

Introduction

The National Institute of Standards and Technology (NIST) facilitated the development of this Seized Drugs Process Map through a collaboration between the NIST Forensic Science Research Program and the NIST administered Organization of Scientific Area Committees (OSAC) for Forensic Sciences (specifically OSAC's Seized Drugs Subcommittee). Process mapping visually represents the critical steps and decision points of a workflow, allowing others to understand a process and its components more clearly and revealing areas of improvement. Process maps use standard symbols to describe each element in the process – e.g., inputs, outputs, decisions, and steps – making it easier to communicate a process than long-form documentation.

The Seized Drugs Process Map captures the decision-making and process flow details most frequently encountered in the discipline of seized drug examination and processing. It was developed by a diverse group of practitioners and **is intended to reflect current practices** within the field. The Seized Drugs Process Map depicts variations in practice that may be influenced by agency size, agency type (public vs private), agency policies, geographical location and jurisdiction. Certain processes represented in the map have a required sequence while other components may vary. For this reason, it is important to state that the OSAC Seized Drugs Subcommittee does not necessarily support or endorse (as best practices) all of the different steps and paths depicted in this process map.

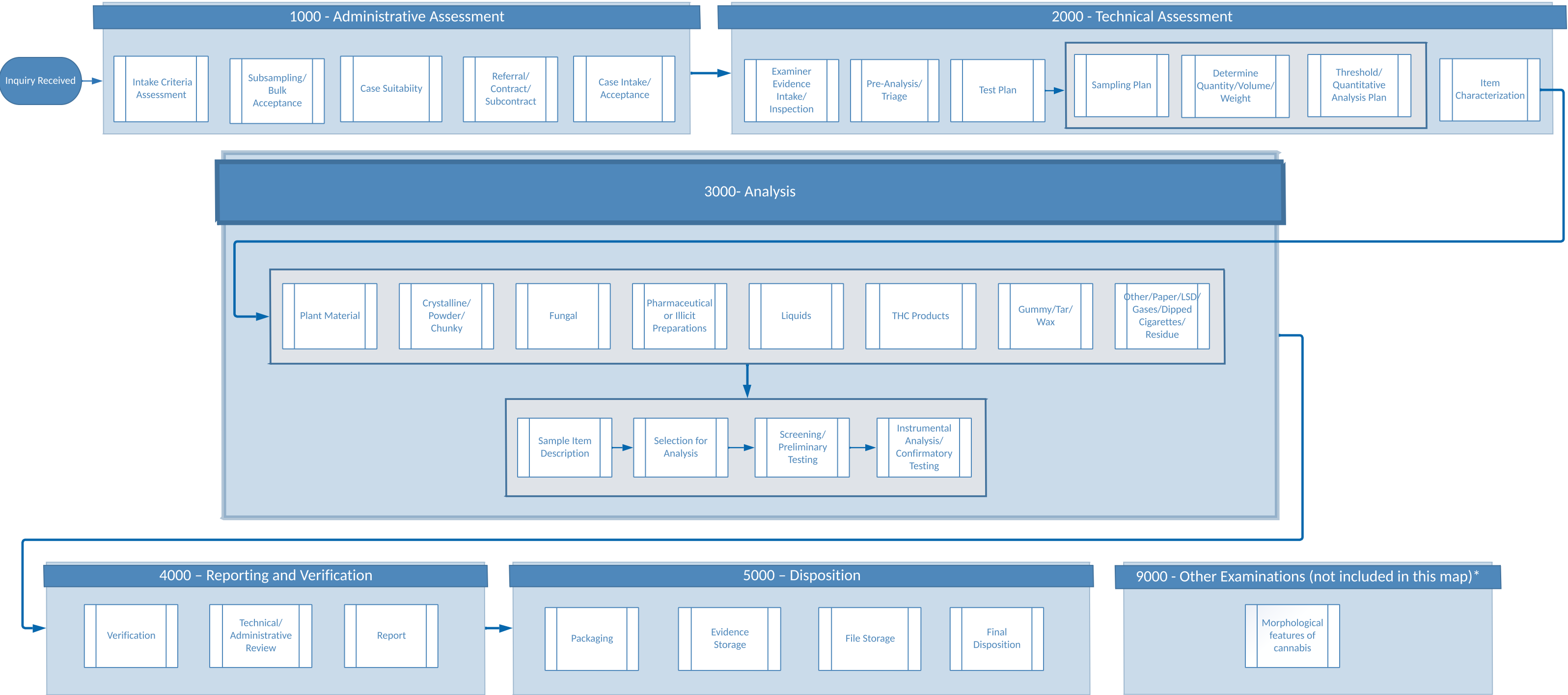
Process Map Applications:

The Seized Drugs Process Map is intended to be used to help improve efficiencies while reducing errors, highlight gaps where further research or standardization would be beneficial, and assist with training new investigators. It may also be used to develop specific investigative policies and identify best practices.

Scope of the Seized Drugs Process Map:

The scope of the Seized Drugs process map is limited to core processes within the discipline of seized drugs; therefore, certain topics are omitted from this map such as morphological features of cannabis. These topics may be covered in future process mapping exercises.





Underlined Word
Word that will be defined in the glossary

Linkage TO/FROM another page

Linkage TO/FROM within the same page

Technology Assist
Technology that aids in the steps on this page

Input Box
Outlines the inputs at the beginning of each section

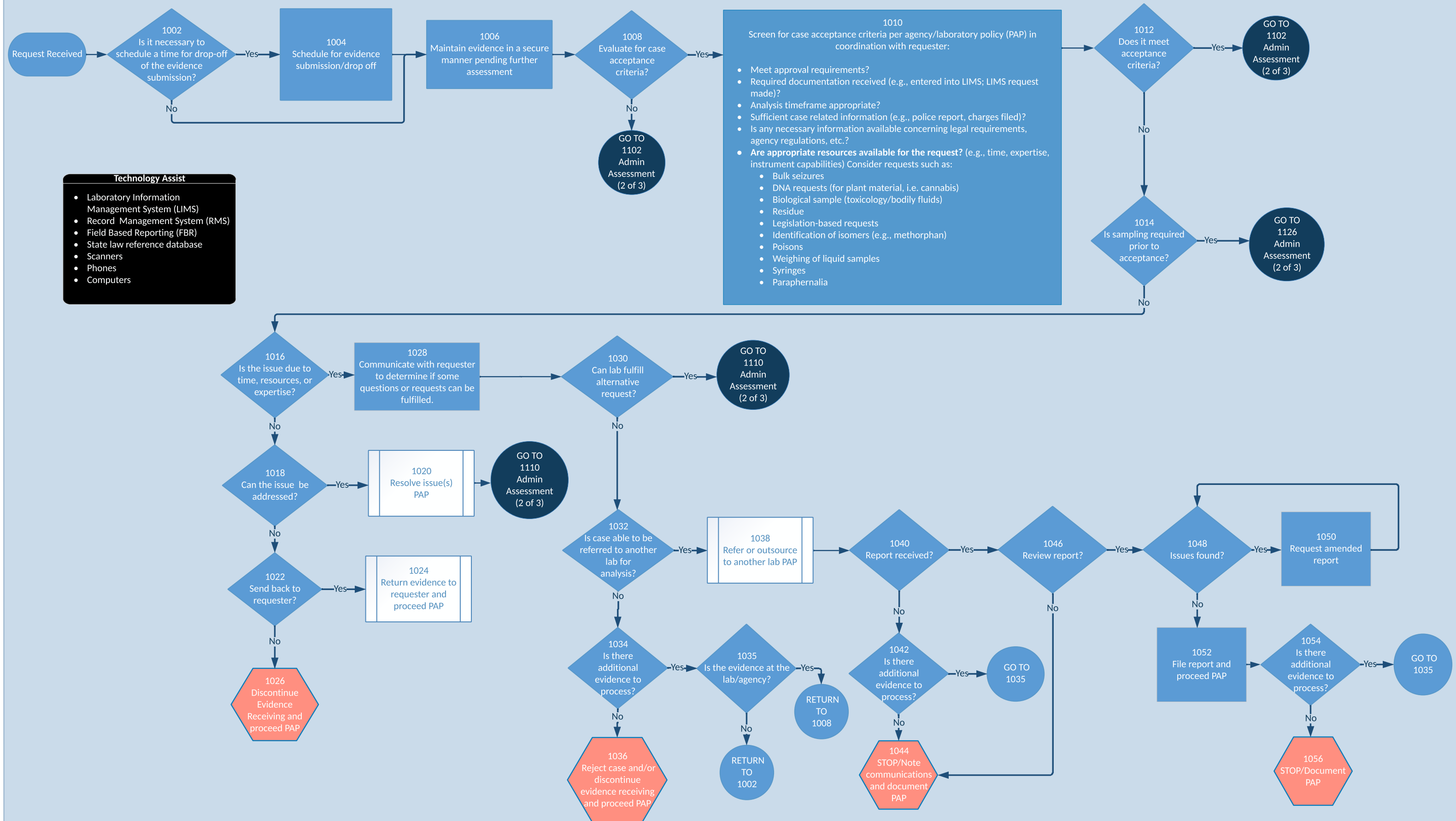
Output Box
Describes an output of the steps on the page

Discontinuation of Assessment or Examination

Legend	
	Process start/end
	Process
	Decision
	Subprocess
	Document



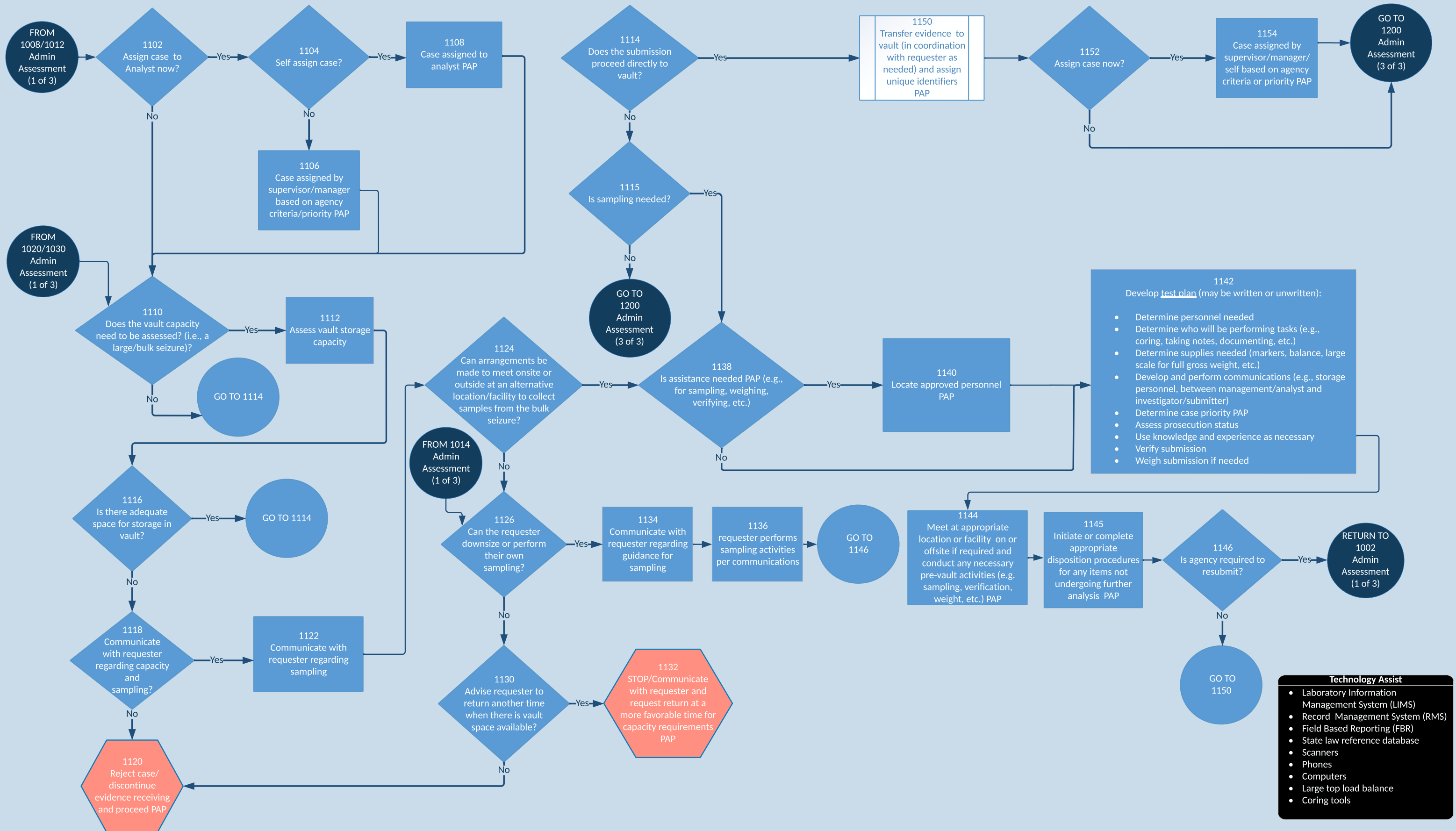
1000 - Administrative Assessment (1 of 3)



Technology Assist

- Laboratory Information Management System (LIMS)
- Record Management System (RMS)
- Field Based Reporting (FBR)
- State law reference database
- Scanners
- Phones
- Computers

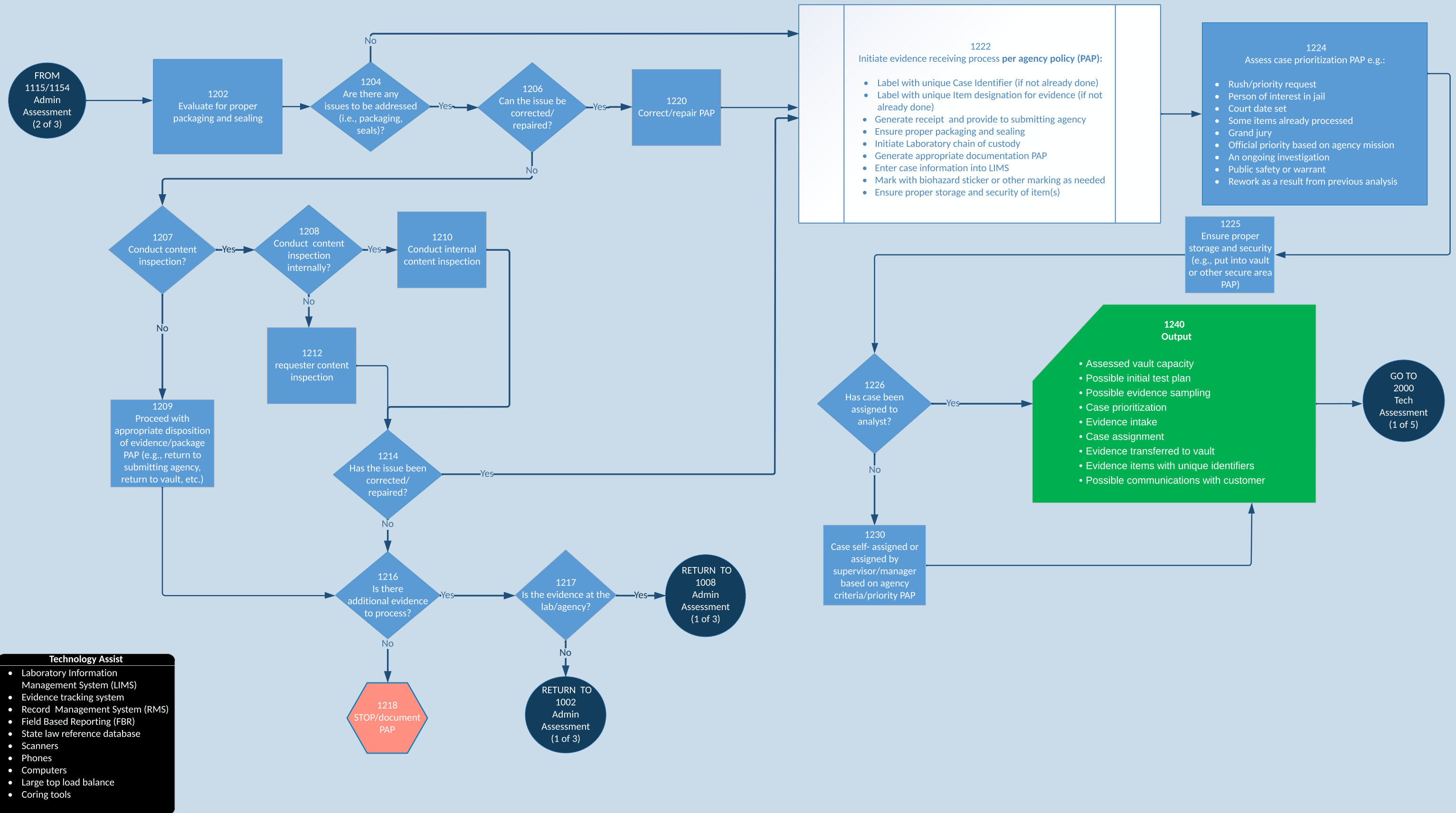
1100 - Administrative Assessment (2 of 3)



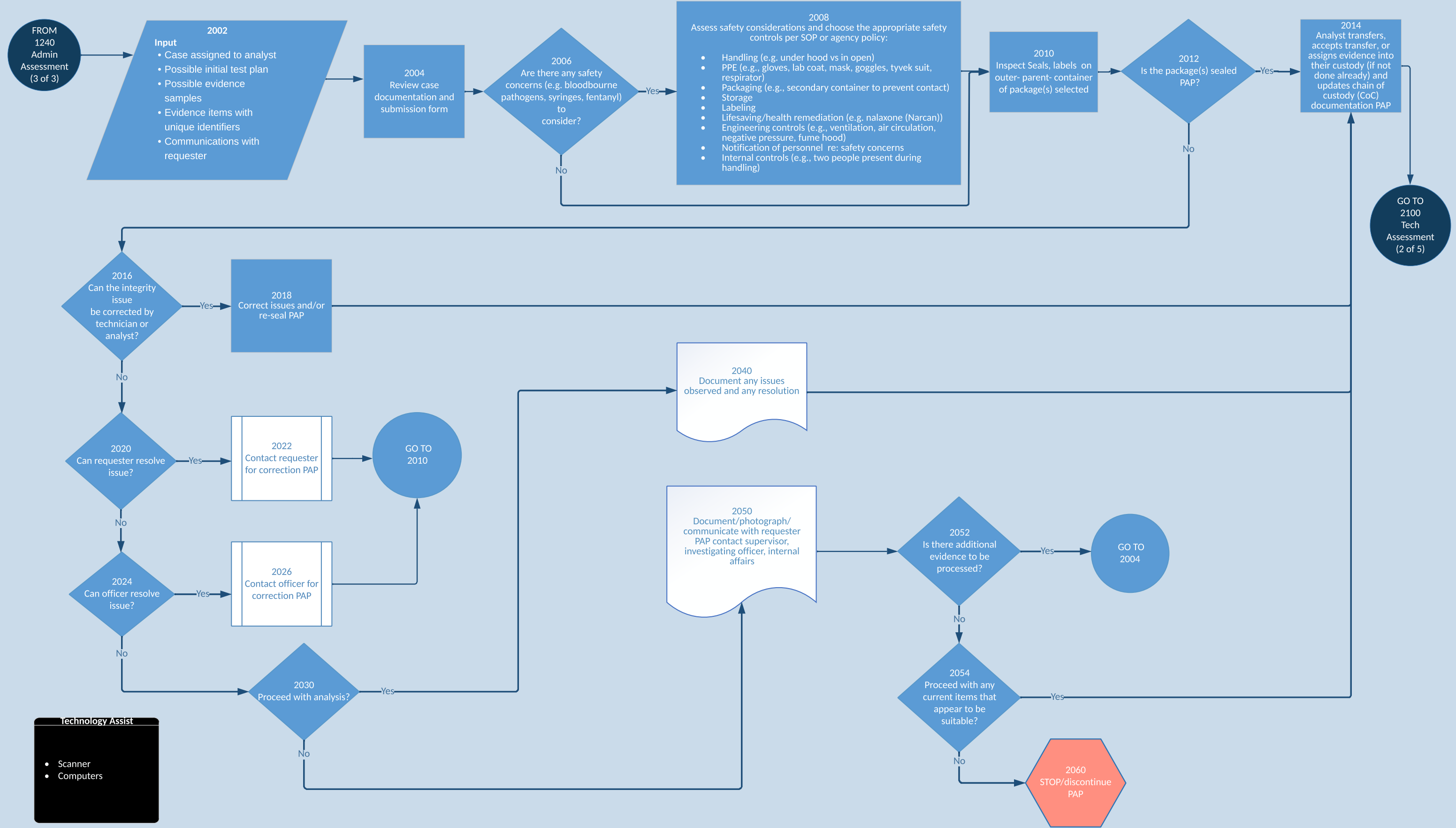
Technology Assist

- Laboratory Information Management System (LIMS)
- Record Management System (RMS)
- Field Based Reporting (FBR)
- State law reference database
- Scanners
- Phones
- Computers
- Large top load balance
- Coring tools

1200 - Administrative Assessment (3 of 3)

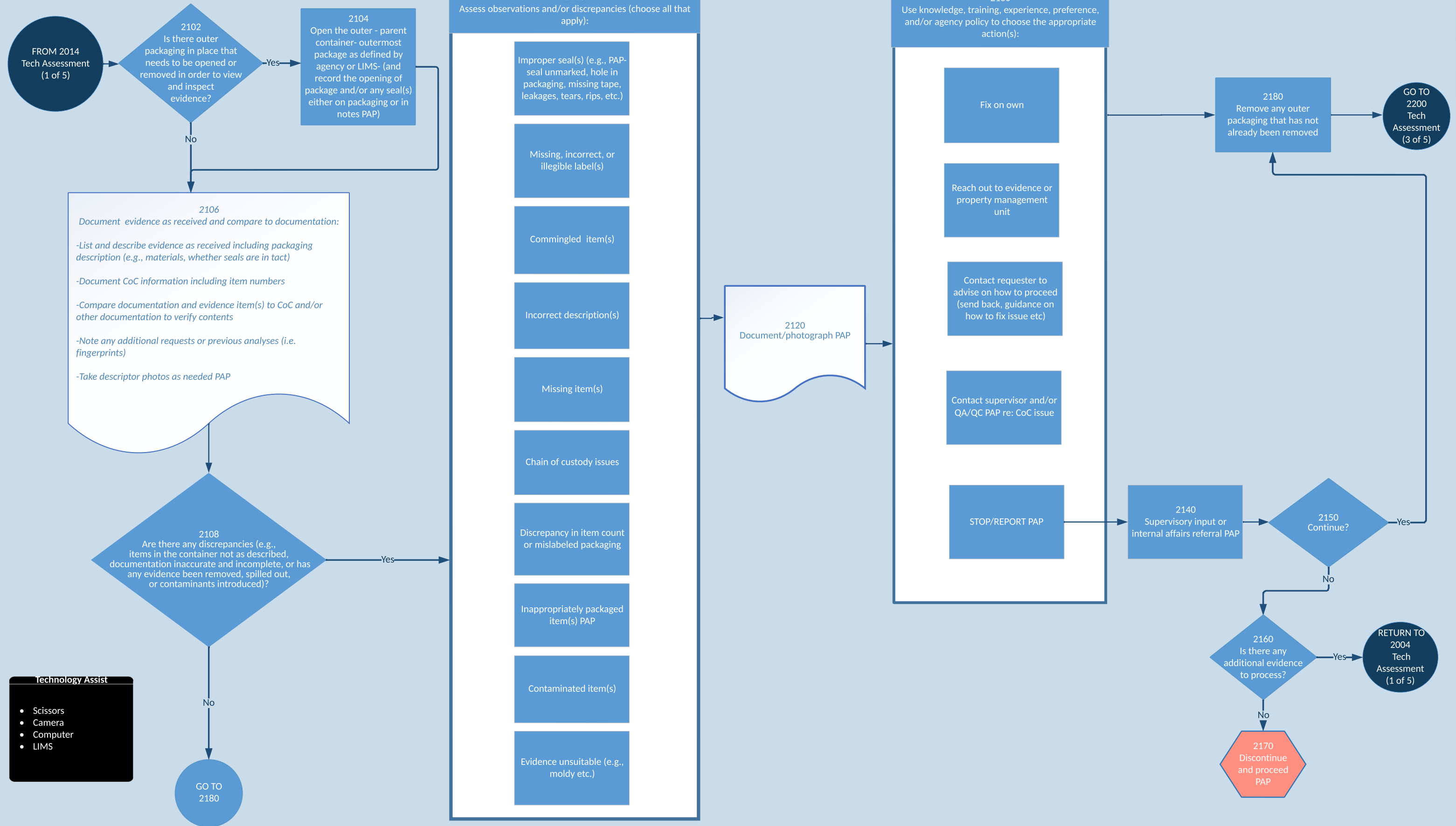


2000 - Tech Assessment (1 of 5) Examiner Evidence Intake



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2100 - Tech Assessment (2 of 5) Evidence Inspection

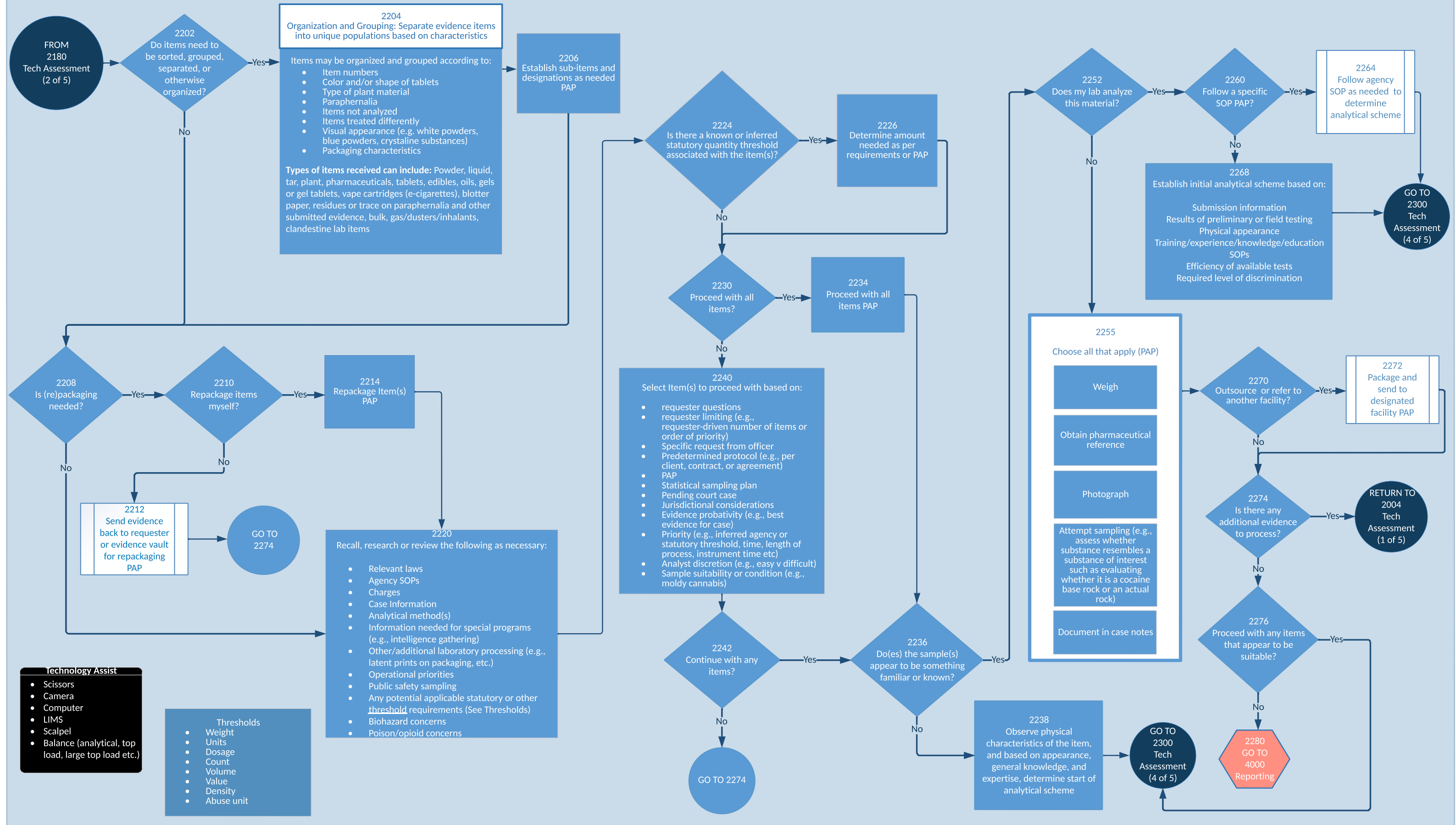


Technology Assist

- Scissors
- Camera
- Computer
- LIMS

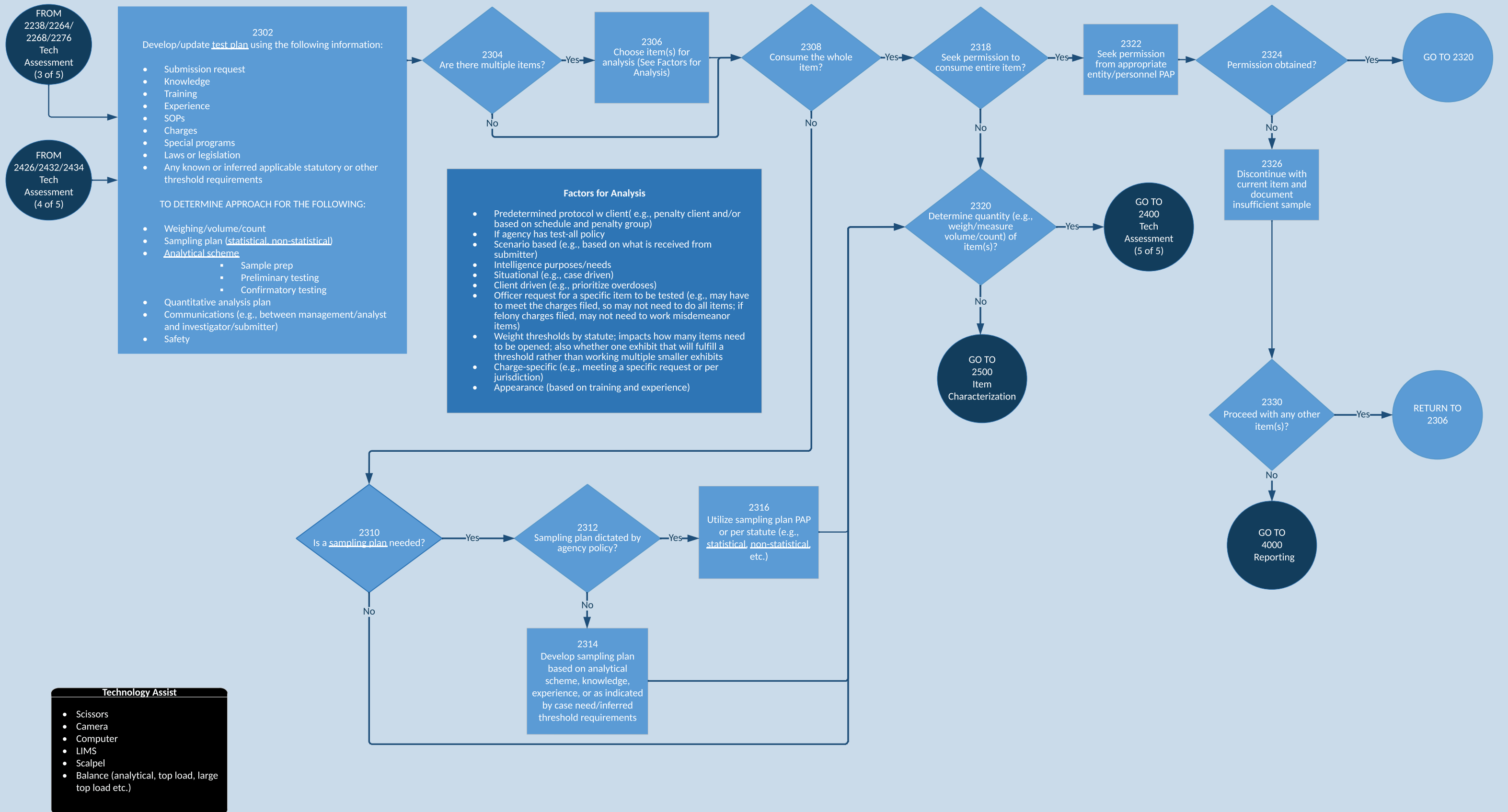
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2200 - Tech Assessment (3 of 5) Pre-Analysis/Triage



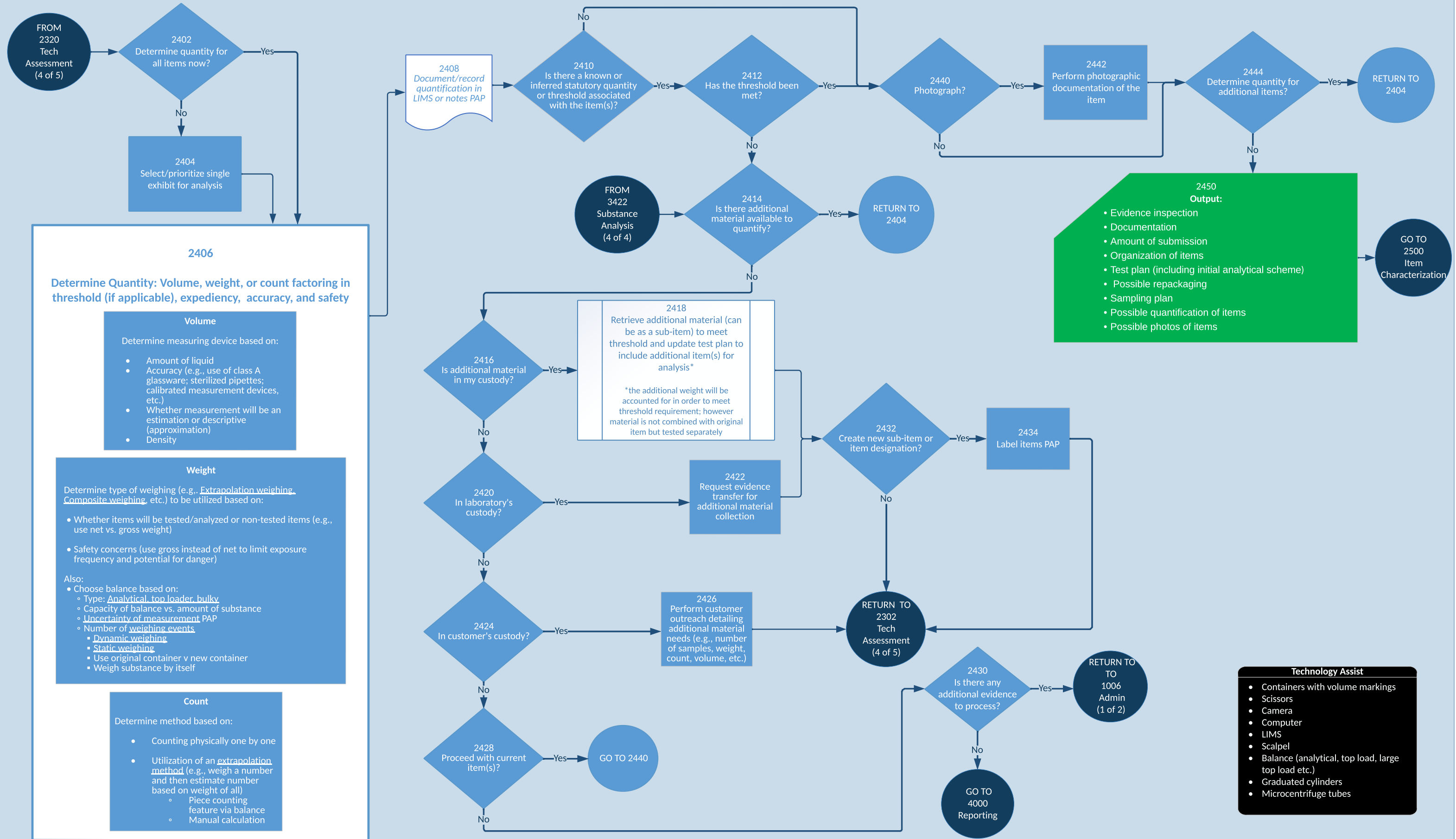
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2300 - Tech Assessment (4 of 5) Test Plan Development/Sampling Plan Development



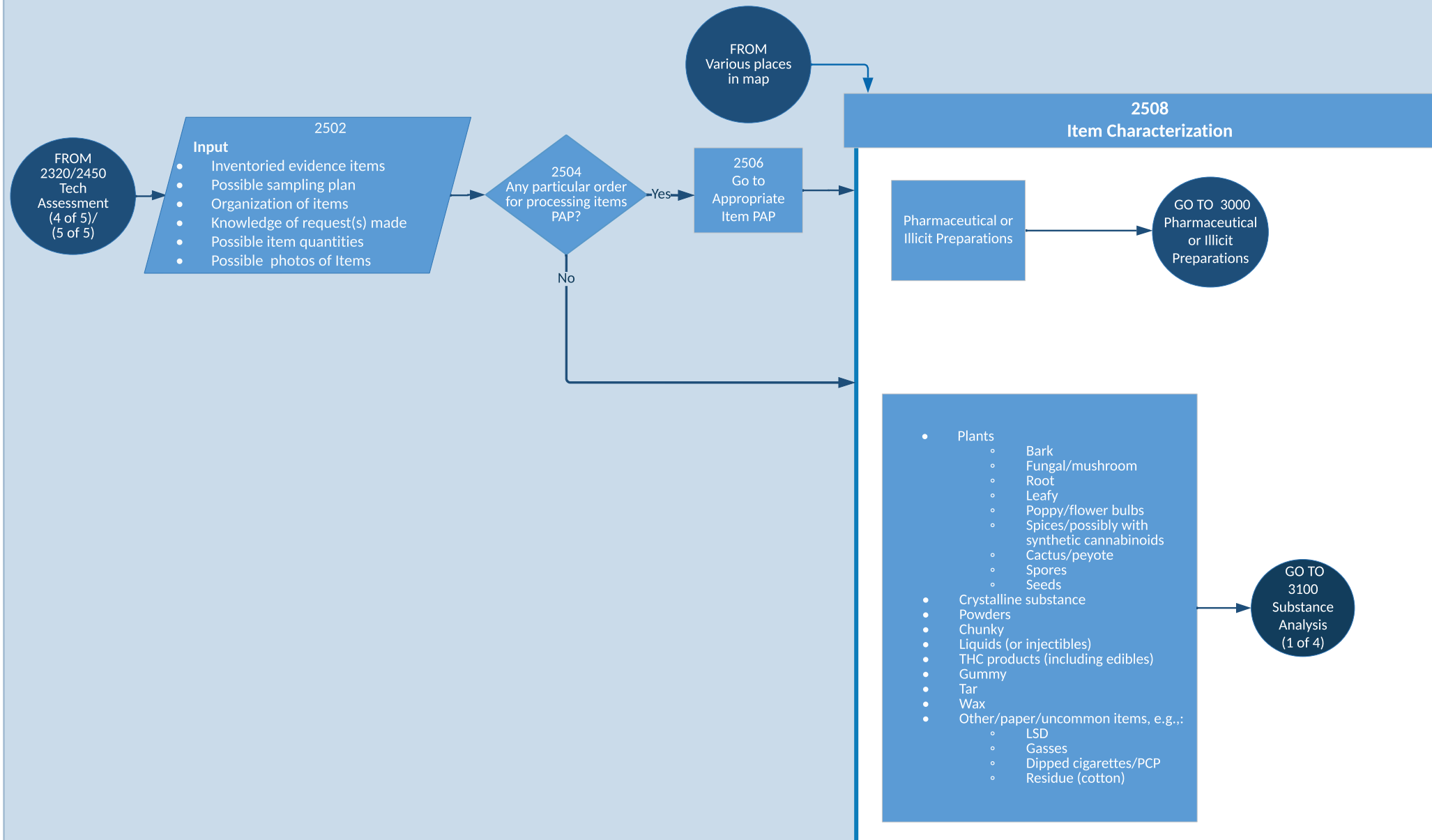
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2400 - Tech Assessment (5 of 5) Determine Quantity

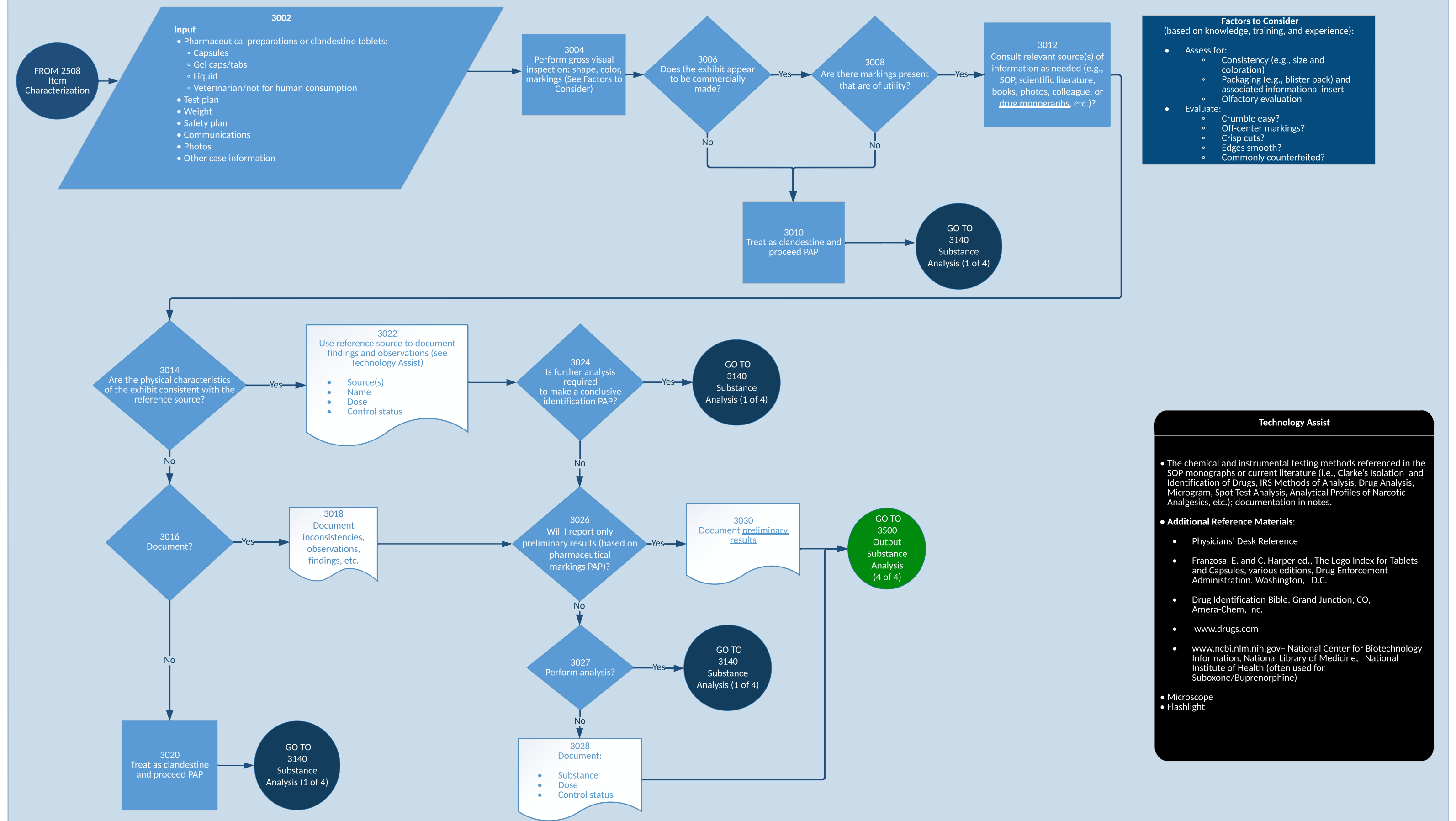


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2500 - Item Characterization



3000 - Pharmaceutical or Illicit Preparations



Factors to Consider
(based on knowledge, training, and experience):

- Assess for:
 - Consistency (e.g., size and coloration)
 - Packaging (e.g., blister pack) and associated informational insert
 - Olfactory evaluation
- Evaluate:
 - Crumble easy?
 - Off-center markings?
 - Crisp cuts?
 - Edges smooth?
 - Commonly counterfeited?

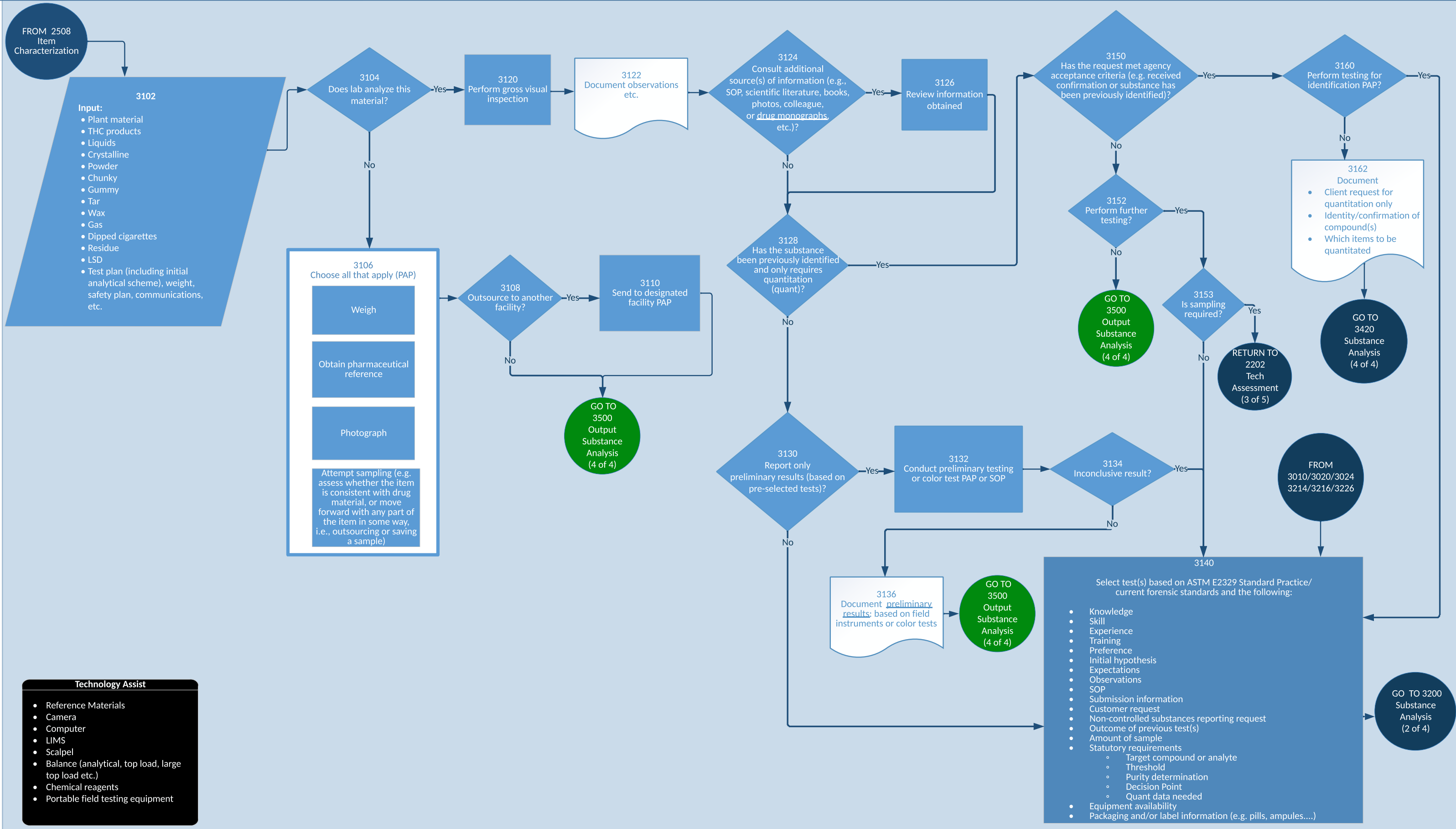
Technology Assist

- The chemical and instrumental testing methods referenced in the SOP monographs or current literature (i.e., Clarke's Isolation and Identification of Drugs, IRS Methods of Analysis, Drug Analysis, Microgram, Spot Test Analysis, Analytical Profiles of Narcotic Analgesics, etc.); documentation in notes.
- Additional Reference Materials:**
 - Physicians' Desk Reference
 - Franzosa, E. and C. Harper ed., The Logo Index for Tablets and Capsules, various editions, Drug Enforcement Administration, Washington, D.C.
 - Drug Identification Bible, Grand Junction, CO, Amara-Chem, Inc.
 - www.drugs.com
 - www.ncbi.nlm.nih.gov- National Center for Biotechnology Information, National Library of Medicine, National Institute of Health (often used for Suboxone/Buprenorphine)
- Microscope
- Flashlight

This process map provides a visual description and attempts to represent all reasonable variations of casework currently performed by controlled substance/seized drug chemists. OSAC does not necessarily support or endorse (as best practices) all of the different steps and paths depicted in this process map.

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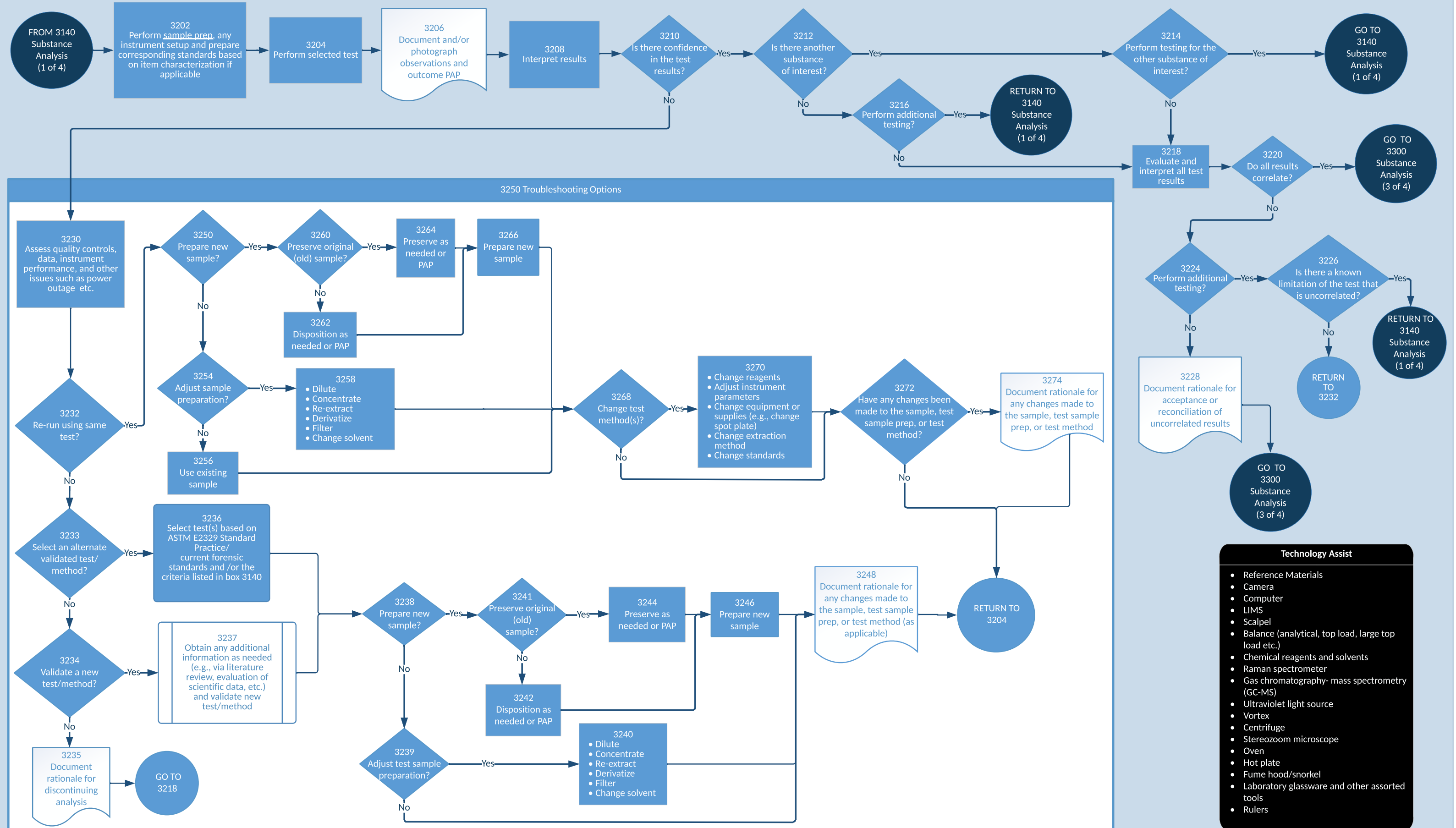
3100 - Substance Analysis (Page 1 of 4)



- Technology Assist**
- Reference Materials
 - Camera
 - Computer
 - LIMS
 - Scalpel
 - Balance (analytical, top load, large top load etc.)
 - Chemical reagents
 - Portable field testing equipment

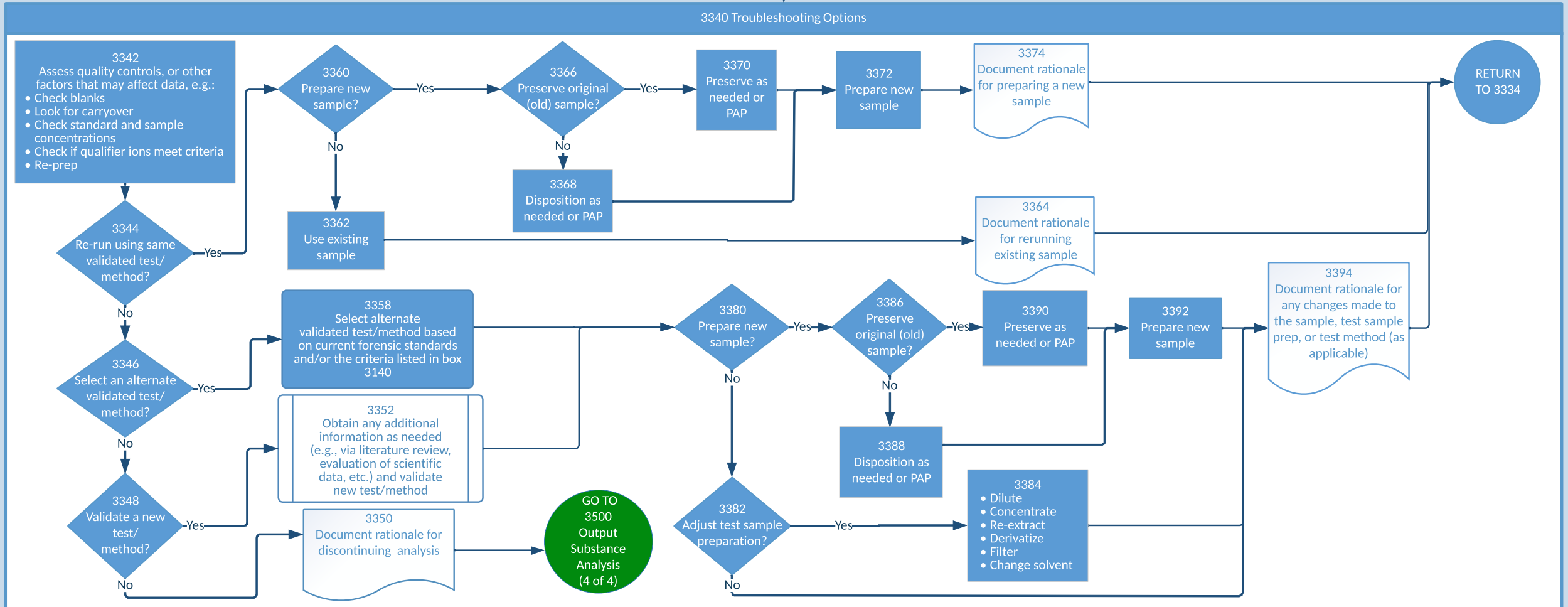
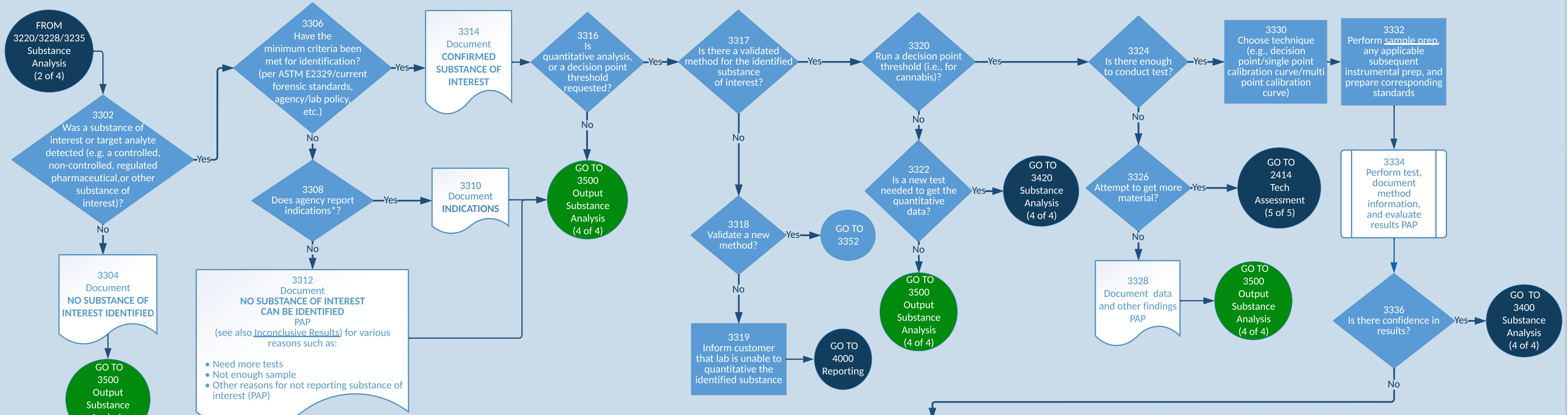
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3200 - Substance Analysis (Page 2 of 4)



- Technology Assist**
- Reference Materials
 - Camera
 - Computer
 - LIMS
 - Scalpel
 - Balance (analytical, top load, large top load etc.)
 - Chemical reagents and solvents
 - Raman spectrometer
 - Gas chromatography- mass spectrometry (GC-MS)
 - Ultraviolet light source
 - Vortex
 - Centrifuge
 - Stereozoom microscope
 - Oven
 - Hot plate
 - Fume hood/snorkel
 - Laboratory glassware and other assorted tools
 - Rulers

3300 - Substance Analysis (Page 3 of 4)



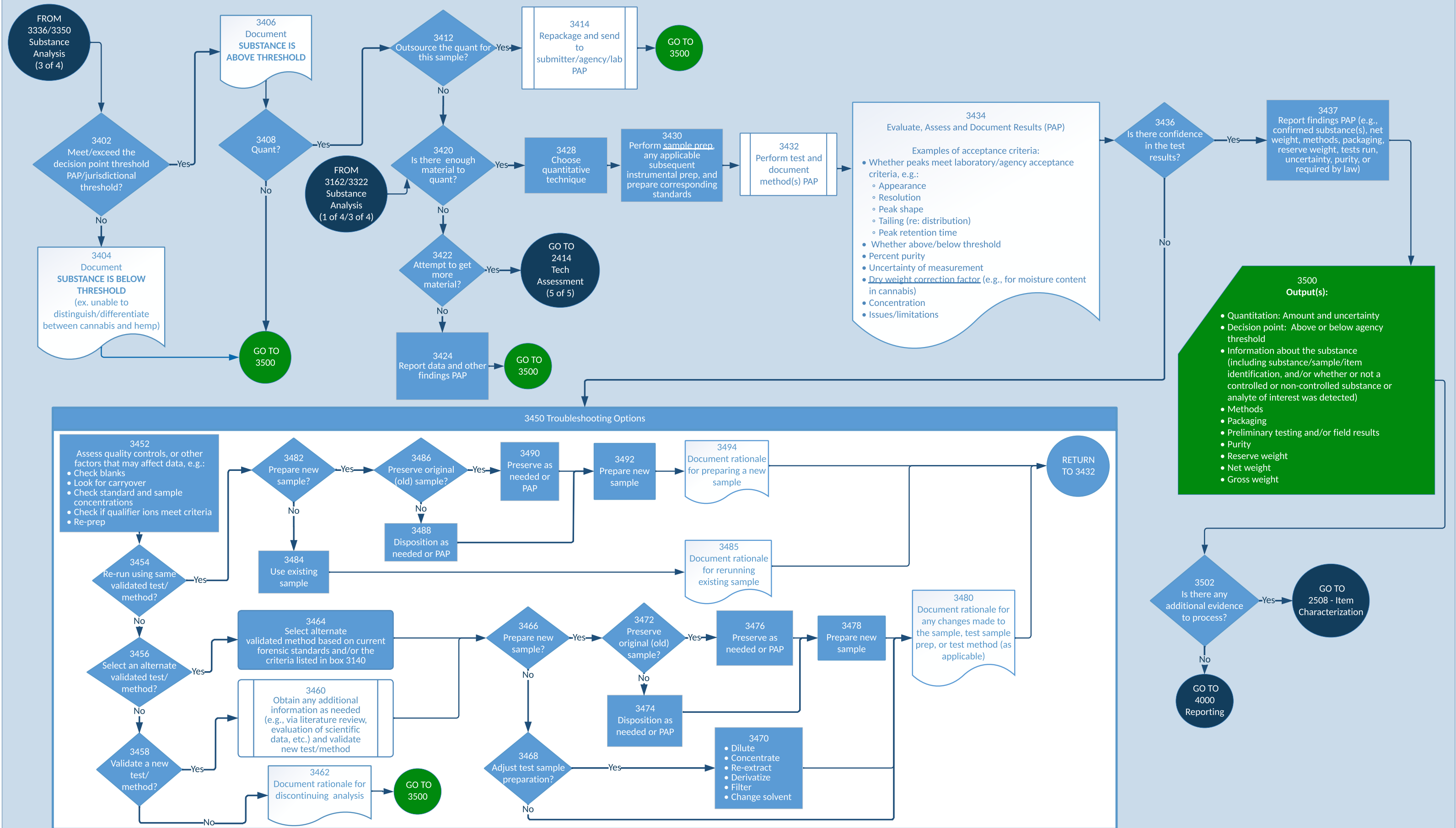
***INDICATIONS**
Some agencies may use these terms; for the purposes of this process map these terms are defined as the following:

Presumptive ID- Establishment of the possibility that a substance is present. For example, an analyst may know name and exact compound but doesn't have enough information to confirm.

Indications- In cases where a specific compound or isomer cannot be confirmed, an analyst may report out class information, or in the case of isomers, list all possible isomers that might be present.

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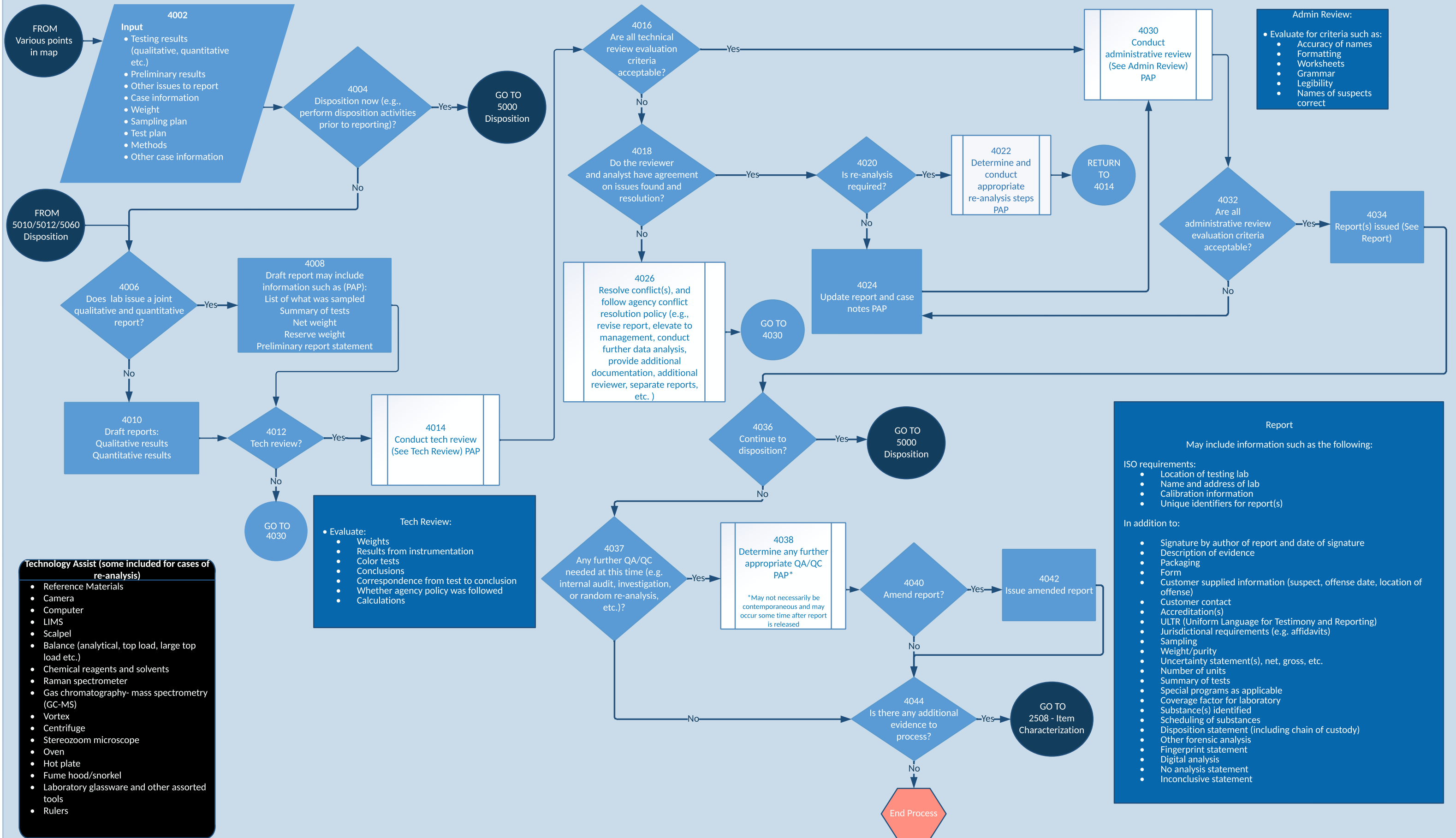
3400 - Substance Analysis (Page 4 of 4)



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4000 - Reporting



- Technology Assist (some included for cases of re-analysis)**
- Reference Materials
 - Camera
 - Computer
 - LIMS
 - Scalpel
 - Balance (analytical, top load, large top load etc.)
 - Chemical reagents and solvents
 - Raman spectrometer
 - Gas chromatography- mass spectrometry (GC-MS)
 - Vortex
 - Centrifuge
 - Stereozoom microscope
 - Oven
 - Hot plate
 - Fume hood/snorkel
 - Laboratory glassware and other assorted tools
 - Rulers

- Tech Review:**
- Evaluate:
 - Weights
 - Results from instrumentation
 - Color tests
 - Conclusions
 - Correspondence from test to conclusion
 - Whether agency policy was followed
 - Calculations

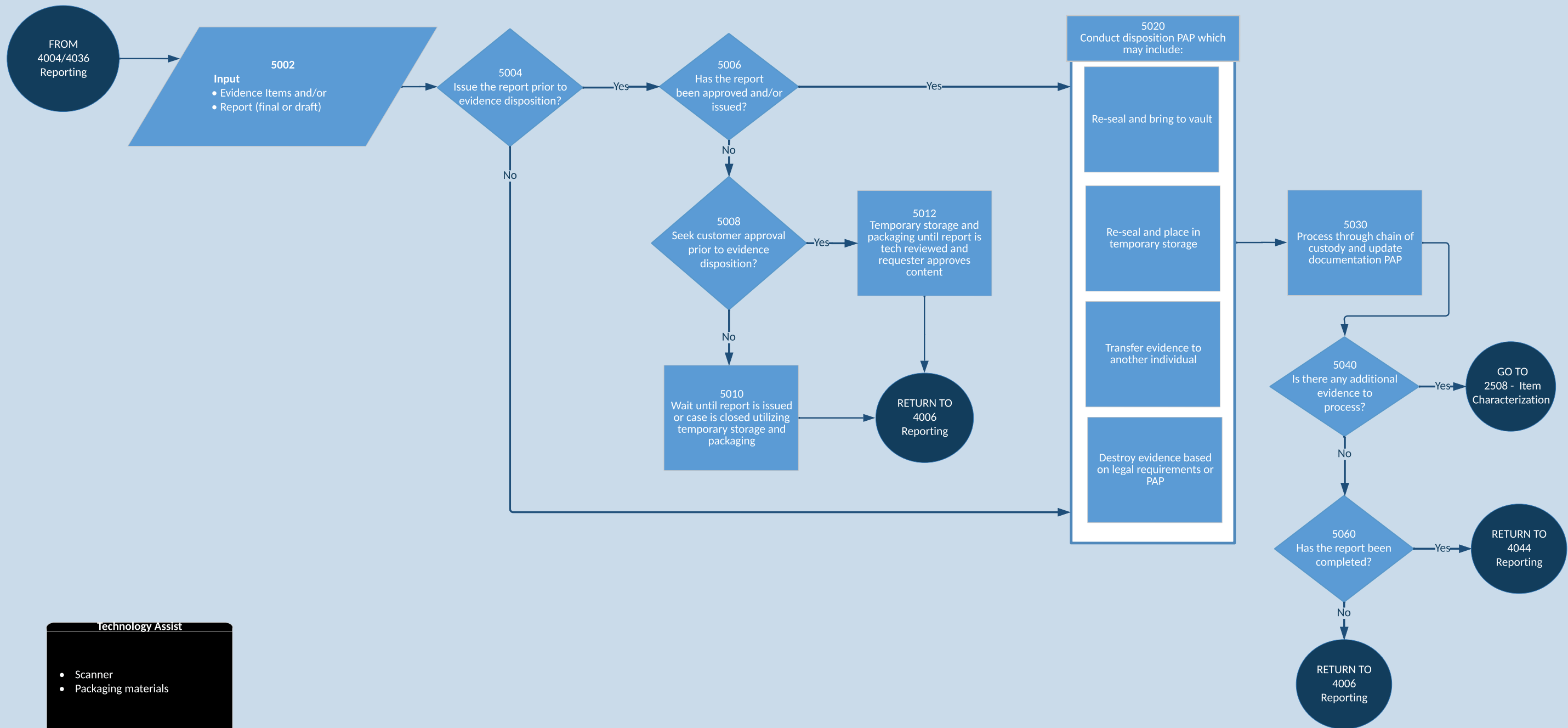
- Admin Review:**
- Evaluate for criteria such as:
 - Accuracy of names
 - Formatting
 - Worksheets
 - Grammar
 - Legibility
 - Names of suspects correct

- Report**
- May include information such as the following:
- ISO requirements:
- Location of testing lab
 - Name and address of lab
 - Calibration information
 - Unique identifiers for report(s)
- In addition to:
- Signature by author of report and date of signature
 - Description of evidence
 - Packaging
 - Form
 - Customer supplied information (suspect, offense date, location of offense)
 - Customer contact
 - Accreditation(s)
 - ULTR (Uniform Language for Testimony and Reporting)
 - Jurisdictional requirements (e.g. affidavits)
 - Sampling
 - Weight/purity
 - Uncertainty statement(s), net, gross, etc.
 - Number of units
 - Summary of tests
 - Special programs as applicable
 - Coverage factor for laboratory
 - Substance(s) identified
 - Scheduling of substances
 - Disposition statement (including chain of custody)
 - Other forensic analysis
 - Fingerprint statement
 - Digital analysis
 - No analysis statement
 - Inconclusive statement

This process map provides a visual description and attempts to represent all reasonable variations of casework currently performed by controlled substance/seized drug chemists. OSAC does not necessarily support or endorse (as best practices) all of the different steps and paths depicted in this process map.

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5000 - Disposition



Technology Assist

- Scanner
- Packaging materials

Glossary of Terms and Definitions

Abbreviations:

PAP: Per Agency/Laboratory Policy

Analytical Balance: Balances designed with a draft shield and the sensitivity to measure small amounts of substance in the sub-milligram range.

Analytical Scheme: From SWGDRUG:

An analytical scheme shall be comprised of validated methods that are appropriate for the analyte.

- The combinations of methods chosen for a particular analytical scheme shall identify the specific drug of interest, preclude a false positive and minimize false negatives.
- For quantification the method should reliably determine the amount of analyte present.
- If validated methods are used from published literature or another laboratory's protocols, then the methods shall be verified within each laboratory.
- If non-routine validated methods are used, then the method shall be verified prior to use.
- Verification should, at a minimum, demonstrate that a representative set of reference materials has been carried through the process and yielded the expected results.

Bulky: Taking up much space, typically inconveniently; too large for available storage accommodations.

Composite Weighing: Weighing a representative, homogenized sample⁴.

Drug Monograph: Monograph is a written document of the study of a single item. Monographs can be created for individual drugs, or in some cases, classes of drugs. These monographs contain information that can be useful in identifying an individual drug.

Dry Weight Correction Factor: A method sometimes used to account for moisture present in plant material. For example, this may be done to meet the statutory requirement of "0.3 % on a dry weight basis"; it may be represented as a moisture percentage or a ratio of dry to wet mass.

Dynamic Weighing: A dynamic weighing process involves placing a weighing vessel on a balance, taring the balance, and adding material immediately to the weighing vessel without removing it from the balance⁶.

Extrapolation Weighing: Estimating the weight of an entire amount based on the weight of a defined portion of the amount, assuming the properties throughout the entire amount are the same.

Inconclusive Results: If testing indicates the presence of a substance that cannot be identified, the results may be reported as "Unable to identify", with the appropriate accompanying footnote

- For insufficient amount of evidence: "Insufficient sample for identification"
- For insufficient instrumentation: "Due to limitations in instrumentation, the laboratory is unable to identify the compound in this exhibit at this time."
- For no reference standard or reference library available: "Due to unavailability of appropriate reference standard/reference libraries, the laboratory is unable to identify the compound in this exhibit at this time."
- For unsuitable evidence (e.g., decomposed plant material) for identification: "Due to the unsuitable condition of the evidence, the laboratory is unable to identify the substance."

Indications: In cases where a specific compound or isomer cannot be confirmed, an analyst may report out class information, or in the case of isomers, list all possible isomers that might be present.

Large Top Loader (Bulky Balance): A top load balance that can hold larger, bulky items

Non-Statistical Sampling Plan: A sampling technique used when the laboratory does not intend to report a conclusion about the whole population of a multi-item submission. Examples include pharmaceutical, composite, and single unit selection/arbitrary sampling^{1, 3}.

Preliminary Results: Results of a preliminary test, a test performed to help determine possible drug, drug type, or drug class but it is not specific enough of a test to positively identify it.

Presumptive ID: Establishment of the possibility that a substance is present⁵. For example, an analyst may know name and exact compound but don't have enough info to confirm.

Sampling Plan: From ISO/IEC 17025-3125: 3.29S: A statistically valid approach to determine the number of sub-items that must be tested in order to make an inference about the whole population.

Sample Prep: Any preparation needed in order to test the sample using a specific test

- o Extraction method
- o Dissolution
- o Derivatization
- o Crystallization techniques for introducing sample into instrumentation

Static Weighing: A static weighing process involves removal of the tared weighing vessel, filling with material, and then returning to the balance to obtain the net weight⁶.

Statistical Sampling Plan: A statistically valid approach to determine the number of sub-items that must be tested in order to make an inference about the whole population. Examples include hypergeometric and Bayesian methods^{1, 2, 3}.

Top Loader (Balance): A balance with less sensitivity as the analytical balance with an open top. Used when precision of 0.01 grams is sufficient.

Uncertainty of Measurement: An estimation of how closely (dispersion) an analytical technique can determine a measurement result such as weight or quantitation.

Weighing Event: An instance when something is placed on the balance i.e. empty weigh paper, weigh paper with substance, empty plastic bag, etc.

References:

¹<https://www.svgdrug.org/approved.htm>

²http://enfsi.eu/wp-content/uploads/2016/09/drugs_sampling_guideline_unodc-enfsi.pdf

³<https://www.astm.org/e2548-16.html>

⁴Adapted from : https://www.dea.gov/sites/default/files/2019-10/Forensics/ADM%20R4%202019_Public%20Posting_Final2.pdf

⁵Adapted from: https://www.sog.unc.edu/sites/www.sog.unc.edu/files/course_materials/Presumptive%20and%20Confirmatory%20Forensic%20Tests.pdf

⁶<https://www.svgdrug.org/supplemental.htm>