Alberta Wetland Restoration Directive

November 1, 2016

Title:	**Alberta Wetland Restoration Directive**
Number:	**AEP, Water Conservation, 2016, No. 4**
Program Name:	**Water Policy Branch**
Effective Date:	**November 1, 2016**
This document was updated on:	
ISBN No.	**978-1-4601-3148-0 (Print)** **978-1-4601-3149-7 (PDF)**
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Purpose

The purpose of this Directive is to provide assurance to the Department that wetland restoration actions are meeting intended outcomes to restore wetland area and function. This Directive provides direction to Wetland Replacement Agents (WRA) who undertake wetland restoration actions. This Directive applies only to restoration of mineral wetlands (i.e. marshes, shallow open waters, and swamps).

Policy Context

This Directive supports the Alberta Wetland Policy and the Alberta Wetland Mitigation Directive.

Reference Documents

- Alberta Wetland Regulatory Requirements Guide
- Alberta Wetland Identification and Delineation Directive
- Alberta Wetland Assessment and Impact Report Directive
- Alberta Wetland Mitigation Directive
- Alberta Wetland Classification System
- Alberta Wetland Rapid Evaluation Tool – Actual (ABWRET-A) Manuals
- Professional Responsibilities in Completion and Assurance of Wetland Science, Design and Engineering Work in Alberta

Enforcement / Compliance

Wetland Replacement Agents must adhere to this Directive for a restoration action to be recognized for regulatory purposes.

A wetland restoration plan, validation report, and verification report submitted by a Wetland Replacement Agent must be authenticated by a professional who is governed by a professional regulatory organization in accordance with practice standards set out in the *Professional Responsibilities in Completion and Assurance of Wetland Science, Design and Engineering Work in Alberta*.

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Citation

Government of Alberta. 2016. *Alberta Wetland Restoration Directive.* Water Policy Branch, Alberta Environment and Parks. Edmonton, Alberta.

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1. Introduction to Alberta's Wetland Replacement Program

The Alberta Wetland Policy requires an Applicant to follow the mitigation hierarchy (avoid, minimize, replace), and, where permanent loss of wetland area is approved, comply with wetland replacement requirements. There are two types of replacement:

- Restorative – wetland restoration, enhancement and construction
- Non-restorative – science, data, research and education related to wetlands

Restorative replacement is fulfilled by any of the following mechanisms:

1) Purchase of credits from a third-party wetland bank[1], or trade in available first-party credits. A wetland bank is a wetland, or collection of wetlands, that is restored, enhanced or constructed for the explicit purpose of providing wetland that meets the restorative replacement requirement in advance of an authorized loss of wetland area.
2) Payment to the in-lieu fee program allocated to restorative replacement. A third-party agent is obligated to expend in-lieu fees on restorative replacement actions approved by the province. At this time, in-lieu fees are paid directly to the designated Wetland Replacement Agent[2,3].
3) Undertake a permittee-responsible replacement action, whereby the Applicant restores, constructs or enhances a wetland.

The steps involving a wetland restorative replacement action are as follows (See Figure 1):

1) A wetland restorative replacement plan is submitted to the regulatory body for review and approval prior to the Wetland Replacement Agent (WRA) undertaking any replacement actions.
2) The restorative replacement action is undertaken according to the approved plan.
3) A validation report is submitted to the regulatory body within 30 working days after the restoration action is completed, confirming that the restorative replacement action was undertaken according to the approved plan.
4) Basic site monitoring is conducted annually, and wetland vegetation monitoring is conducted (at a minimum) in years three and four after the restoration action is completed. A WRA may wish to monitor for a longer period prior to verification if they deem the wetland needs more time to establish or if adaptive management is necessary.
5) A verification report is submitted to the regulatory body, including both monitoring and ABWRET assessment results. A third-party verifier must assess and conclude whether the site was successfully established and on a trajectory to become a healthy, functional wetland.

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[1] Details about wetland banking processes are under development.

[2] This interim process will continue until the Department sets up a wetland replacement account. This includes specifying how a portion of in-lieu collected may be allocated toward non-restorative replacement actions.

[3] Wetland Replacement Agent (WRA) is an entity that is responsible for undertaking replacement action, including submitting required documents to the regulatory body. A WRA may be a first party - an approval holder undertaking a permittee based restorative replacement, or a third party – a wetland bank or entities undertaking restorative replacement through the in-lieu fee program.

Once steps 1 to 5 have been completed, and the regulatory body has reviewed and accepted the verification conclusion, the site will be recognized as a restorative replacement wetland for regulatory purposes.

Figure 1. Wetland restorative replacement process steps.

2. Wetland Restorative Replacement Directive Background and Purpose

Types of restorative replacement recognized by the Alberta Wetland Policy include wetland restoration, construction or enhancement. The definitions of each type are provided below.

1) Wetland restoration refers to the re-establishment of hydrology, vegetation and wetland processes within a previously drained wetland.
2) Wetland construction refers to the creation of a new wetland on land that was previously upland, or that is designed into a portion of an artificial system such as a stormwater pond or excavation pit.

Both restoration and construction will result in an increase in wetland area *and* function.

3) Enhancement refers to actions taken to increase the function and/or health of an existing, albeit degraded, wetland.

This Directive applies to wetland restoration of mineral wetlands (i.e. marshes, shallow open waters, and swamps) undertaken as part of a wetland bank, in-lieu program, or permittee-responsible restoration.

The purpose of this Directive is to provide assurance to the Department that wetland restoration actions are meeting intended outcomes to restore wetland area and function. Separate directives will be published in the future for wetland construction and enhancement, as well as for monitoring standards and guidelines.

2.1. Roles and Responsibilities

A Wetland Replacement Agent (WRA) is the party undertaking and responsible for the restoration action. The restoration plan, validation and monitoring steps may be conducted by and authenticated by employees of a WRA or may be authenticated by an independent third party. However, verification must be conducted by an independent third party to conclude whether or not the site is healthy and functional, based on the monitoring results and an ABWRET assessment.

A wetland restoration plan, validation report, and verification report submitted by a WRA must be authenticated by a professional who is governed by a professional regulatory organization in accordance with practice standards set out in the *Professional Responsibilities in Completion and Assurance of Wetland Science, Design and Engineering Work in Alberta*.

Wetland restoration actions may be inspected by the regulatory body as part of the wetland replacement program to audit individual projects and to evaluate the overall program.

2.2. Regulatory Context

Any applicable regulatory authorizations and approvals must be obtained prior to execution of a wetland restoration project. If an engineered structure is required, regulatory approval for the structure must also be obtained. Where wetland drainage has been authorized under the *Water Act* or its predecessor acts, the regulatory body may amend or cancel that authorization in consultation with the approval holder.

Wetlands that have been restored for regulatory purposes are subject to replacement requirements of the Alberta Wetland Policy.

2.3. Ownership and Agreement

Consent from the landowner (private or Crown-owned) and consent from any other third parties that may be affected by the restoration actions must be obtained by the WRA prior to submission of a restoration plan to the department.

The WRA must submit a signed agreement with the landowner and affected third parties to the regulatory body as part of the replacement plan. The agreement must secure the restored wetland or collection of wetlands for a 10-year term, stated in the terms of the agreement, a conservation easement, or fee simple purchase. It is recommended the agreement also include the following:

- A description of the roles and responsibilities of each party
- Permission for the restoration crew, third-party consultants, and government staff to access the site during the 10-year term, for the purposes of performing a site assessment, restoration actions, monitoring, maintenance, and auditing of the restoration site
- Agreement between parties of restricted activities within the restored wetland, and relevant plans (e.g. grazing management plan within wetland)
- An understanding that the landowner and all involved parties must apply for *Water Act* authorization and are subject to the Alberta Wetland Policy if they wish to perform an activity within the restored wetland at a later date
- Landowner acknowledgement that activities that activities occurring in the restored wetland without *Water Act* authorization will be reported to the regulatory body

3. Wetland Restoration Plan

Successful restoration involves re-establishment of natural hydrology, vegetation, and wetland processes within a previously drained wetland. A detailed Wetland Restoration Plan, authenticated by a professional as set out in Section 2.1, must be submitted to the Department, as part of the regulatory application prior to undertaking a restoration project. The restoration plan must contain the following information, as described in the following subsections:

- Landowner and third party agreements (Section 2.3)
- Team roles (Section 3.1)
- Wetland Objectives (Section 3.2)
- Site Assessment (3.3)
- Wetland Restoration Methods (3.4)
- Restoration Plan Statement (3.5)

3.1. Team Roles

The restoration plan must include a brief description of the qualifications of the WRA team members, including:

- The WRA name and contact information
- Name and contact information of all authenticating professionals
- Restoration team members, their role, and description of their qualifications and competencies

3.2. Wetland Objectives

The Alberta Wetland Policy recognizes and manages both wetland area and functions, including the hydrologic processes of a wetland, its ability to improve and protect water quality, the biodiversity and habitat it contains, and its use by humans. A successfully restored wetland should exhibit multiple functions, although it may perform better at certain functions than others. For example, a wetland may not provide habitat for fish, but may provide habitat for other flora and fauna such as amphibians, invertebrates, or wetland vegetation biodiversity.

Objectives should be clearly stated in the restoration plan, and be realistic, measurable and achievable. Each restoration plan must have objectives related to the restoration of the hydrology, soils (over time), and vegetation, and must consider both site-specific conditions and regional landscape context. Objectives must include the following:

1) Wetland class, form and type to be restored,
2) Targeted wetland zones and plant communities,
3) Size of the restored wetland, and
4) Targeted wetland functions.

Functional objectives of a restoration plan should be linked to wetland models described in the ABWRET-A, since the site will be verified using this tool. Objectives must refer to specific wetland functions (e.g. amphibian and invertebrate habitat) rather than general functional groups (e.g. “we aim to restore biodiversity”). Objectives that align with local, municipal, watershed or regional land use plans are encouraged.

3.3. Site Assessment

Selection of a site for wetland restoration should consider informed science and best professional judgment to increase the likelihood of wetland establishment and success. Appropriate site selection should consider regional variation, landscape context, surrounding land uses and projected threats and stressors.

To qualify for restoration, the site must meet the following criteria:

- Be a previously existing wetland that has been drained via ditch or tiles
- Occur in a landscape position where hydrology can be appropriately re-established
- Align with geographic preference for replacement, as set out in Section 7 of the Wetland Mitigation Directive
- Occur in a position where the restored site can be integrated into the surrounding landscape, and will be resilient to anticipated pressures or stressors.

Site selection is one of the most important aspects of wetland restoration, and should take into consideration both local and watershed conditions. This will aid in evaluating and comparing potential sites, setting wetland objectives and devising the restoration methods. A site assessment must be conducted at an appropriate time of the year during the growing season, preferably between June 1 and September 1, but can extend into other times of the snow-free season.

Table 1 Site Assessment Tasks and Reporting Requirements

Site Assessment Task	Site Assessment Reporting Requirements
Site assessment information	• Authenticating professional's name, contact information, signature, professional designation and date • Assessment date
Site location	• Relative Wetland Value Assessment Unit • Legal land description of restoration site • GPS location of centre of each wetland to be restored
Delineation and classification (as per Directive and AWCS Guide)	• Anticipated delineated wetland area and anticipated wetland class of each wetland, based on desktop and field delineation and classification aided by o Historical air photo review, remote sensing o Topographic breaks/slope position, elevation of the ditch, remnant vegetation and soils indicators, if available, and where appropriate
Landscape characteristics	• Surrounding land uses • Landscape position and watershed setting (e.g. headwater, toe of slope, etc.)
Hydrology	• Natural inlets or outlets • Water levels and anticipated amplitude • Calculate effective supply area for an engineered structure • Groundwater characteristics, if monitoring data are available (e.g. perched, local groundwater table, regional groundwater fed)
Impacts and disturbances	• Location of ditches or other disturbances in the wetland (e.g. berms, dugouts) • Estimated time since the impact occurred (e.g. when was the drain installed) • Extent of the impact (e.g. partial versus full drainage/resultant change in class) • Photos with GPS locations and descriptions
Physical measurements	• Measurement of full supply level (FSL) and basin characteristics using accurate spot elevation methods (e.g. real time kinetic survey). This includes spot elevations of: o the basin FSL o the center of ditch at plug location o basin FSL around the extent of the basin o cross sectional transect lines through the deepest portion of the basin o additional measurements for control structures as required by the regulating body
Soils	• General soil classification, if necessary
Vegetation (as per Alberta Wetland Classification System)	• Best professional judgement of seed bank integrity • Anticipated wetland community and zones, based on wetland characteristics and regional context • Dominant plant species and wetland indicator status • Weedy species presence, if visible
Water chemistry	• Salinity or conductivity measurement, if open water is present, or based on observed evidence (e.g. salt encrustations) • Additional information may be requested by regulatory body
Wildlife	• Potential suitable habitat for specific wildlife • Additional information may be requested by regulatory body
Impacts of wetland restoration actions to downstream landowners	• Surface water impacts, such as altered drainage patterns, downstream water volumes • Anticipated downstream user impacts • Impacts to third parties with surface or subsurface leases • Proximity to airports, municipalities and roads

3.4. Wetland Restoration Methods

Restoration involves re-establishment of natural hydrology, typically via installment of a ditch plug or engineered structure, or removal of drainage tiles. Other types of restorations may be possible, as described in Table 2.

Table 2. Restoration Approaches

Type of Wetland Disturbance	Restoration Approach
Ditch or drain at wetland outlet	Earthen ditch plug[4] or engineered structure[5]
Diversion of water source from wetland	Return water source to wetland
Tile drains	Tile drain removed or rendered inoperable

Wetland Restoration Methods must contain the following information:

- The restoration approach (see above)
- Design specifications and plans
- Restoration activity schedule and budget
- Restoration planting techniques, timing, and species lists (see details below). This includes selection of passive (natural succession and colonization of vegetation through dispersal and existing seed bank) versus active planting techniques.
  - Consider employing active planting if the source of native plant species dispersal is poor and/or seed bank integrity is low. Level of disturbance (e.g. cultivation, presence of weedy species), distance from other wetlands, and wetland class may influence which technique is employed.
- Use of salvaged soils and/or vegetation from donor sites, if available and appropriate; consider the condition of soil and vegetation at both the restoration and donor site
- Planting of native perennials and woody species in adjacent upland to provide habitat for waterfowl and songbirds, and to provide a physical-chemical buffer from surrounding land uses and disturbances

If active planting is selected, the restoration plan must consider the following principles:

- Use of appropriate wetland seed mixes that include only species native to the region and adapted to the local conditions within the wetland
- Use of appropriate planting techniques for wetland species within each wetland zone present at the site (note that not all wetland zones may be present at a site):
  - Wet meadow
  - Shallow wetland
  - Deep wetland
  - Open water
- Seeding and planting at an appropriate time of the year and at appropriate water levels to promote germination of specific species.

[4] For additional guidance on ditch plug wetland restoration see the Minnesota Wetland Restoration Guide: Blocking and Filling Surface Drainage Ditches: Technical Guidance Document, Document No.: WRG 4A-1. Oct 14, 2015.

[5] Specific site conditions may require a structure to limit impacts to downstream or adjacent landowners/users or to limit downstream environmental impacts. An engineered structure is often required where the 1:100 year flood flow is greater than 0.5 cms, or where 50% probability of exceeding mean annual runoff that is greater than 25,000 cubic metres.

Figure 2. Example of ditch plug restoration, restored in the same year as the photo was taken.

The regulatory body reviews the restoration plan for completeness of information and compliance with restoration plan requirements, prior to approval. The regulatory body may request re-submission if the plan does not meet requirements. The regulatory body may also request additional information.

3.5. Restoration Plan Statement

- The restoration plan statement is a written confirmation of the restoration process, authenticated by a professional as set out in Section 2.1, and must contain:
- Title of the restoration
- Addressee
- *Water Act* Approval number, or other authorization number, if applicable
- Wetland legal land location and GIS coordinates
- Date of restoration commencement and expected date of completion
- A statement as to whether the wetland restoration actions comply with this Directive
- A statement confirming that the WRA has appropriate resources to undertake and complete wetland restoration actions according to the plan
- A statement concluding whether the restoration plan is sufficiently robust to establish a healthy, functioning wetland
- Contact information of Authenticating Professional, signature, professional designation and date

The regulatory body reviews the restoration plan for completeness of information and compliance with restoration plan requirements. The regulatory body may request re-submission or supplementary information if the restoration plan does not meet requirements.

4. Wetland Restoration Validation

This section outlines the requirements for validating that wetland restoration was completed according to the wetland restoration plan.

A desktop review and at least one site visit are required for validation assessment. A Wetland Validation Report must be submitted to the regulatory body within 30 working days of completing the restoration action. For example, if a restoration ditch plug is installed by September 30, but seeding and planting is completed by April 30 of the following year, the validation report is due on May 30. A desktop review and at least one site visit are required for validation assessment.

A Wetland Validation Report must contain the following information:

- Validation team roles
- Validation assessment
- Validation statement

4.1. Validation Team Roles

A brief description of the Validation Team must be provided. This description includes:

- The WRA name and contact information
- Authenticating validator's name and contact information
- Validation team members, their role, and description of their qualifications and competencies

4.2. Validation Assessment

Validation must assess if a) the wetland restoration actions were undertaken and completed according to the restoration plan and b) the restoration is likely to succeed, based on the authenticating validator's best professional judgement. Specific factors that need to be addressed are:

- Whether or not the restoration approach (e.g. earthen ditch plug) was undertaken according to the restoration plan
- Whether or not the restoration works (i.e. earthworks or engineered structures) were installed and operating as intended
- Whether or not the delineated wetland meets the intended area and class stated in the restoration plan
- Restoration activity completion timelines (e.g. as scheduled)
- Whether or not the Hydrology has been adequately restored. Specific considerations include:
  - water levels, including comparison to restoration plan
  - inlets and outlets
- A report on the status of other restoration actions, including vegetation planting techniques

4.3. Validation Statement

The validation statement is a written summary of the validation process, authenticated by a professional as set out in Section 2.1, and must contain:

- Title of the restoration project
- Addressee
- *Water Act* Approval number, or other authorization number, if applicable
- Wetland legal land location and GIS coordinates
- Date of validation site assessment
- A statement as to whether or not the wetland restoration actions comply with this Directive
- A statement as to whether or not the wetland actions were undertaken and completed according to the approved wetland restoration plan
- Any deviations that occurred from the approved restoration plan, including any anticipated effect on the likelihood of wetland establishment and success
- Authenticating validator's contact information, signature, professional designation and date

The regulatory body reviews the validation report for insufficient information and compliance with validation requirements. The regulatory body may request re-submission or supplementary information if the validation report does not meet requirements.

5. Wetland Restoration Monitoring

The purpose of monitoring is to track changes in the condition of a wetland over time using vegetation and other indicators. Basic monitoring and maintenance inspection should be conducted annually, at a minimum, beginning in year one. Vegetation monitoring must be performed, at a minimum, during the third and fourth growing season, between June 1 and August 31.

Vegetation monitoring may require calculation of vegetation indices and indicators. Two such indices, called the Index of Biological Integrity (IBI) and Floristic Quality Index (FQI)[6], are currently being developed in Alberta. Adaptive management is encouraged to control weedy species and resolve site deficiencies, where required. Monitoring must include:

- Record of annual maintenance checks
- Photographic evidence of the wetland taken from the same vantage points annually
- Annual assessment of wetland class and size
- Annual measurement of water levels taken from the same location
- Annual inspection of soil indicators

[6] Regional IBI's have either been developed or are currently being developed for the Parkland and Grassland natural regions of Alberta. Wetland Monitoring Guides and Directives will be released by the Department in advance of the need for the monitoring requirements of this Directive.

- Evidence of wildlife use
- Vegetation indices and indicators, monitored in years three and four at a minimum
    - Species list and relative percent cover in each plant community zone (e.g. wet meadow, shallow wetland, deep wetland, open water)
    - Average total percent cover of vegetated versus non-vegetated area (target is > 75%) within two 1 x 1 meter quadrats placed at three transects
    - Average relative cover of native perennial wetland plants within the vegetated zone (target is > 60%) within two 1 x 1 meter quadrats placed at three transects
    - Relative cover of invasive species within the vegetated zone (target is < 10%) within two 1 x 1 meter quadrats placed at three transects
    - Vegetation condition calculated using appropriate regional IBI and/or FQI where available (target is above the 25th quartile of regional calibration sites), based on vegetation relative cover within two 1 x 1 meter quadrats placed at three transects
    - Planting success, if applicable

6. Wetland Restoration Verification

This section outlines the requirements to verify that a wetland is functioning and to confirm through monitoring tools that the wetland has been established and is on a trajectory toward a healthy state.

Verification must occur a minimum of four years after the wetland has been restored. The Verification Report must be completed by an independent third party professional. The WRA must submit the Verification Report to the regulatory body within 60 working days of verification completion.

A desktop review and at least one site visit are required for verification. A wetland Verification Report must contain the following information:

- Verification team member roles
- Monitoring results and synthesis
- Verification assessment
- Verification conclusion

6.1. Verification Team Roles

A brief description of the verification team must be provided. This includes:

- The WRA name and contact information
- Authenticating verifier’s name and contact information
- Verification team members, their roles, and description of their qualifications and competencies
- Independence statement of the team

6.2. Monitoring Results and Analysis

Wetland verification assessment is a process in which a verifier determines if the wetland restoration actions comply with the restoration actions required under this Directive, and the wetland is on a trajectory toward a healthy, functioning ecosystem. At a minimum, the verification assessment must include the following:

- Estimated wetland size and class, based on monitoring data above
- Evaluation of monitoring data collected to confirm accuracy, quality and completeness
- Submission of all monitoring results and analysis, based on standards that are stated within monitoring and reporting requirements (when made available)
- Evaluation of monitoring results, including vegetation monitoring indices and indicator scores (IBI and FQI results, in regions where they are available)
- Actual relative wetland value at the point of verification (result of ABWRET-A assessment)

6.3. Verification Assessment of Relative Value

The relative value of a wetland or collection of wetlands at a site will be determined at the point of verification using the Alberta Wetland Rapid Evaluation Tool – Actual (ABWRET-A). In order to assist the WRA in the planning of restoration actions, the regulatory body has set the following rules:

- Wetland restoration undertaken through the permittee-responsible program is based on a C-value replacement ratio. The relative value determined at the point of verification will be used to collect information on restoration program success, but will not be used to penalize or reward a WRA if the relative value is other than C-value.
- Restoration undertaken through the in-lieu program is based on a D-value replacement ratio. The relative value determined at the point of verification will be used to collect information on restoration program success, but will not be used to penalize or reward a WRA if the relative value is other than D-value.
- The relative value of each wetland in a wetland bank is based on the relative value determined by an ABWRET-A assessment at the point of verification, and may range from A to D; a wetland bank may be eligible for advance credit release, subject to meeting regulatory body specified wetland bank requirements.

These requirements are subject to change, as informed by the regulatory body's ongoing review of the wetland restoration program.

6.4. Verification Conclusion

The verification conclusion, authenticated by a professional as set out in Section 2.1, must be presented as a summary letter (separate page) at the front of the Verification Report. The conclusion must contain:

- Title of the restoration project
- Addressee
- *Water Act* Approval number, or other authorization number, if applicable
- Wetland legal land location and GIS coordinates

- Date of verification site assessment
- A statement concluding that the restoration works are in good condition and performing as intended
- A statement concluding whether or not the restoration action has resulted in wetland area, class and value that are equivalent to the restoration plan
- A statement concluding whether or not the wetland has become established and is on a trajectory towards a healthy functioning wetland, based on the results and discussion of monitoring data collected and analyzed
- A statement indicating whether or not indicators and biomonitoring tools (i.e. IBI and FQI) reflect achievement of targets stated in the monitoring criteria
- If relevant, probable causes of deviation from intended or anticipated health, function, class or area of the wetland
- Contact information of authenticating verifier, signature, professional designation and date

The regulatory body will review the verification report for completeness and compliance with verification requirements prior to approving the action as a verified restoration site. The regulatory body may request re-submission or supplementary information if the verification report does not meet requirements.

7. Records Management and Registry

A WRA must keep records of the restoration actions, and provide them upon request of the regulatory body. In the future, a provincial wetland registry will be available for a WRA to submit verified restoration sites. The registry will be a publicly accessible database that displays:

- Wetland losses, and associated wetland replacement actions
- Replacement actions that meet Alberta Wetland Policy requirements
- Replacement actions undertaken in advance of wetland loss (i.e. wetland bank)

Contact Information

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Authorities

Original signed by: Date: November 1, 2016

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