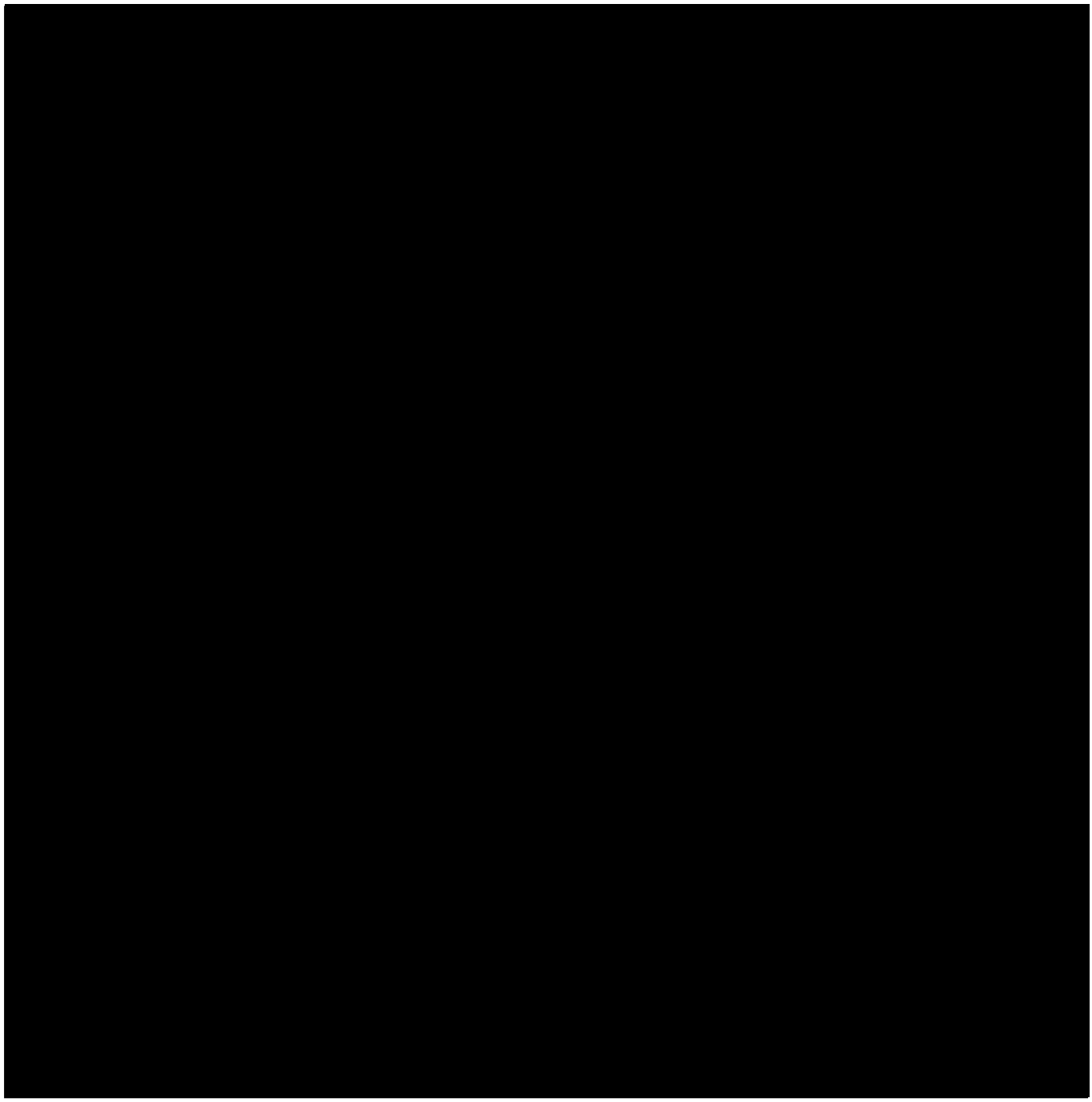
31.4: Right to Real Property

The Applicant has engaged an agent, [redacted] which engagement is reflected in the Letter of Intent below. The agent has purchased the property from the owners of record. The Real Estate Purchase and Sale Agreement below reflects that sale.

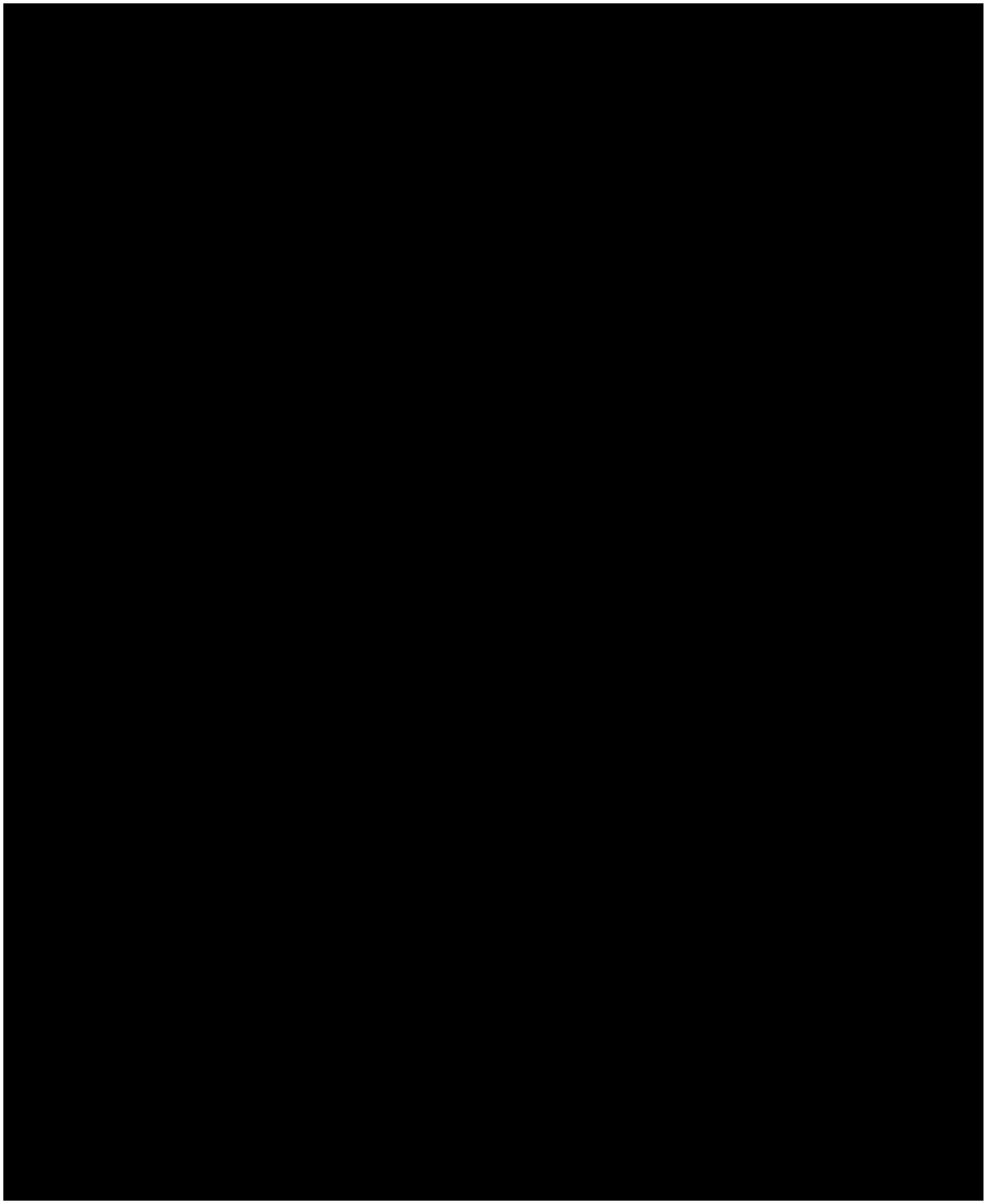
LETTER OF INTENT WITH AGENT
REAL ESTATE PURCHASE AND SALE AGREEMENT



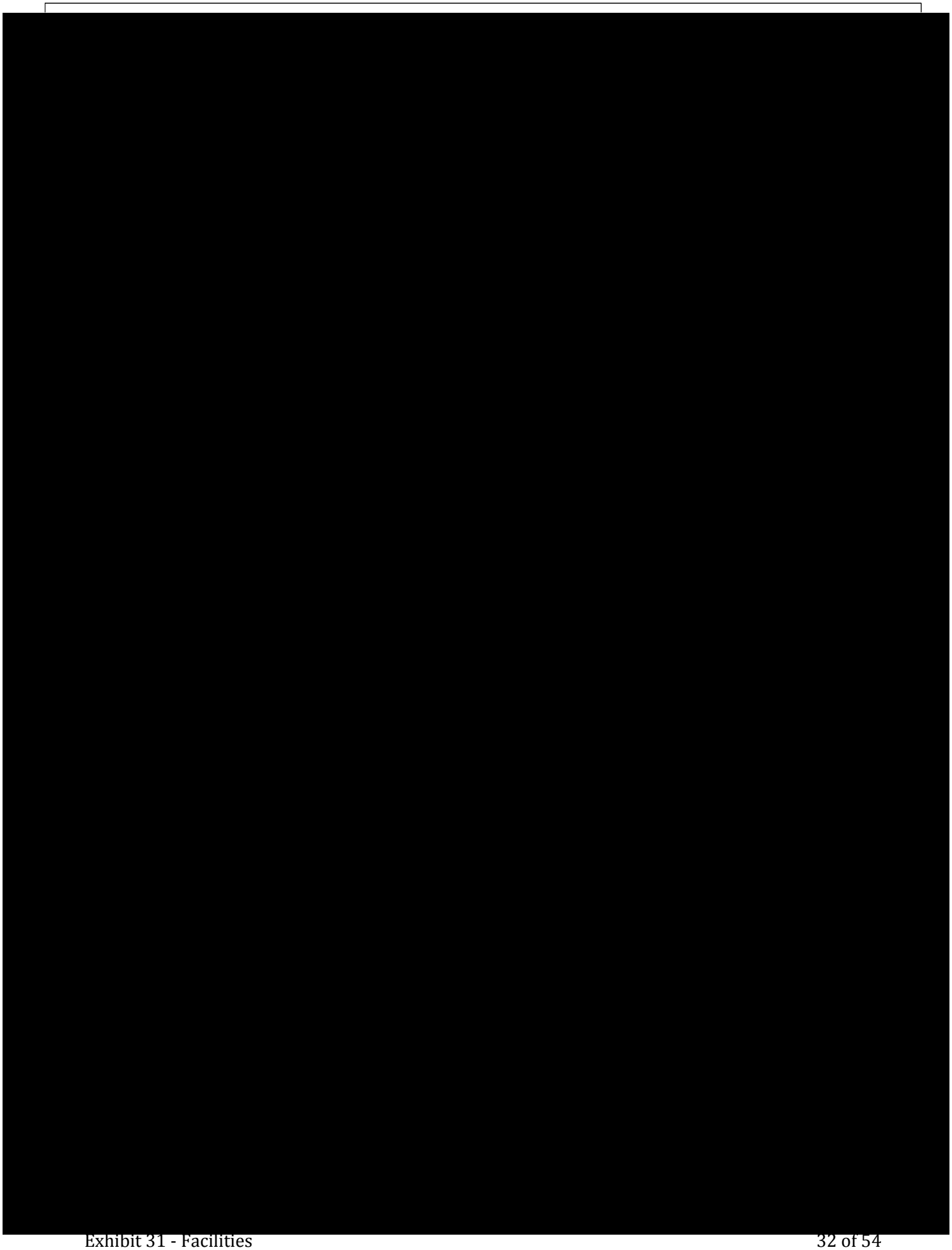
LANDLORD

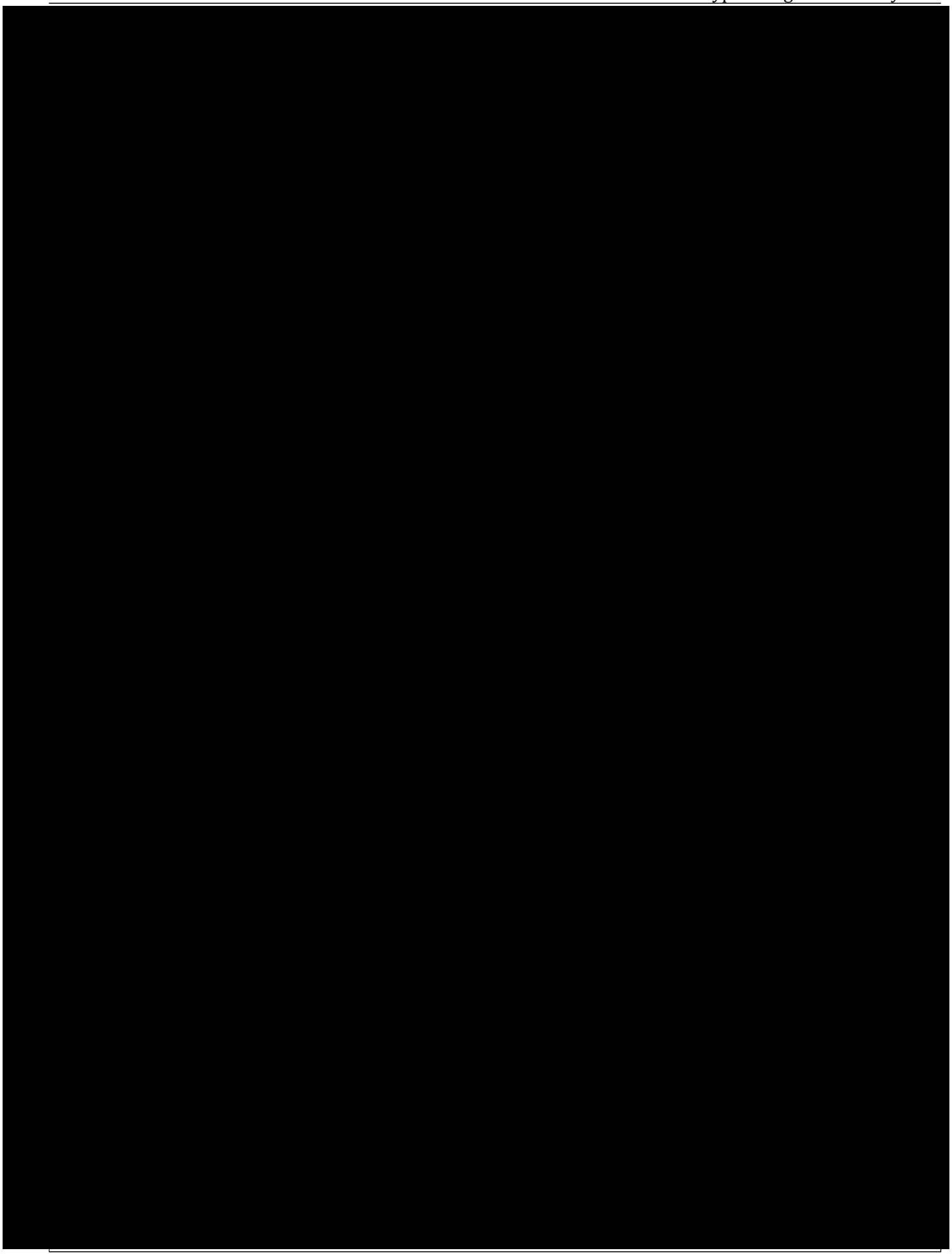


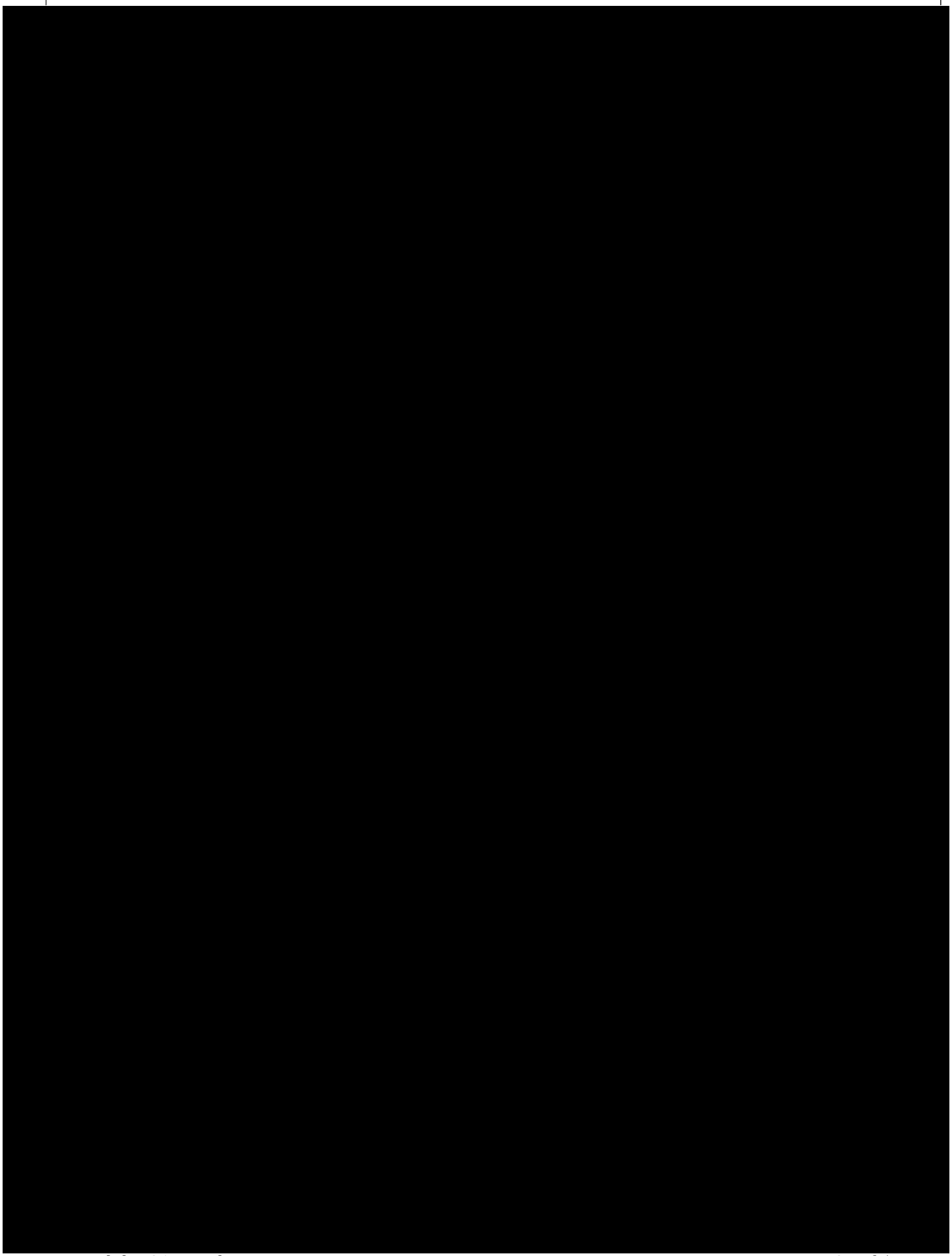
31.5: Zoning Approval



<u>31.6: Blueprint/Schematics</u>







31.7: Timetable for Completion and Operation

Construction of a retail dispensary facility is faster than building a new grow. Build-out can typically be accomplished within six months.

Once the Applicant receives its license, we expect substantial completion of the retail dispensary within 6 months, and we will be open for business as soon thereafter as we receive local regulatory approval.

31.8: Public Hours

The Retail Dispensary Facility will be open to the public between 8 a.m. and 8 p.m. on weekdays, and 9 a.m. to 7 p.m. on weekends.

31.9: Hours of Occupation and Contact

The Retail Dispensary Facility will occupied by employees between 7:30 a.m. and 8:30 p.m. on weekdays, and between 8:30 a.m. and 7:30 p.m. on weekends. After-hours contact for management is as follows:

[redacted]

Attachment E
Retail Dispensary Facility

[redacted]

Located on [redacted], our [redacted] location will be located in a strip-mall with ample parking. With easy access from [redacted]5, this location will be easy for patients to navigate and help meet the medical needs of nearly 200,000 residents in [redacted]

31.1 Facility Name and Type

[redacted]

31.2: Facility Location

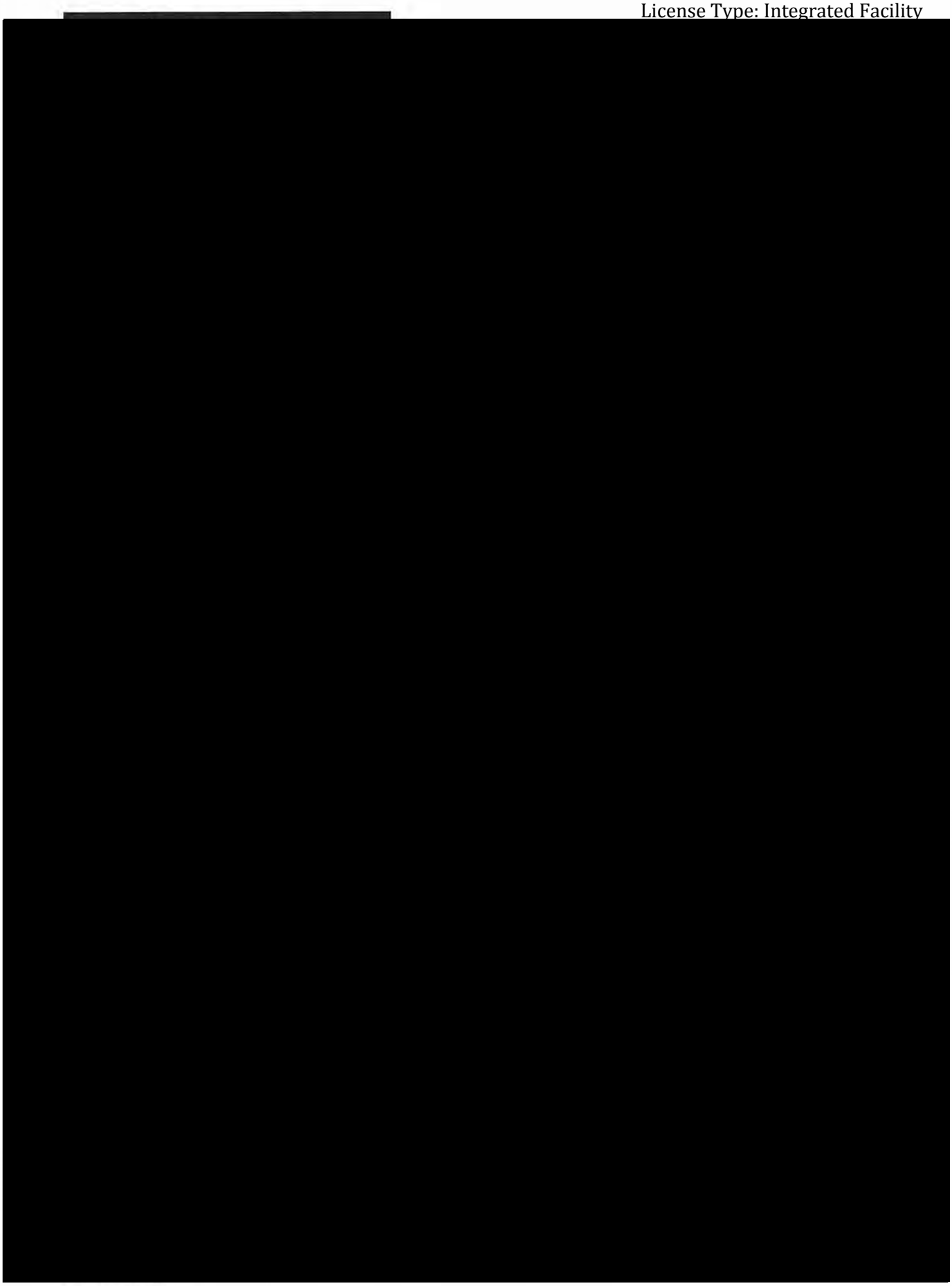
[redacted]

31.3 Aerial Photograph

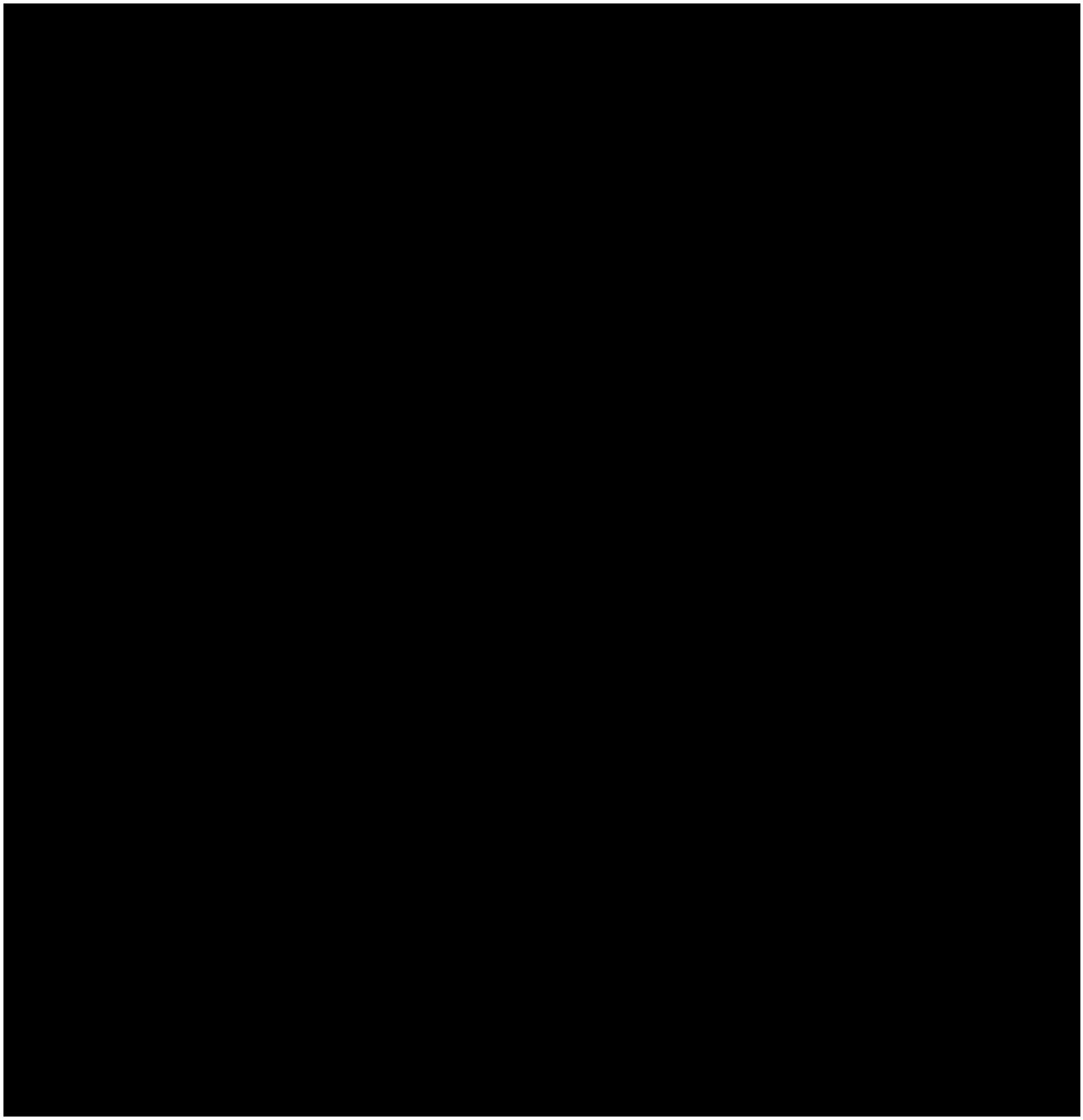
31.4: Right to Real Property

The Applicant has engaged an agent, [redacted], which engagement is reflected in the Letter of Intent below. The agent has purchased the property from the owners of record. The Real Estate Purchase and Sale Agreement below reflects that sale.

LETTER OF INTENT WITH AGENT
REAL ESTATE PURCHASE AND SALE AGREEMENT

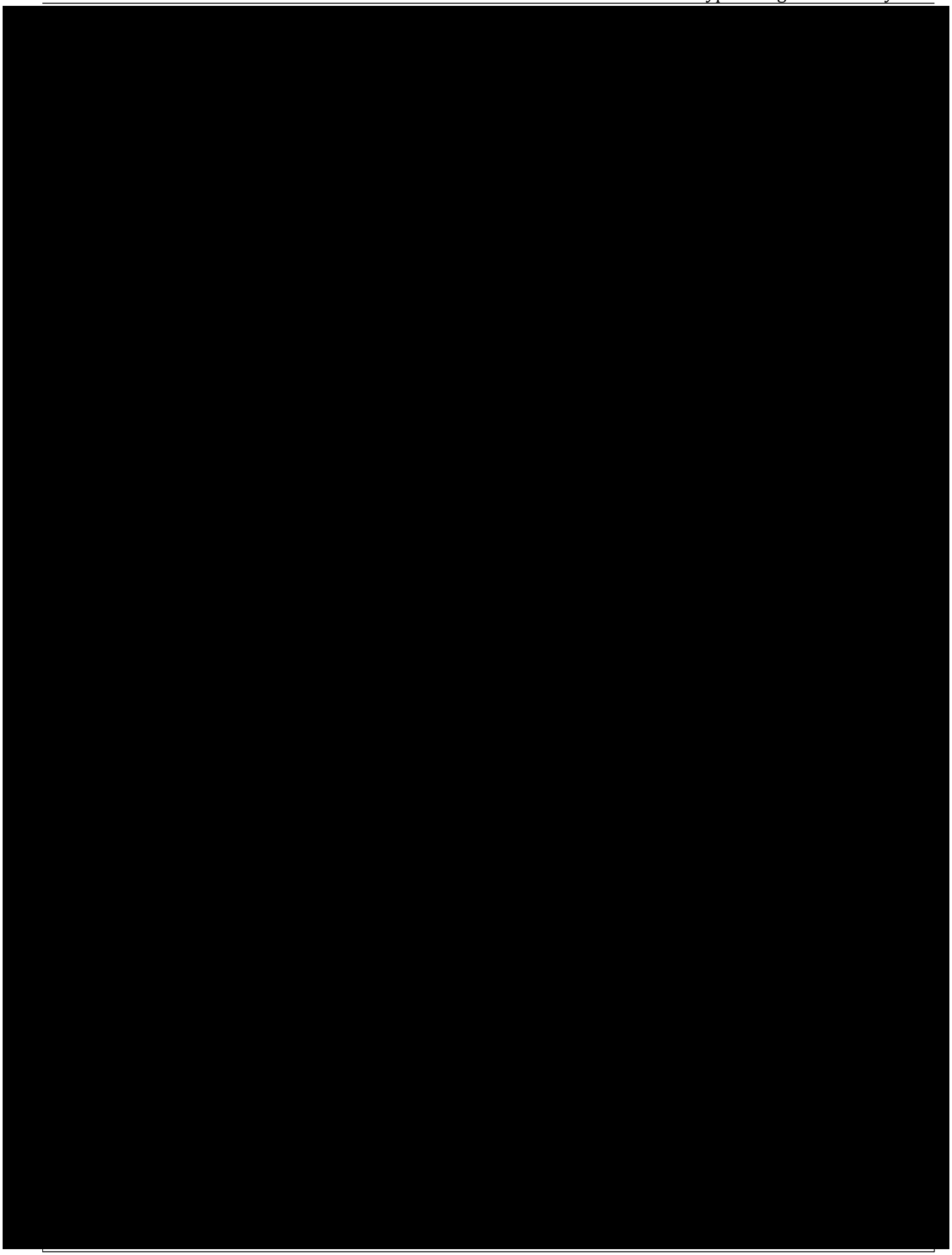


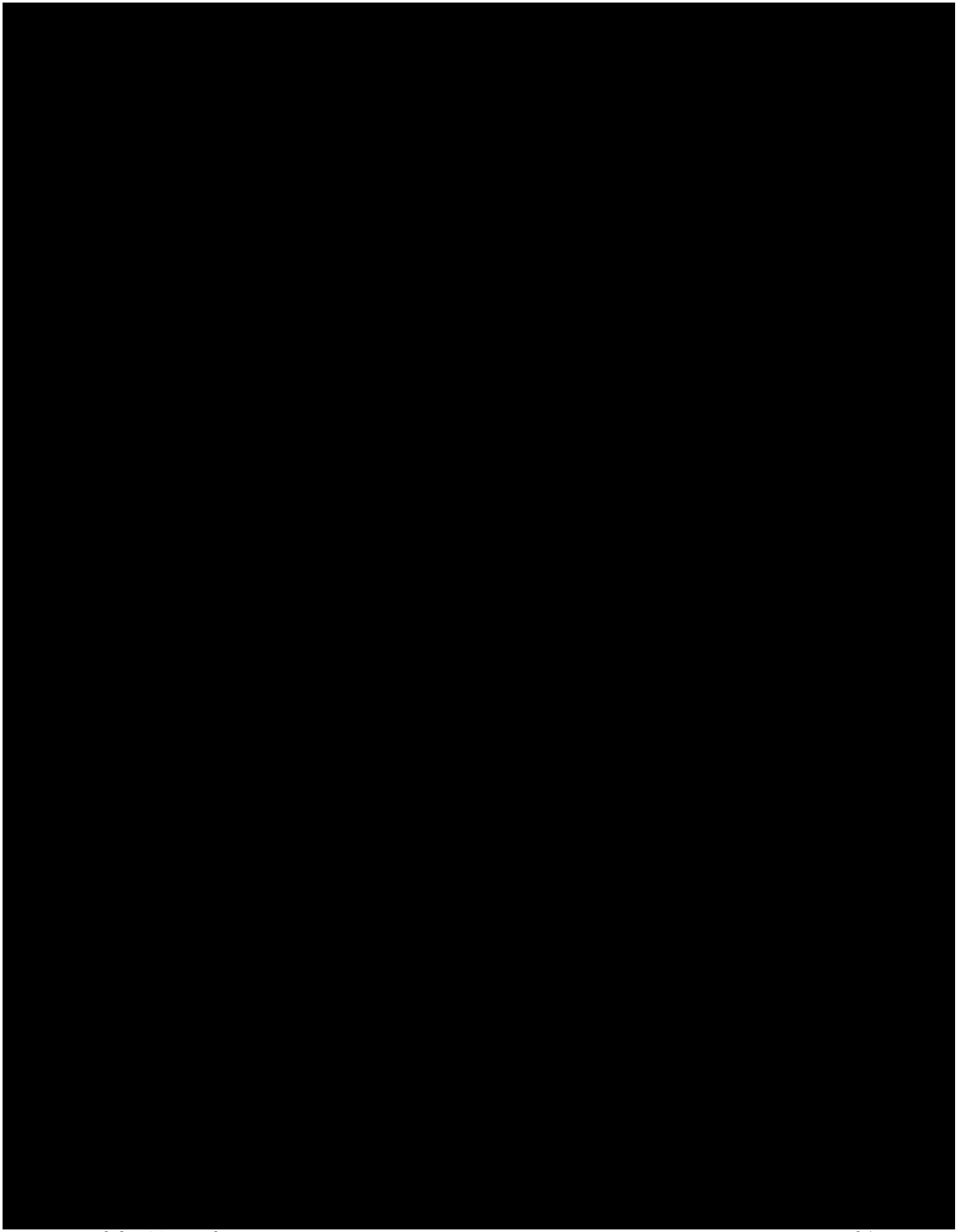
31.5: Zoning Approval



31.6: Blueprint/Schematics

[redacted]





31.7: Timetable for Completion and Operation

Construction of a retail dispensary facility is faster than building a new grow. Build-out can typically be accomplished within six months.

Once the Applicant receives its license, we expect substantial completion of the retail dispensary within 6 months, and we will be open for business as soon thereafter as we receive local regulatory approval.

31.8: Public Hours

The Retail Dispensary Facility will be open to the public between 8 a.m. and 8 p.m. on weekdays, and 9 a.m. to 7 p.m. on weekends.

31.9: Hours of Occupation and Contact

The Retail Dispensary Facility will occupied by employees between 7:30 a.m. and 8:30 p.m. on weekdays, and between 8:30 a.m. and 7:30 p.m. on weekends. After-hours contact for management is as follows:

[redacted]

Attachment F
Retail Dispensary Facility

[redacted]

Situated on the corner of a shopping center outlot, this standalone former bank building features ample parking lots to meet the needs of our medical marijuana patients. This location also features a drive-thru. The former bank-vault will be used in designing our product vault that exceeds the state's requirements for secure product storage.

31.1 Facility Name and Type

[redacted]

31.2: Facility Location

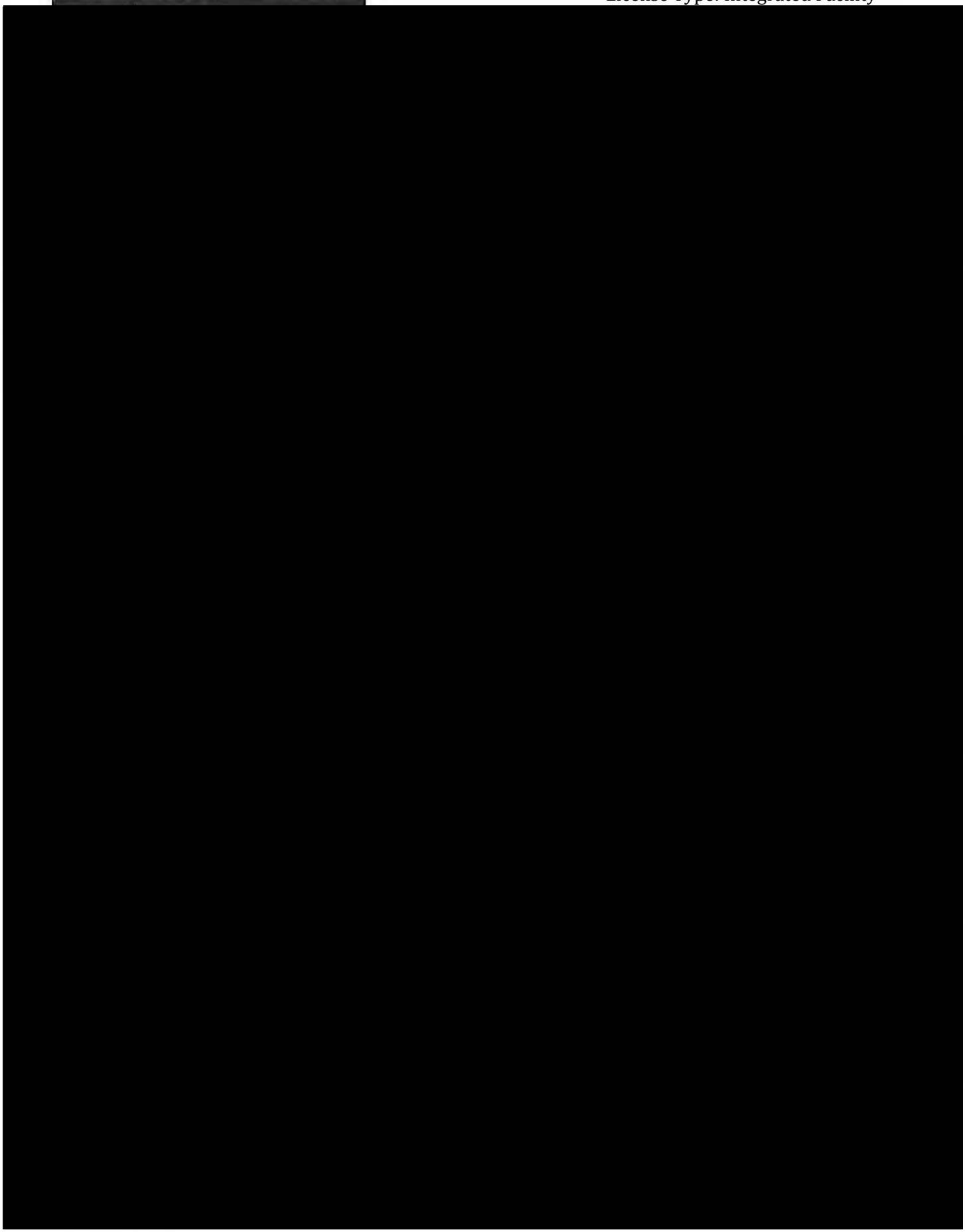
[redacted]

31.3 Aerial Photograph

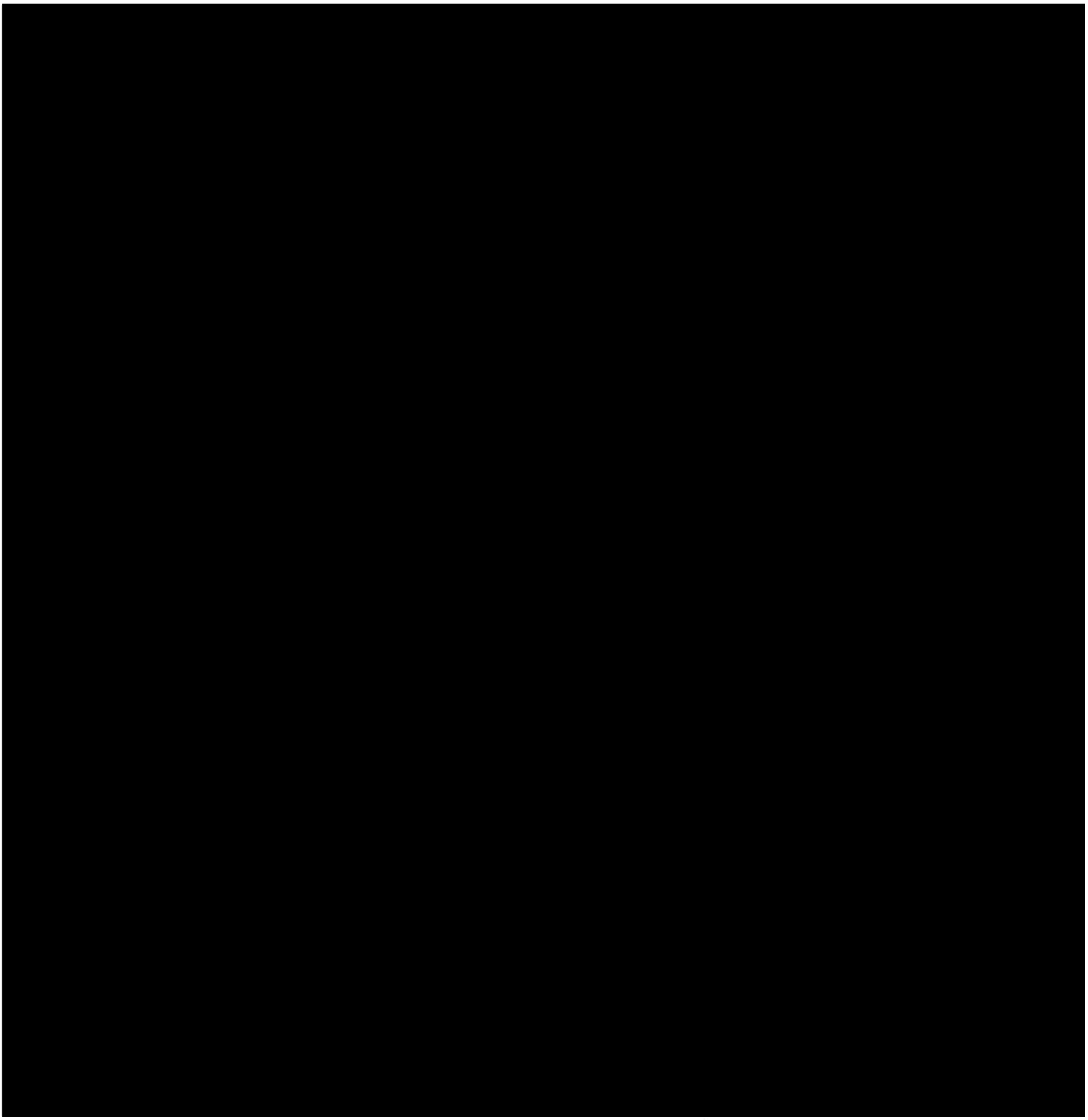
31.4: Right to Real Property

The Applicant has engaged an agent, [redacted], which engagement is reflected in the Letter of Intent below. The agent has purchased the property from the owners of record. The Real Estate Purchase and Sale Agreement below reflects that sale.

LETTER OF INTENT WITH AGENT
REAL ESTATE PURCHASE AND SALE AGREEMENT

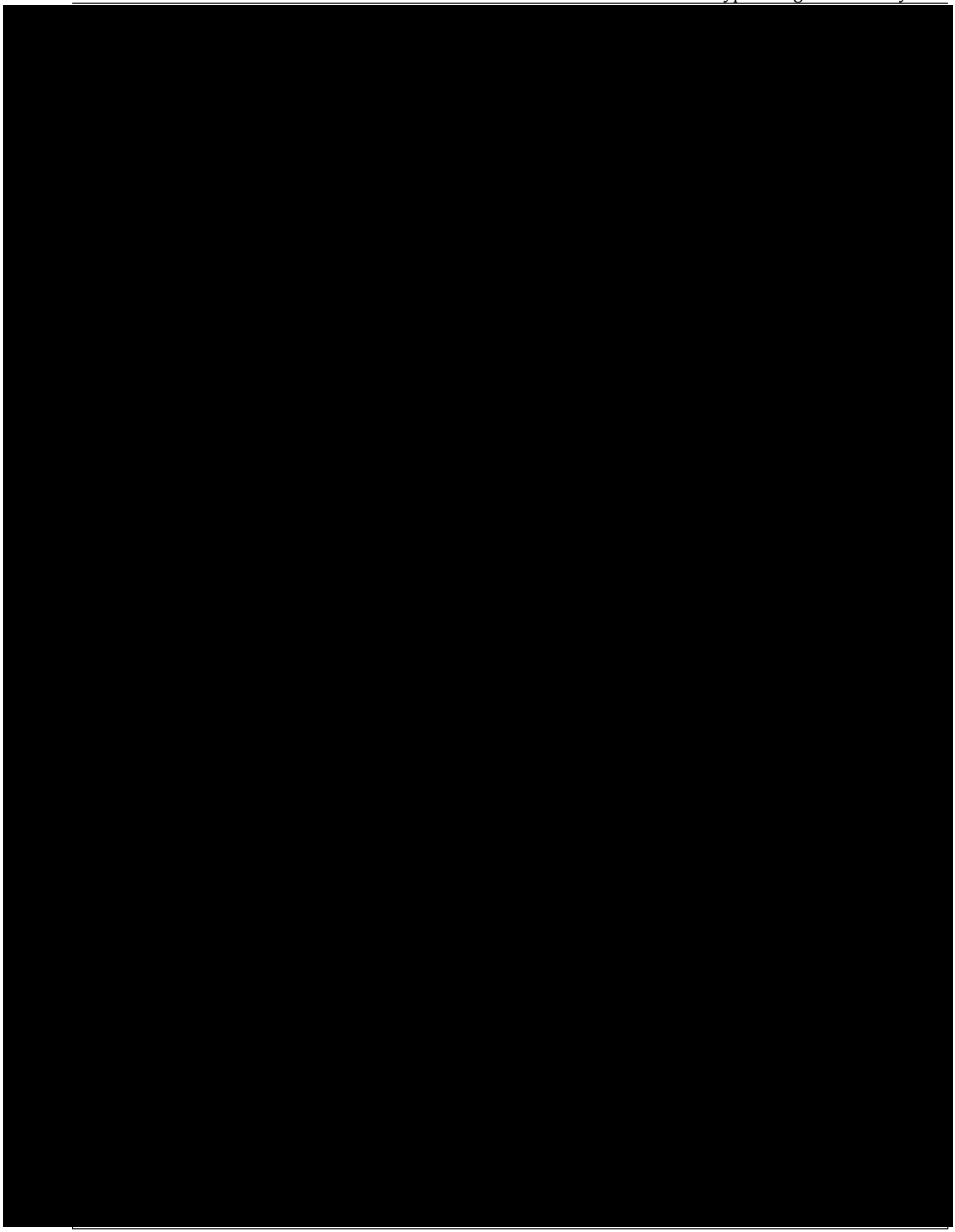


31.5: Zoning Approval



31.6: Blueprint/Schematics

[redacted]



[redacted]

31.7: Timetable for Completion and Operation

Construction of a retail dispensary facility is faster than building a new grow. Build-out can typically be accomplished within six months.

Once the Applicant receives its license, we expect substantial completion of the retail dispensary within 6 months, and we will be open for business as soon thereafter as we receive local regulatory approval.

31.8: Public Hours

The Retail Dispensary Facility will be open to the public between 8 a.m. and 8 p.m. on weekdays, and 9 a.m. to 7 p.m. on weekends.

31.9: Hours of Occupation and Contact

The Retail Dispensary Facility will occupied by employees between 7:30 a.m. and 8:30 p.m. on weekdays, and between 8:30 a.m. and 7:30 p.m. on weekends. After-hours contact for management is as follows:

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 32 – Engineering Plans and Specifications (Cultivation Facilities)

Verification

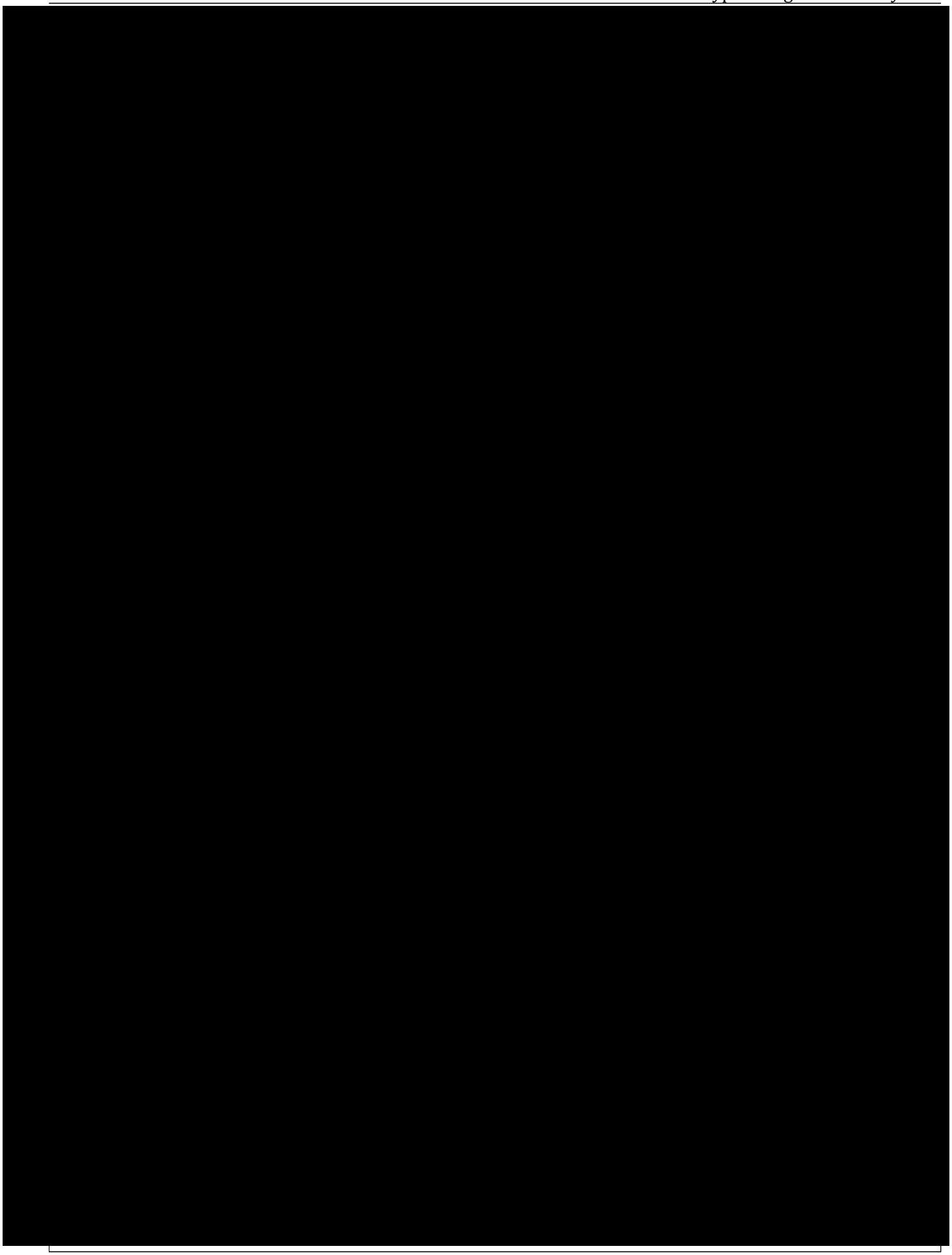
The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

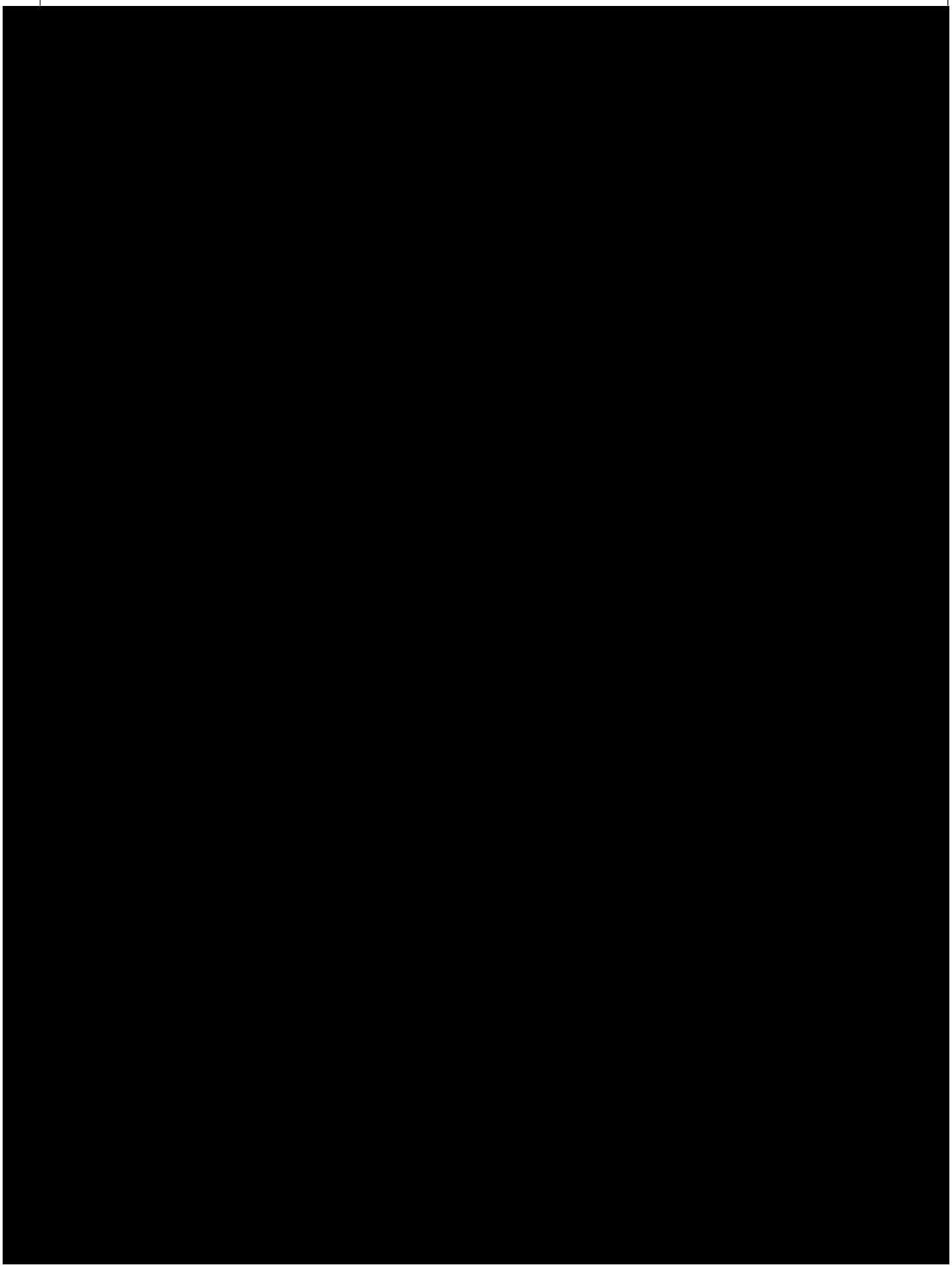
Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/22/23**
Signature of Verifying Individual	**Verification Date**

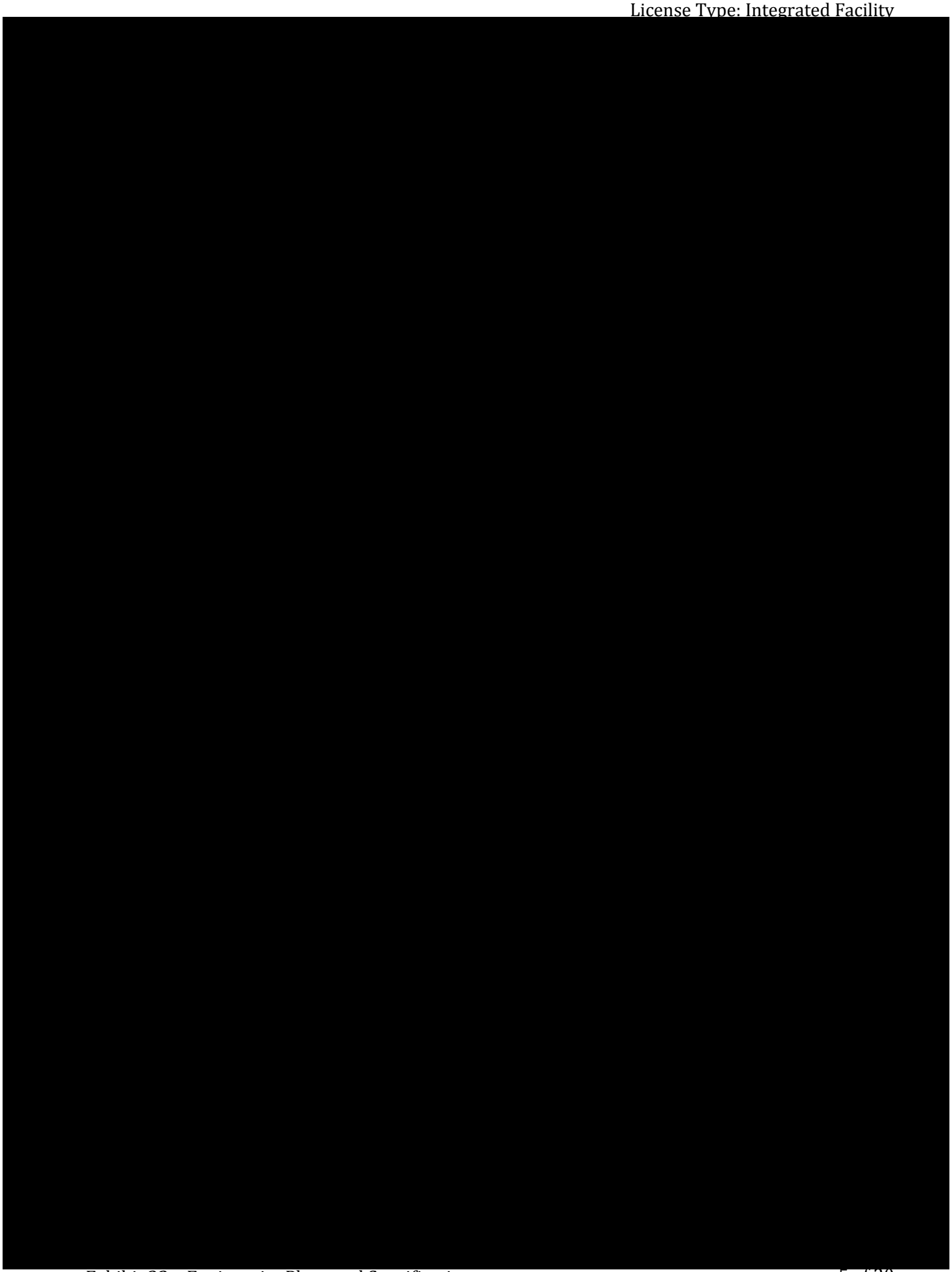
The following Engineering Plans and Specifications are divided into two sections.

The first, labeled Attachment A, are the schematics for the cultivation facility. They include all relevant construction information. The second, labeled Attachment B, include all security features.

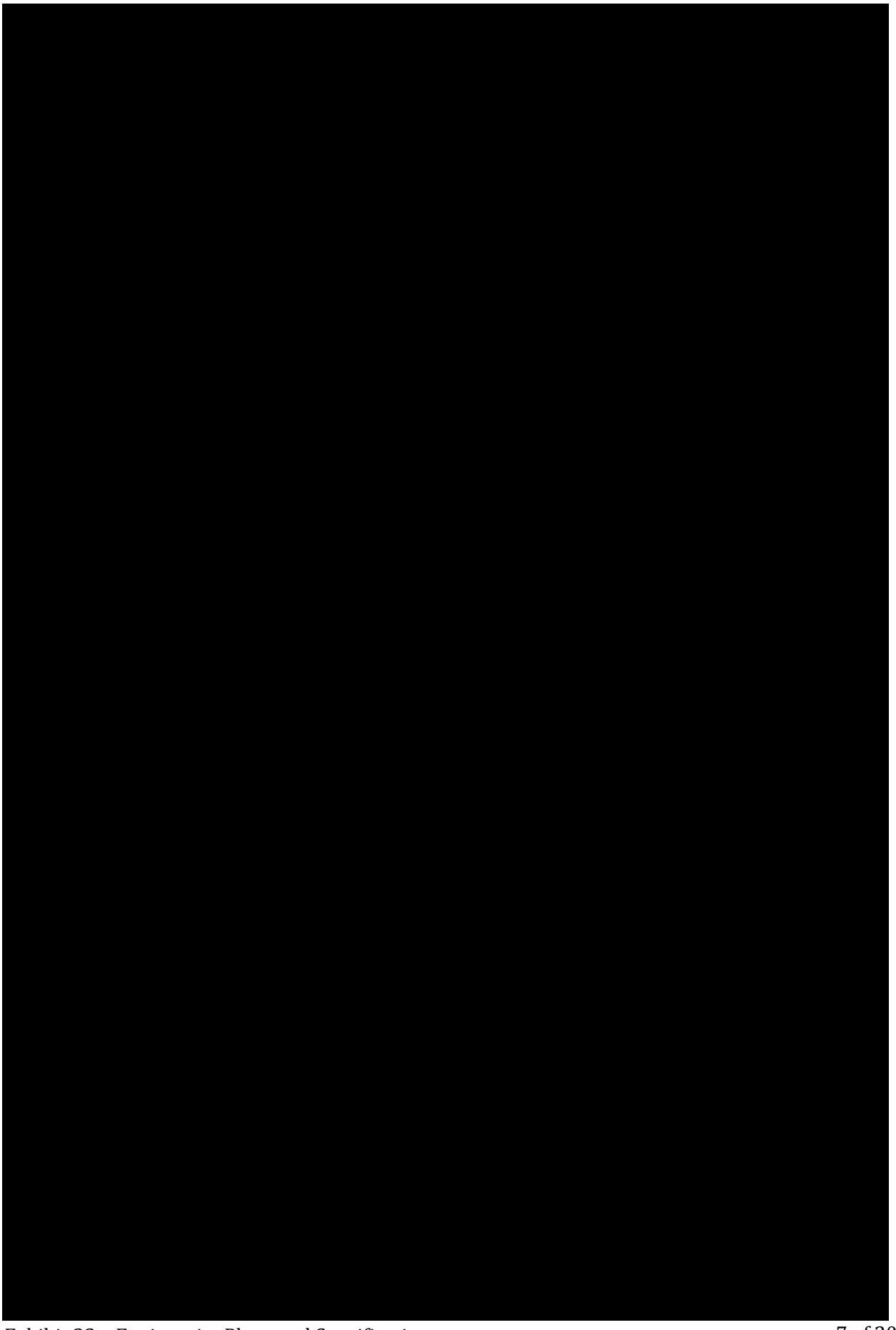
Attachment A

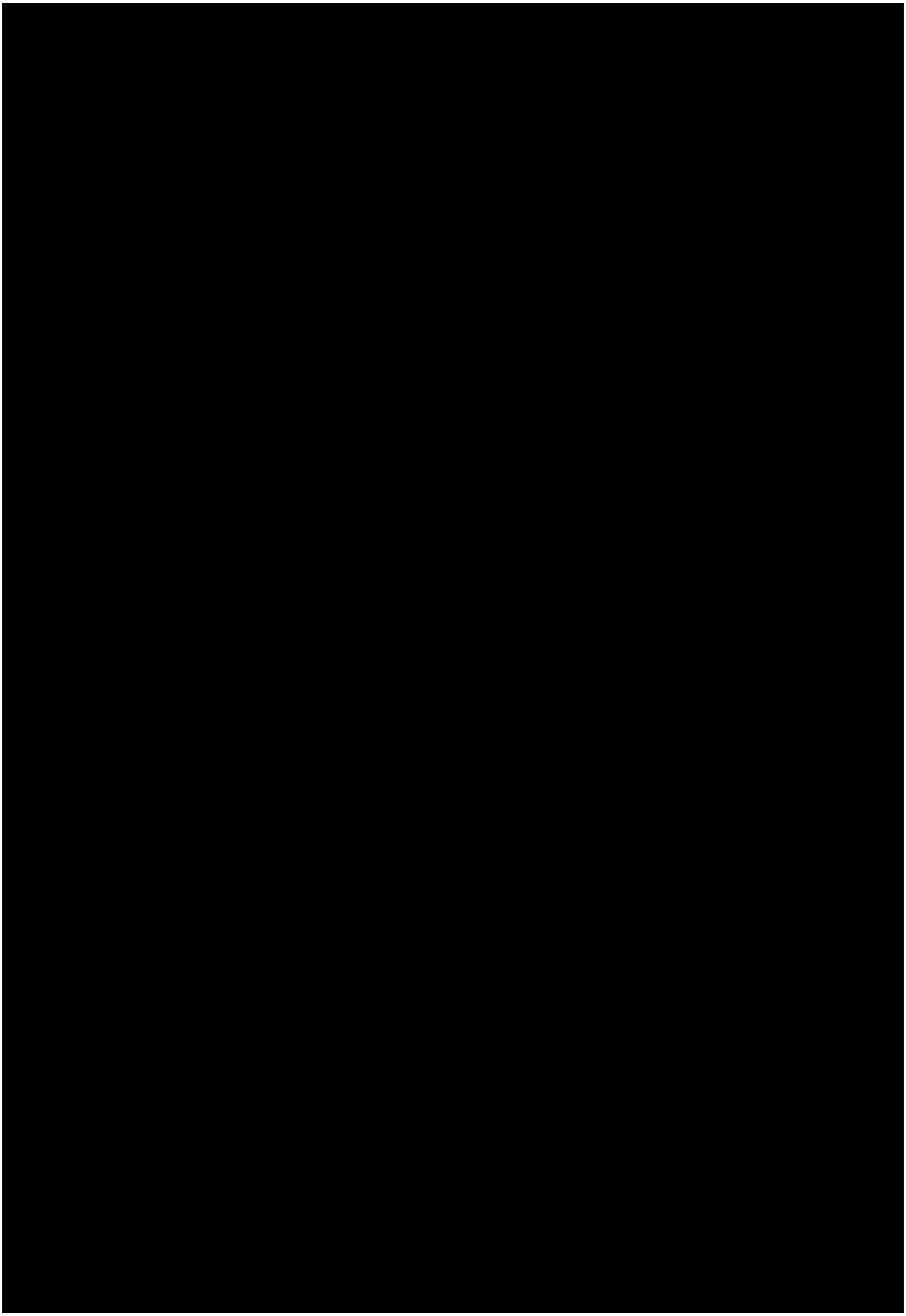


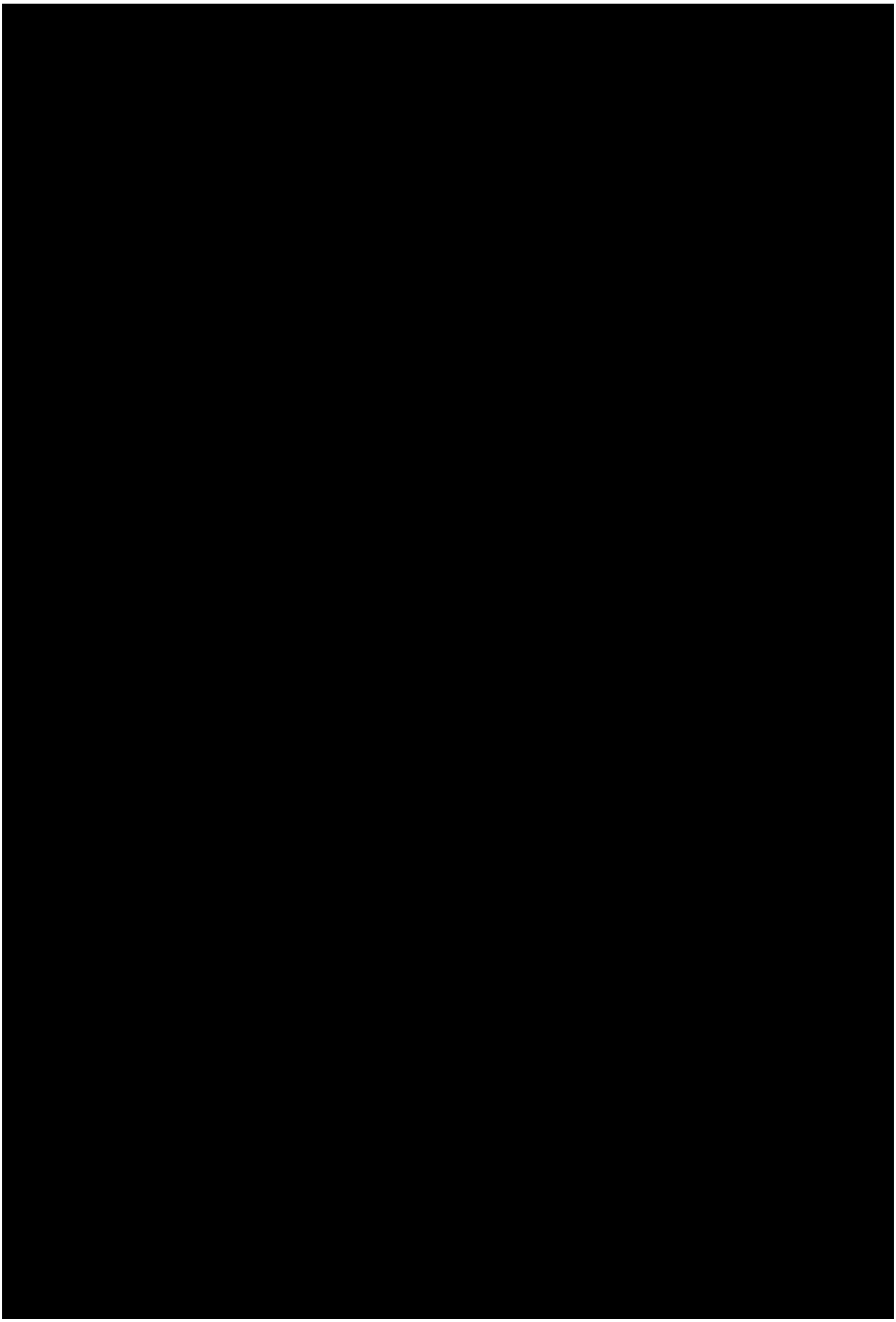


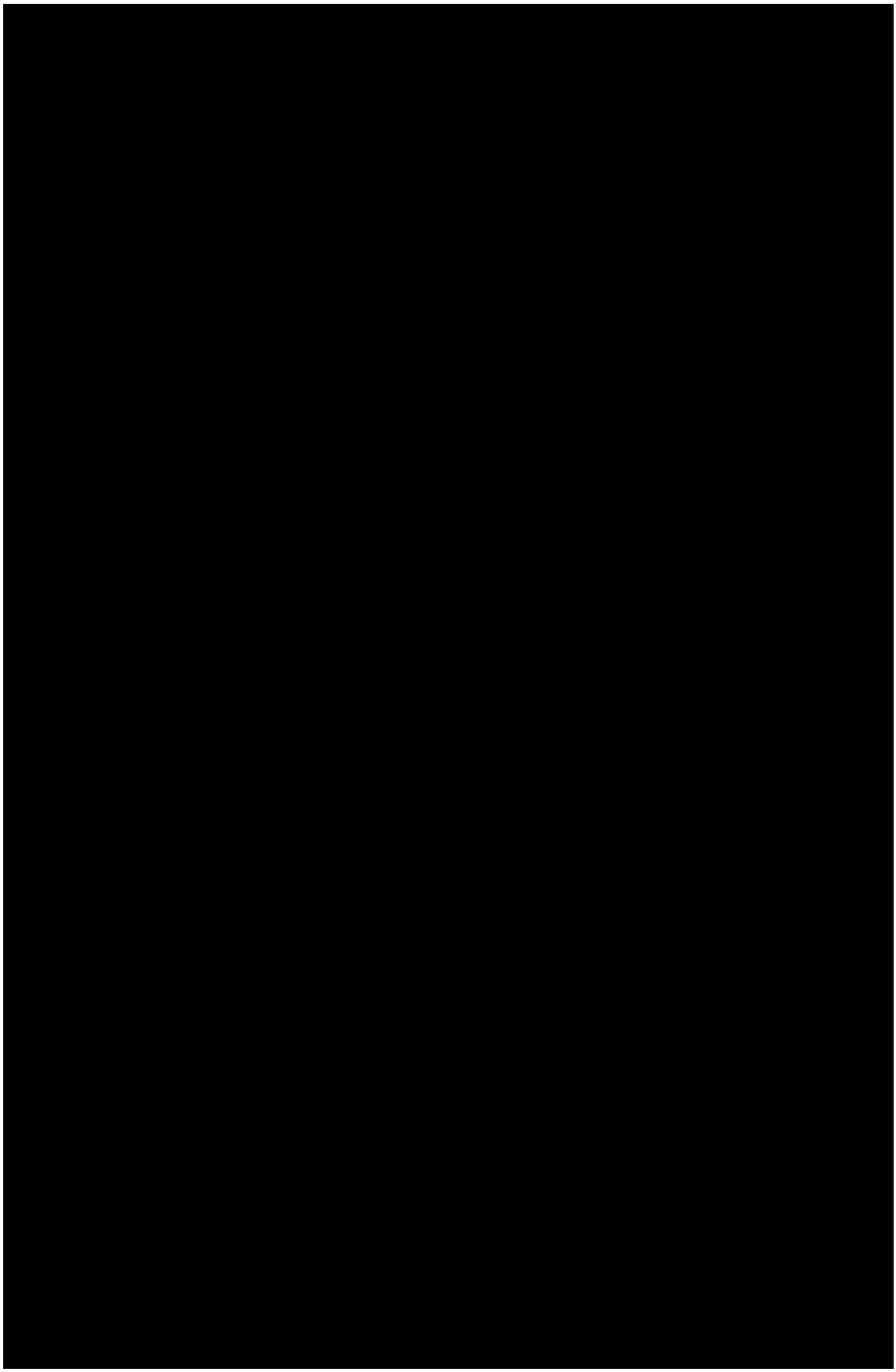


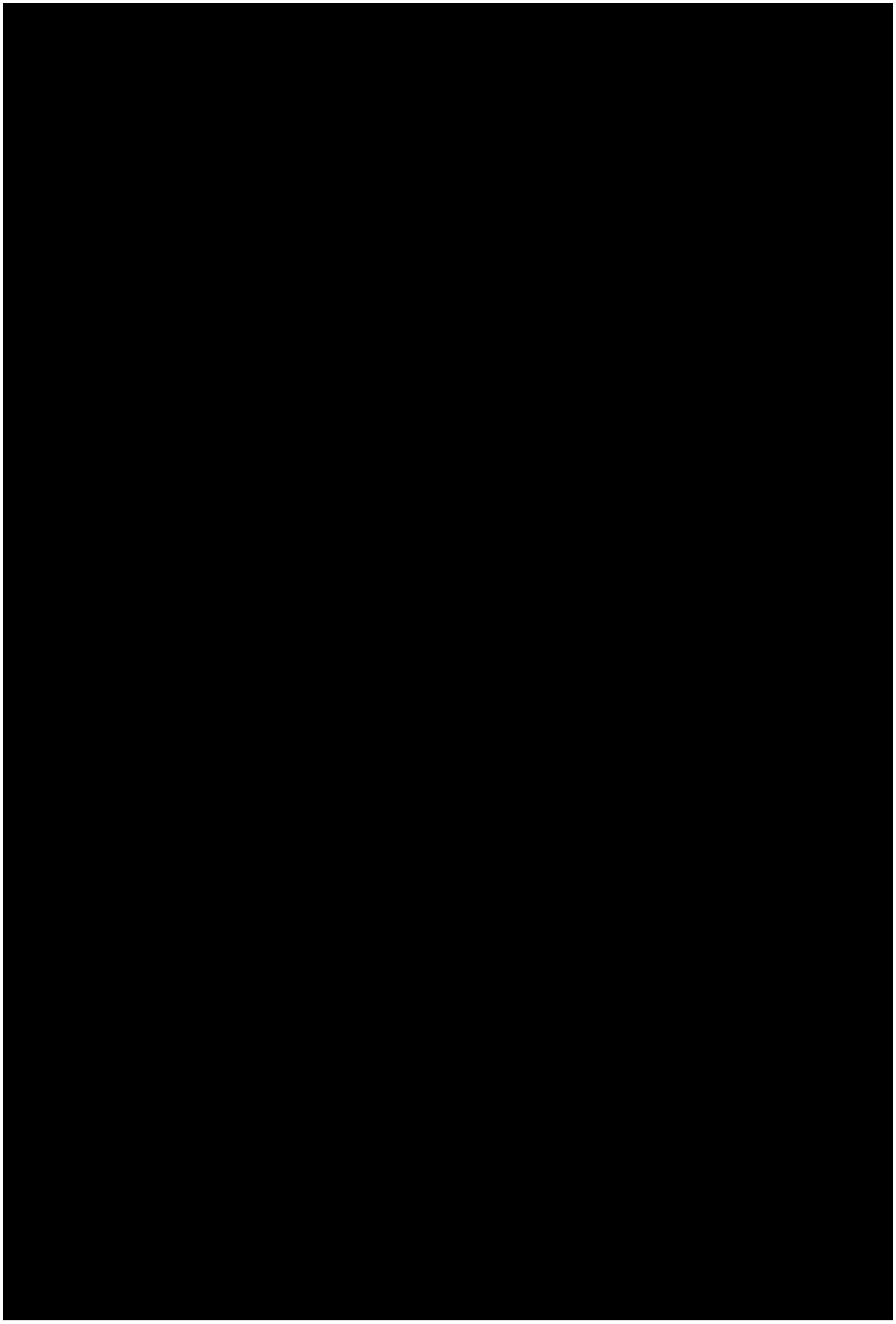
Attachment B

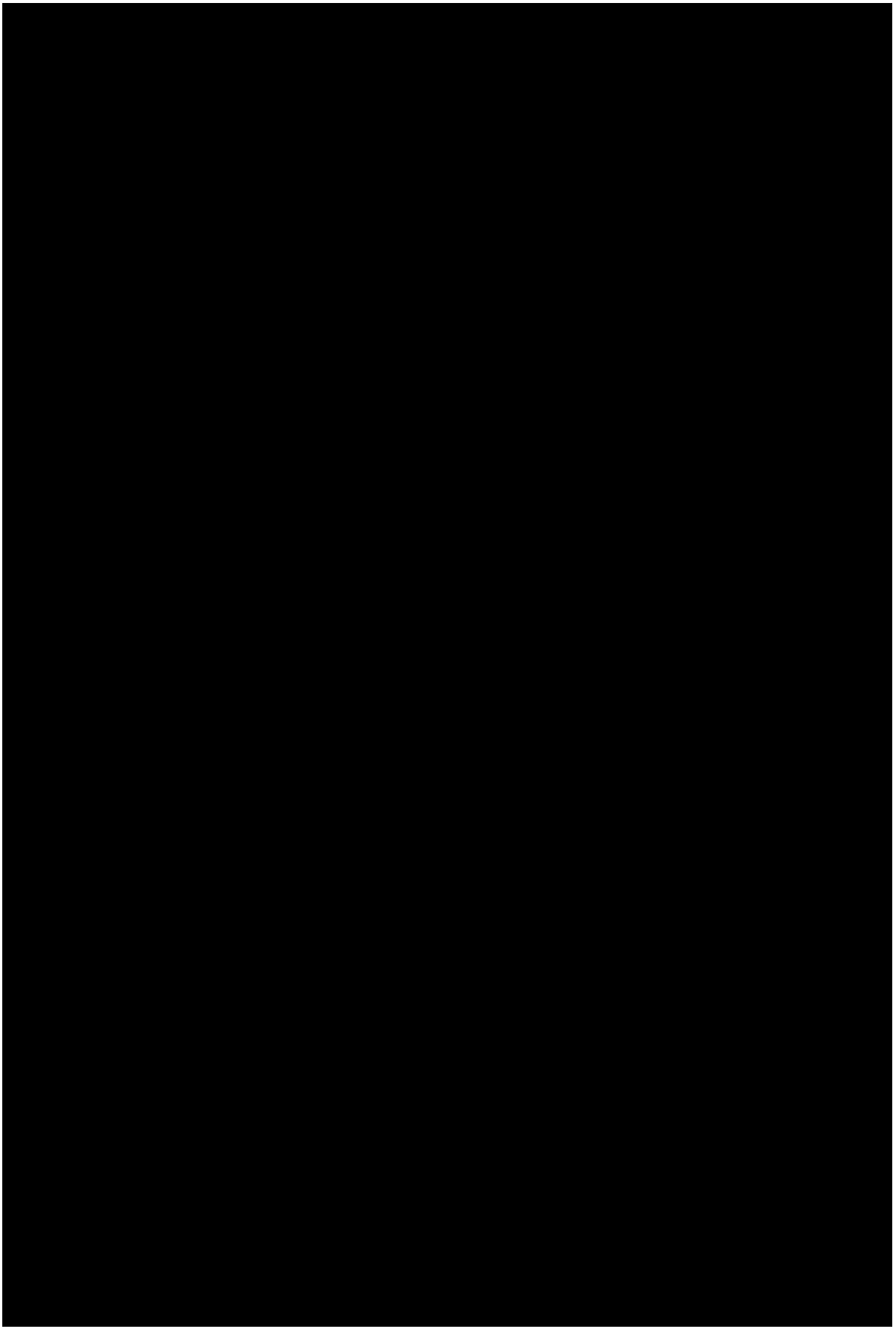


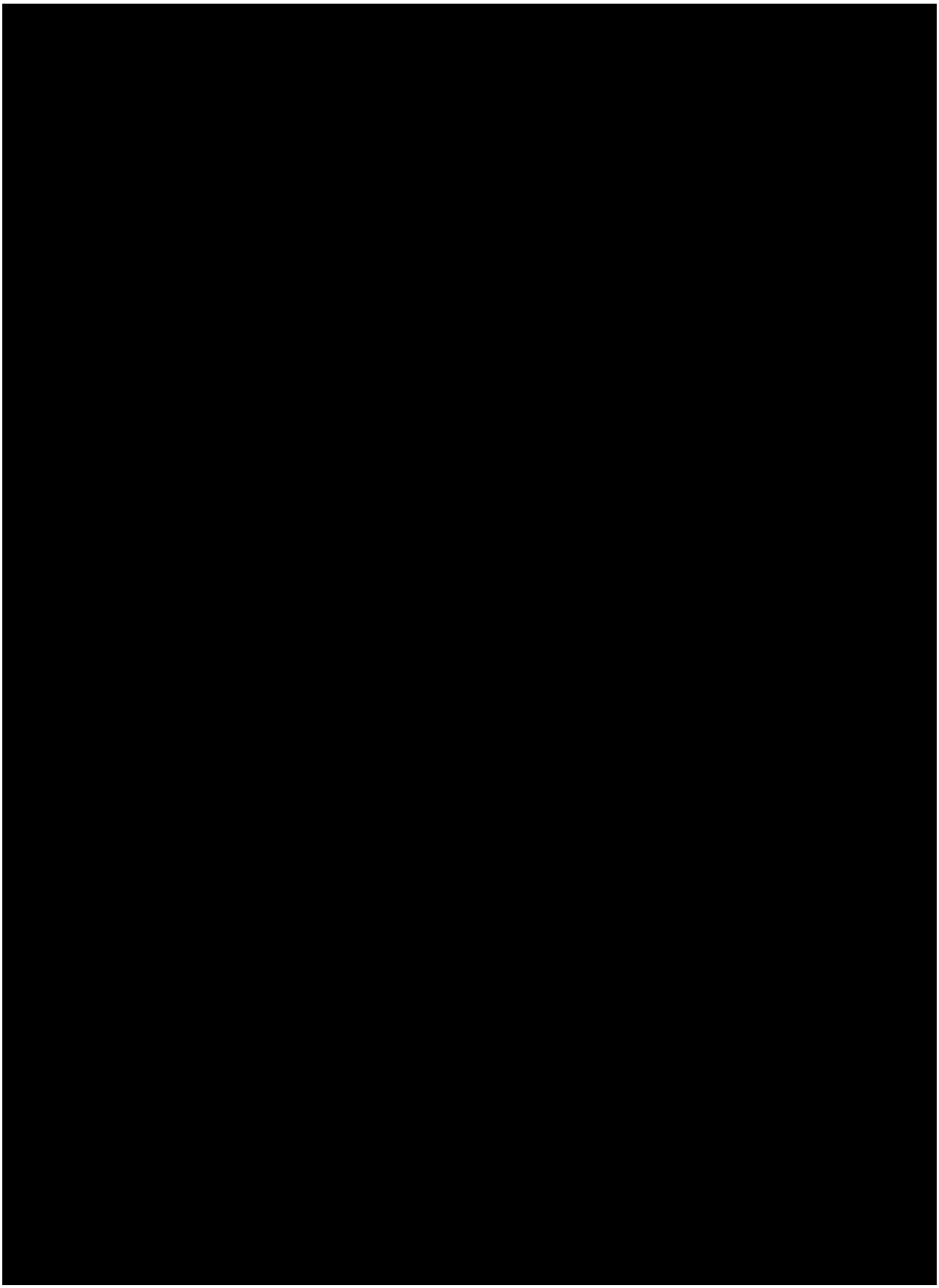


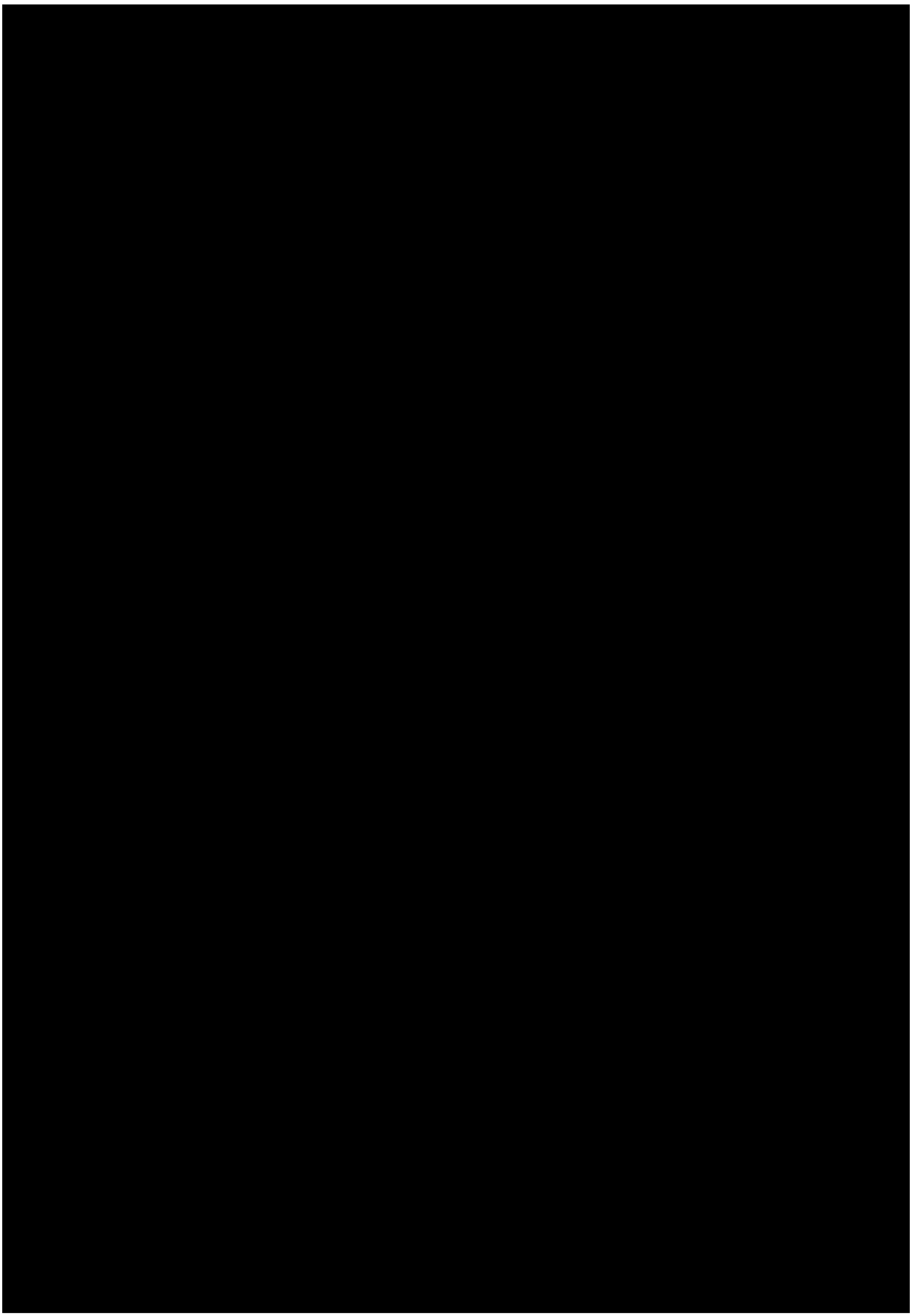


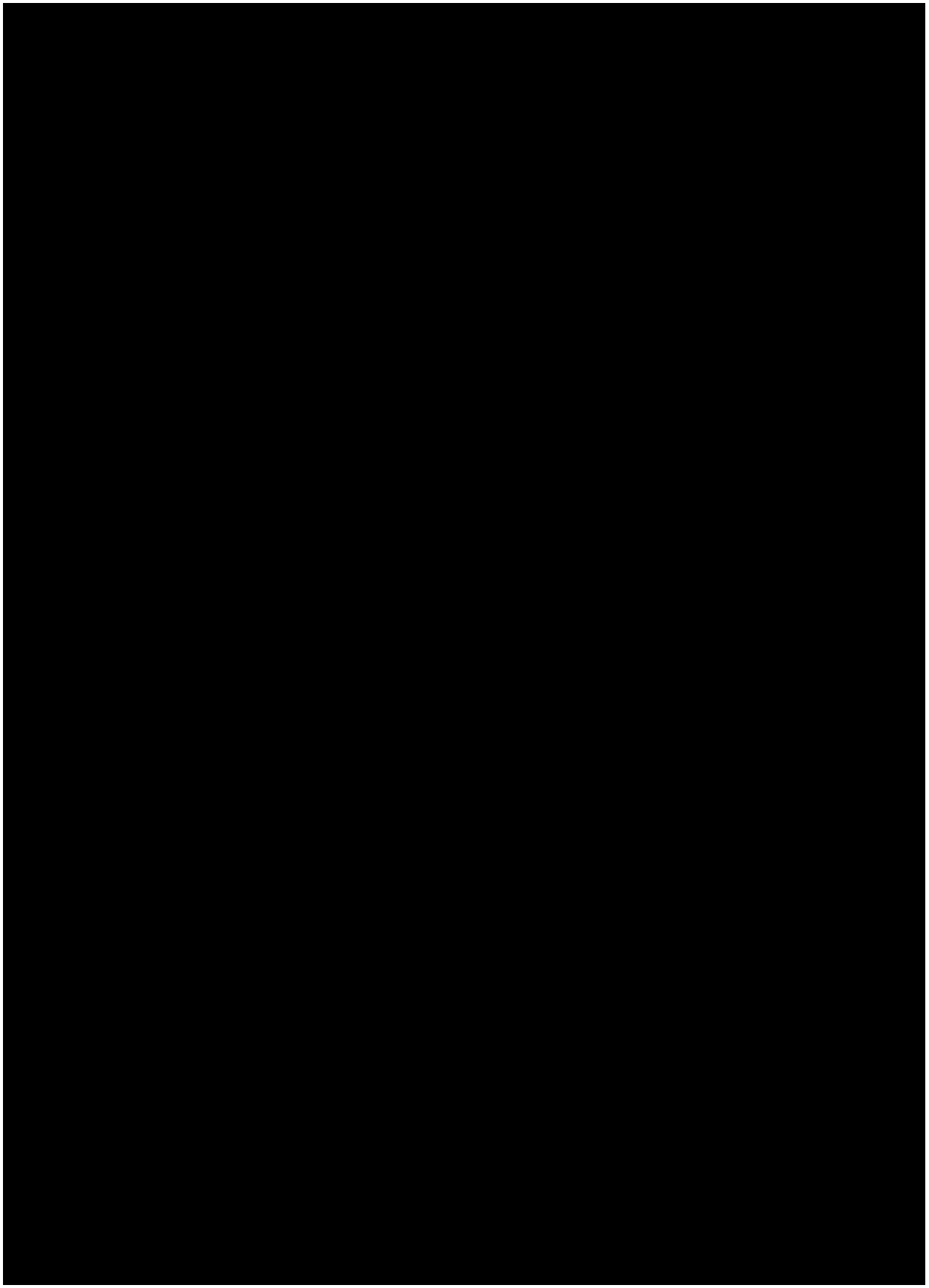


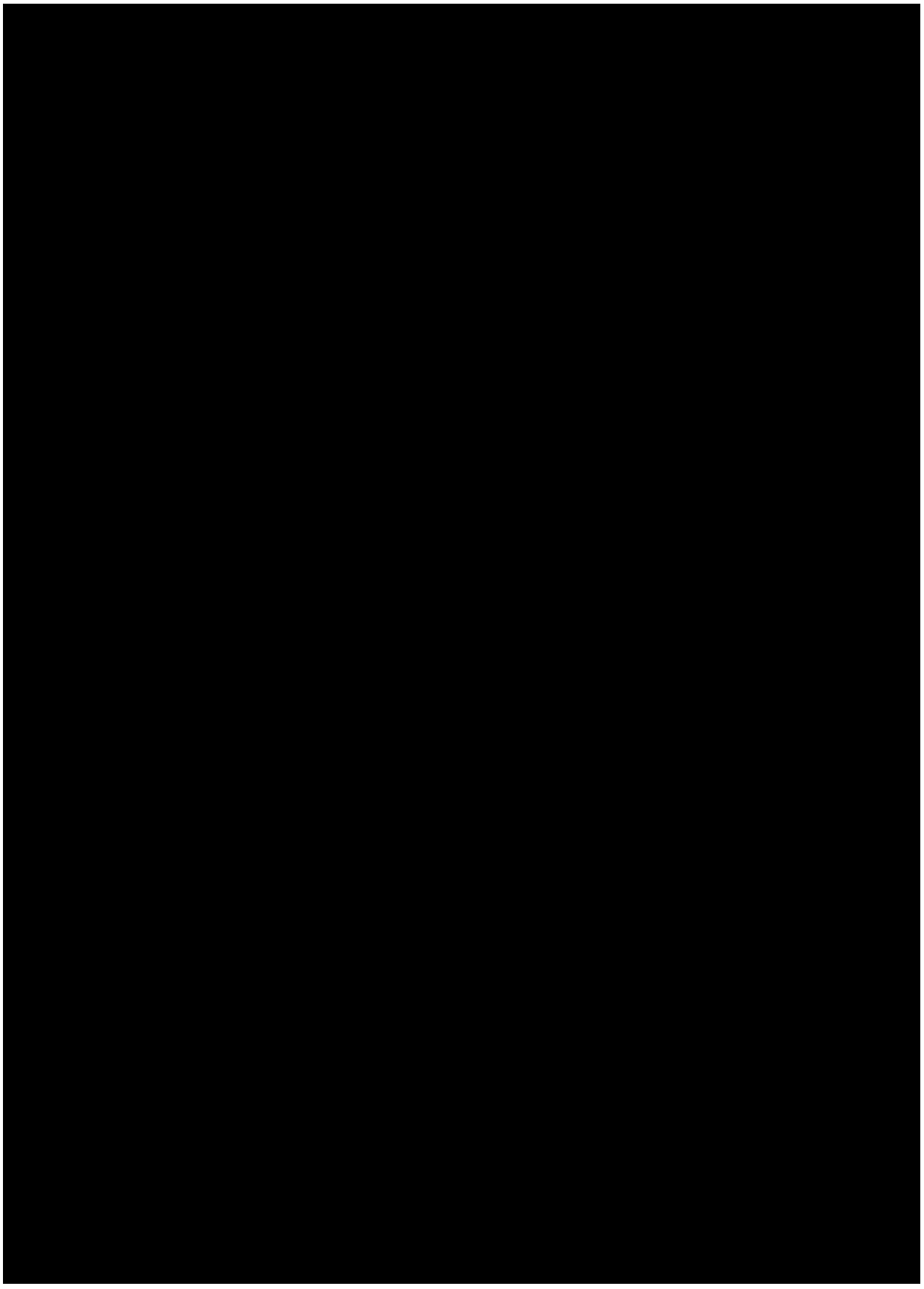


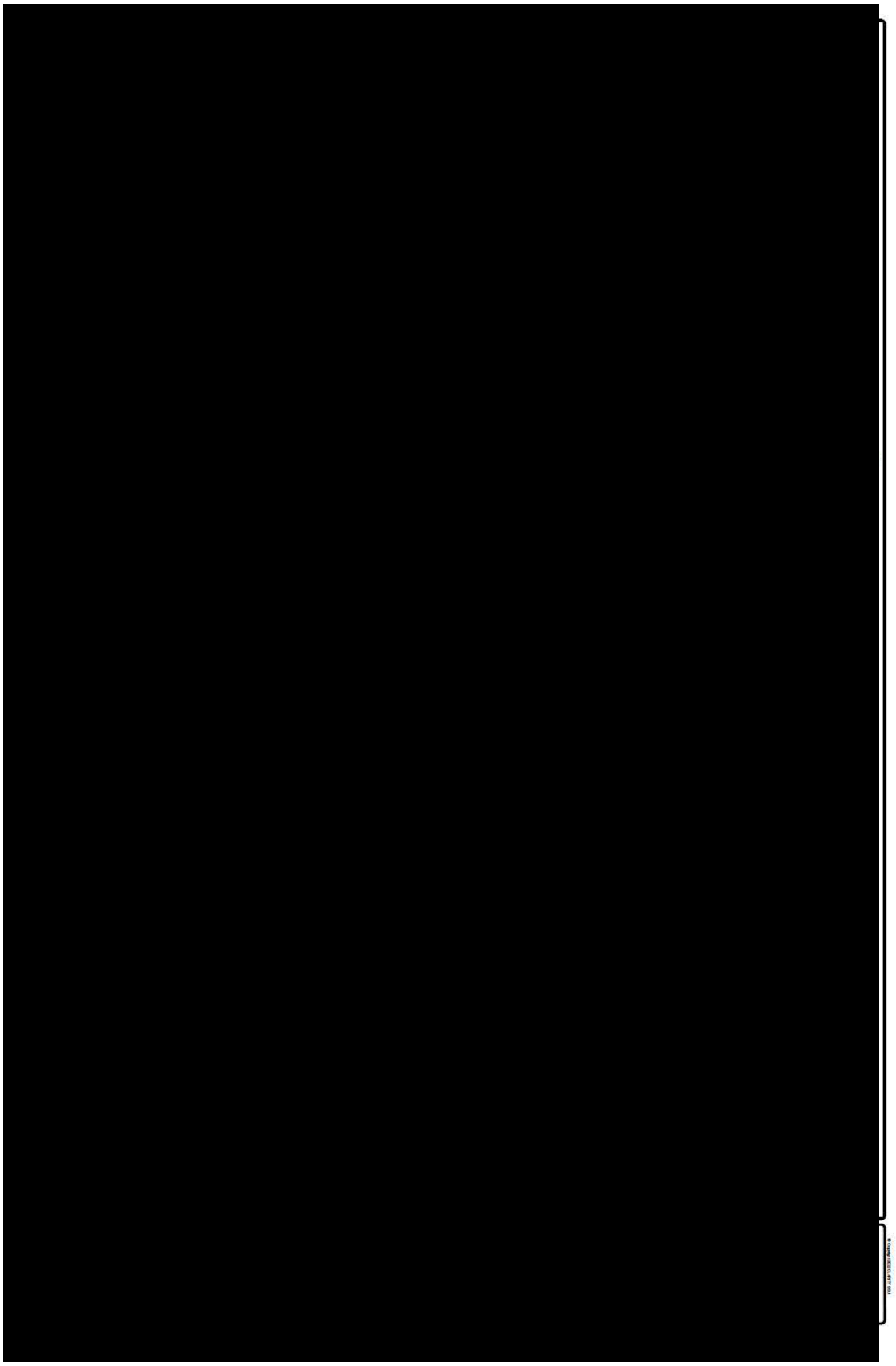


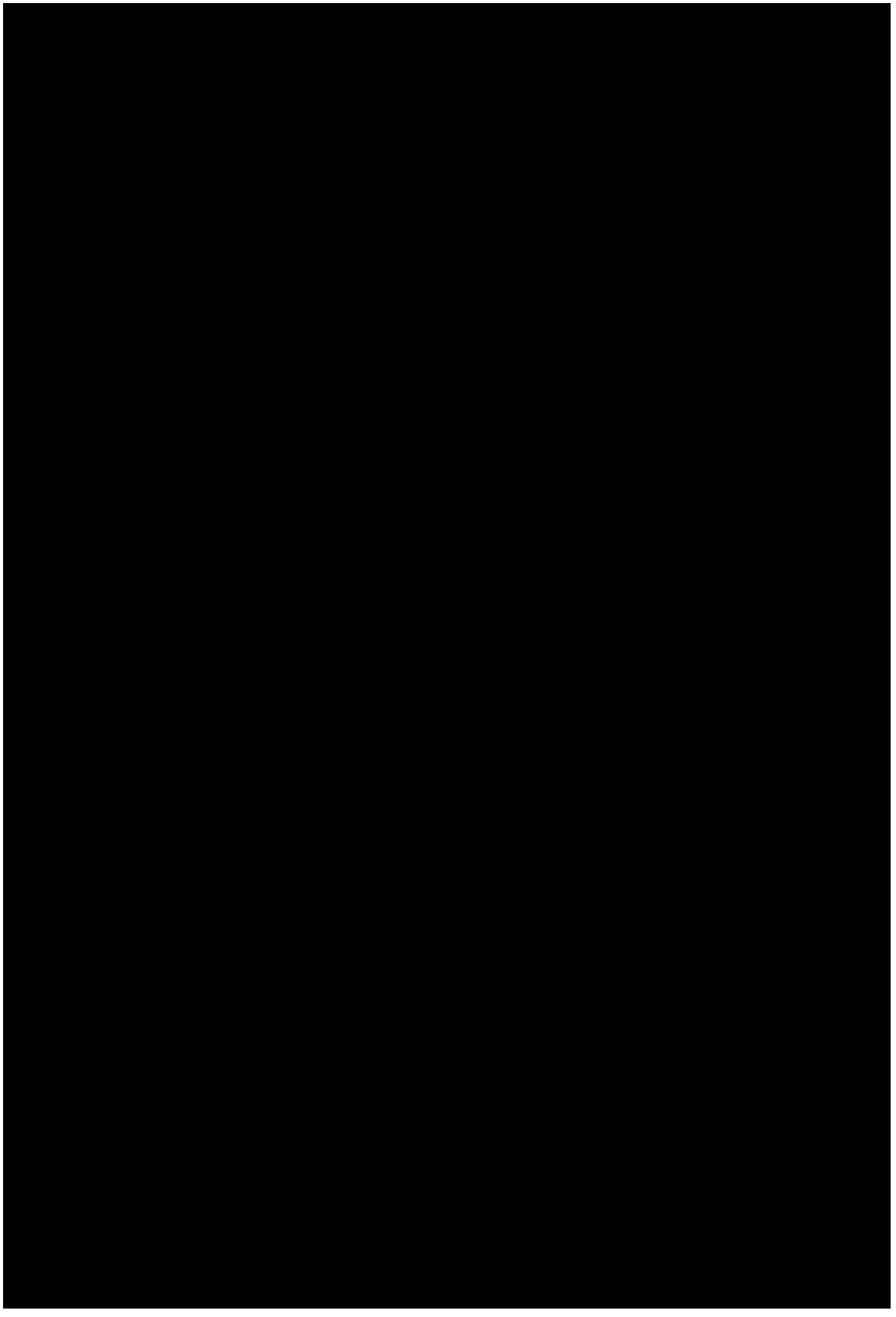


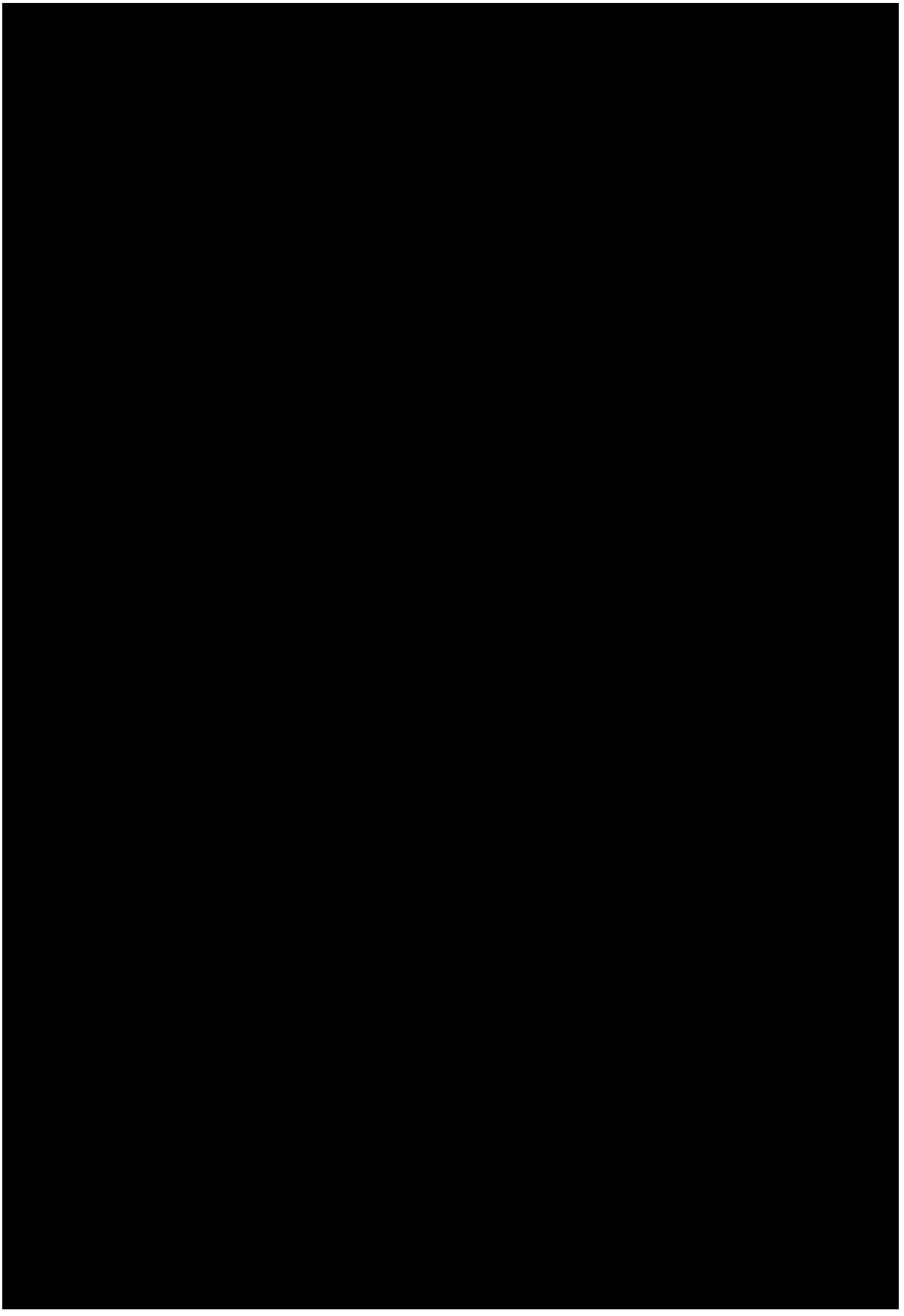


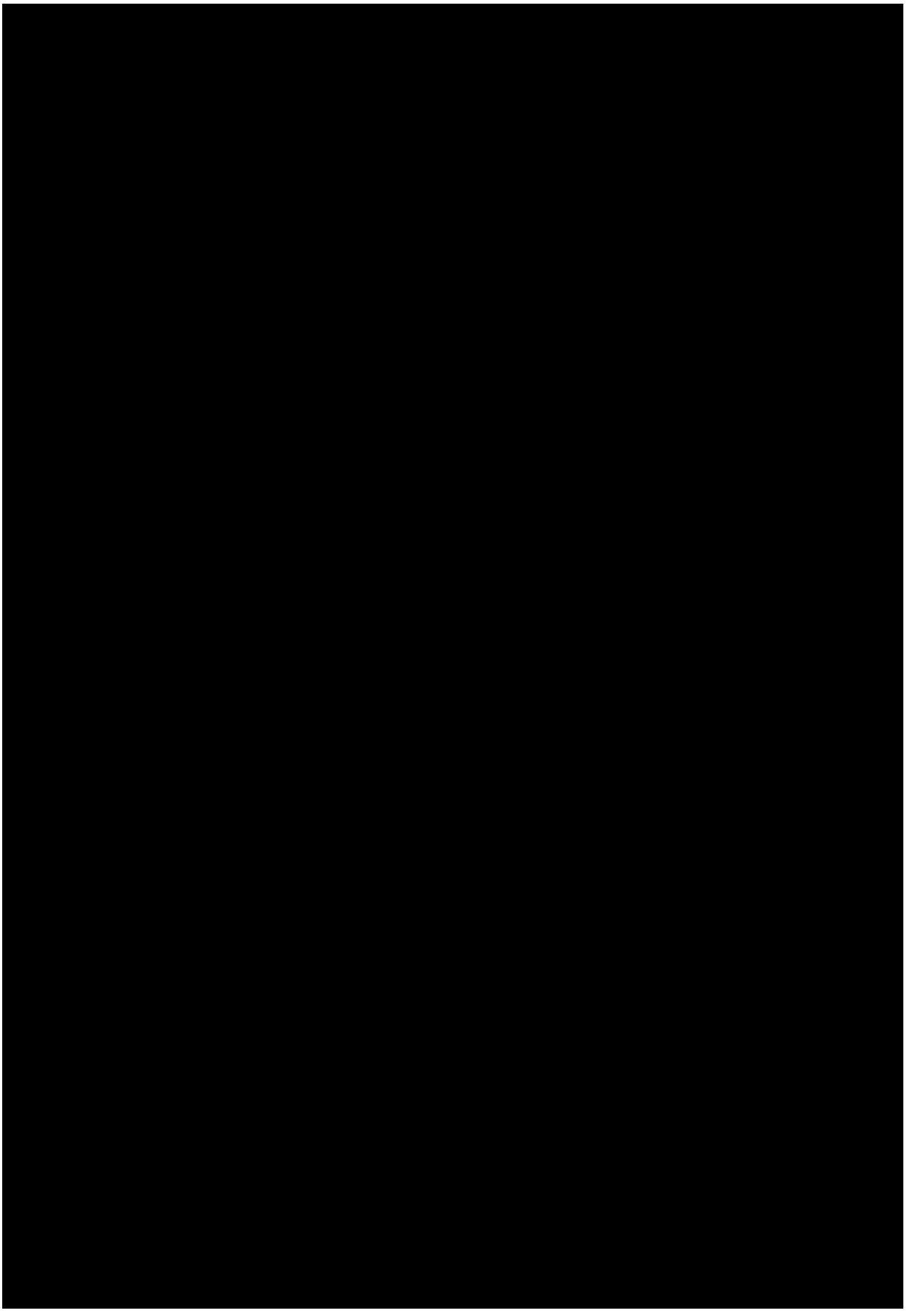












Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 33 - Security Plan

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/24/23**
Signature of Verifying Individual	**Verification Date**

33.1

[redacted]

[redacted]

33.2

[redacted]

33.3

[redacted]

[redacted]

33.4

[redacted]

[redacted]

[redacted]

[redacted]

33.5

[redacted]

33.6

[redacted]

[redacted]

[redacted]

33.7

[redacted]

33.8

[redacted]

[redacted]

33.9

[redacted]

[redacted]

33.10

[redacted]

[redacted]

33.11

[redacted]

33.12

[redacted]

33.13

[redacted]

[redacted]

33.14

Visitors purchasers must arrive at the front (public) entryway and display their

[redacted]

[redacted]

33.15

[redacted]

[redacted]

33.16

[redacted]

33.17

[redacted]

33.18

[redacted]

33.19

[redacted]

[redacted]

33.20

[redacted] They will be fully insured for at $1 million casualty with all tags and licenses up to date.

33.21

[redacted]

33.22

[redacted]

33.23

[redacted]

33.24

[redacted]

33.25

[redacted]

[redacted]

33.27

[redacted].

33.28

[redacted]

[redacted]

33.29

[redacted]

33.30

[redacted]

33.31

[redacted]

[redacted]

33.32

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 34 – Personnel

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/20/23**
Signature of Verifying Individual	**Verification Date**

FORM G: PERSONNEL ROSTER & VERIFICATION

[redacted] | Integrated Facility

Business License Applicant Name | License Type

Complete the following information, current to within thirty (30) days prior to the date of application, for all personnel (each leader and employee) affiliated with the Applicant. Attach additional forms if necessary.

[redacted] | Co-Owner

Leader/Employee Name | Title/Position

[redacted]

SSN | Telephone | Email

[redacted]

Street Address

Chicago | IL | 60625

City | State | Zip

[redacted] | Co-Owner

Leader/Employee Name | Title/Position

[redacted]

SSN | Telephone | Email

[redacted]

Street Address

Birmingham | AL | 35211

City | State | Zip

[redacted] | Co-Owner

Leader/Employee Name | Title/Position

[redacted]

SSN | Telephone | Email

[redacted]

Street Address

Birmingham | AL | 35211

City | State | Zip

[redacted] | CEO

Leader/Employee Name | Title/Position

[redacted]

SSN | Telephone | Email

[redacted]

Street Address

Las Vegas | NV | 89138

City | State | Zip

[redacted] | Co-Owner

Leader/Employee Name | Title/Position

[redacted]

SSN | Telephone | Email

[redacted]

Street Address

Chicago | IL | 60640

City | State | Zip

[redacted] | Co-Owner

Leader/Employee Name | Title/Position

[redacted]

SSN | Telephone | Email

[redacted]

Street Address

Chicago | IL | 60647

City | State | Zip

[redacted] | Co-Owner

Leader/Employee Name | Title/Position

[redacted]

SSN | Telephone | Email

[redacted]

Street Address

Bessemer | AL | 35020

City | State | Zip

[redacted]
Leader/Employee Name

Co-Owner
Title/Position

[redacted]
SSN Telephone Email

[redacted]
Street Address

Bessemer
City

AL
State

35020
Zip

[redacted]
Leader/Employee Name

VP for Cultivation
Title/Position

[redacted]
SSN Telephone Email

[redacted]
Street Address

Tuscon
City

AZ
State

85739
Zip

[redacted]
Leader/Employee Name

Board Member
Title/Position

[redacted]
SSN Telephone Email

[redacted]
Street Address

Las Vegas
City

NV
State

89117
Zip

[redacted]
Leader/Employee Name

Board Member
Title/Position

[redacted]
SSN Telephone Email

[redacted]
Street Address

Las Vegas
City

NV
State

89108
Zip

[redacted] Board Member

Leader/Employee Name | Title/Position

[redacted]

SSN | Telephone | Email

[redacted]

South Jordan | UT | 84009

City | State | Zip

Leader/Employee Name | Title/Position

SSN | Telephone | Email

Street Address

City | State | Zip

Leader/Employee Name | Title/Position

SSN | Telephone | Email

Street Address

City | State | Zip

Applicant Verification: The undersigned hereby verifies that the information provided hereinabove (and attached, as necessary) constitutes a complete and accurate roster of personnel of the Applicant. The undersigned further verifies that, if the Applicant is issued a business license, each individual listed hereinabove (and attached, as necessary) will be registered to the AMCC website and will undergo appropriate pre-employment background checks.

Jon Loevy | Co-Owner

Printed Name of Verifying Individual | Title of Verifying Individual

/s/ Jon Loevy | 3/20/23

Signature of Verifying Individual | Verification Date

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 35 – Business Leadership Credentials

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

35.1 A Curriculum Vitae for the Business

While the Applicant is majority-owned by longtime Alabama residents, the minority owners are part-owners of a national, multistate cannabis operator called [redacted] has a tremendous amount of experience operating in medical markets, has won extremely competitive contests for all license categories in Utah, Pennsylvania, New Jersey, California, Michigan, Missouri, Massachusetts, Illinois, New York, Ohio, and, most recently, Maryland. We have established and are successfully operating medical cannabis businesses in the most highly regulated medical cannabis markets in the nation. In addition to our cultivation and processing facilities, we are presently operating, or are in the process of opening, a total of ten (10) medical cannabis dispensaries across the U.S.

Founded in 2014, [redacted] is one of the largest privately held cannabis companies in the nation. We operate successfully in some of the most highly regulated medical cannabis markets. With the support of our team of pharmacists and patient care associates we have earned a solid reputation of delivering high quality patient care to our members in a safe environment.

Our Co-Founder, Board Member, and former CEO [redacted] helped build Justice from scratch into a multi-state cannabis company with a top-tier licensing footprint. The differentiator for [redacted] lies in its unusual, sweet spot in the industry. Unlike many other multi-state operators, ours is not a massive public company expanding through brute force and other people's money, nor is it among the novices lacking sufficient expertise. Uniquely in between, [redacted] and his business partner have invested and re-invested more than $30MM of their own capital--betting on themselves and their ability to succeed. In so doing, they have built a dynamic, fast-growing, and thriving medical cannabis company. [redacted] has a multi-state licensing footprint on par with some of the corporate marijuana behemoths, but the competitive personality and drive of a scrappy start-up innovating to serve a new industry.

[redacted] is dedicated to researching, cultivating and responsible distribution of medical cannabis products to those who are seeking alternatives to their personal wellness. The Company's vision was conceived and designed to research, develop, and dispense a variety of quality medical cannabis products.

[redacted] leadership team displays an extraordinary breadth and depth of scientific expertise, engineering skills, and business experience.

[redacted]

[redacted] is an experienced Senior Executive who has been responsible for the daily operations and management of several well-known, highly profitable cannabis companies. His cannabis experience includes, but is not limited to, cannabis/extract/dispensary design build and construction, cannabis and extract production, facilities staffing, inventory control, production/revenue management, marketing strategy, compliance, security distribution and retail operations. Darin has held the position of Chief Operations Officer, Senior Vice President of Operations and Director of Operations.

[redacted] extensive military background is highlighted by his time as a decorated Special Operations Combat Paramedic in the elite 75th Ranger Regiment. From his time in the military, [redacted] has formed strong leadership skills and is highly proficient operating in high stress, asymmetric fast moving, team-oriented environments.

Moreover, [redacted] is an accomplished plant scientist. After being honorably discharged from his service in the Army, [redacted] went on to graduate Cum Laude with Bachelor of Sciences in Genetics, Cellular and Developmental Biology from Arizona State University.

Upon receiving his Bachelor of Sciences degree Darin accepted the Global Technical Operations Manager position for World Wide Wheat, a renowned plant genetics company. At World Wide Wheat Darin managed operations and logistics for research at 18 globally located nurseries. Additionally, [redacted] managed a commercial production subsidiary, World

Grain, LLC in which he managed the financials, farmland procurement, and crop management.

[redacted] is currently the CEO of [redacted] the past 3 years, [redacted] has focused on developing a world class management team which has successfully increased revenues by 600%, and increased Justice's footprint by 225%. Justice currently has an operational

License Type: Integrated Facility footprint within 10 states, and is expanding rapidly. By 2023, [redacted] will have 40+ dispensaries under management throughout the US, paired with 300k square feet of new cultivation and manufacturing capabilities. In total [redacted] has guided the design, build and the successful execution of operations of over 2 million square feet of cultivation, extraction, distribution and retail shops.

[redacted] COO:

[redacted] brings 40 years of international business experience to [redacted] He specializes in helping smaller and start-up companies grow into business superstars. [redacted] excels in helping companies maximize productivity and quality, expand markets, and implement best practices for success. [redacted] believes strongly that a high-performing company starts with investing in its employees and producing the best possible product. With that philosophy, he has successfully expanded and improved multi-million-dollar companies in areas as diverse as precision manufacturing, disk drive technology, and plastic molding. He has improved the productivity and profitability of companies in the United States, Hong Kong, Thailand, and Malaysia.

[redacted] experience is invaluable in the new and emerging industry of medical cannabis.

[redacted] VP for Facilities:

[redacted] brings a wealth of knowledge about construction, cultivation, and manufacturing. He oversees the design and construction of [redacted]s state-of-the-art cannabis retail facilities, cultivations, extraction labs, and kitchen facilities.

[redacted] extensive experience in both construction and cannabis cultivation make him uniquely suited to oversee and implement every type of cannabis facility. From new construction of state-of-the-art cultivation and extraction facilities to retrofitting older facilities to bring them up to the highest standards, [redacted] ensures that all of J[redacted] facilities are top-notch.

[redacted], VP for Cultivation:

[redacted] has more than a decade of experience in cannabis cultivation. Known in our company as the Hardest Working Man in Cannabis, [redacted] knows everything there is to know about growing safe, healthy, potent cannabis plants.

His responsibilities at [redacted] include managing indoor and greenhouse operations; developing SOP's and protocols for all states; developing custom water schedules and nutrient mixes with a deep understanding of automated environment control; developing pest and mold protocols and strategies; and running seed to sale software.

[redacted] Lead Pharmacist:

[redacted] is a Licensed Pharmacist with deep knowledge of pharmacy best practices to continually create better patient care, better customer experience, greater efficiency, and improved accuracy.

[redacted] holds a Bachelor of Science in Biology from Pennsylvania State University; a Bachelor of Science in Pharmacy from Temple University, and a Masters of Science in Medical Cannabis Science and Therapeutics from the University of Maryland.

She is licensed by the State of Utah as a Medical Cannabis Pharmacy Medical Provider.

[redacted] has more than 20 years of experience in high-volume retail pharmacies. She excels in patient care and patient counseling. [redacted] helps advise medical cannabis patients about how best to treat their illnesses and manage their symptoms effectively and responsibly.

35.2 Role of Leadership Executive Personnel

CEO: The CEO will have the ultimate authority for all day-to-day decision-making for all of the Applicant's facilities. The CEO is responsible for ensuring that we are following our stated policies and procedures. Externally, the CEO is responsible for developing realistic production and sales goals and refines the company's operations as necessary to achieve those goals. The CEO is also responsible for approving all operating policies and procedures, as well as for all training programs for employees, including updating these training programs quarterly.

COO: The Chief Operating Officer serves as our operations expert. The COO is responsible for

License Type: Integrated Facility the operation and business aspects of our facilities. The COO determines the strains and types of products we will grow and sell and the prices we will charge for said products. The COO develops all standard operating procedures.

Controller: This position is responsible for the day-to-day accounting/book-keeping functions of our facilities.

Director of Technology and Facility Maintenance ("DTFM"): The DTFM devises the strategic design, acquisition, management, and implementation of our technology infrastructure including, without limitation, the company's Electronic Tracking System ("ETS") software, Track and Trace System ("TTS" or METRC), and security systems.

Security

Security Manager: The Security Manager will train and educate staff on all aspects of security and will be responsible for reporting violations or potential violations to the local law enforcement agencies. The Security Manager will also oversee product deliveries and supervise compliance by our secure transporter contractor.

Security Officers: Security Officers carry out the policies, procedures, and protocols of our stringent security plans in accordance with all applicable laws, rules, and regulations. They are responsible for, among other things: screening visitors, guests and employees at the entrance, handling perimeter security, site surveillance, access control and product movement compliance.

Cultivation

The Applicant's cultivation facility will be designed, constructed, and operated by experienced cannabis professionals, including those listed above. Every aspect of the cultivation, harvest, processing, and manufacturing will be overseen by knowledgeable cultivators, plant scientists, and materials scientists familiar with best practices for the highest quality cannabis products.

They will supervise a staff of dedicated propagation teams, cultivation teams, harvest teams, packagers, and extraction technicians.

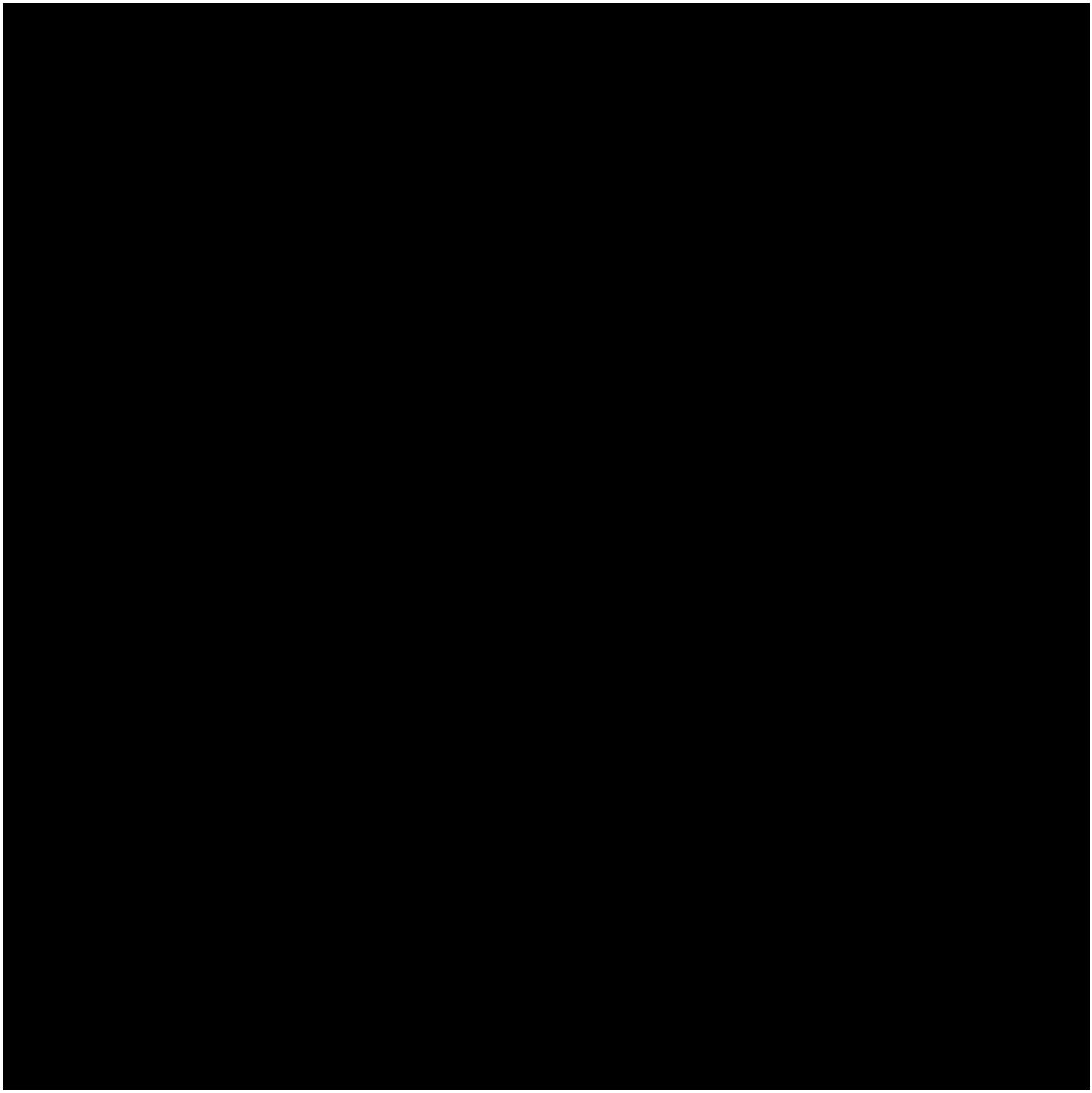
Retail Dispensaries

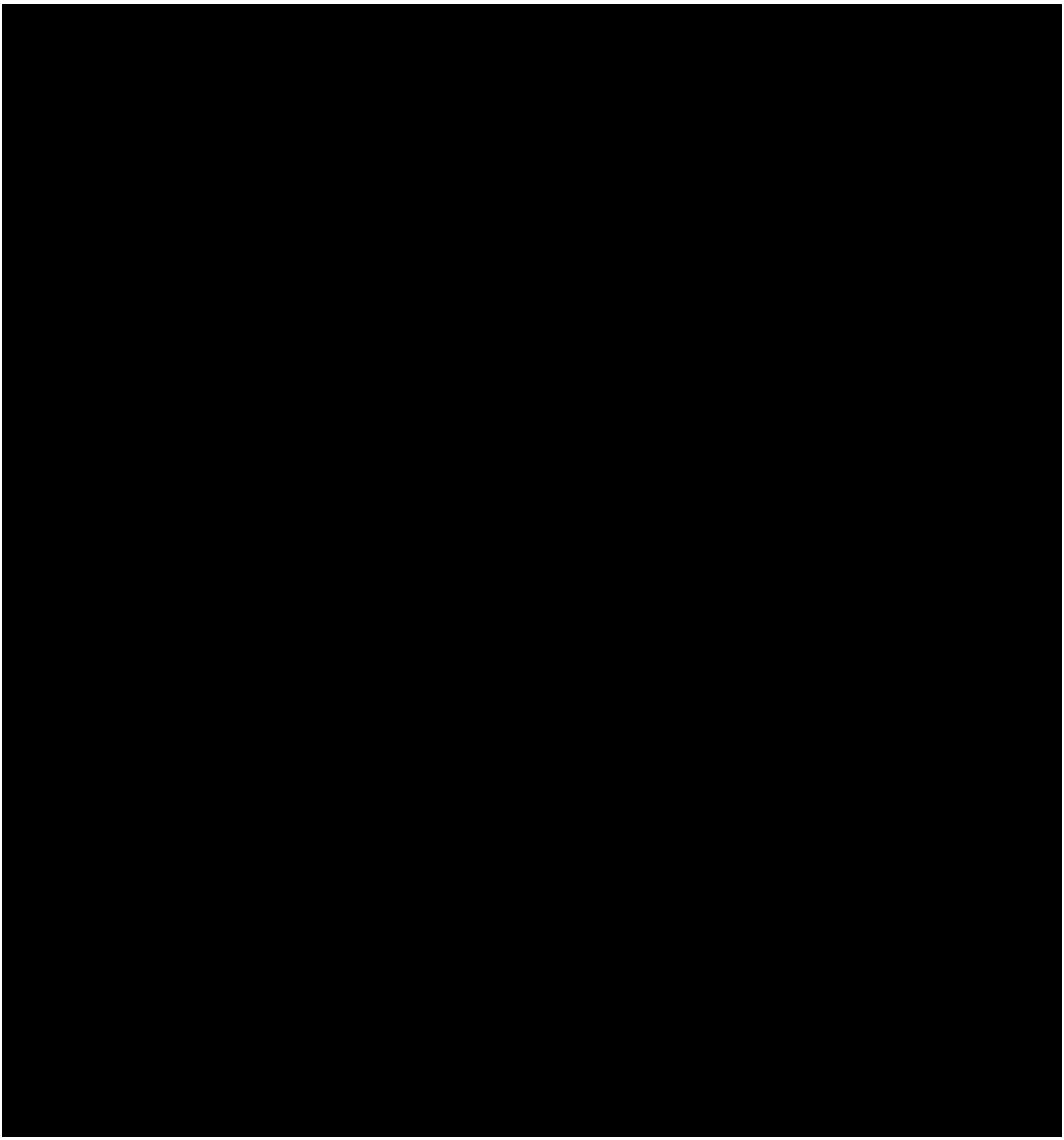
The Applicant will employ a Regional Dispensary Manager to oversee the operations of all five retail dispensaries, ensuring that Justice's high standards of quality and professionalism are implemented in each location.

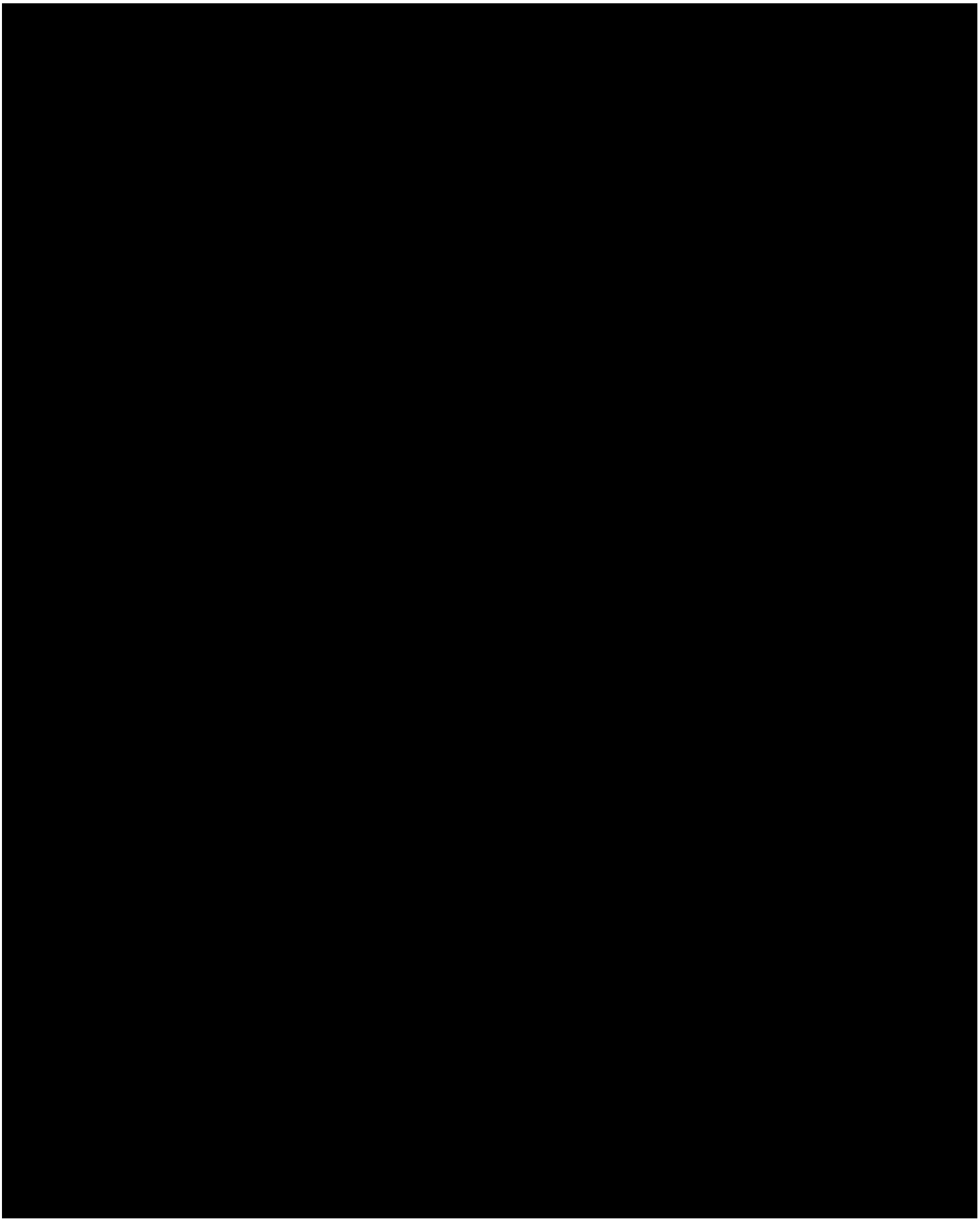
Each of the five retail dispensaries will employ a Dispensary Manager, as well as several shift supervisors and Patient Care Advocates.

Patient Care Advocates ("PCAs"): PCAs work with clients in the dispensaries on a one-on-one basis. They will handle intakes and use their comprehensive knowledge of cannabis strains, methods of ingestion and any education on cannabis to assist patients in understanding the best course of treatment. PCAs will be trained on their cannabis knowledge, marketing and brand awareness and interpersonal skills in how to deal with patients. PCAs will be stationed in our retail sales floor and in our reception area.

35.3 5-Year Hiring Plan (see next page)







Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 36 – Employee Handbook

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	Co-Owner
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**12/28/22**
Signature of Verifying Individual	**Verification Date**

The Applicant has partnered with a multistate operator owned by one of the Applicant's owners, Justice Cannabis Co. Attached please find Justice Cannabis Co.'s employee handbook, which will be utilized in all cultivation, manufacturing, and retail dispensing facilities.

Because the handbook exceeds 25 pages, below please find a summary of its contents.

The first ten pages set out the Applicant's core values and mission. Simply put, our company was founded on the ideal of delivering social justice to communities and individuals who've been adversely impacted by cannabis prohibition. We also believe that cannabis is a natural, safe, and effective tool for personal wellness.

Pages 10-17 describe our hiring and employment practices. We are an equal opportunity employer, and we are committed to fairness and transparency in our hiring and employment practices.

Pages 17-24 set forth our policies regarding employee pay and benefits. The Applicant will offer a competitive, living wage and full benefits, including health insurance, to qualified employees.

Pages 24 – 30 detail our generous paid leave policy, including paid holidays, sick days, parental leave, family and medical leave, and leave for military service.

Pages 30 – 35 describe our rigorous Employee Code of Conduct, which holds our team members to the highest standards of ethical and professional conduct. That section also describes our disciplinary process.

Pages 35 – 41 explain the Applicant's zero-tolerance approach to discrimination and harassment in the workplace. We are committed to being a safe, inclusive, professional workplace, and we believe in providing clear guidance on best practices in order to ensure that all employees are honored and valued.

Pages 41 – 44 set forth our policy on drugs and alcohol, including legal and responsible medical use of cannabis outside the workplace.

Pages 45 – 50 relate our policies regarding technology and social media in and outside of the workplace.

Pages 55 – 56 discuss our policies and procedures concerning separation, including termination and resignation.

Most relevant to this Application, though, is the section of our Employee Handbook concerning Workplace Safety and Security, located on pages 51 – 54.

Occupational health and safety: The company is committed to providing a safe and healthful working environment. Accordingly, the Applicant complies with relevant federal and state occupational health and safety laws including maintenance of a written health and safety plan. We require our employees to be active participants in that process, working cooperatively to identify and resolve any potential safety issues.

Workers' Compensation: We comply with all applicable federal, state, and local health and safety regulations, and we provide a work environment as free as possible from recognized hazards. Team Members who are injured on the job may be eligible for workers' compensation insurance benefits.

Building Access: The Applicant strictly controls all access to both cultivation and retail dispensary facilities. All external doors remain locked at all times, and are equipped with emergency exit mechanisms. Each employee is provided with a badge/keycard, and must badge into and out of the facility every time they enter or leave. The Applicant maintains strict policies regarding visitors and the use of keys and alarm codes.

Security and surveillance: Every facility maintains at least one security officer on the premises during all operational hours. Our security officers are highly trained and held to the highest professional standards. Their job is to deter and prevent theft and violence, and to ensure the safety and comfort of the customers and employees. In order to prevent and solve theft issues, and to comply with state laws, employees are subject to electronic surveillance.

Workplace Violence: The Applicant has a zero-tolerance policy toward workplace violence, and we take every step possible to prevent acts or threats of violence. We will not condone any acts or threats of violence against Team Members, customers, or visitors to company premises at any time or while engaged in business with or on behalf of the company. Accordingly, all Applicant's employees have a "duty to warn" their supervisors and security personnel of any evidence of workplace violence.

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 37 - Secure Transport Drivers

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	
Signature of Verifying Individual	**3/24/23**
	Verification Date

FORM H: SECURE TRANSPORT DRIVERS

Complete a separate form and verification for each of the Applicant's secure transport drivers.

[redacted] Integrated Facility

Business License Applicant Name | License Type

Secure Transport Driver Information

[redacted]

Driver's License Information

[redacted]

Issued by (State) | Number | Issue Date | Expiration Date

Citations, Fines & Violations

List all motor vehicle citations, fines, and violations received by the driver in the last three (3) years. Attach additional forms if necessary.

Type (select all that apply): ☐ Citation ☐ Fine ☐ Violation

N/A

Violation/Charge | Issued By

Date of Occurrence | Location (City/County) | Location (State)

Disposition/Amount | Date of Disposition

Type (select all that apply): ☐ Citation ☐ Fine ☐ Violation

Violation/Charge | Issued By

Date of Occurrence | Location (City/County) | Location (State)

Disposition/Amount | Date of Disposition

Type (select all that apply): ☐ Citation ☐ Fine ☐ Violation

Violation/Charge | Issued By

Date of Occurrence | Location (City/County) | Location (State)

Disposition/Amount | Date of Disposition

Type (select all that apply): ☐ Citation ☐ Fine ☐ Violation

Violation/Charge | Issued By

Date of Occurrence | Location (City/County) | Location (State)

Disposition/Amount | Date of Disposition

Type (select all that apply): ☐ Citation ☐ Fine ☐ Violation

Violation/Charge | Issued By

Date of Occurrence | Location (City/County) | Location (State)

Disposition/Amount | Date of Disposition

Type (select all that apply): ☐ Citation ☐ Fine ☐ Violation

Violation/Charge | Issued By

Date of Occurrence | Location (City/County) | Location (State)

Disposition/Amount | Date of Disposition

Applicant Verification: The undersigned hereby verifies that the information provided hereinabove (and attached, as necessary) constitutes complete and accurate information for the secure transport driver identified hereinabove (and attached, as necessary). The undersigned further verifies that the secure transport driver identified hereinabove is at least 21 years of age and has a minimum of three (3) years driving experience.

Jon Loevy	Co-Owner
Printed Name of Verifying Individual	Title of Verifying Individual
/s/ Jon Loevy	3/24/23
Signature of Verifying Individual	Verification Date

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 38 - Driver's Manual

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

_____Jon Loevy_____	**_____Co-Owner_____**
Printed Name of Verifying Individual	**Title of Verifying Individual**
_____/s/ Jon Loevy_____	**_____3/24/23_____**
Signature of Verifying Individual	**Verification Date**

Our company was formed by Alabama residents who have partnered with a very successful national cannabis company licensed and operating in multiple medical cannabis markets. As a cannabis company with experience in various highly regulated medical states, we have extensive experience in transporting cannabis in medical markets. We also have ongoing relationships with insurance carriers familiar with cannabis transport. We will leverage those relationships and that experience to provide safe, secure, and compliant transportation for medical cannabis in Alabama.

Vehicles: Because our cannabis company has integrated cannabis operations in multiple states (including, for example, New Jersey and Pennsylvania) we currently own, operate, and insure a number of Secure Transport Vehicles. In Illinois, our factory is located far from the majority of the State's population, and we are presently transitioning our mode of transportation to rely on outside delivery services. Thus, if we are awarded a license in Alabama, our Secure Transport Vehicles presently in Illinois will be available to relocate to Alabama. These include the following:

Make	**Model**	**VIN**	**Plate No.**
Nissan	Cargo Van	[redacted]	[redacted]
Ford	Transit	[redacted]	[redacted]

Driver's Manual: Below is the Driver's Manual used by our Secure Transport Drivers:

TRANSIT SECURITY PRACTICES

A. TRANSPORTATION PROTOCOLS

1. Transportation Vehicles

[redacted]

[redacted]

[redacted]

2.Transportation Staffing

[redacted]

3.Shipment Requests, Preparation for Transport, and Transportation Manifest

[redacted]

[redacted]

4.Prior to Transport

[redacted]

[redacted]

5.Transportation Route and Delivery Procedures

[redacted]

6.Arrival and Unloading Procedures

[redacted]

7.Records

[redacted]

8.Reportable Incidents and Evidence of Adverse Loss

[redacted]

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 39 - Quality Control and Quality Assurance Plan

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**/s/ Jon Loevy**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

All cannabis product manufacturing shall be conducted under such conditions and controls as are necessary to minimize the potential for the growth of microorganisms, allergen cross-contact, contamination of cannabis products, and deterioration of cannabis products. Cannabis products capable of supporting the rapid growth of undesirable microorganisms shall be held at temperatures that prevent the cannabis product from becoming adulterated during manufacturing, processing, packing and holding. Measures such as sterilizing, irradiating, pasteurizing, cooking, freezing, refrigerating, controlling pH, or controlling water activity that are undertaken to destroy or prevent the growth of undesirable microorganisms shall be adequate under the conditions of manufacture, handling, and transfer to prevent the cannabis product from being adulterated.

39.1 Manufacturing Quality Control

[redacted]

[redacted]

[redacted]

Record Requirement

[redacted]

Procedures

[redacted]

Raw materials and other ingredients shall be held in bulk, or in containers designed and [redacted]

Packaging Requirements

[redacted]

39.2 Testing Plan

[redacted]

[redacted]

Taking Possession & Storage of Cannabis Goods Prior to Testing

When we take possession of a cannabis good, the first step we initiate is a review of

[redacted]

Cannabis Preservation Methods

[redacted]

[redacted]

Sterilization of Tools

[redacted]

Staff Measures to Prevent Contamination

[redacted]

Limited-Access Areas

[redacted]

Collection of Laboratory Samples & Chain of Custody

[redacted]

Laboratory Responsibilities

[redacted]

[redacted]

Receipt of Certificate of Analysis and Testing results

[redacted]

[redacted]

Re-Packaging, Packaging, and Re-Labeling

[redacted]

39.3 Failed Certificate of Analysis Status

[redacted]

Returns from Licensed Retail

[redacted]

Defective Product Returns to a Licensee

[redacted]

Shipping Manifest and Certificate of Analysis

[redacted]

SALES INVOICE/ SHIPPING MANIFEST

PLEASE USE PERMANENT INK FOR ALL ITEMS

INVOICE/MANIFEST NUMBER:				**ACTUAL DATE AND TIME OF DEPARTURE:**	/ / ☐ AM ☐ PM
ATTACHED PAGE(S)?	**YES** ☐ **NO** ☐	**# OF ATTACHED PAGES:**		**ESTIMATED DATE AND TIME OF ARRIVAL:**	/ / ☐ AM ☐ PM

SHIPPER INFORMATION	
STATE LICENSE #	
TYPE OF LICENSE	
BUSINESS NAME	
BUSINESS ADDRESS	
CITY, STATE, ZIP CODE	
PHONE NUMBER	
CONTACT NAME	

RECEIVER INFORMATION	
STATE LICENSE #	
TYPE OF LICENSE	
BUSINESS NAME	
DELIVERY ADDRESS	
CITY, STATE, ZIP CODE	
PHONE NUMBER	
CONTACT NAME	

DISTRIBUTOR INFORMATION				
STATE LICENSE #		DRIVER'S NAME		
BUSINESS NAME		CA DRIVER'S LICENSE#		
STREET ADDRESS		VEHICLE MAKE		
CITY, STATE, ZIP		VEHICLE MODEL		
PHONE NUMBER		VEHICLE LIC. PLATE #		
CONTACT NAME		ACTUAL DATE AND TIME OF ARRIVAL	/ /	☐ AM ☐ PM

PRODUCT SHIPPED DETAILS

SHIPPER COMPLETES ALL THE UNSHADED COLUMNS BELOW. RECEIVER COMPLETES ONLY THE SHADED COLUMNS BELOW

(Please attach additional pages, if needed)

UID TAG NUMBER (IF APPLICABLE)	ITEM NAME AND PRODUCT DESCRIPTION (INCLUDE WEIGHT OR COUNT)	QTY ORDERED	QTY REC'D	UNIT COST	TOTAL COST	RETAIL ONLY	
						UNIT RETAIL VALUE	TOTAL RETAIL VALUE
1A4060300002FBB000001869	Synergy De-stemmed Comp (Frozen)	5322					
1A4060300002FBB000001414	Frozen Synergy (Fresh Cannabis Plant)	26,844					
1A4060300002FBB000001875	Destemmed COMP Canteloupe Haze	126					

PRODUCT REJECTION

IF PRODUCTS ARE REJECTED, PLEASE CIRCLE THE ITEMS BEING REJECTED IN THE PRODUCT SHIPPED DETAILS SECTION ABOVE

REASON FOR REJECTION:	

PRODUCT RECEIPT CONFIRMATION

I CONFIRM THAT THE CONTENTS OF THIS SHIPMENT MATCH IN WEIGHT AND COUNT AS INDICATED ABOVE.
I AGREE TO TAKE CUSTODY OF ALL ITEMS AS INDICATED RECEIVED ABOVE – AND WHICH ARE NOT CIRCLED.
THE PRODUCTS CIRCLED ABOVE ARE REJECTED FOR DELIVERY AND REMAIN IN THE CUSTODY OF THE DISTRIBUTOR FOR RETURN TO THE SHIPPER AS INDICATED ON THIS FORM AND ALL ATTACHED PRODUCT DETAILS SHEET(S).

NAME OF PERSON RECEIVING AND/OR REJECTING PRODUCT:		PHONE NUMBER:	
SIGNATURE OF PERSON RECEIVING AND/OR REJECTING PRODUCT:		DATE SIGNED:	

Steep Hill California
1005 PARKER STREET BERKELEY CA 94710
L CENSE # C8 18 0000044 TEMP

CERTIFICATE OF ANALYSIS

Samp e Name:	B rthday Cake
Steep H ID:	BK69696
Batch ID:	HAYDEN 01
State ID:	SHBK00372
C ass f cat on:	Inha ab e - Non-Ed b e
Samp e Type:	F ower
Samp e We ght:	14.39 grams
Batch We ght:	8.1 pounds

Date Co ected:	7/1/2019
Date Rece ved:	7/1/2019
Date Reported:	7/10/2019
Customer:	Justice CC

OVERALL BATCH SUMMARY: PASS

Cannab no ds	Res dua Pest c des	M crob a Impur t es	Mycotox ns	Heavy Meta s	Water Act v ty	Res dua So vents	Fore gn Mater a
N/A	Pass	Pass	Pass	Pass	Pass	NT	Pass

Cannabinoid Results – Standard Potency **7/2/2019**

Standard potency ana ys s ut z ng H gh Performance L qu d Chromatography w th Photo D ode Array Detector (HPLC-PDA; SOP-068)

Analyte	%	mg/g	% (Dry)	mg/g (Dry)	LOD mg/g	LOQ mg/g
CBD	ND	ND	ND	ND	0.021	0.069
CBDA	0.023	0.23	0.026	0.26	0.058	0.193
CBG	0.187	1.87	0.21	2.1	0.030	0.100
CBN	ND	ND	ND	ND	0.041	0.135
THC	0.66	6.6	0.73	7.3	0.064	0.21
THCA	17.6	176	19.6	196	0.099	0.33
Tota	18.5	185	21	210		

Total THC	Total CBD
16.1 %	0.020 %
161 mg/g	0.20 mg/g
17.9 % (Dry)	0.022 % (Dry)
179 mg/g (Dry)	0.22 mg/g (Dry)

Cannabinoid Results – Extended Cannabinoids NT

Standard potency ana ys s ut z ng H gh Performance L qu d Chromatography w th Photo D ode Array Detector (HPLC-PDA; SOP-068)

Analyte	%	mg/g	% (Dry)	mg/g (Dry)	LOD mg/g	LOQ mg/g
CBC	NT	NT	NT	NT	NT	NT
CBCA	NT	NT	NT	NT	NT	NT
CBD	NT	NT	NT	NT	NT	NT
CBDA	NT	NT	NT	NT	NT	NT
CBDV	NT	NT	NT	NT	NT	NT
CBDVA	NT	NT	NT	NT	NT	NT
CBG	NT	NT	NT	NT	NT	NT
CBGA	NT	NT	NT	NT	NT	NT
CBLA	NT	NT	NT	NT	NT	NT
CBN	NT	NT	NT	NT	NT	NT
CBNA	NT	NT	NT	NT	NT	NT
THC	NT	NT	NT	NT	NT	NT
Δ8-THC	NT	NT	NT	NT	NT	NT
THCA	NT	NT	NT	NT	NT	NT
THCV	NT	NT	NT	NT	NT	NT
THCVA	NT	NT	NT	NT	NT	NT
Tota	NT	NT	NT	NT	NT	NT

Amy Goodwin Ph D
Laboratory Director
Date 7/10/2019

All LQC samples were per ormed and met acceptance criteria as required by § 5730 o the Bureau o Cannabis Control Cali ornia Code o Regulations, itle 16, Division 42 he ollowing results relate only to the samples tested and or the speci ic tests conducted Steep Hill grants permission to reproduce this document in ull only

CERT F CATE # BK69696
REV S ON # BK69696 1

Steep Hill California
1005 PARKER STREET BERKELEY CA 94710
L CENSE # C8 18 0000044 TEMP

CERTIFICATE OF ANALYSIS

Residual Pesticides Results **Pass** **7/10/2019**

Res dua pest c de ana ys s ut z ng L qu d and Gas Chromatography – Mass Spectrometry (LC-MSMS + GC-MSMS; SOP-070 + SOP-080) - **Limit units: µg/g**

Analyte	Pass/Fail	µg/g	Limit	LOD µg/g	LOQ µg/g	Analyte	Pass/Fail	µg/g	Limit	LOD µg/g	LOQ µg/g
Abamect n	Pass	ND	0.1	0.0184	0.061	F ud oxon	Pass	ND	0.1	0.0039	0.0129
Acephate	Pass	ND	0.1	0.0039	0.0131	Hexyth azox	Pass	ND	0.1	0.0035	0.0118
Acequ nocy	Pass	ND	0.1	0.0105	0.035	Imaza	Pass	ND	ND	0.0099	0.033
Acetam pr d	Pass	ND	0.1	0.0039	0.0131	Im dac opr d	Pass	ND	5	0.0036	0.0120
A d carb	Pass	ND	ND	0.0038	0.0125	Kresox m-methy	Pass	ND	0.1	0.0035	0.0118
Azoxystrob n	Pass	ND	0.1	0.0039	0.0129	Ma ath on	Pass	ND	0.5	0.0035	0.0118
B fenazate	Pass	ND	0.1	0.0039	0.0129	Meta axy	Pass	ND	2	0.0035	0.0118
B fenthr n	Pass	ND	3	0.0039	0.0129	Meth ocarb	Pass	ND	ND	0.0037	0.0124
Bosca d	Pass	ND	0.1	0.0039	0.0129	Methomy	Pass	ND	1	0.0035	0.0118
Captan	Pass	ND	0.7	0.092	0.31	Methy Parath on	Pass	ND	ND	0.024	0.081
Carbary	Pass	ND	0.5	0.0039	0.0129	Mev nphos	Pass	ND	ND	0.00191	0.0064
Carbofuran	Pass	ND	ND	0.0038	0.0125	Myc obutan	Pass	ND	0.1	0.0035	0.0118
Ch orantran pro e	Pass	ND	10	0.0039	0.0129	Na ed	Pass	ND	0.1	0.0036	0.0120
Ch ordane	Pass	ND	ND	0.0150	0.050	Oxamy	Pass	ND	0.5	0.0036	0.0120
Ch orfenapyr	Pass	ND	ND	0.024	0.081	Pac obutrazo	Pass	ND	ND	0.0097	0.032
Ch orpyr fos	Pass	ND	ND	0.023	0.078	Pentach oron trobenzene	Pass	ND	0.1	0.024	0.079
C ofentez ne	Pass	ND	0.1	0.0039	0.0129	Permethr n	Pass	ND	0.5	0.020	0.068
Coumaphos	Pass	ND	ND	0.0037	0.0124	Phosmet	Pass	ND	0.1	0.0035	0.0116
Cyf uthr n	Pass	ND	2	0.092	0.30	P perony Butox de	Pass	ND	3	0.0035	0.0118
Cypermethr n	Pass	ND	1	0.094	0.31	Pra ethr n	Pass	ND	0.1	0.023	0.075
Dam noz de	Pass	ND	ND	0.024	0.078	Prop conazo e	Pass	ND	0.1	0.0035	0.0118
D az non	Pass	ND	0.1	0.0039	0.0131	Propoxur	Pass	ND	ND	0.0037	0.0122
D ch orvos	Pass	ND	ND	0.0037	0.0124	Pyrethr ns	Pass	ND	0.5	0.023	0.075
D methoate	Pass	ND	ND	0.0037	0.0124	Pyr daben	Pass	ND	0.1	0.0035	0.0118
D methomorph	Pass	ND	2	0.0024	0.0080	Sp netoram	Pass	ND	0.1	0.0027	0.0089
Ethoprophos	Pass	ND	ND	0.0037	0.0122	Sp nosad	Pass	ND	0.1	0.0035	0.0116
Etofenprox	Pass	ND	ND	0.0037	0.0124	Sp romes fen	Pass	ND	0.1	0.023	0.075
Etoxazo e	Pass	ND	0.1	0.0039	0.0131	Sp rotetramat	Pass	ND	0.1	0.0035	0.0118
Fenhexam d	Pass	ND	0.1	0.0039	0.0131	Sp roxam ne	Pass	ND	ND	0.0037	0.0124
Fenoxycarb	Pass	ND	ND	0.0037	0.0122	Tebuconazo e	Pass	ND	0.1	0.0035	0.0118
Fenpyrox mate	Pass	ND	0.1	0.0039	0.0131	Th ac opr d	Pass	ND	ND	0.0037	0.0124
F pron	Pass	ND	ND	0.0037	0.0122	Th amethoxam	Pass	ND	5	0.0035	0.0118
F on cam d	Pass	ND	0.1	0.0039	0.0129	Tr f oxystrob n	Pass	ND	0.1	0.0035	0.0118

Microbial Impurities Results **Pass** **7/4/2019**

M crob o og ca screen ng ut z ng Pathogen Dx. (PDX; SOP-076)

Analyte	Pass/Fail	Result	Limit	LOQ
Asperg us f avus	Pass	ND	ND	Not Detected n 1 gram
Asperg us fum gatus	Pass	ND	ND	Not Detected n 1 gram
Asperg us n ger	Pass	ND	ND	Not Detected n 1 gram
Asperg us terreus	Pass	ND	ND	Not Detected n 1 gram
E. co (STEC)	Pass	ND	ND	Not Detected n 1 gram
Sa mone a	Pass	ND	ND	Not Detected n 1 gram

Mycotoxin Results **Pass** **7/9/2019**

Mycotox n ana ys s ut z ng L qu d Chromatography – Mass Spectrometry (LC-MSMS; SOP-070) - **Limit units: µg/kg**

Analyte	Pass/Fail	µg/kg	Limit	LOD µg/kg	LOQ µg/kg
Af atox n B1		ND		0.93	3.1
Af atox n B2		ND		0.93	3.1
Af atox n G1		ND		0.93	3.1
Af atox n G2		ND		0.93	3.1
Ochratox n A	Pass	ND	20	2.3	7.6
Tota Af atox ns	Pass	ND	20	0.93	3.1

Amy Goodwin Ph D
Laboratory Director
Date 7/10/2019

All LQC samples were per ormed and met acceptance criteria as required by § 5730 o the Bureau o Cannabis Control Cali ornia Code o Regulations, itle 16, Division 42 he ollowing results relate only to the samples tested and or the speci ic tests conducted Steep Hill grants permission to reproduce this document in ull only

CERT F CATE # BK69696
REV S ON # BK69696 1

Regulatory Compliance Testing

Steep Hill California
1005 PARKER STREET BERKELEY CA 94710
L CENSE # C8 18 0000044 TEMP

CERTIFICATE OF ANALYSIS

Heavy Metals Results **Pass** **7/10/2019**

Heavy meta s ana ys s ut z ng Induct ve y Coup ed P asma Mass Spectrometry (ICP-MS; SOP-072) - **Limit units: µg/g**

Analyte	Pass/Fail	µg/g	Limit	LOD µg/g	LOQ µg/g
Arsen c	Pass	0.190	0.2	0.0048	0.0146
Cadm um	Pass	0.038	0.2	0.00050	0.00152
Lead	Pass	ND	0.5	0.038	0.114
Mercury	Pass	0.0071	0.1	0.0022	0.0067

Moisture Results **7/2/2019**

Mo sture content ana ys s ut z ng Mo sture Ba ance (MB; SOP-055)

Analyte	%
Mo sture	10.09

Water Activity Results **Pass** **7/2/2019**

Water Act v ty ana ys s ut z ng Water Act v ty Meter (WAM; SOP-090) - **Limit units: Aw**

Analyte	Pass/Fail	Aw	Limit
Water Act v ty	Pass	0.55	0.65

Residual Solvents Results NT

Res dua so vents and process ng chem ca s ana ys s ut z ng Headspace Gas Chromatography – Mass Spectrometry (HS-GC-MS; SOP-010) - **Limit units: µg/g**

Analyte	Pass/Fail	µg/g	Limit	LOD µg/g	LOQ µg/g	Analyte	Pass/Fail	µg/g	Limit	LOD µg/g	LOQ µg/g
1,2 D ch oroethane		NT	NT	NT	NT	n-Heptane		NT	NT	NT	NT
Acetone		NT	NT	NT	NT	n-Hexane		NT	NT	NT	NT
Aceton tr e		NT	NT	NT	NT	Isopropano		NT	NT	NT	NT
Benzene		NT	NT	NT	NT	Methano		NT	NT	NT	NT
n-Butane		NT	NT	NT	NT	Methy ene Ch or de		NT	NT	NT	NT
Ch oroform		NT	NT	NT	NT	n-Pentane		NT	NT	NT	NT
Ethano		NT	NT	NT	NT	Propane		NT	NT	NT	NT
Ethy Acetate		NT	NT	NT	NT	To uene		NT	NT	NT	NT
Ethy Ether		NT	NT	NT	NT	Tota Xy enes		NT	NT	NT	NT
Ethy ene Ox de		NT	NT	NT	NT	Tr ch oroethy ene		NT	NT	NT	NT

Terpenoid Results - Standard Terpenes NT

Standard terpene ana ys s ut z ng Gas Chromatography – Mass Spectrometry (GC-MS; SOP-069)

Analyte	%	mg/g	LOD mg/g	LOQ mg/g	Analyte	%	mg/g	LOD mg/g	LOQ mg/g
Caryophy ene Ox de	NT	NT	NT	NT	Phyto 1	NT	NT	NT	NT
β-Caryophy ene	NT	NT	NT	NT	Phyto 2	NT	NT	NT	NT
C trone o	NT	NT	NT	NT	α-P nene	NT	NT	NT	NT
α-Humu ene	NT	NT	NT	NT	β-P nene	NT	NT	NT	NT
L monene	NT	NT	NT	NT	Terp no ene	NT	NT	NT	NT
L na oo	NT	NT	NT	NT	Tota	NT	NT	NT	NT
β-Myrcene	NT	NT	NT	NT					

Amy Goodwin Ph D
Laboratory Director
Date 7/10/2019

All LQC samples were per ormed and met acceptance criteria as required by § 5730 o the Bureau o Cannabis Control Cali ornia Code o Regulations, itle 16, Division 42 he ollowing results relate only to the samples tested and or the speci ic tests conducted Steep Hill grants permission to reproduce this document in ull only

CERT F CATE # BK69696
REV S ON # BK69696 1

Steep Hill California
1005 PARKER STREET BERKELEY CA 94710
L CENSE # C8 18 0000044 TEMP

CERTIFICATE OF ANALYSIS

Terpenoid Results - Extended Terpenes NT

Extended terpene ana ys s ut z ng Gas Chromatography – Mass Spectrometry (GC-MS; SOP-069)

Analyte	%	mg/g	LOD mg/g	LOQ mg/g	Analyte	%	mg/g	LOD mg/g	LOQ mg/g
α-B sabo o	NT	NT	NT	NT	L na oo	NT	NT	NT	NT
endo-Borneo	NT	NT	NT	NT	Mentho	NT	NT	NT	NT
Camphene	NT	NT	NT	NT	β-Myrcene	NT	NT	NT	NT
Camphor	NT	NT	NT	NT	Nero	NT	NT	NT	NT
3-Carene	NT	NT	NT	NT	c s-Nero do	NT	NT	NT	NT
Caryophy ene Ox de	NT	NT	NT	NT	trans-Nero do	NT	NT	NT	NT
β-Caryophy ene	NT	NT	NT	NT	c s-β-Oc mene	NT	NT	NT	NT
α-Cedrene	NT	NT	NT	NT	trans-β-Oc mene	NT	NT	NT	NT
Cedro	NT	NT	NT	NT	α-Phe andrene	NT	NT	NT	NT
C trone o	NT	NT	NT	NT	Phyto 1	NT	NT	NT	NT
Euca ypto	NT	NT	NT	NT	Phyto 2	NT	NT	NT	NT
α-Farnesene	NT	NT	NT	NT	α-P nene	NT	NT	NT	NT
β-Farnesene	NT	NT	NT	NT	β-P nene	NT	NT	NT	NT
Fencho	NT	NT	NT	NT	Pu egone	NT	NT	NT	NT
Fenchone	NT	NT	NT	NT	Sab nene	NT	NT	NT	NT
Geran o	NT	NT	NT	NT	Sab nene Hydrate	NT	NT	NT	NT
Gerany Acetate	NT	NT	NT	NT	α-Terp nene	NT	NT	NT	NT
Gua o	NT	NT	NT	NT	γ-Terp nene	NT	NT	NT	NT
α-Humu ene	NT	NT	NT	NT	α-Terp neo	NT	NT	NT	NT
Isoborneo	NT	NT	NT	NT	Terp no ene	NT	NT	NT	NT
Isopu ego	NT	NT	NT	NT	Va encene	NT	NT	NT	NT
L monene	NT	NT	NT	NT	Tota	NT	NT	NT	NT

Foreign Material Results **Pass** **7/2/2019**

Fore gn mater a ana ys s ut z ng v sua nspect on (SOP-057)

Analyte	Pass/Fail
V sua Inspect on	Pass

LOD: L m t of Detect on
LOQ: L m t of Quant tat on
NT: Not Tested
ND: Not Detected
LQC: Laboratory Qua ty Contro

Amy Goodwin Ph D
Laboratory Director
Date 7/10/2019

All LQC samples were per ormed and met acceptance criteria as required by § 5730 o the Bureau o Cannabis Control Cali ornia Code o Regulations, itle 16, Division 42 he ollowing results relate only to the samples tested and or the speci ic tests conducted Steep Hill grants permission to reproduce this document in ull only

CERT F CATE # BK69696
REV S ON # BK69696 1

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 40 – Contamination and Recall Plan

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

Our company was formed by Alabama residents who have partnered with a very successful national cannabis company licensed and operating in multiple medical cannabis markets. As a cannabis company with experience in various highly regulated medical states, we have developed a thorough and meticulous contamination and recall plan and procedure.

This is the recall plan for our company. This plan does not address recall provisions related to non-cannabis products. This plan will be periodically updated and evaluated by the Commission. In the event of a medical cannabis safety issue related to our products, the Facility will protect the public health by efficiently identifying and removing unsafe medical cannabis from the distribution chain and informing consumers of potentially hazardous medical cannabis in the marketplace. This plan will be tested annually through a mock recall event to ensure it functions effectively.

40.1 Provisions for Notifying Originating Producers

[redacted]

[redacted]

40.2 Factors that Necessitate a Recall

[redacted]

40.3 Responsible Positions

The roles and responsibilities of each Recall Team member are as follows:

Recall Team Leader – has the ultimate authority to make the decision to initiate a recall, make critical decisions quickly, and designate team members as needed.

Recall Team Coordinator – oversees the complaint investigation and the traceback process and coordinates the recall team to address the issues at hand.

Government Liaison – contacts the regulatory agencies, is knowledgeable about the Facility's traceability procedures, and is prepared to provide the necessary information, as well as able to access related records and documents.

Media/Customer Spokesperson – disseminates information about the recall to the media and customers, and handles press releases, social media, etc.

Legal Counsel – provides legal advice in the event of a recall or medical cannabis safety event, is familiar with the Facility, and has reviewed this recall plan.

Insurance Agent – provides information relating to insurance coverage. The Recall team meets at least quarterly to review complaints, if any, and assess the teams' readiness to meet the demands of a statewide recall.

40.4 Notification Protocols

[redacted]

[redacted]

notifications, and press release (Appendix I).

[redacted]

[redacted]

40.5 Processes to Ensure all Recalled Product is Returned

[redacted]

[redacted]

40.6 Processes to Report to Commission and Regulators

[redacted]

[redacted]

40.7 Steps Taken to Avoid Further Contamination

The Facility will retain evidence of all communications. We will record all [redacted].

40.8 Investigation and Analysis

[redacted]

Appendix E: Customer Complaint Intake Form

[redacted]

Appendix G: Health Hazard Evaluation Questionnaire

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 41 – Marketing and Advertising Plan

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

__Jon Loevy_____	**__Co-owner_____**
Printed Name of Verifying Individual	**Title of Verifying Individual**
__/s/ Jon Loevy __	**___3/22/23_____**
Signature of Verifying Individual	**Verification Date**

[redacted]s mission is to produce and distribute medical cannabis products for therapeutic purposes. Our marketing plan is a direct reflection of our dedication to our mission of being stewards of this healing plant and our ability to produce clean, high quality medical cannabis products. By marketing the educational and research materials surrounding the efficacy of the medical cannabis plant, we inform our patient population and support our patients in making effective choices for their overall wellness. To increase knowledge about our products and services, we will focus our advertising on local markets, specifically the state of Alabama and thereby all regulatory requirements the state has set forth. We consider ourselves partners with the Alabama Medical Cannabis Commission as our mutual success is imperative to ensuring public safety and the successful roll out of the state's medical cannabis program.

For our marketing purposes, advertisement means any written or verbal statement, illustration, or depiction created to induce patient response and thereby sales through the use of, or a combination of letters, pictures, objects, sounds, lighting effects, illustrations, or other similar means. We understand that the Alabama Medical Cannabis Commission, the "Commission", has a compelling interest in ensuring that any advertising or marketing campaign related to or involving medical cannabis does not encourage, promote, or otherwise create any impression that cannabis is legal, therapeutic, or beneficial, except as specifically authorized by the Act.

Therefore, we will not use a name, logo, sign, advertisement, or other marketing campaign or program without first having submitted it to the Commission for approval and having paid the applicable advertisement fee. Prior to initiating a marketing campaign or launching a new product, our company will seek approval from the Commission. When submitting an advertisement proposal to the commission we will include the following information to the extent possible: the name, logo, sign, advertisement or other marketing campaign or program proposed for use; a brief description of the format, medium, and length of the distribution. In addition to a verification attestation that an actual patient is not being used on the advertisement. We will also submit verification that an official translation of a foreign language advertisement is accurate and include a final copy of the advertisement, including a video where applicable, in a format acceptable to the

Commission.

No advertisement of medical cannabis or any related product will be proposed that would be within 500 feet of the perimeter of a prohibited facility or any business or organization where, in the opinion of the Commission, the placement of the advertisement targets or is attractive to minors.

Including on a billboard, on a radio or television broadcast, including a system for transmitting visual images and sound that are reproduced on screens. Which will include broadcasts, cable, on-demand, satellite, cinema, social media, or another internet-based platform. We will also not produce advertisements that on any handheld or other portable sign.

With respect to public places, no advertisements will be placed on a brochure, handbill, pamphlet, leaflet, or flyer directly handed, deposited, fastened, thrown, scattered, cast, or otherwise distributed to any person. Nor will these advertisements ever be left upon any private property without the consent of the property owners.

Advertisements will not be placed on a vehicle, public transit vehicle, or public transit shelter. Nor will they be placed on or in a publicly owned or operated property such as a park, community center or recreation center.

Our name, logo, sign, advertisements or other marketing campaign or program will not include reference to or be accompanied by any image bearing a resemblance to a cartoon character or of any individual (actual or fictional), nor more than 10% of whose audience is, or should be reasonably anticipated to be, composed of minors. Our marketing team will vet all proposals and ensure that thorough research is conducted prior to initiating graphic design renderings. Our marketing department will not produce, market, distribute, offer, sell, license or cause to be marketed, distributed, offered sold or licensed, any apparel or other merchandise related to the sale of medical cannabis. We will not suggest, by direct or indirect reference, a relationship to edibles, including candy, cookies, cakes, ice cream, or other edible products including beverages.

At no time we will include designs or other presentational effects that are commonly used to target minors.

No marketing materials, campaigns or advertisements will suggest or otherwise indicate that the product or entity in the advertisement has been approved or endorsed by the Commission, the State of Alabama or any person, entity or agency associated with the State of Alabama per Section 538-X-4-17(e). Further Justice Cannabis Co. will not advertise in a manner that is inconsistent with the medicinal and approved use of medical cannabis. Nor will we encourage the use of medical cannabis for a condition other than the state approved qualifying medical conditions.

The following conditions qualify for the therapeutic use of medical cannabis:

Autism	Cancer-related weight loss or chronic pain	Chron's Disease	Depression, epilepsy or condition causing seizures	HIV/AIDS-related nausea or weight loss
Panic Disorder	Parkinsons	Persistent nausea not related to pregnancy	PTSD	Sickle Cell
Spasticity associated with diseases including ALS, MS, and spinal cord injuries	Terminal illness	Tourette's	Chronic pain for which conventional therapies and opiates should not be used or are ineffective	

Our products, advertisements and educational materials will not contain any statement, design, representation, picture, or illustration that contains or communicates:

- False or misleading statements.

- Names other than the registered name of the licensee's registered business name or an approved d/b/a, or the registered name of medical cannabis or related products.
- A depiction of cannabis plants or any part thereof, except for signs, displays and marketing material provided inside a dispensing site, including but not limited to brochures or other written materials provided directly to patients and caregivers within the sales are of the dispensary.
- Slang terms and similar references, including words or depictions directly or indirectly referring to, unlicensed uses of cannabis.
- Disparagement of a competitor's products.
- Obscene, indecent, or profane statements or depictions; or
- Statements as to the safety or efficacy of medical marijuana, unless supported by substantial evidence or substantial clinical data.

Further, [redacted] will not display external signage larger than sixteen inches in height by eighteen inches in width that is not attached to our facility's permanent structure or vehicle.

We will develop a website specific to the Alabama market advertising the name, business address, contact information, and services provided. The website will require the user's affirmation that they are not a minor before access is granted to the homepage and menu. The website will not allow for direct engagement between or among consumers, nor consumer generated content. The website will not host consumer reviews or testimonials. However patient feedback will be shared with staff to encourage the enhancement of our patient care policies and procedures.

The website will not provide a medium for user to transmit website content to minors. Further it will not target a consumer group with a high likelihood of reaching or appealing to minors, for example Boy Scout Troupes, youth athletic teams or community recreation centers. All content will be submitted to the Commission prior to being posted, per paragraph 4 of Section 538 - X-4-.17(d). The website will not host or permit the

transaction business of the dispensary or otherwise facilitate a sales transaction to consumers or businesses. At no time will our website violate the rules prescribed in Section 538-X-4-.17 .7(a-f).

41.1 Proposed Logos, Branding, Messaging, and Advertising Communications

Patient education is a high priority at [redacted] and this is an area in which we have excelled. It forms the foundation of our messaging and advertising communications plan. With medical cannabis licenses in California, Massachusetts, New Jersey, Illinois, Pennsylvania, Missouri and Utah, we are led by a highly experienced team of cannabis professionals. Our team has already created a plethora of helpful educational materials for our patients and has successfully implemented policies and SOPs for patient education. Additionally, because our model is to employ pharmacists at our dispensaries/pharmacies (e.g., at our medical cannabis pharmacies in Edwardsville and Dixon City, Pennsylvania), our experience specifically includes patient education policies and procedures for our Medical Cannabis Pharmacy Agents ("MCPAs") and our Pharmacy Medical Providers ("PMPs").

Educating Patients and Designated Caregivers:

[redacted]

[redacted]

Patient Consultations:

[redacted]

[redacted]

[redacted]

Written & Verbal Care Instructions:

[redacted]

[redacted]

Additional Resources Under Development:

[redacted]

[redacted]

Substance Abuse and Addiction Support:

[redacted]

Safe Storage and Disposal of Medical Cannabis:

[redacted]

[redacted]

Accidental Ingestion of Medical Cannabis:

[redacted]

[redacted]

Providing Patients Up-to-Date Medical Research:

[redacted]

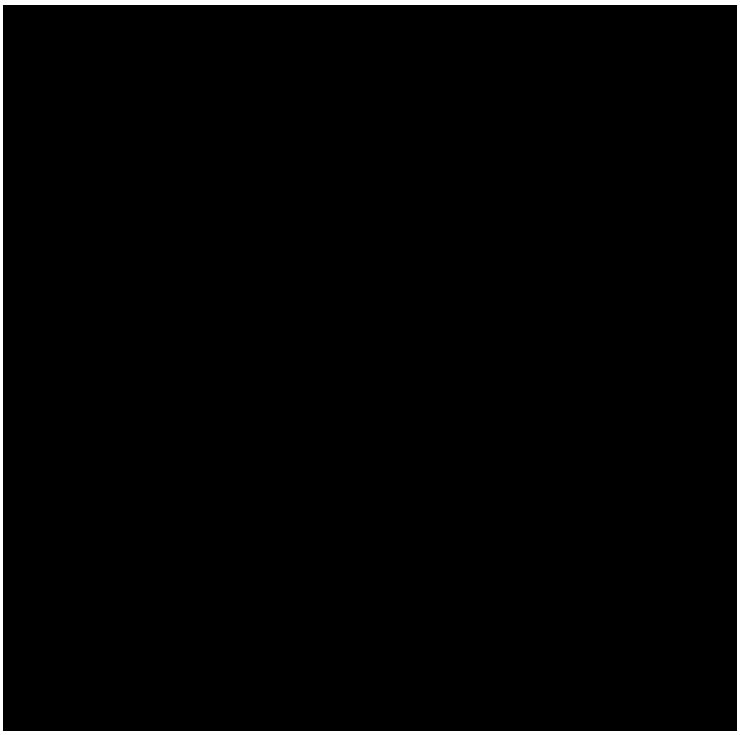
[redacted]

Our Written Educational Materials:

[redacted]

Logos

Examples of Use



41.2 Media Outlets and Platforms for Marketing & Advertising Campaigns

We will focus on digital and print media with national and local publications. Examples of national publications include Marijuana Business Daily, High Times, Weedmaps, Leafly and Media. Examples of local platforms include, but are not limited to, Citizen of East Alabama, the Montgomery Advertiser, the Montgomery Independent, the Alexander City Outlook, the Gadsden Times, and the Birmingham Medical News Magazine.

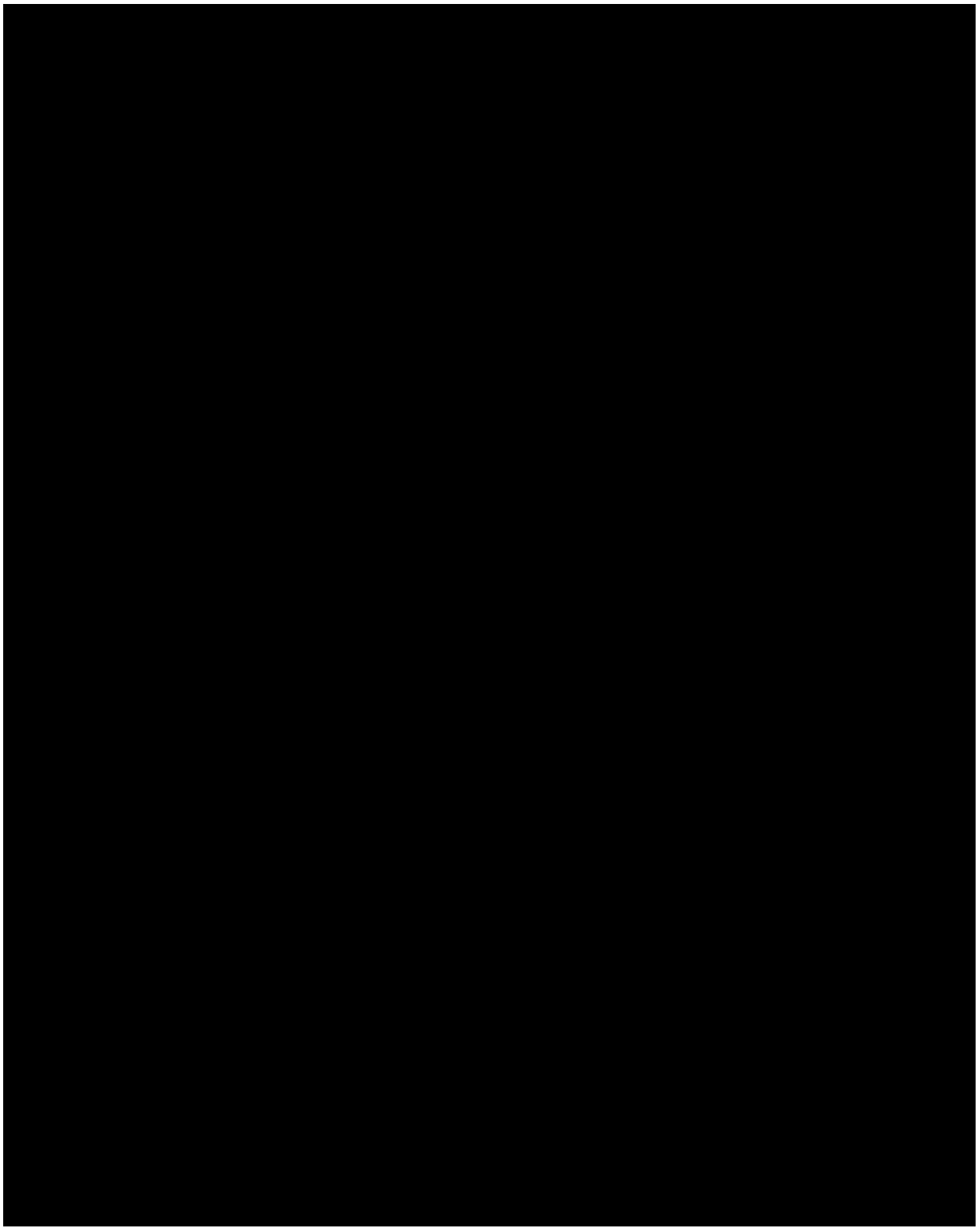
41.3 Media Outlets & Third Party Individuals Contracted to Provide Marketing Services

Our company has begun outreach to local media outlets in Alabama and other third parties to be in the best position to market when we win a license and begin operations. Some of these include the following in the markets we intend to serve:

41.4 Virtual Renderings of All Packaging to be Provided by the Applicant

Prior to the sale, distribution, or marketing of any medical cannabis products, proposed packaging and labeling will be submitted to the Commission for approval. The following page is an indication of the labeling that will be featured on the medical cannabis products. Justice Cannabis Co. has yet to develop products and packaging for the state of Alabama.

41.5 Exemplars of All Proposed Labeling



Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Exhibit 42 – Website and Social Media

Verification

The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/14/23**
Signature of Verifying Individual	**Verification Date**

42.1 – Sitemap

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

42.2 – Websites and Social Media Pages

Website

[redacted]

Social Media Pages

[redacted]

Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

Minority Ownership Documents

Verification

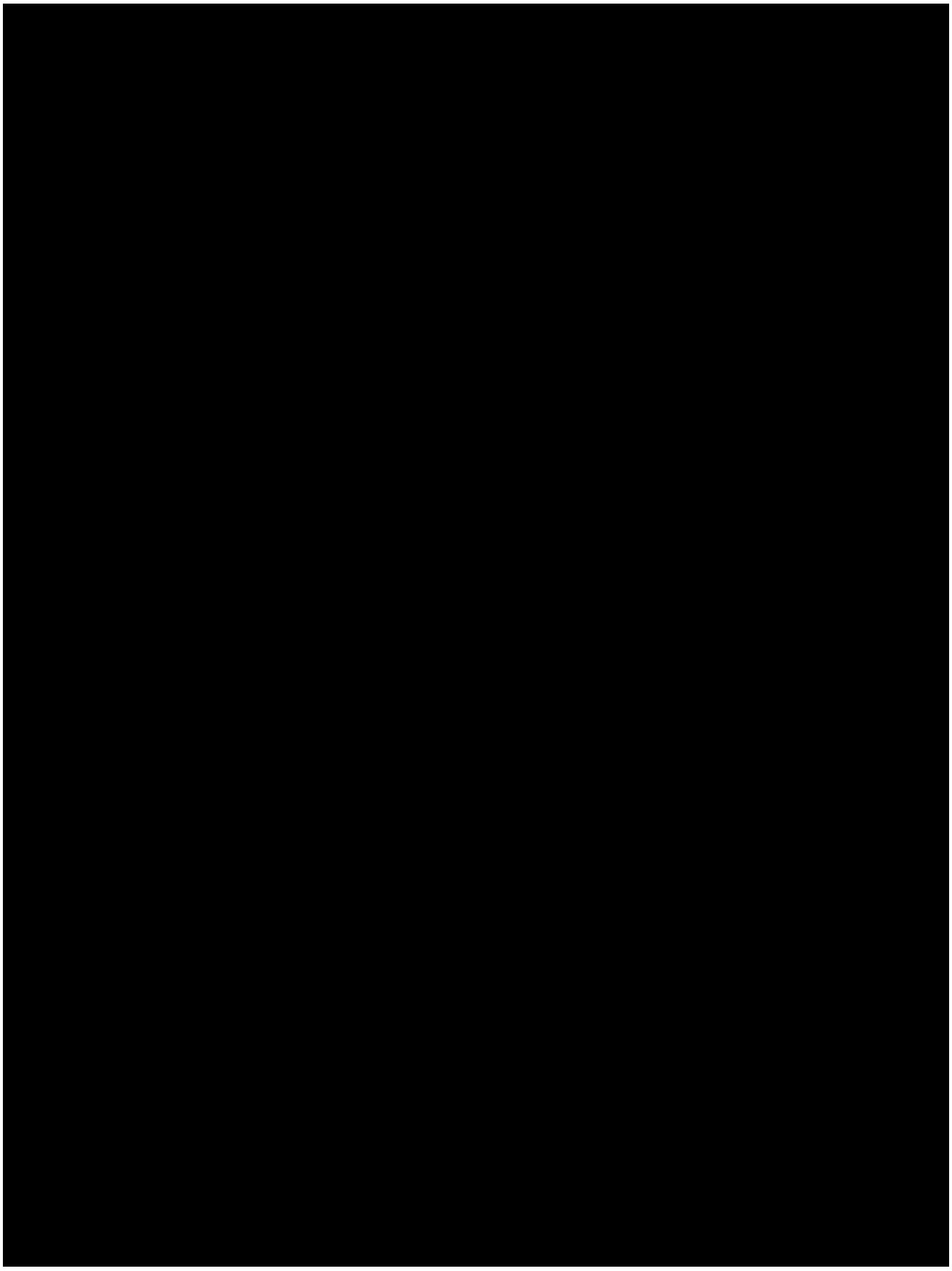
The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

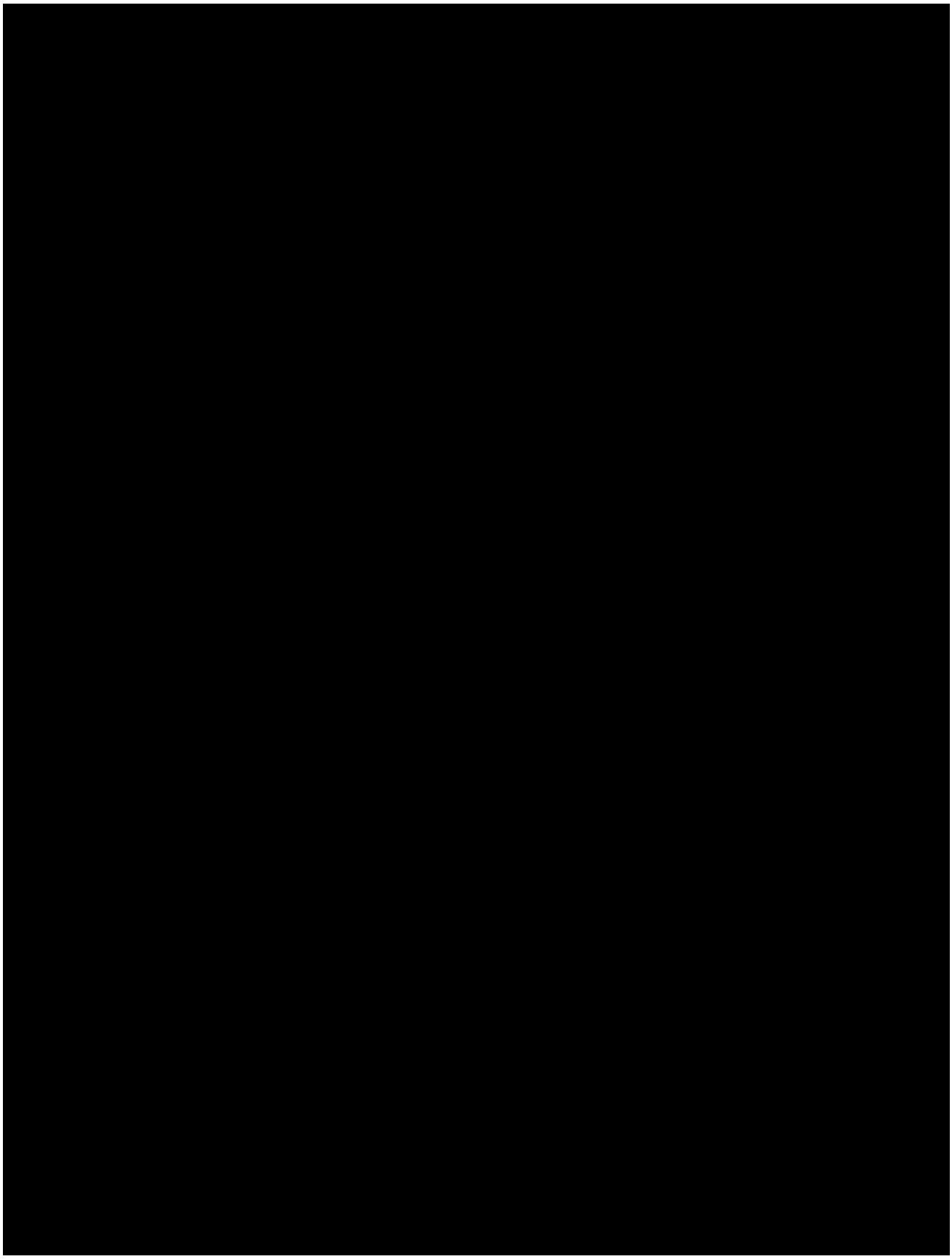
Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/22/23**
Signature of Verifying Individual	**Verification Date**

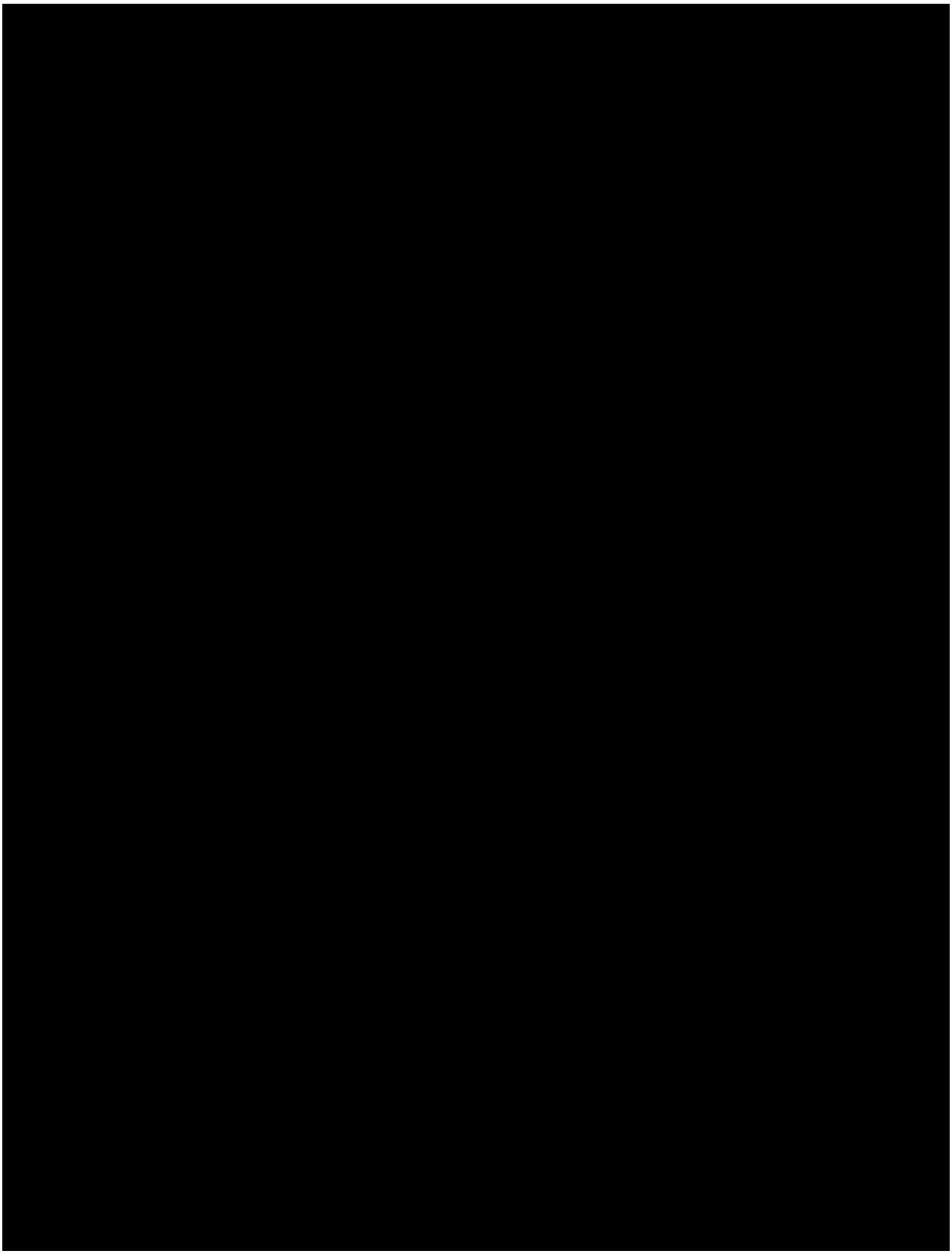
The Applicant qualifies as a minority owned business. 53% of the Applicant's ownership is by African American residents of the State of Alabama. The majority ownership is made up of the following:

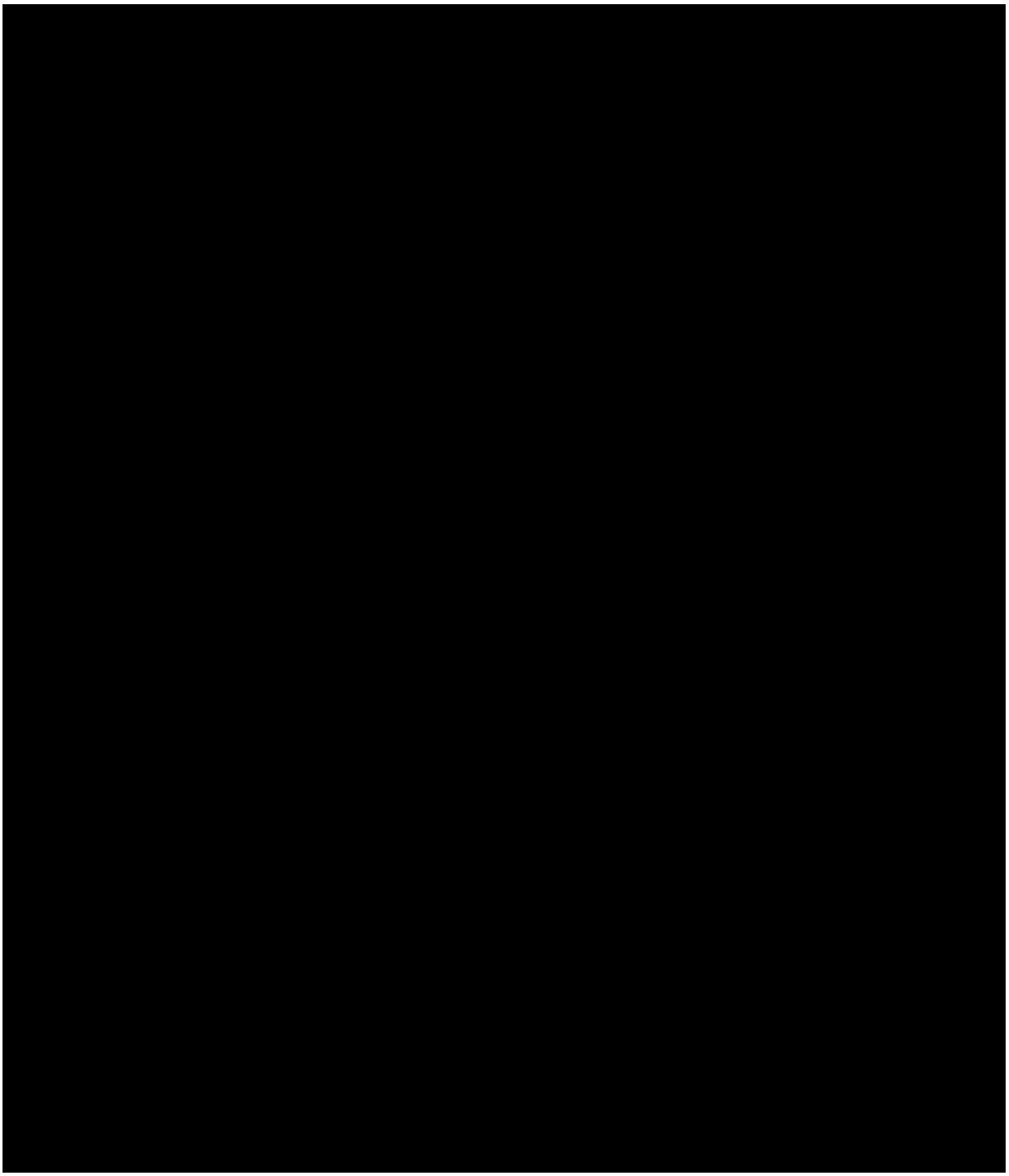
- [redacted] - 24.5% ownership
- [redacted] - 24.5% ownership
- [redacted] - 2% ownership
- [redacted] - 1% ownership
- [redacted] - 1% ownership

Please see the attached identification documents.









Redacted Copy

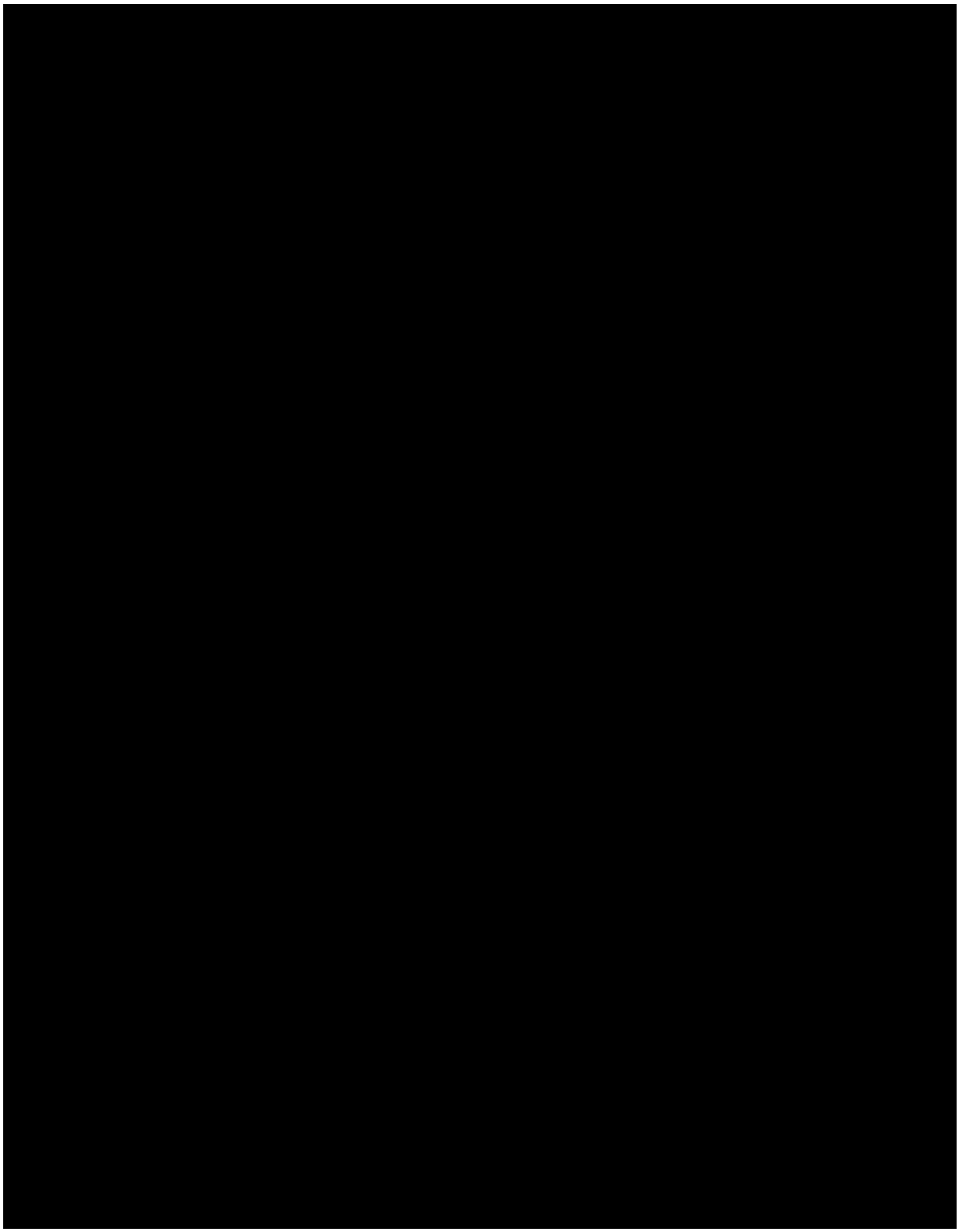
The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

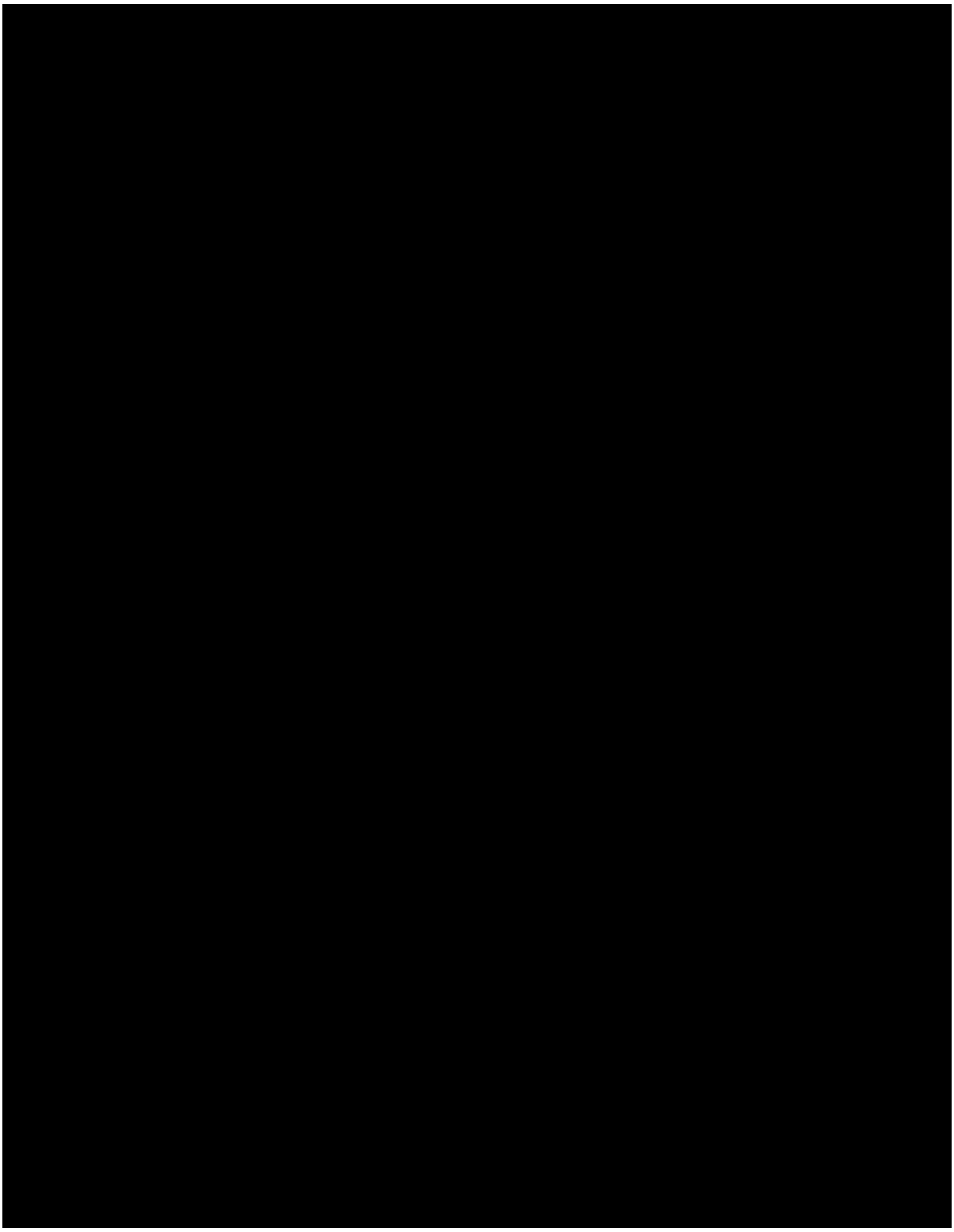
Proof of Minimum Liability and Casualty Insurance

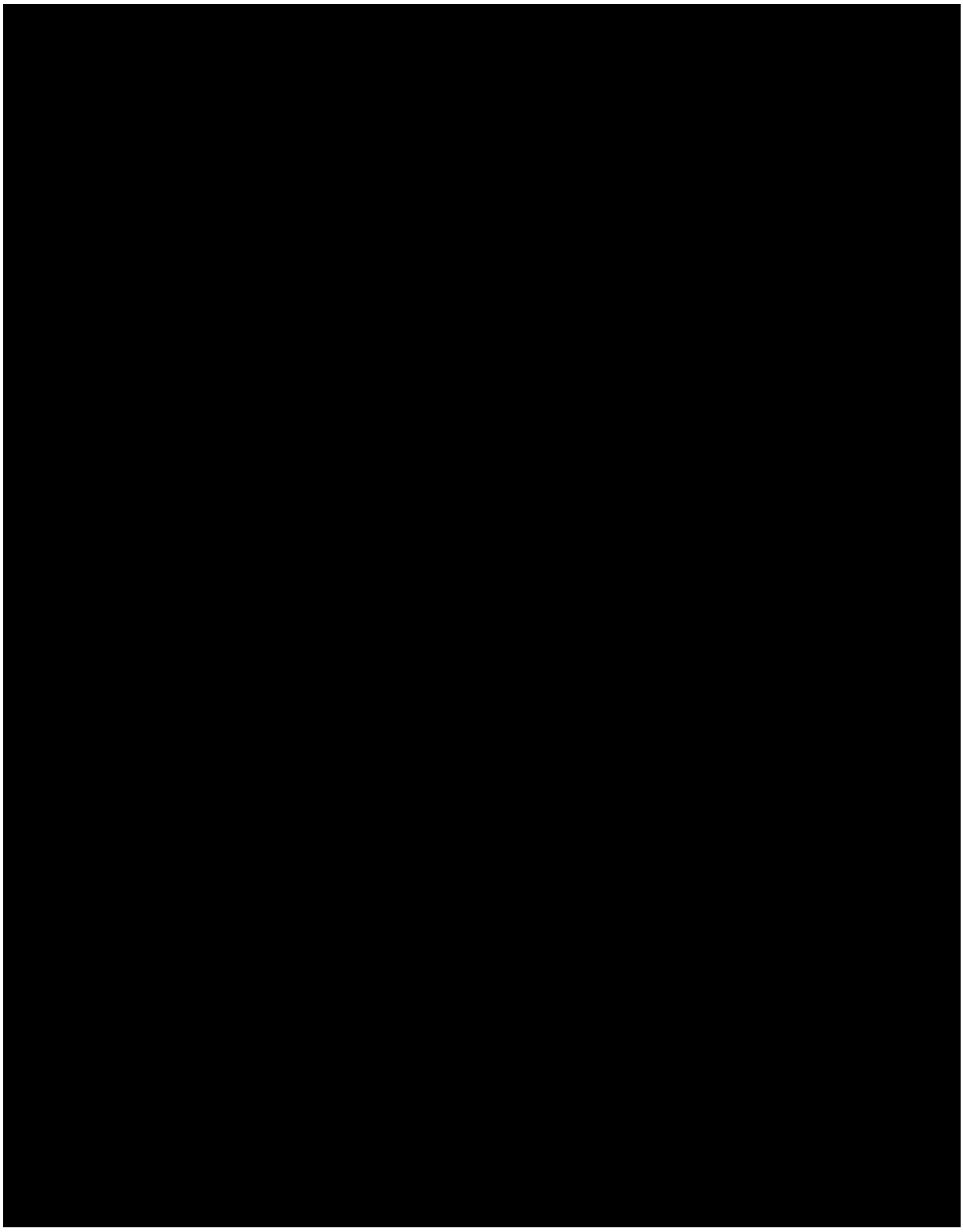
Verification

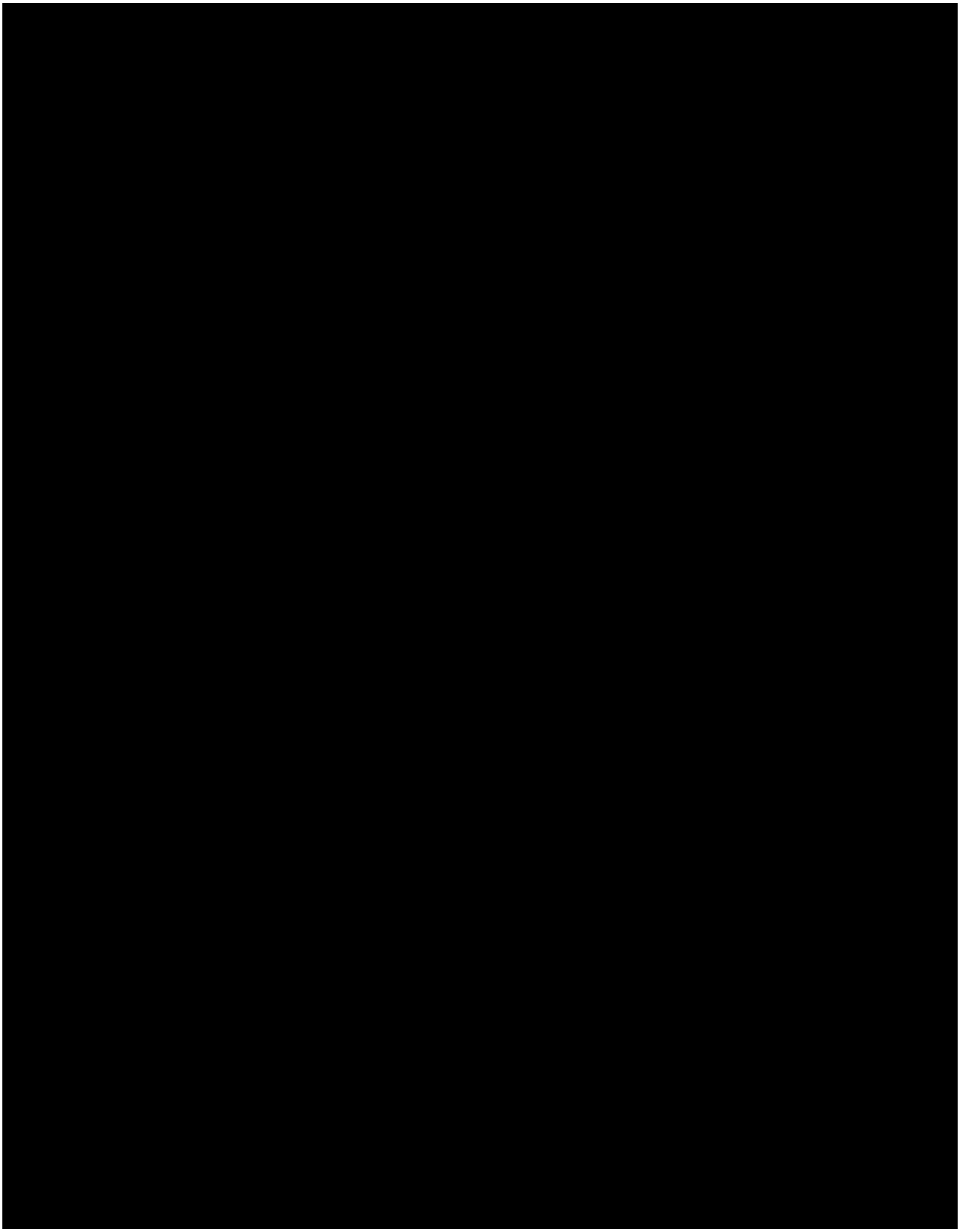
The undersigned verifies that the information contained in this Exhibit, including any attachments thereto, is accurate and complete, based on the best available information at the date of verification.

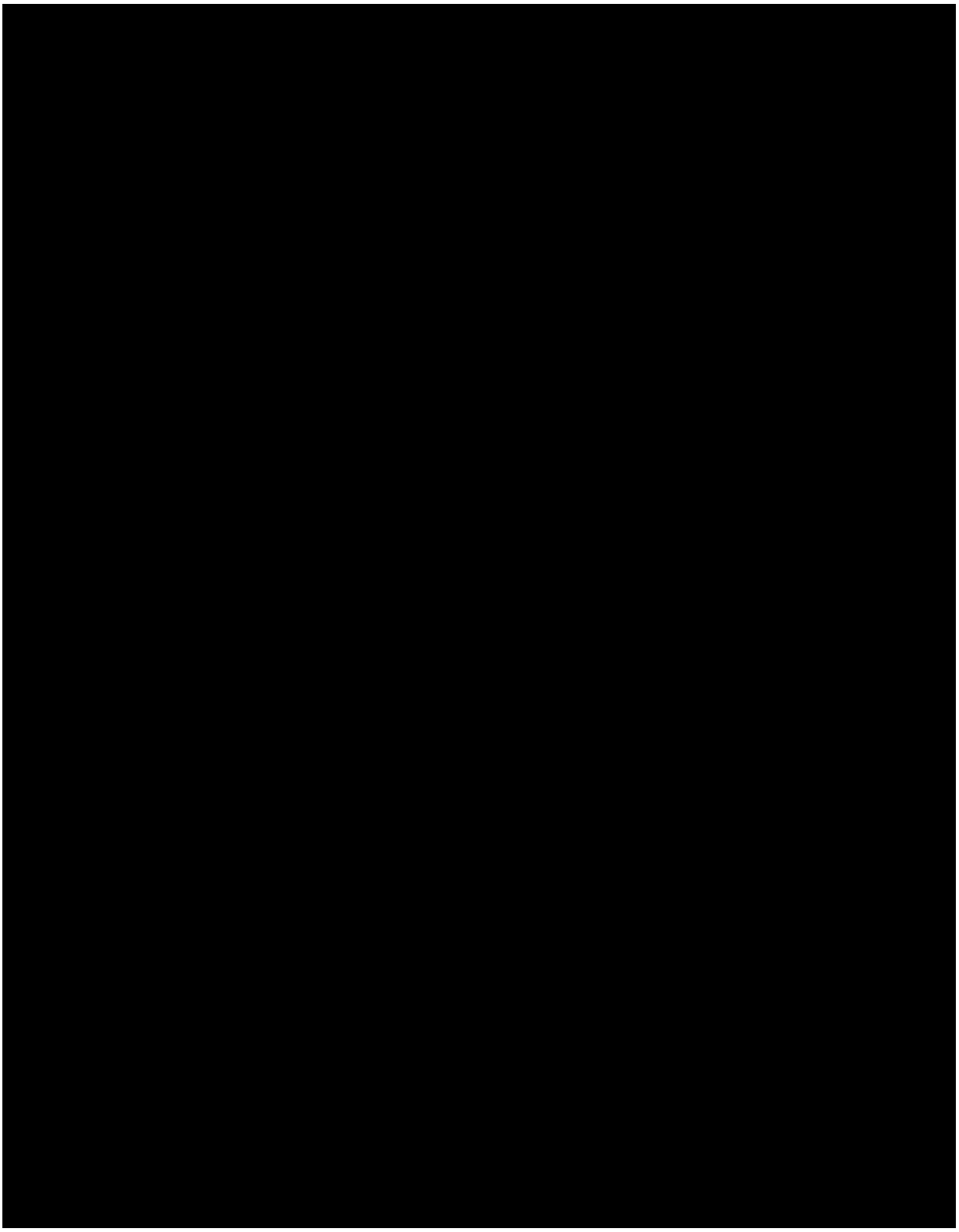
Jon Loevy	**Co-Owner**
Printed Name of Verifying Individual	**Title of Verifying Individual**
/s/ Jon Loevy	**3/23/23**
Signature of Verifying Individual	**Verification Date**

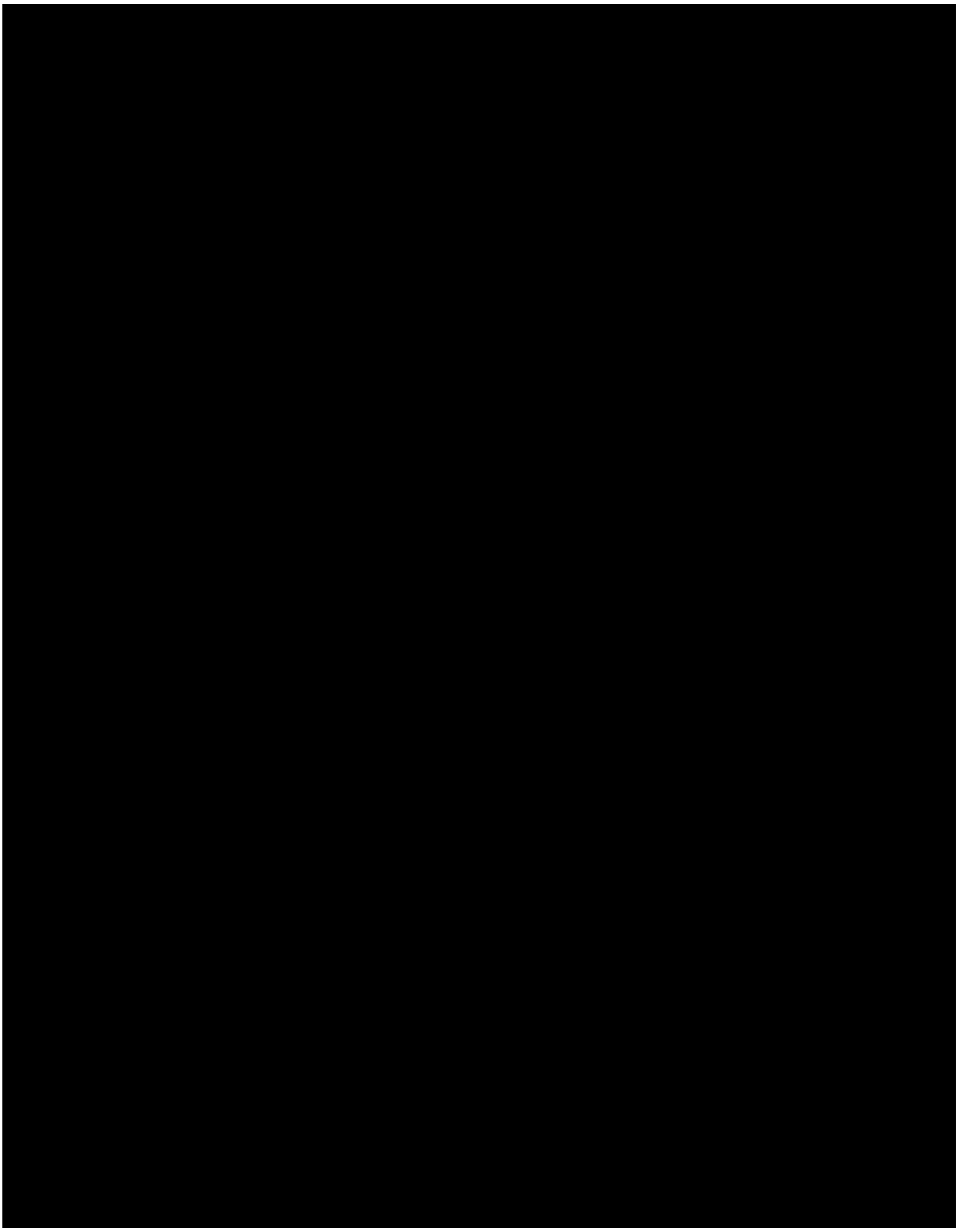


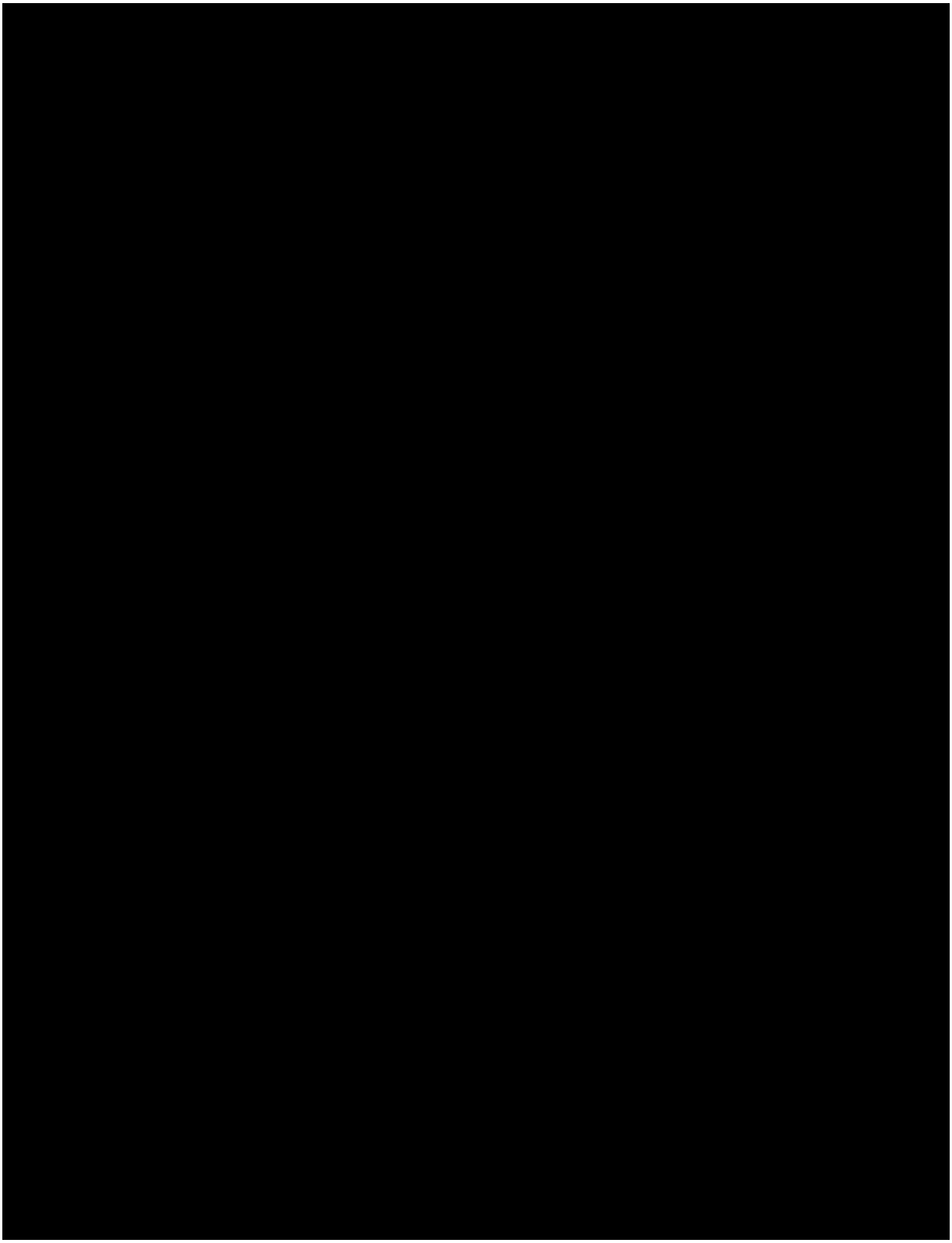












Redacted Copy

The information redacted comprises trade secrets/intellectual property of the applicant, the disclosure of which would jeopardize the safety and security of the forthcoming cannabis facility and would otherwise reveal confidential information; sensitive personnel information; and/or other information protected from disclosure by statute, the public disclosure of which could reasonably be expected to be detrimental to the public safety, welfare, or the best interests of the public.

FORM K: Affidavit of Entity Applicant for Alabama Medical Cannabis License

STATE OF Illinois)

)

Cook **COUNTY**)

Before me, the undersigned notary, did appear the Affiant, who after being by me first duly sworn, did state under oath as follows (*please type or print legibly*):

1. NAME OF ENTITY APPLYING FOR LICENSE: [redacted]
2. NAME OF AFFIANT: [redacted]
3. AFFIANT'S POSITION WITH APPLICANT: Co-Owner
4. AFFIANT IS THE APPLICANT'S (*Check One*): ◯ Responsible Party ☒ Contact Person
   (The affidavit of BOTH individuals is required)
5. TYPE OF LICENSE BEING SOUGHT BY APPLICANT (*Check One*):

◯ Cultivator	◯ Processor	◯ Secure Transporter
◯ Dispensary	☒ Integrated Facility	◯ State Testing Laboratory

6. On behalf of the Applicant, I do hereby affirm under oath as follows:
   a. I, the undersigned Affiant named in paragraph 2 above, am an adult, over the age of 19 years and competent to provide this Affidavit.
   MV INITIAL HERE
   b. In my position stated in paragraph 3 above, I have been duly authorized by the Applicant identified in paragraph 1 above (hereinafter, "Applicant") to provide this Affidavit.
   (Attach a copy of the entity applicant's written authorization to this Affidavit.)
   MV INITIAL HERE
   c. I understand and acknowledge that this Affidavit and the statements, information and documents or other exhibits accompanying it, are for the purpose of seeking one (1) license of the type specified in paragraph 5 above, on behalf of the Applicant. Neither I nor the Applicant are seeking a different Alabama Medical Cannabis license on behalf of any individual or any other entity.
   MV INITIAL HERE
   d. That all statements, information, documents and other exhibits provided in the Application are true and correct, based on my own personal knowledge and a diligent investigation by me. To the extent any information provided therein was heretofore outside my personal knowledge or ability to affirm, I have personally communicated with those within the Applicant's business who have such personal knowledge, whose duties

include knowledge of the facts stated and/or the integrity of the documents or other exhibits, and I am able, based on such communications, to attest to their currentness and accuracy. This I and the Applicant affirm under penalty of perjury and other applicable sanctions under the AMCC Rules and Alabama law.

____ INITIAL HERE

e. Applicant understands and acknowledges that the license being applied for is a revocable privilege granted by this state and is not a property right, and that this Application likewise does not convey to, or otherwise entitle unto, the Applicant any rights to a license.

____ INITIAL HERE

f. Applicant understands, acknowledges, and will continue to respect and comply with AMCC Rules regarding limited communication during the Application process.

____ INITIAL HERE

g. Applicant consents to all background checks, examinations, inspections, and search and seizure by AMCC and law enforcement personnel during this Application process and afterward, to the extent a license is awarded.

____ INITIAL HERE

h. Applicant has no economic interest, as defined in the AMCC Rules, in any other license or Application for license under the Darren Wesley "Ato" Hall Compassion Act, § 20-2A-1, et seq., Code of Alabama 1975.

____ INITIAL HERE

i. I and the Applicant will at all times, to the best of our ability, comply with the AMCC Rules, and cooperate and maintain transparency with the AMCC, its staff and other agents.

____ INITIAL HERE

j. Any verification provided in the Application is hereby affirmed under oath to be true and correct as of the date of the Application's submission.

____ INITIAL HERE

Signature of Affiant
Acting for and on behalf of:

[redacted]

Applicant

Sworn to and subscribed before me on this 23rd day of March, 2023.

Notary Public

My Commission Expires: 6/11/23

MELINDA EK
Official Seal
Notary Public - State of Illinois
My Commission Expires Jun 11, 2023

[SEAL]

FORM K: Affidavit of Entity Applicant for Alabama Medical Cannabis License

STATE OF IL)

)

Cook **COUNTY**)

Before me, the undersigned notary, did appear the Affiant, who after being by me first duly sworn, did state under oath as follows (*please type or print legibly*):

1. NAME OF ENTITY APPLYING FOR LICENSE: [redacted]
2. NAME OF AFFIANT: [redacted]
3. AFFIANT'S POSITION WITH APPLICANT: Co-Owner
4. AFFIANT IS THE APPLICANT'S (*Check One*): ⊗ Responsible Party ○ Contact Person
   (The affidavit of BOTH individuals is required)
5. TYPE OF LICENSE BEING SOUGHT BY APPLICANT (*Check One*):

○ Cultivator	○ Processor	○ Secure Transporter
○ Dispensary	⊗ Integrated Facility	○ State Testing Laboratory

6. On behalf of the Applicant, I do hereby affirm under oath as follows:
   a. I, the undersigned Affiant named in paragraph 2 above, am an adult, over the age of 19 years and competent to provide this Affidavit.
   _____ INITIAL HERE
   b. In my position stated in paragraph 3 above, I have been duly authorized by the Applicant identified in paragraph 1 above (hereinafter, "Applicant") to provide this Affidavit. ***(Attach a copy of the entity applicant's written authorization to this Affidavit.)***
   _____ INITIAL HERE
   c. I understand and acknowledge that this Affidavit and the statements, information and documents or other exhibits accompanying it, are for the purpose of seeking one (1) license of the type specified in paragraph 5 above, on behalf of the Applicant. Neither I nor the Applicant are seeking a different Alabama Medical Cannabis license on behalf of any individual or any other entity.
   _____ INITIAL HERE
   d. That all statements, information, documents and other exhibits provided in the Application are true and correct, based on my own personal knowledge and a diligent investigation by me. To the extent any information provided therein was heretofore outside my personal knowledge or ability to affirm, I have personally communicated with those within the Applicant's business who have such personal knowledge, whose duties

include knowledge of the facts stated and/or the integrity of the documents or other exhibits, and I am able, based on such communications, to attest to their currentness and accuracy. This I and the Applicant affirm under penalty of perjury and other applicable sanctions under the AMCC Rules and Alabama law.
_____ INITIAL HERE

e. Applicant understands and acknowledges that the license being applied for is a revocable privilege granted by this state and is not a property right, and that this Application likewise does not convey to, or otherwise entitle unto, the Applicant any rights to a license.
_____ INITIAL HERE

f. Applicant understands, acknowledges, and will continue to respect and comply with AMCC Rules regarding limited communication during the Application process.
_____ INITIAL HERE

g. Applicant consents to all background checks, examinations, inspections, and search and seizure by AMCC and law enforcement personnel during this Application process and afterward, to the extent a license is awarded.
_____ INITIAL HERE

h. Applicant has no economic interest, as defined in the AMCC Rules, in any other license or Application for license under the Darren Wesley "Ato" Hall Compassion Act, § 20-2A-1, et seq., Code of Alabama 1975.
_____ INITIAL HERE

i. I and the Applicant will at all times, to the best of our ability, comply with the AMCC Rules, and cooperate and maintain transparency with the AMCC, its staff and other agents.
_____ INITIAL HERE

j. Any verification provided in the Application is hereby affirmed under oath to be true and correct as of the date of the Application's submission.
_____ INITIAL HERE

_____
Signature of Affiant
Acting for and on behalf of:

[redacted]

Applicant

Sworn to and subscribed before me on this 23rd day of March, 2023.

_____
Notary Public

My Commission Expires: 6/11/23

[SEAL]

MELINDA EK
Official Seal
Notary Public - State of Illinois
My Commission Expires Jun 11, 2023