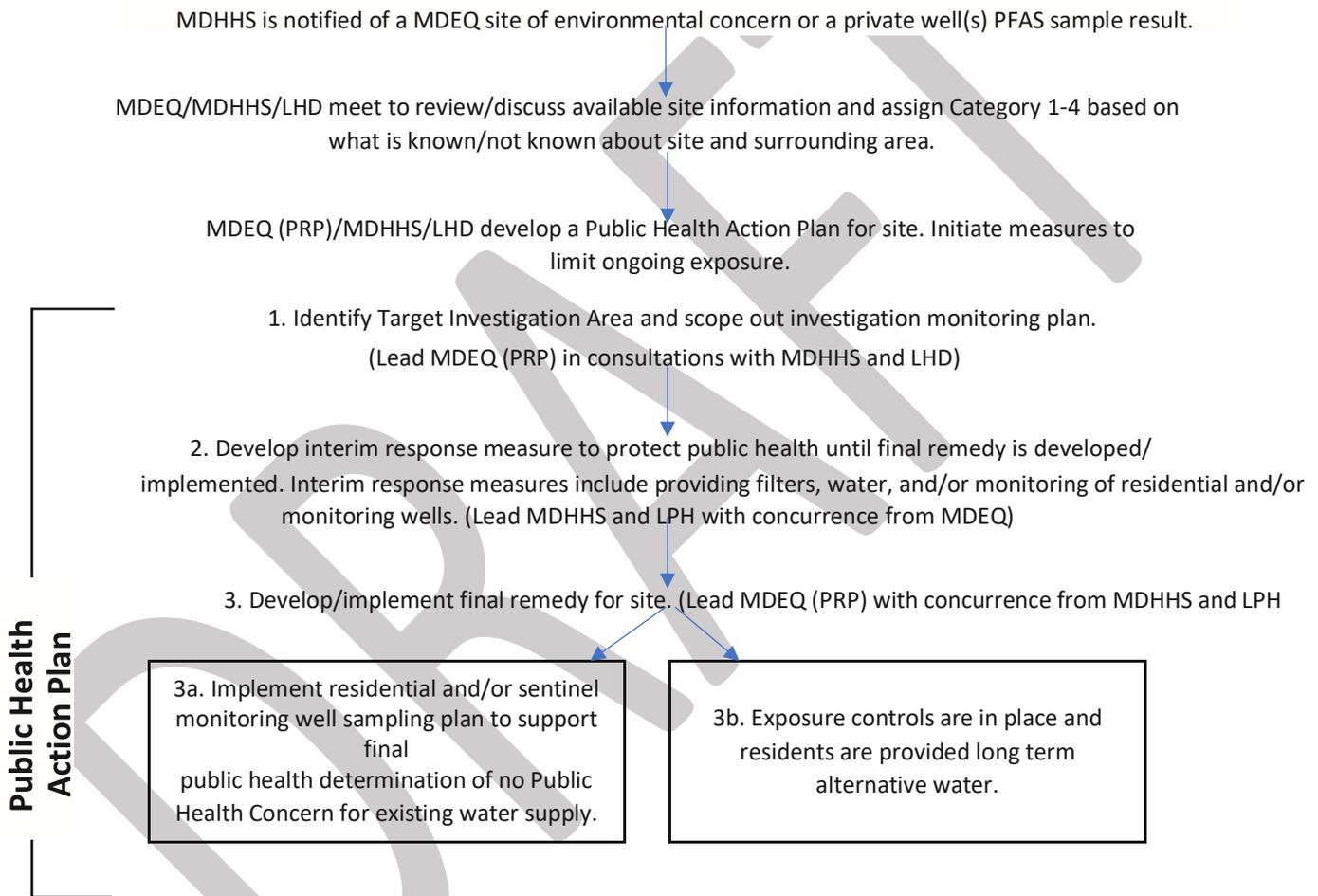


Statewide PFAS in Residential Wells Decision Framework

The Michigan Department of Health and Human Services (MDHHS) and Michigan Department of Environmental Quality (MDEQ) have developed the “Statewide PFAS in Private Wells Decision Framework” to address per- and polyfluoroalkyl substances (PFAS) in private drinking water wells in the State of Michigan. This document describes the general process MDHHS follows, in conjunction with the Michigan Department of Environmental Quality (MDEQ) and Local Public Health (LPH), to jointly identify a set of actions that address PFAS exposures from private drinking water wells or the uncertainty of potentially hazardous exposures. Note: A Potential Responsible Party (PRP) can be involved through the regulatory agency. Details for the specific Categories for various sites and plans to provide interim water (filters) and a long-term water source for residents are discussed on pages 2-14.



PFAS in Residential Wells Decision Framework

Background

Per- and polyfluoroalkyl substances (PFAS) discovery efforts started with a convergence of action by Department of Defense on-base work, the US Environmental Protection Agency conducting unregulated chemical contaminant monitoring of large municipal water supplies, and environmental investigation work by the Michigan Department of Environmental Quality (MDEQ). During fiscal year 2018, Michigan engaged in a state-wide PFAS discovery effort by testing waste water treatment plant effluent, municipal water supplies, surface water, fish, and deer.

Additionally, potential source locations were identified based on suspected or known, current or past use of large-quantity high-concentration PFAS liquids (e.g. Class B Aqueous Film Forming Foam (AFFF) concentrate firefighting foam use, mist suppressant at chrome plating plants, weather-proofing on shoes) and disposal of waste into poorly constructed or unlined landfills.

The Michigan Department of Environmental Quality (MDEQ) discovery of PFAS in environmental media that people either consume (groundwater used as drinking water, surface water used as drinking water, fish, and deer) or can easily contact (dust, surface soils, foam, or surface water) has resulted in concerns by the public and initiated actions pursuant to the Public Health Code (Act 368). This Framework is designed to facilitate science-based consensus around the evaluation of PFAS private well drinking water results and the associated environmental investigation, along with public health actions when needed.

Purpose of the Framework

Michigan Department of Health and Human Services (MDHHS) and Michigan Department of Environmental Quality (MDEQ) developed this framework to address per- and polyfluoroalkyl substances (PFAS) in private drinking water wells in Michigan. PFAS are contaminants of emerging concern. The State of Michigan continues to learn more about sources and toxicity of

PFAS and fate and transport of the chemicals when they are released to the environment. Additionally, some sites are not well characterized when drinking water analytical results suggest that PFAS has impacted private wells. This decision framework will be used in collaboration with the Site Team (LPH, MDHHS, and the MDEQ project staff) to develop site-specific, public health action plans based on the information available for the site. As more becomes known about the nature and extent of a potential PFAS-contaminated site, regulators and public health entities narrow the focus of investigative and mitigative efforts and interventions. Therefore, this framework shall remain a “living document” and will be updated as necessary. Also, the decision points and recommendations contained herein shall not restrict MDHHS or local health departments from enacting Act 368 of 1978 (i.e., the Public Health Code) as needed to protect public health.

This process provides public health recommendations that include interim measures that protect public health while regulatory agencies and responsible parties investigate and address sources, provide long-term treatment, and/or provide permanent alternate water sources. The framework is designed to be proactively protective of public health when there are limitations in the amount of information regarding the PFAS site contamination or limitations in the information on the extent of PFAS groundwater contamination.

The State of Michigan has established a drinking water criterion of 70 ppt for PFOA and PFOS combined that serves as the regulatory threshold for triggering response action under Part 201. Additionally, total PFAS is used as an initial screen in the decision framework. Total PFAS over 70 ppt is used as an initial decision point for further evaluation for the following reasons: (1) There is limited toxicity information for the other PFAS. (2) Although there is limited information regarding background levels for PFAS in environmental media, levels of total PFAS greater than or equal to 70 ppt in a private well suggest PFAS source(s) have entered groundwater.

As additional information becomes available, on both toxicity of certain PFAS and background levels, this initial decision point can be modified.

All decisions should be made collaboratively between MDHHS, LPH, MDEQ, and other involved entities. MDEQ leads and makes decisions regarding the investigation of the nature and extent of contamination and implements their regulatory program authorities; MDHHS makes public health decisions based upon the data as it is understood by the agencies under its authorities.

Description of the Site-Specific Public Health Action Plan

The purpose of the site-specific Public Health Action Plan (PHAP) is to ensure protection of public health and consistent communication by the Site Team. The plan provides the rationale for public health actions at locations being sampled by MDEQ for identification of PFAS-containing groundwater being used as drinking water. The Site Team are the staff from MDEQ, MDHHS, and LPH.

The PHAP is written after Site Team discussions on the suspected source, site conditions, sampling strategy, and proposed public health actions. The site-specific PHAP can vary in approach and complexity based on site-specific conditions. A PHAP is necessary for sites in categories 1 and 2 and for some sites in category 3. Category 4 sites will typically only involve communication of information to the residents.

In general, public health actions in response to potentially hazardous PFAS containing groundwater used as drinking water can include public communications, community engagement and health education, public health determinations, and/or public health-funded actions. The primary public health action is to limit ongoing exposure. Assistance can be provided to obtain urgent alternative water sources, such as bottled water. Interim alternate water can be provided by public health at categories 1 and 2 as a stop-gap measure while the regulatory agency determines the details related to a permanent alternate water source. Interim alternate water will not be provided by public health if the regulatory agency is not pursuing an

environmental investigation to determine the need for a permanent alternate water source, or unless local public health can provide sufficient demonstration of concern and need related to PFAS. Category 3 may or may not include public health-funded actions, whereas Category 4 should never include public-health funded actions.

The PHAP is generated by the Site Team. MDHHS coordinates the writing of the PHAP with review and concurrence by MDEQ and/or Local Public Health, depending on which agencies are involved at a given PFAS site. Each site-specific PHAP has four sections: 1) reason for the investigation 2) sampling plan rationale 3) data evaluation response plan and 4) logistics of implementing the public health actions. The PHAP is updated when public health actions change due to an increase in site-specific data-driven knowledge including but not limited to a decrease in uncertainty, an increase in the defined spatial (vertical and horizontal) extent of PFAS-containing groundwater, or an increase in data documenting temporal variation in groundwater PFAS concentrations.

1. Section 1 – The Reason for the Investigation section includes a brief background overview of the characteristics that led the regulatory agency to begin sampling private drinking water wells including the description of what is suspected or known about a localized PFAS source. This section includes PFAS groundwater data, if known, as well as information about the suspected source. Note to MDEQ: Review MPART summary document. The summary can be the basis of most, if not all, of the information needed for this section.
2. Section 2 – The Sampling Plan Rationale section describes the logic for selecting a given set of private wells for sample collection. Attachment 1 provides some of the factors that should be considered, including groundwater flow speed and direction. The plan should include a map of the sampling area, as well as text explaining the plan, including the

expected spatial extent of the results and the known and/or expected limitations and uncertainties associated with the data. This section should include a proposed timeline for sample collection, analysis, and reporting validated data to partner agencies. Other site-specific information may be highlighted in this section to explain sampling decisions.

3. Section 3 – The Data Evaluation Response Plan section is created using the Private Drinking Water Well Decision Framework (see attachment 2) to guide a multi-agency conversation to determine what actions are taken based on the private well analytical results. The data evaluation response plan identifies actions that limit residents’ risk of hazardous exposures to PFAS contaminated groundwater. The actions must address uncertainties associated with PFAS source location, strength, and movement relative to the location of private drinking water wells. The actions must include communication of residential drinking water results, source characteristics, drinking water recommendations, health education, and the reasons for public health actions.

d. For category 1 and 2 sites, the actions must include one or more of the following approaches:

- i. prompt implementation of an sentinel well program to monitor changes in PFAS concentrations in groundwater over time. The sentinel well system must adequately cover the horizontal and vertical extent of the aquifer to provide early detection of trends toward unacceptable levels of PFAS that may impact private drinking water wells.
- ii. repeat sampling and analysis of private wells for PFAS within the mapped sampling area until a data set is established across seasonal and temporal variations that demonstrates low risk of hazardous PFAS levels occurring in the private drinking water wells.

- iii. MDEQ provides summary of actions and results for the Site Team to use in developing a communications plan for local health department. This explains to residents that the results indicate that private drinking water wells do not require further sampling.

c. For Category 3 sites, the actions are:

- i. timely investigation, ranging from desk-top efforts to sample collection in the field, of the suspected source, and a written summary made by the regulatory agency (MDEQ or US EPA) that will guide the Site Team to move the site to either a Category 2, opening a site investigation, or Category 4, providing residents communication on why groundwater monitoring data is not needed for this site.

d. A Category 4 site will likely only require communication to residents whose wells were tested.

4. Section 4 – Public Health Action Logistics section operationalizes flow of data and information to all departments on the Site Team, results reporting to the residents, health education messaging to individuals and the community, and the delivery of any public health-provided interim alternate water.

Public Health Logistics Plan

The MDHHS, MDEQ, and LPH develop a Public Health Action Plan to provide information to the public, reduce exposure for residents with PFAS concentrations in their private drinking water wells above a public health action level, and/or monitor to make sure that PFAS concentrations do not increase above a public health action level. Based on the recommendations in the PHAP, a monitoring plan is developed. In some instances, the monitoring plan can be combined with interim alternate water, on a case-by-case basis and with justification.

When MDHHS determines that interim alternate water is to be provided in combination with the monitoring plan, MDHHS may provide funding to LPH for interim measures to reduce exposure until a long-term alternate water source is identified. When Interim alternate water is provided, the preferred first option is certified filtration systems with replacement filtration cartridges. MDHHS may also cover the cost of installation of the filtration, if funds are available.

For residents with PFAS levels exceeding the EPA Lifetime Health Advisory (LHA), funding is provided for bottled water to bridge the time gap between resident notification and installation of the filtration system. Phone calls are made as soon as possible to residents with well test results exceeding the EPA LHA to notify them of their results. These calls are typically made by LPH.

Most often, MDHHS provides PFAS private well test results to the residents in the form of mailings. Letter content is developed jointly by MDHHS and LPH.

The MDHHS mailing packet to residents consists of:

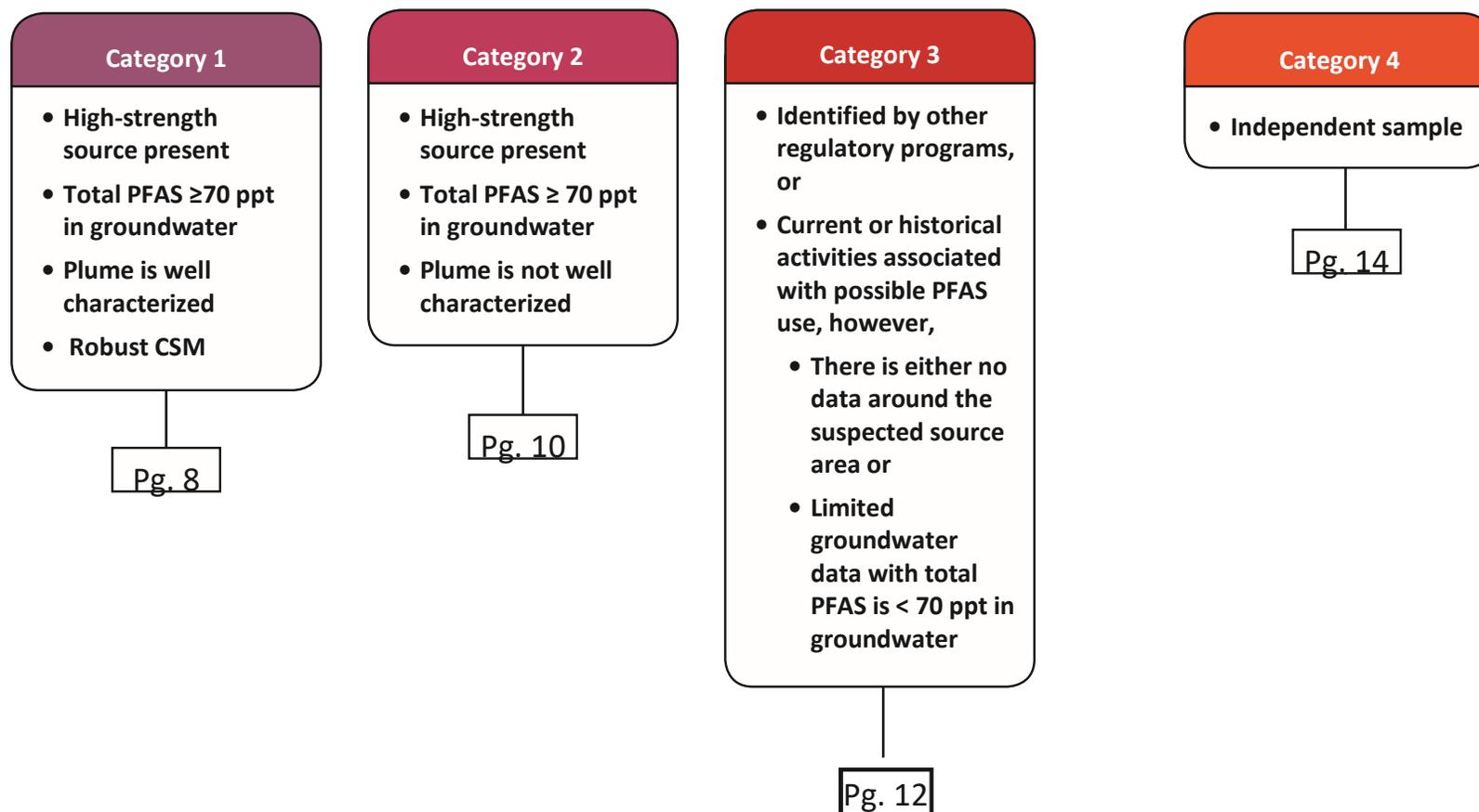
- Private well owner letter including:
- General PFAS information
- General LHA information
- Total PFOA/PFOS result
- Total PFAS result
- Drinking water advisory or recommendation, when applicable
- Contact information
- Signatures of the MDHHS Chief Medical Executive and Local Public Health Officer
- Laboratory report
- Laboratory-specific Understanding Your Well Test Results fact sheet
- Statewide PFAS fact sheet

MDHHS provides LPHs with an encrypted file that includes residential well contact information, well results, and mailing dates.

PFAS in Residential Wells Decision Framework

Category 1, 2, & 3 MDEQ/ PRP Sample

Category 4 Independent Sample



Description of Categories

1 - Known High-Strength Source, Strong CSM: Category 1 sites include those sites for which extensive PFAS investigations that include vertical aquifer sampling (VAS) have been conducted. PFOS + PFOA are ≥ 70 ppt in groundwater, which has triggered MDEQ regulatory authority/action. Based on the results of these investigations, a robust Conceptual Site Model (CSM) characterizing the nature and extent PFAS in soil and groundwater has been developed. The CSM contains comprehensive information on the extent of PFAS in groundwater, including the direction of groundwater flow and the extent of PFAS plumes migrating from identified source areas. In particular, MDEQ evaluates that CSM provides sufficient information with which to identify whether a specific drinking water well is or is not likely to be located within the path of a migrating PFAS plume.

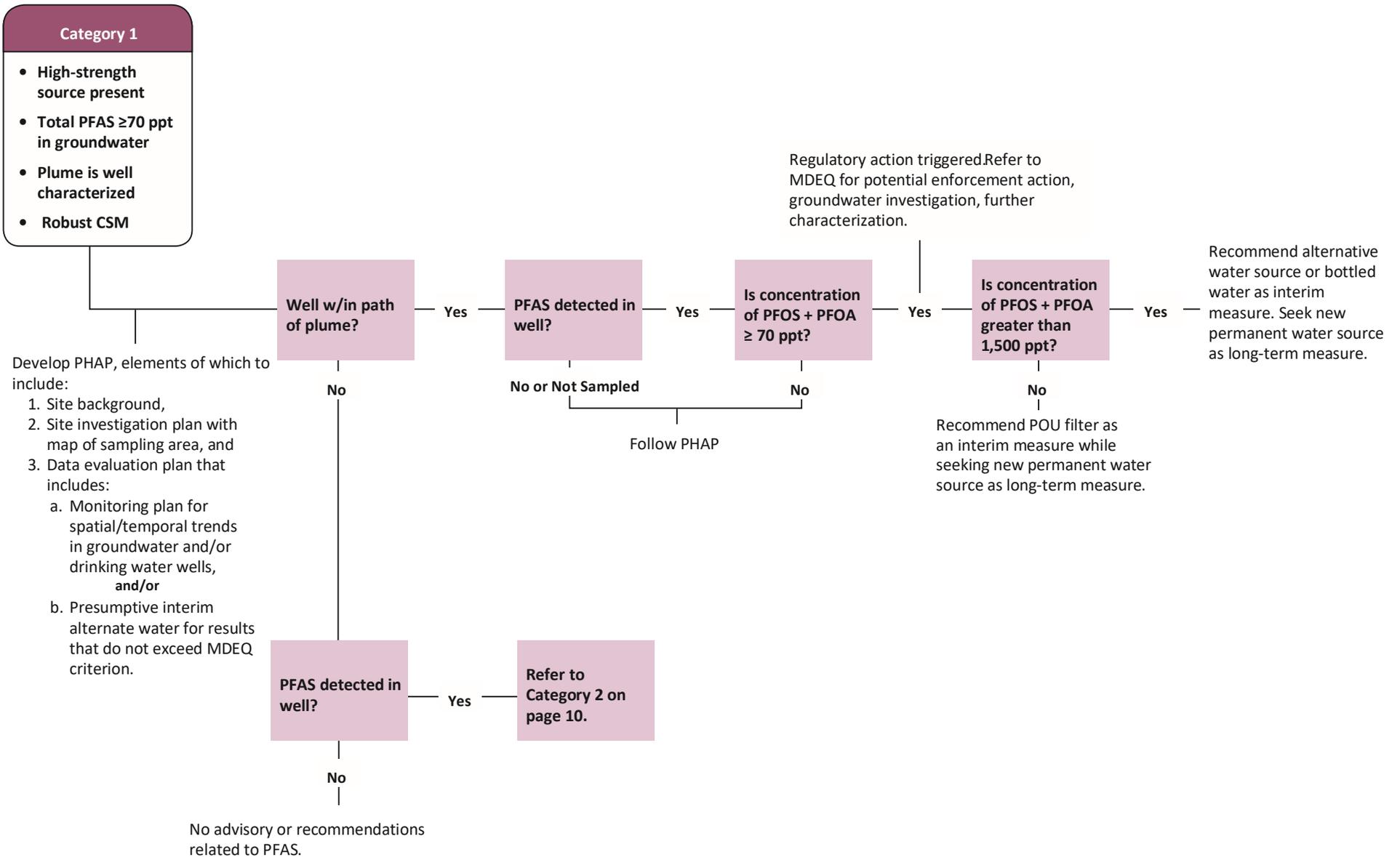
2 - Likely High-Strength Source, Limited CSM: Category 2 sites include those sites for which limited PFAS investigations have been conducted and a strong CSM has not yet been developed. PFOS + PFOA are ≥ 70 ppt in groundwater, which has triggered MDEQ regulatory authority/action. The limited groundwater data (monitoring wells and/or drinking water wells) indicate of concentrated source(s) and documented presence of PFAS ≥ 70 ppt in

groundwater; however, the location(s) and source strength(s) have not been fully characterized. Furthermore, there is limited information available documenting the direction of groundwater flow and/or the extent of PFAS plumes that may be migrating in groundwater in the area.

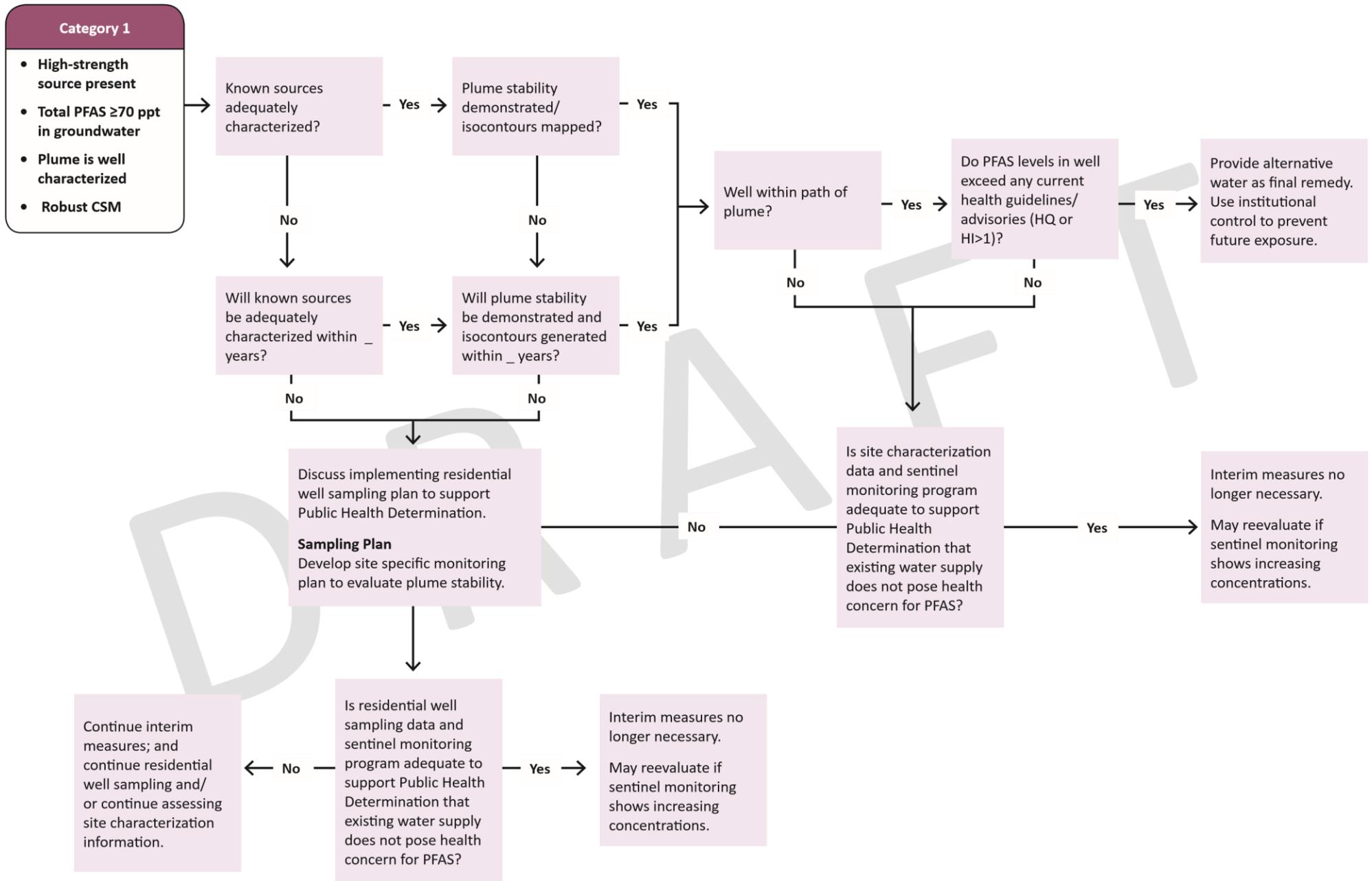
3 - Potential Source: Category 3 sites in addition to land cleanup may include areas potentially impacted by PFAS identified by other regulatory programs. These programs include, but are not limited to: Industrial Pretreatment Program (IPP), the Statewide Testing Initiative, water quality assessments conducted by the MDEQ Water Resources Division, etc. Category 3 sites also include sites where no PFAS investigations have been conducted; however, available information indicates that current and/or historical activities/operations known to be associated with the use of PFAS have been identified in the area. Operations/activities associated with PFAS use include plating businesses, airports, refineries, and land application of biosolids. Although available information documents PFAS-use activities in the area, no or minimal investigations have been conducted to characterize the absence/presence of concentrated PFAS sources or the absence/presence of PFAS in groundwater used as a drinking water source.

4 - Unknown Source: Category 4 sites are sites where no groundwater investigations have been conducted and there are no available records indicating the presence (both current and/or historical) of operations/activities associated with PFAS use. This category is intended to address locations where a property owner/occupant has conducted independent sampling and laboratory results show a presence of PFAS. Public health actions would be dependent on the Hazard Quotient (HQ) or the Hazard Index (HI) for the sample, if one can be calculated. For residential well results with detectable levels of PFAS greater than 70 ppt, suggestive of a nearby high-strength source, MDHHS will notify LPH and MDEQ. The agencies will ensure that the well owner is informed of agency conclusions.

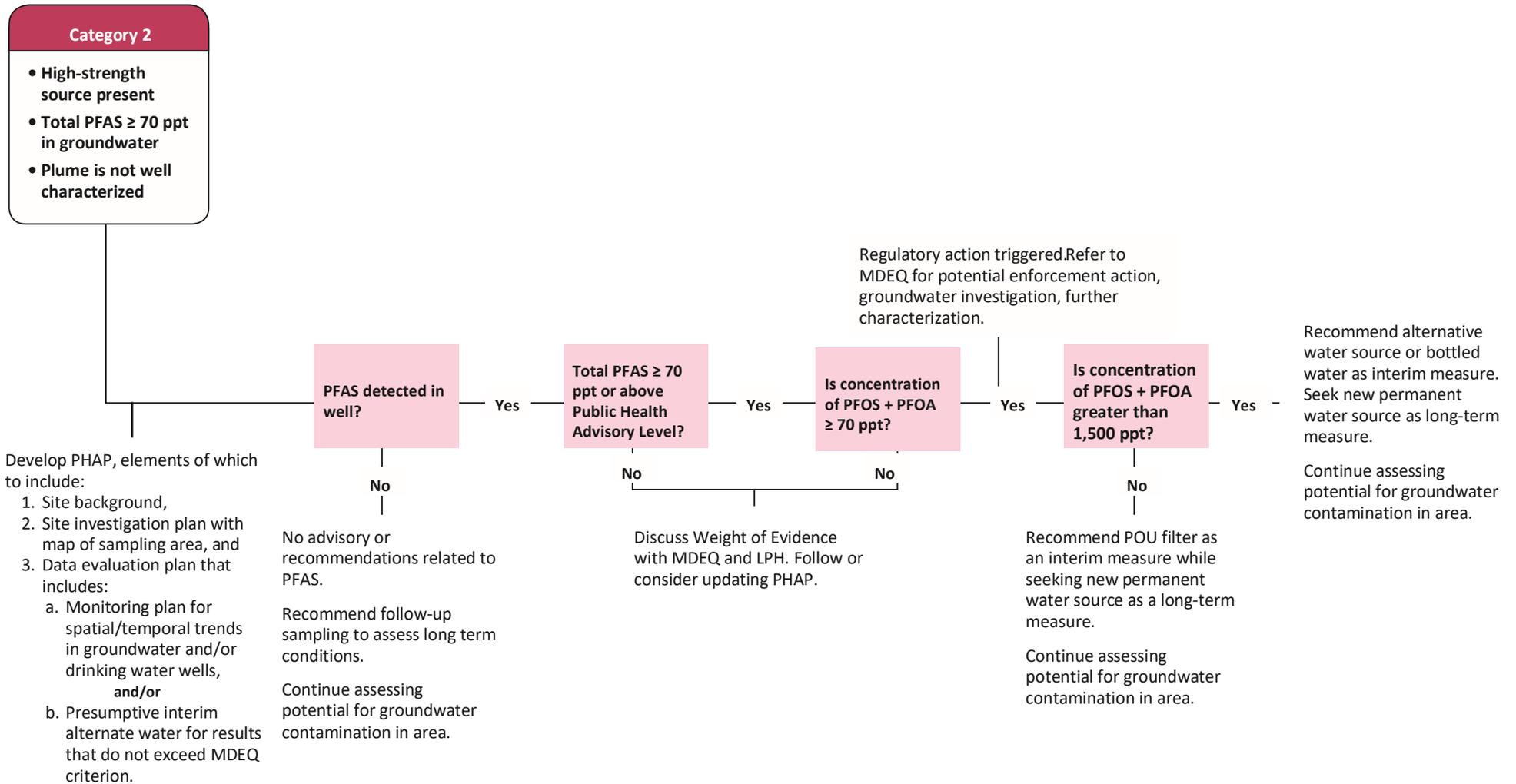
Category 1: Monitoring, Sampling, and Interim Water Planning



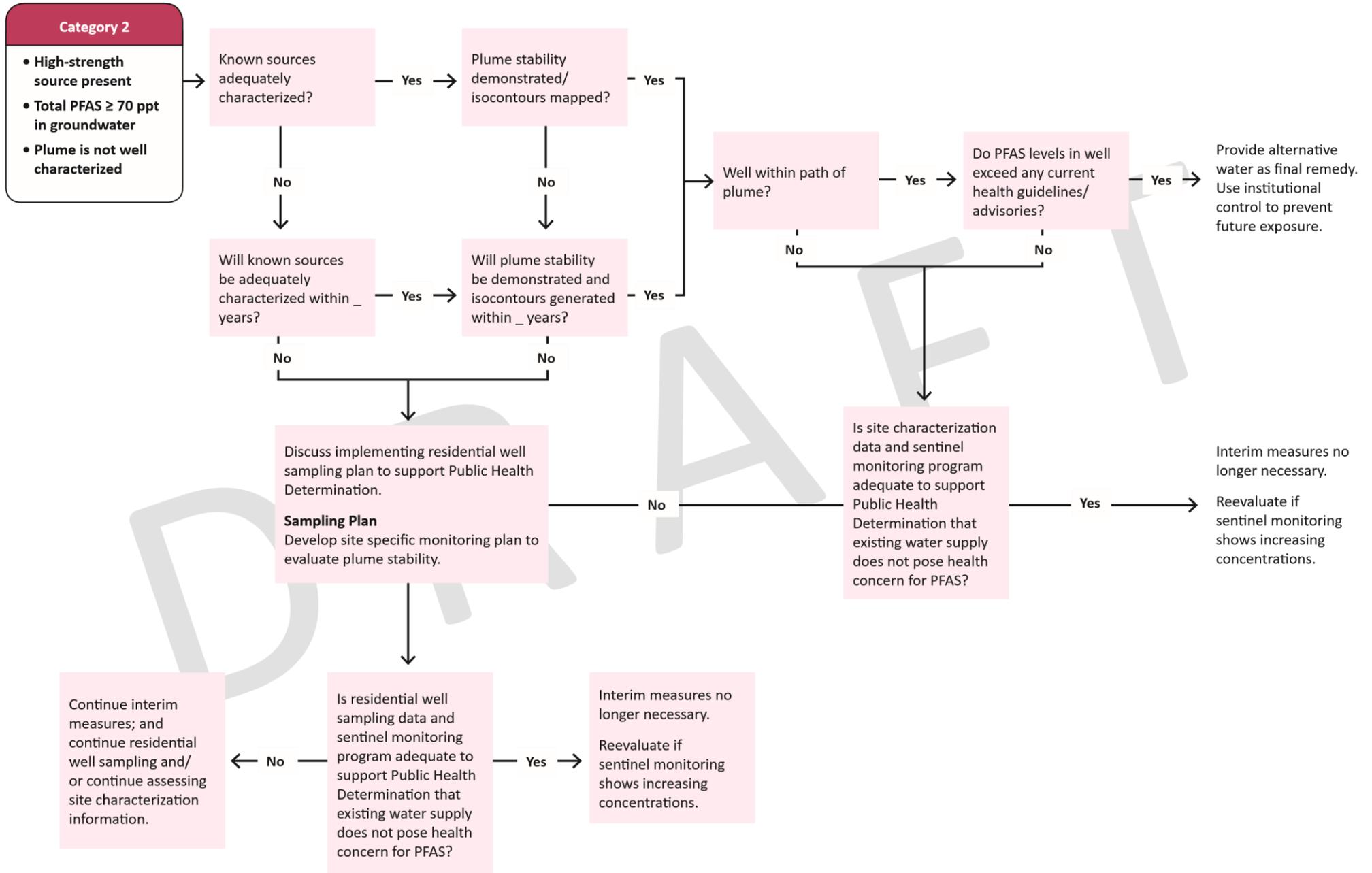
Category 1: Transitioning from Interim Water to Final Remedy



Category 2: Monitoring, Sampling, and Interim Water Planning



Category 2: Transitioning from Interim Water to Final Remedy



Category 3: Monitoring, Sampling, and Interim Water Planning (next page)

Category 3

- Identified by other regulatory programs, or
- Current or historical activities associated with possible PFAS use, however,
 - There is either no data around the suspected source area or
 - Limited groundwater data with total PFAS is < 70 ppt in groundwater

MDHHS calculates HQ or HI

HQ or HI < 1:
Education + personal choice

1 < HQ or HI < 3:
Education + personal choice + recommend alternate water with emphasis on low risk

HQ or HI > 3:
Education + recommend alternate water with emphasis on the elevated risk

HQ or HI = NA
as screening levels are not available for PFAS chemical: Education + personal choice

Regulatory action triggered. Refer to MDEQ or potential enforcement action, groundwater investigation, further characterization.

PFAS detected in well?

No

No advisory or recommendations related to PFAS.

Re-evaluate site if additional information regarding the presence of concentrated PFAS source in area becomes available.

Total PFAS ≥ 70 ppt or above Public Health Advisory Level?

No

Discuss Weight of Evidence with MDEQ and LPH. Develop PHAP to include:
 1. Site background,
 2. Site investigation plan with map of sampling area, and
 3. Data evaluation plan that includes:
 a. Monitoring plan for spatial/temporal trends, and/or presumptive interim alternate water for results that do not exceed MDEQ water criterion

Is concentration of PFOS + PFOA ≥ 70 ppt?

No

Is concentration of PFOS + PFOA greater than 1,500 ppt?

No

Recommend POU filter as an interim measure while seeking new permanent water source as a long-term measure.

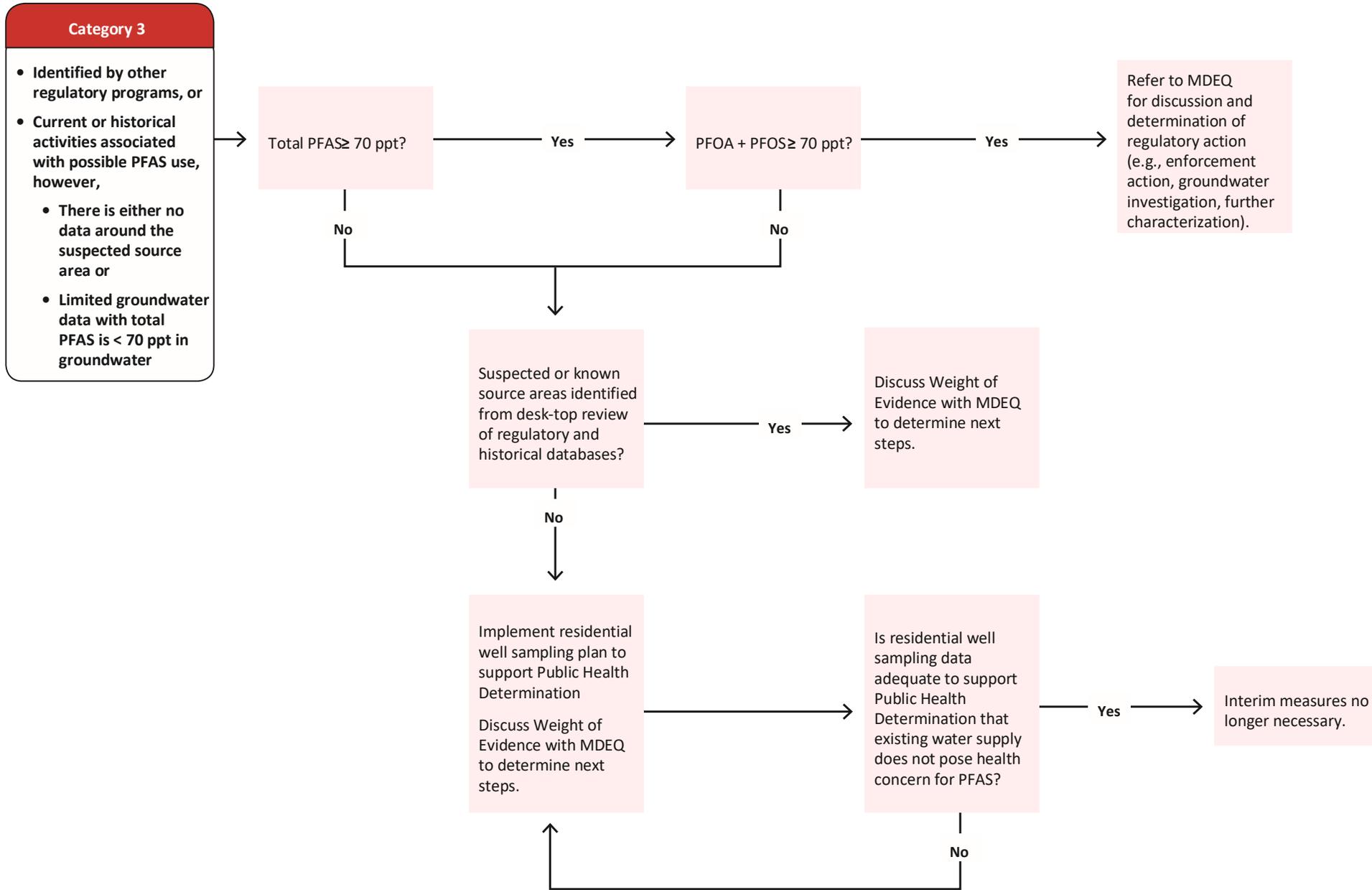
Continue assessing potential for groundwater contamination in area.

Recommend alternative water source or bottled water as interim measure. Seek new permanent water source as long-term measure.

Continue assessing potential for groundwater contamination in area.

Develop PHAP, elements of which to include:
 1. Site background,
 2. Site investigation plan with map of sampling area, and
 3. Data evaluation plan that includes:
 a. Monitoring plan for spatial/temporal trends in groundwater and/or drinking water wells, and/or presumptive interim alternate water for results that do not exceed MDEQ water criterion.

Category 3: Transitioning from Interim Water to Final Remedy



Category 4: Independent Sample

