REPORT FOR THE ECONOMIC REGULATION AUTHORITY INQUIRY INTO WATER RESOURCE MANAGEMENT AND PLANNING CHARGES

DEPARTMENT OF WATER'S PROCESSES

FINAL REPORT – 12 MARCH 2010

Quantum
management consulting & assurance

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1.0	4 March 2010	QMCA	First Draft
1.1	9 March 2010	QMCA	Minor updates based on feedback from ERA
Final	12 March 2010	QMCA	Minor updates based on feedback from DoW

Disclaimer

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BACKGROUND

The Economic Regulation Authority (Authority) has received a reference from the Western Australian Government to conduct an inquiry into water resource management and planning charges. The Terms of Reference for the inquiry are provided in Attachment A.

The Authority published a Draft Report on 3 December 2009 and a Final Report is due by 29 October 2010.

To assist in addressing matters raised in the Terms of Reference from the Government, the Authority appointed Quantum Management Consulting & Assurance (Quantum) to undertake a process review of some of the Department of Water's (DoW) water resource management and planning functions. Only functions relevant to potential cost recovery have been reviewed and not all functions of the DoW.

OBJECTIVES

For each of the Department's water resource management and planning functions, describe in detail the processes used by the Department. The process review of the DoW should include:

- a process map and detailed description of the activities and tasks undertaken for each function, and the processes and systems used to carry out these tasks and activities;
- identifying the number of full time equivalents (FTEs) allocated to undertake each function, and activities within each function;
- case studies that illustrate the typical processes for different activities within each function; and
- a description of the process by which the DoW allocates the costs of executive, corporate and enabling functions to the services which they support.

While the focus of the advice should be on a clear description and presentation of the DoW's activities and processes, the consultants should also indicate if there are any activities where it could be possible to improve the effectiveness of the processes.

WATER RESOURCE MANAGEMENT AND PLANNING FUNCTIONS

Assess, Allocate and Licence Water Resources

- Licensing
- Compliance and Enforcement
- Allocation Planning (including Environmental Water Planning)
- Groundwater Assessment, Investigation & Review
- Surfacewater Assessment
- Water Measurement and Information (Note 1)

Metering

- Metering

Urban Water Management

- Water and Land Use Coordination

Manage Water Quality

- Water Source Protection

Executive, Corporate and Enabling Functions

- Executive and Corporate Services, where allocated to the above activities (Note 2)

NOTES

(1) Activities in the Water Measurement and Information functions are integral parts of other functions mapped in this report and therefore, have not been shown as separate processes.

(2) Executive and corporate activities are not currently allocated to the above activities, so these processes have been excluded from this report.

APPROACH

The approach to this engagement comprised:

- Consult with the Authority's Project Manager to gain a clear understanding of the background and requirements for this project
- Review the draft report published on 3rd December 2009 on the Authority's inquiry into the water resource management and planning charges
- Review available supporting material/ information on the current business processes of the Department of Water (DoW) (eg Annual Report).
- Identify key personnel at the DoW to consult with and provide a briefing on the assignment
- Obtain relevant documentation from the DoW (eg operating policies and procedures, job descriptions, previous functional reviews).
- Undertake consultation with the DoW's staff to obtain an understanding of the processes
- Obtain an organisation chart with the approved/current FTE complements
- Develop process maps in the agreed format for the nominated business processes
- Develop detailed descriptions of the activities, tasks, personnel and systems
- Identify the number of staff allocated to undertake each activity and function.
- Write case studies that illustrate the typical processes for different activities within each function eg assessment and issue of a water licence.
- If overhead costs are allocated, write a description of the process used to allocate overhead costs to the services which they support, using actual data for 2008/09 as an example.
- Progressively obtain feedback from the Department on the process maps and descriptions to confirm their accuracy.
- From analysis of the process maps and descriptions, highlight potential improvements in the effectiveness of processes.
- Develop a written report including the required outputs and any suggested process improvements.
- Provide the draft report to the Authority and the DoW for feedback
- Issue final report to the Authority and the DoW

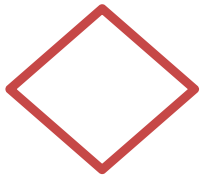
ACKNOWLEDGEMENT

Quantum Management Consulting & Assurance gratefully acknowledges the assistance of the Department of Water's staff to our consultants in the preparation of this information and providing valuable feedback during the engagement.

PROCESS MAP LEGEND

Process

Alternate Process



Decision

Document

Terminator

GLOSSARY

ABR	Australian Business Register
AO	Administration Officer
ASIC	Australian Securities and Investments Commission
ASO	Assessing Officer
ASS	Acid Sulphate Soils
DEC	Department of Environment and Conservation
DoW	Department of Water
E	Engineer
EO	Environmental Officer
EPP	Environmental Protection Plan
GAM	Groundwater Assessment Manager
GIM	Groundwater Investigations Manager
GIS	Geographical Information System
GRR	Groundwater Review Manager
H	Hydrologist (above ground water)
HG	Hydrogeologist (below ground water)
IO	Issuing Officer
LUP	Land use planning
NRMO	Natural Resource Management Officer
PID	Project Initiation Document
PM	Project Manager
PO	Project Officer
PSO	Project Support Officer
RAA	Regional Administration Assistant
RH	Regional Hydrologist (above ground water)
RHG	Regional Hydrogeologist (below ground water)
RIWI	Rights in Water and Irrigation Act 1914
RO	Records Officer or Regional Officer
SAT	State Administrative Tribunal
SE	Supervising Engineer
SH	Senior Hydrologist (above ground water)
SHG	Senior Hydrogeologist (below ground water)
SNRMO	Senior Natural Resource Management Officer
SRS	Statutory Referral System
TO	Technical Officer
TRIM	Electronic document management system
WAPM	Water Allocation Planning Manager
WIN	Water Identification Number database
WRL	Water Resources Licensing database

LICENSING

SUMMARY

Currently there are 52 groundwater and 22 surface water management areas proclaimed under the Rights in Water and Irrigation Act 1914 (RIWI Act). These cover the major water resources of the State, and licensing is active in most areas.

Licences are required for all artesian groundwater wells throughout the State. The DoW aims to protect the interests of existing users and the environment by only issuing new licences if the total number issued in an area will not exceed the allocation limits for the resources.

In areas proclaimed under the RIWI Act, the DoW ensures that water use is within sustainable limits.

Proclaimed Areas

In proclaimed areas under the RIWI Act it is illegal to take water from a water course or groundwater aquifer without a licence. Applications for water licenses are made through DoW's regional offices. A licence does not guarantee that water is always available to be taken. During drought periods restrictions are applied so that the available water is shared, and damage to the environment, the resource and users is minimised. Conditions define how and when water may be taken and specify obligations the licence holder must meet when using the water.

Unproclaimed Areas

Water can be taken from watercourses in unproclaimed areas without a licence so long as the flow is not "sensibly" diminished, affecting the rights of downstream users. Water can also be taken from unproclaimed groundwater areas provided the water is from a non artesian source. If conflict arises, the DoW can issue a direction defining the amount, the purpose and the way water may be taken.

Water Licensing

The Water Licensing function issues licences and permits to take water for commercial use and public water supply, consistent with the RIWI Act. The Perth branch also develops policies to support the equitable sharing of water resources and the water licensing process.

The DoW has to consider a range of factors as part of the licence assessment process including the public interest, ecological and environmental factors, future water needs, relevant by-laws and conditions and requirements of other relevant decision-making agencies.

There are about 15,000 licences and permits covering 759 groundwater resources and 181 surface water resources throughout the State.

Water licensing is conducted in the regions, with support provided by staff in Perth.

KEY PROCESSES (attached)

- Risk Assessment for Licence Applications
- Assess licence application – Validate application
- Assess licence application – Assess application
- Low Risk applications
- Medium/High Risk applications
- Renew licence
- Transfer licence or water agreement
- Amend/cancel/suspend/surrender/terminate licence
- Case studies

STAFFING

Current staffing (Full-Time Equivalent)	86.1 *
Funded staffing (in 2009/10 budget)	82.0 *

* Including Regional staff assigned to Licensing functions but does not include Land Information staff that support Licensing and other functions of the DoW

RISK ASSESSMENT FOR LICENCE APPLICATIONS

Licence applications, renewals or amendments are assessed for perceived risk to determine the extent of assessment required.

High risk applications will have a more detailed and rigorous assessment than Low risk applications. When setting the risk level , three primary considerations are:

1. The level of allocation in the management area both before and after consideration of the application
2. The size and type of application under consideration and factors associated with that, including the likely level of impact should the allocation be granted
3. The likely decision based on the assessment undertaken. Where the assessment suggests that the application should be refused, the level of assessment should be High regardless of other considerations.

The highest level of risk (Low, Medium or High) should set the level of assessment for the application and identify the appropriate assessment template to use.

The categories of licence application and the risk assessment are shown in the matrix below.

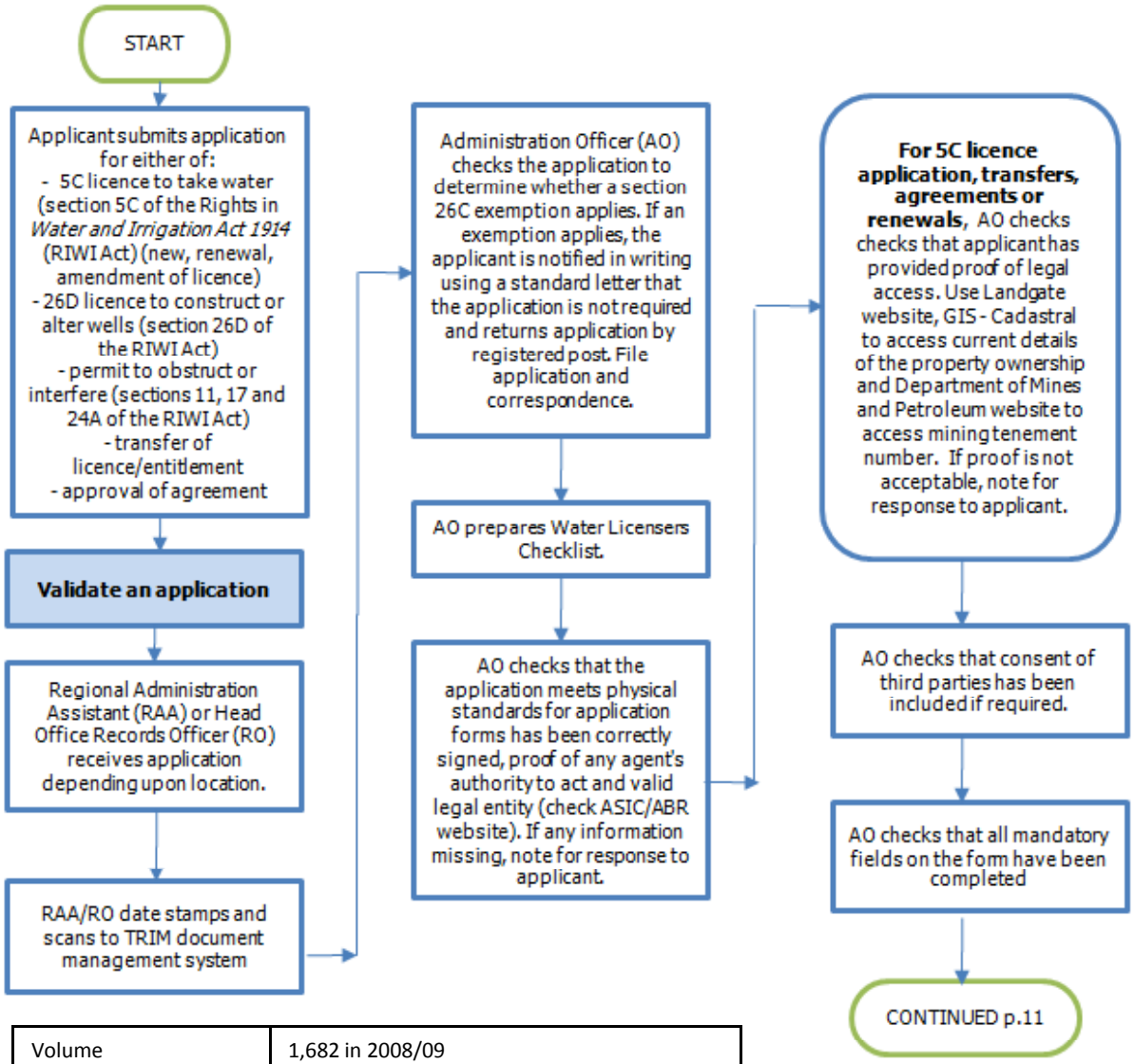
Category **Volume (kL per year)**	**C1 – Resource is less than 30% allocated**	**C2 – resource is between 30% and 70% allocated**	**C3 – resource is between 70% and 100% allocated**	**C4 – resource is greater than 100% allocated**
< 50,000	LOW	LOW	MEDIUM	HIGH
50,000 – 500,000	LOW	MEDIUM	HIGH	HIGH
> 500,000	HIGH	HIGH	HIGH	HIGH

Source: DoW Operational Policy No. 3 - Principles and guidelines for assessing water licence and permit applications in WA February 2007

The matrix does not capture all of the risk factors encountered. Triggers for refining the level of assessment are:.

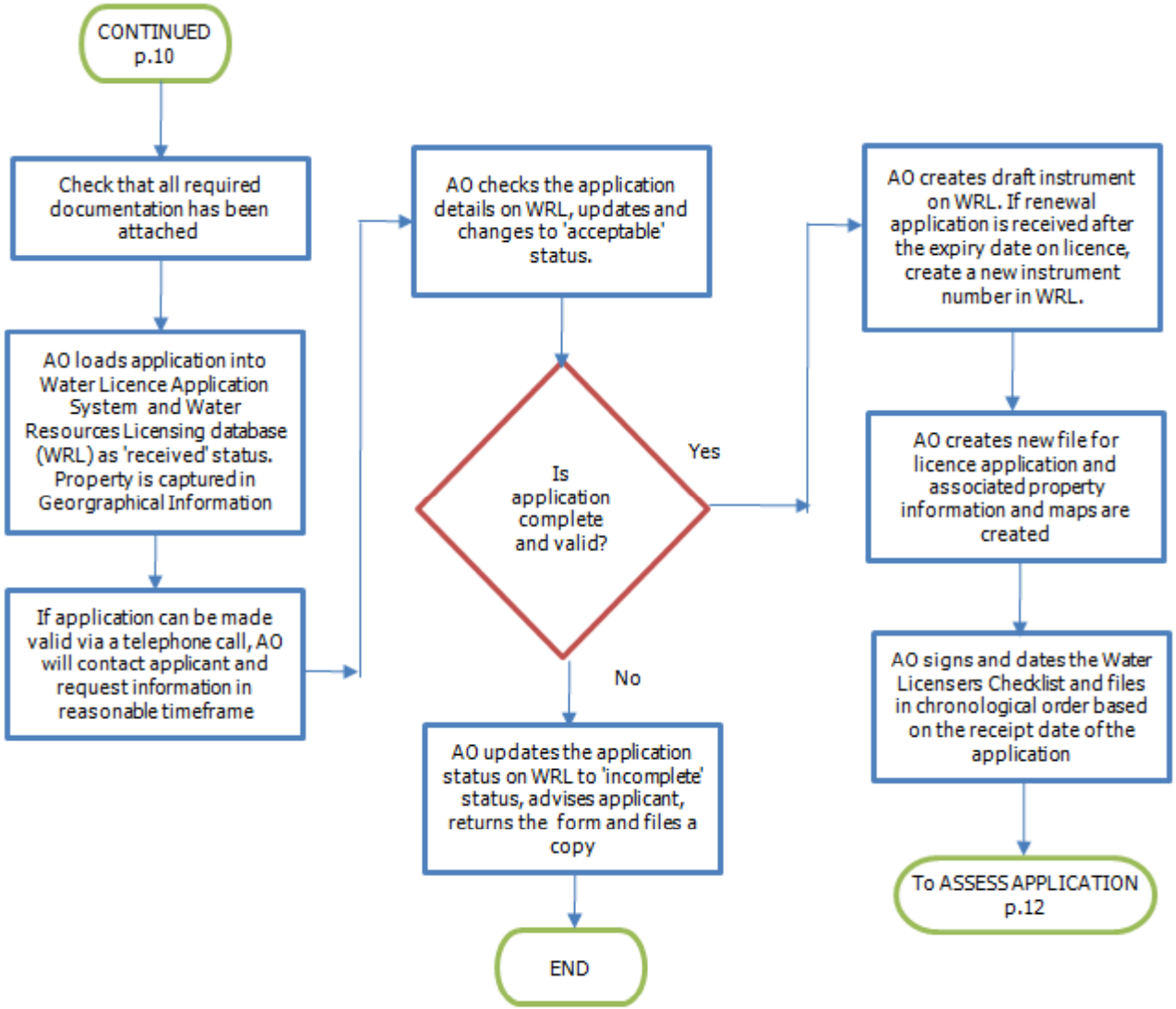
- Domestic supplies – up to 0.2 hectare lawns and gardens, stock watering and household purposes may be assessed as Low risk.
- The difference between the level of allocation and the level of the management response. The larger the gap, the greater the likely risk associated with the assessment of the application.
- Applications that move the allocation level between categories should be assessed at the higher level.
- Applicants requesting significant water allocations compared to the size of the remaining sustainable resource (over 50%) (High).
- Licensed water service providers – will also require an operating strategy for each scheme operated, especially for those supplying potable water (High).
- Applicants proposing to take underground and surface water conjunctively (will also likely require an operating strategy to be drafted to cover licences) (Medium to High).
- Applicants proposing to operate complex schemes involving multiple well fields conjunctively (Medium to High).
- When the local environmental values or other water users are likely to be significantly affected by the taking of the water (High)
- Where there is a need to develop contingency plans, especially where the available information on water being accessed is very limited and the project depends on a reliable water supply (High)
- In areas where Environmental Water Provisions have been set and are likely to be impacted by proposed taking of water (High)
- Any issue identified by the assessing or issuing officer that increases the level of risk to the DoW.
- Note that allocation limits for Fractured Rock Aquifers are often based on current licensed volumes, as opposed to a real sustainable limit of the aquifer determined through hydrogeological analysis. As the applicant needs to prove up the aquifer before the allocation limit is increased, many resources are recorded as C3 or C4.

ASSESS LICENCE APPLICATION – PART 1 – VALIDATE APPLICATION (1 OF 2)

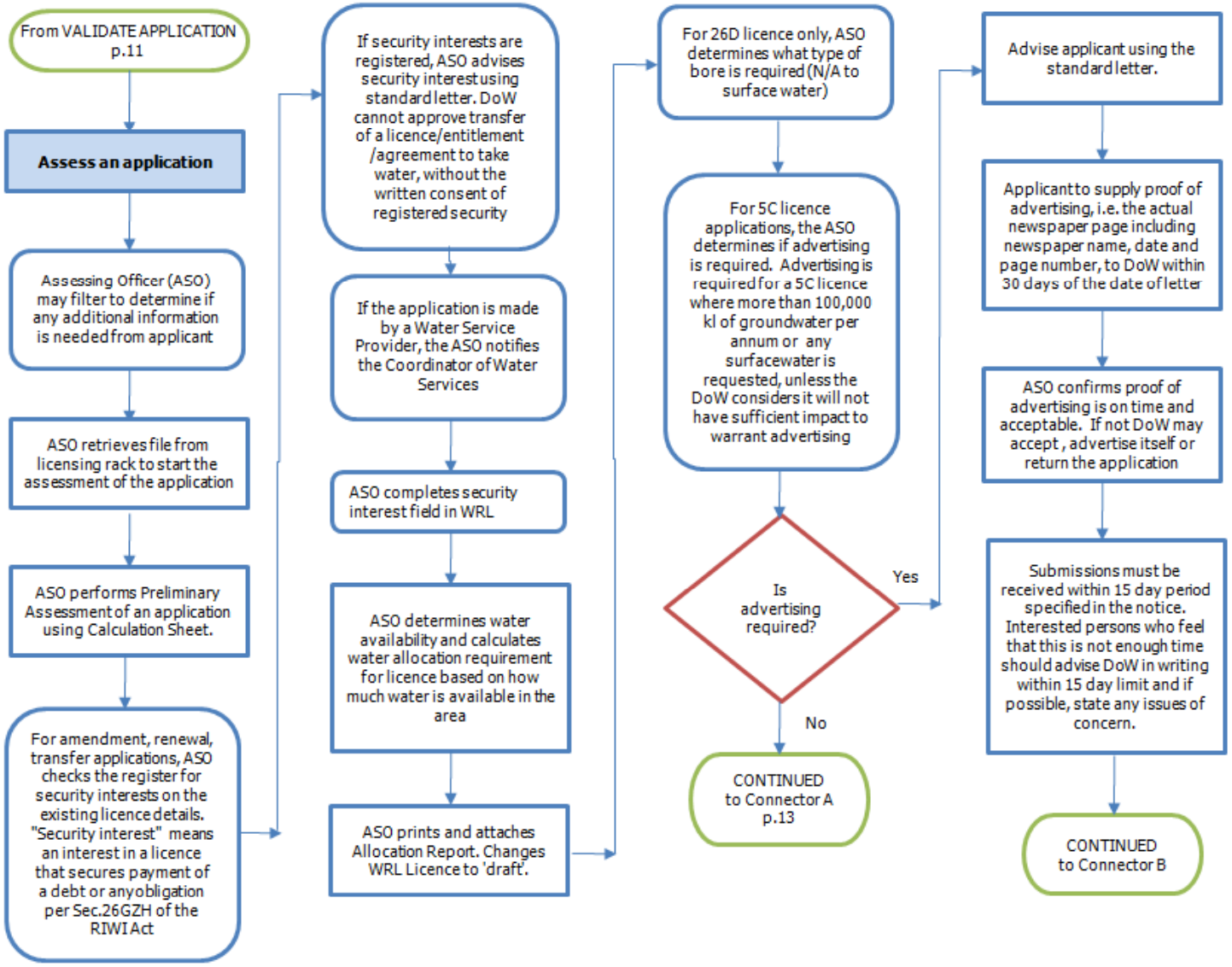


Volume	1,682 in 2008/09
Process Timeframe	Average of 59 to 82 days Source: DoW Annual Report 2008/09

ASSESS LICENCE APPLICATION – PART 1 – VALIDATE APPLICATION (2 OF 2)



ASSESS LICENCE APPLICATION – PART 2 – ASSESS APPLICATION (1 OF 5)



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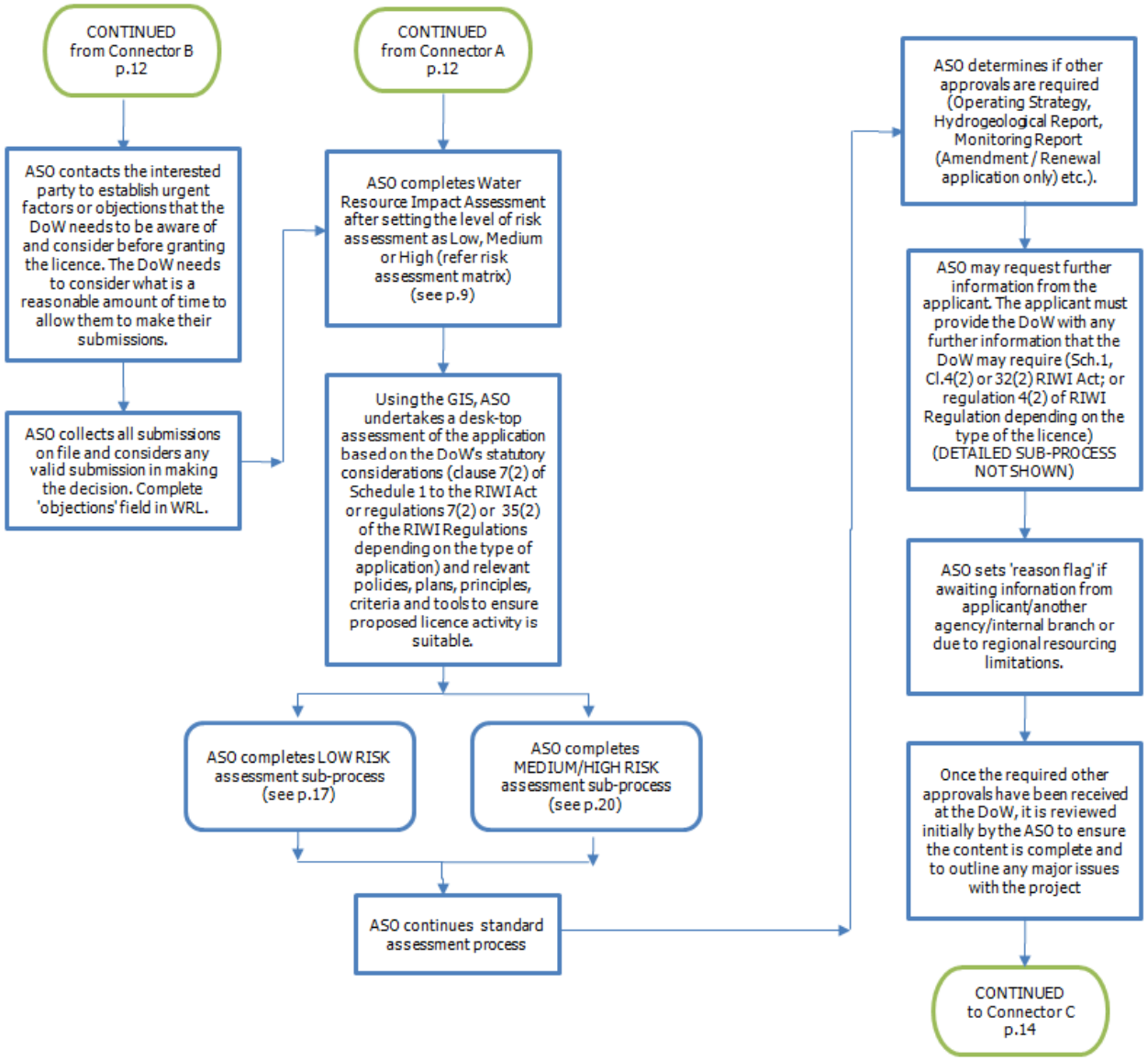

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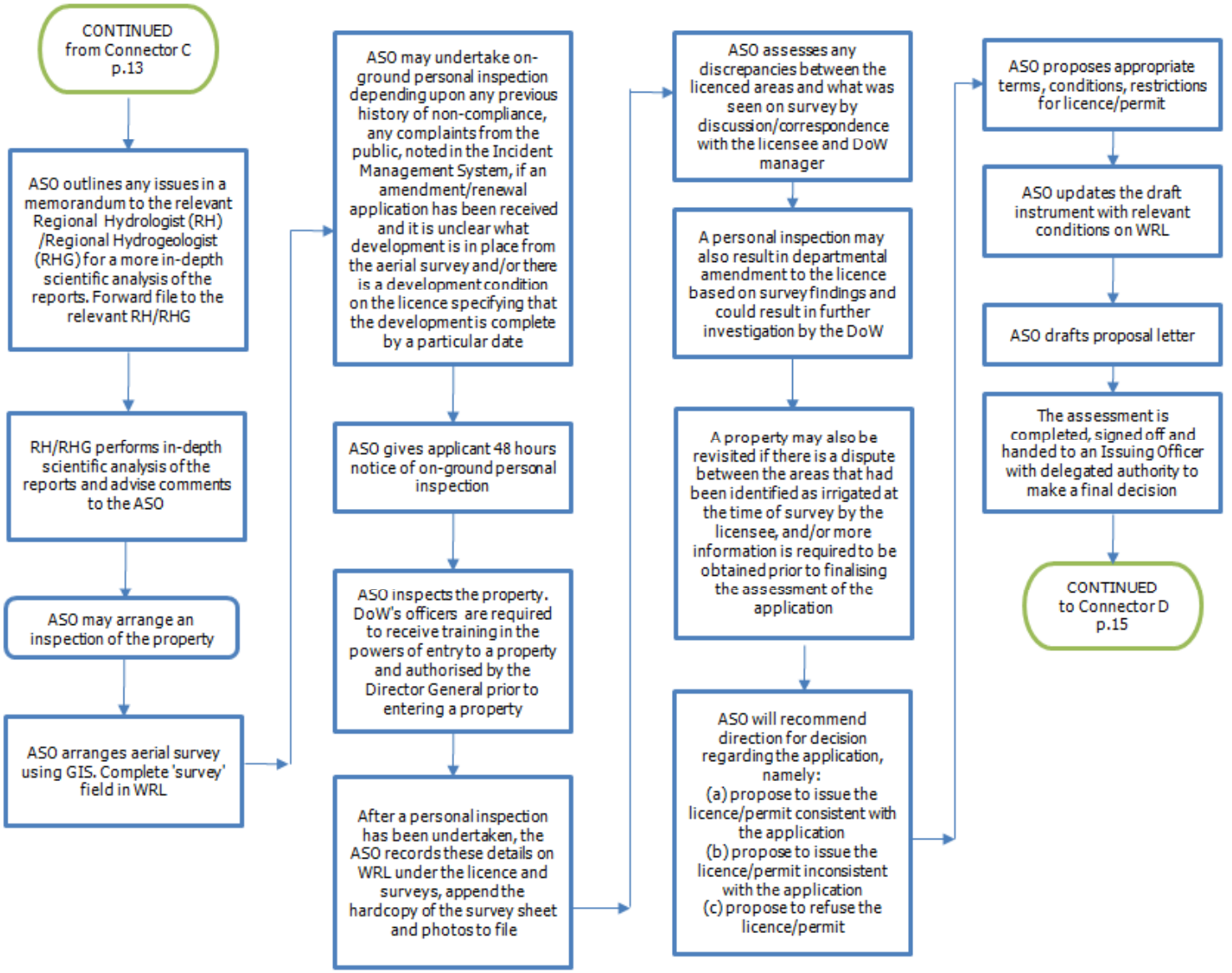

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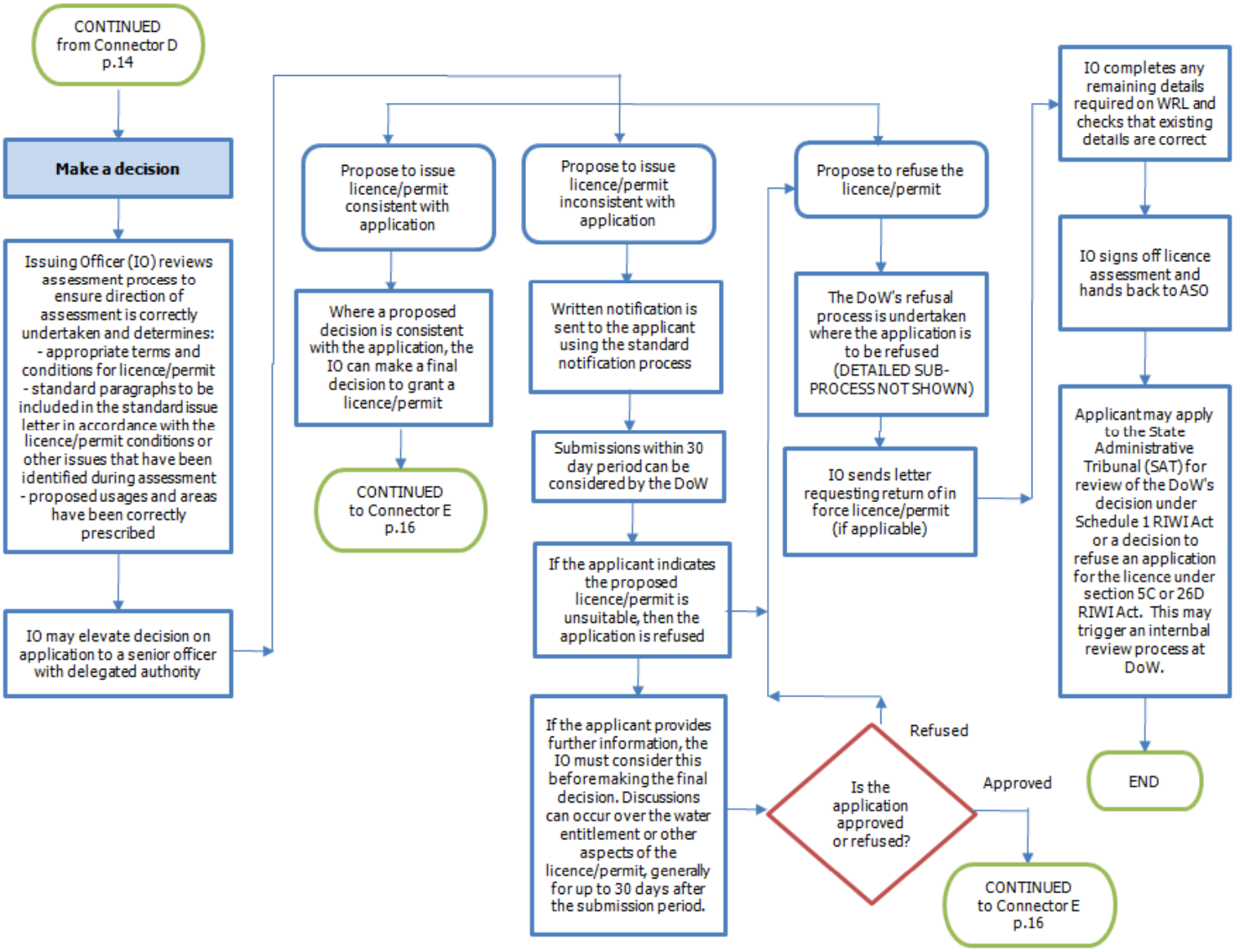
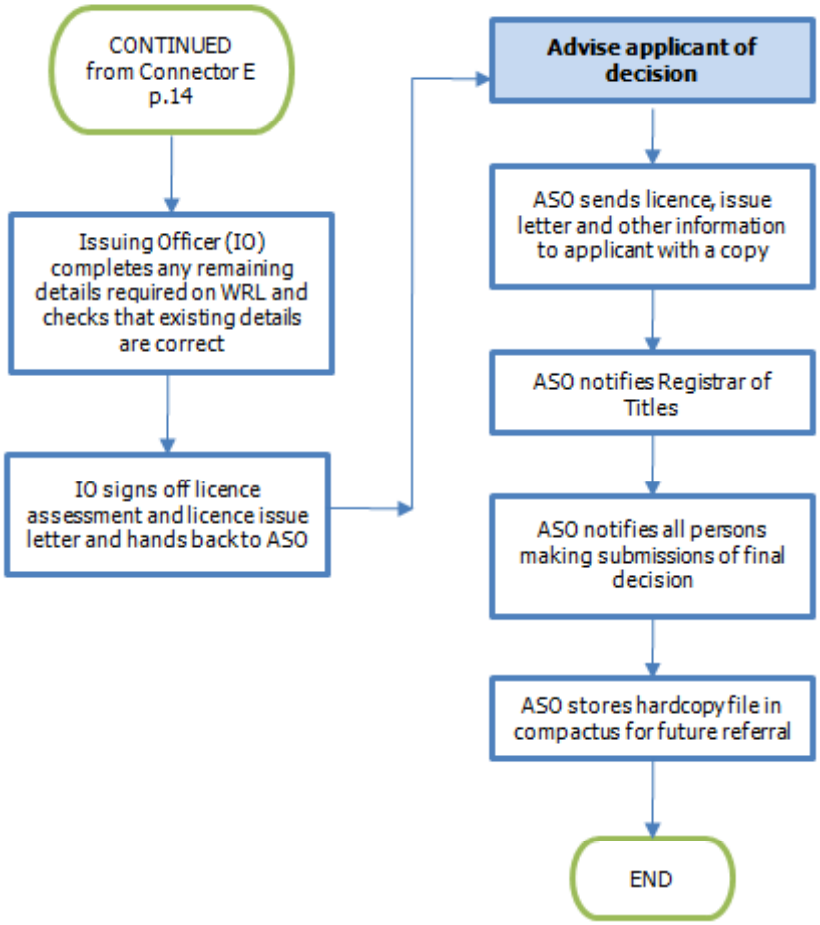
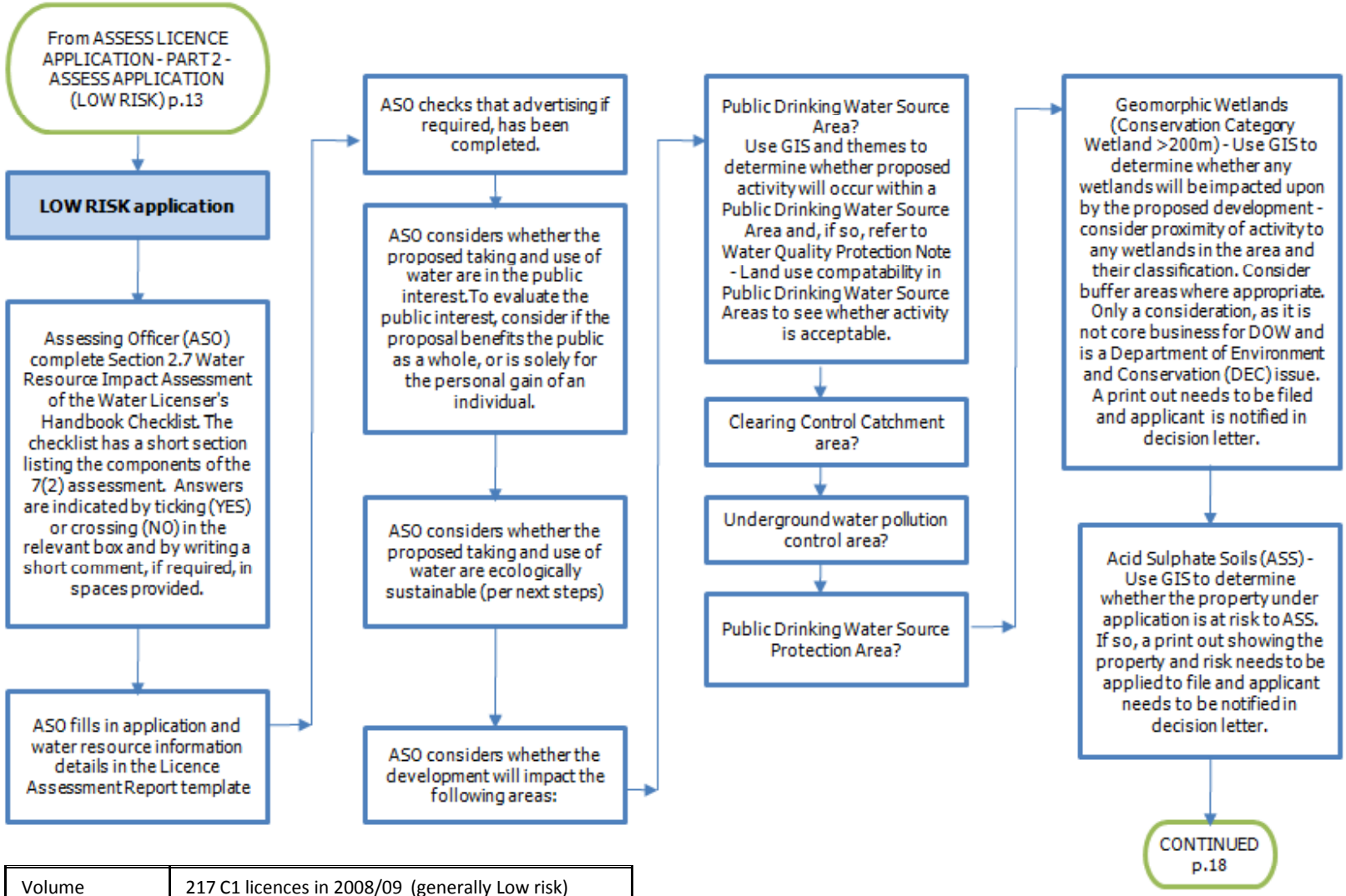


ASSESS LICENCE APPLICATION – PART 2 – ASSESS APPLICATION (5 OF 5)



ASSESS LICENCE APPLICATION : SUB-PROCESS – LOW RISK APPLICATIONS (1 OF 3)



Volume	217 C1 licences in 2008/09 (generally Low risk)
Process Timeframe	Average of 59 days Source: DoW Annual Report 2008/09

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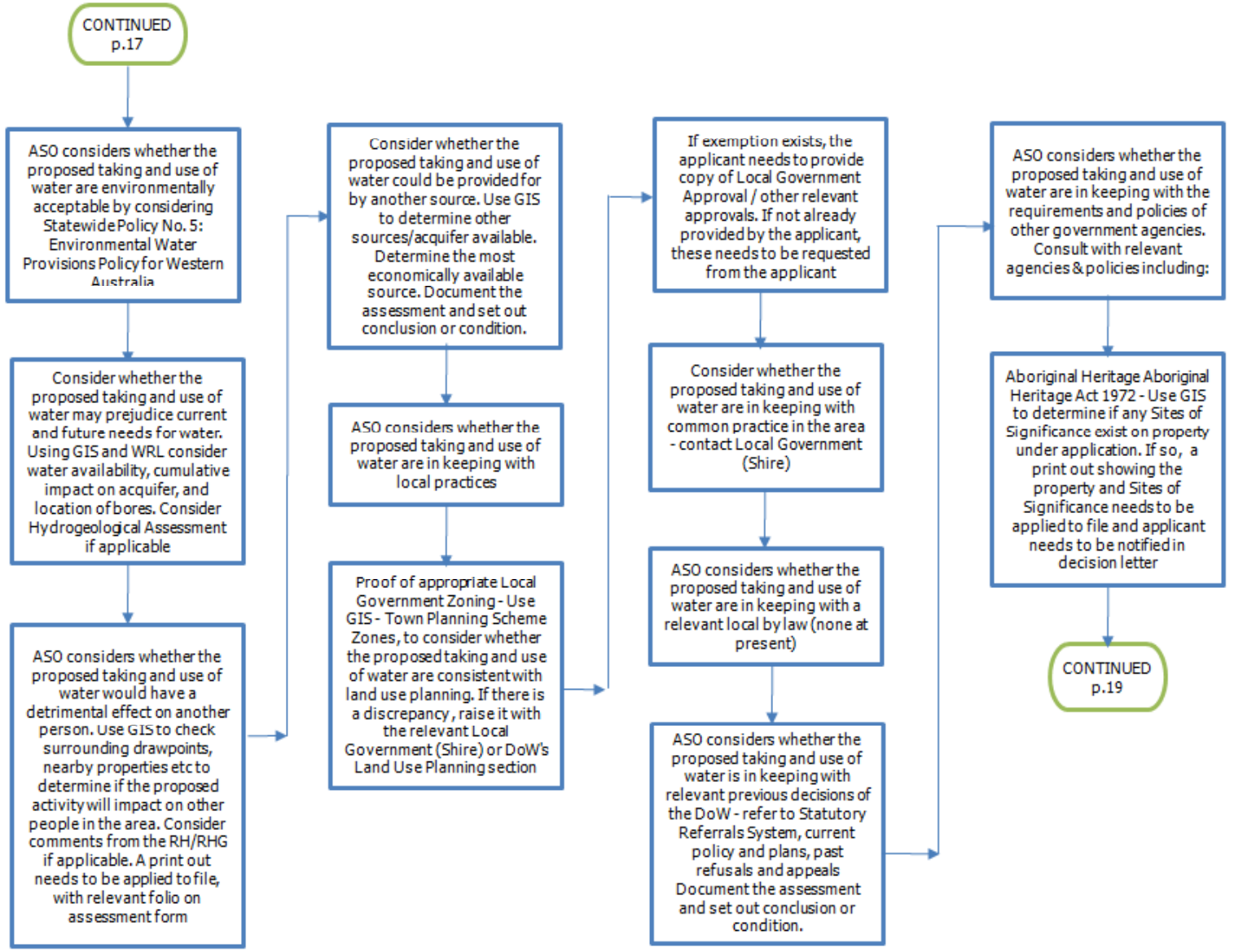

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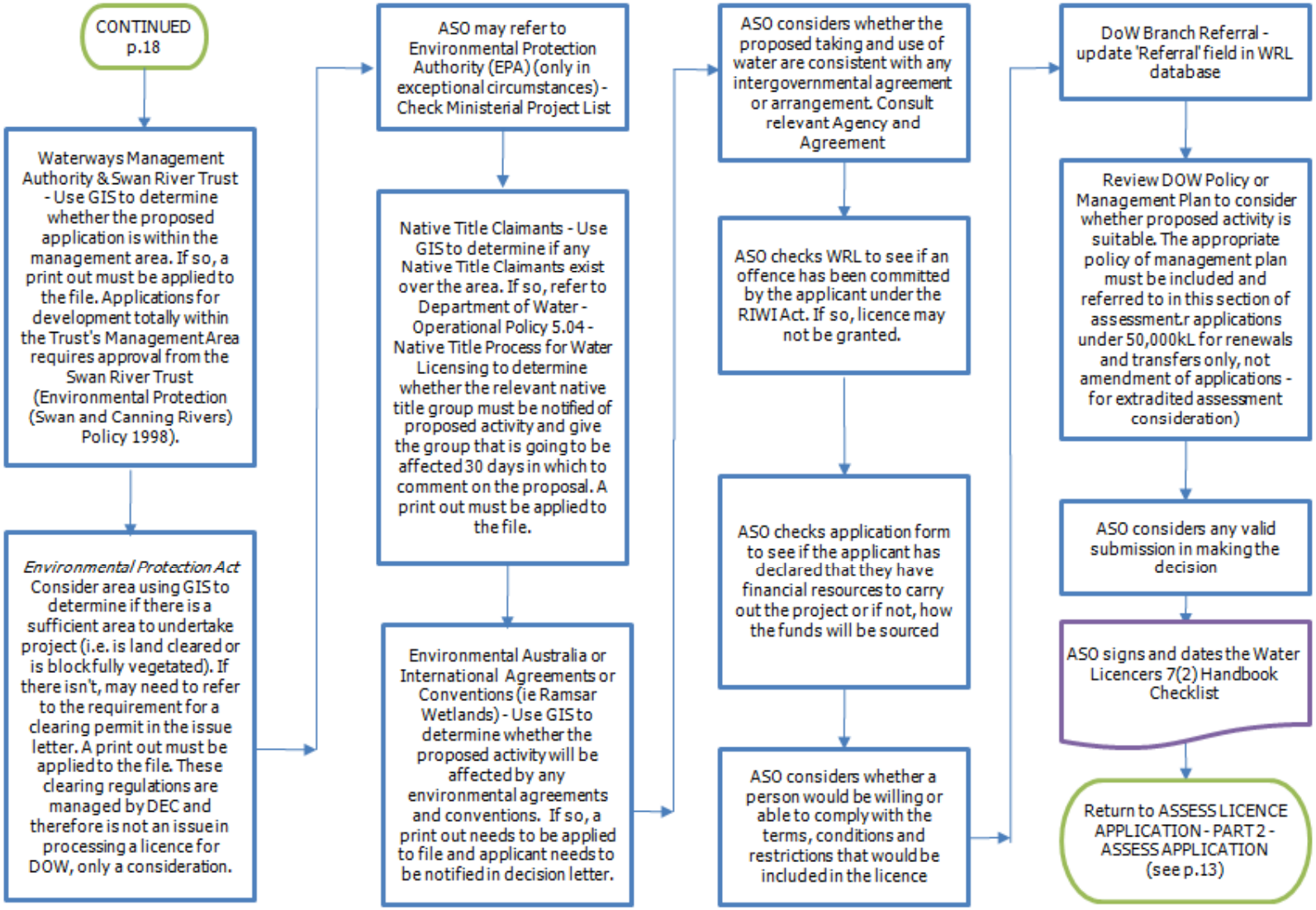
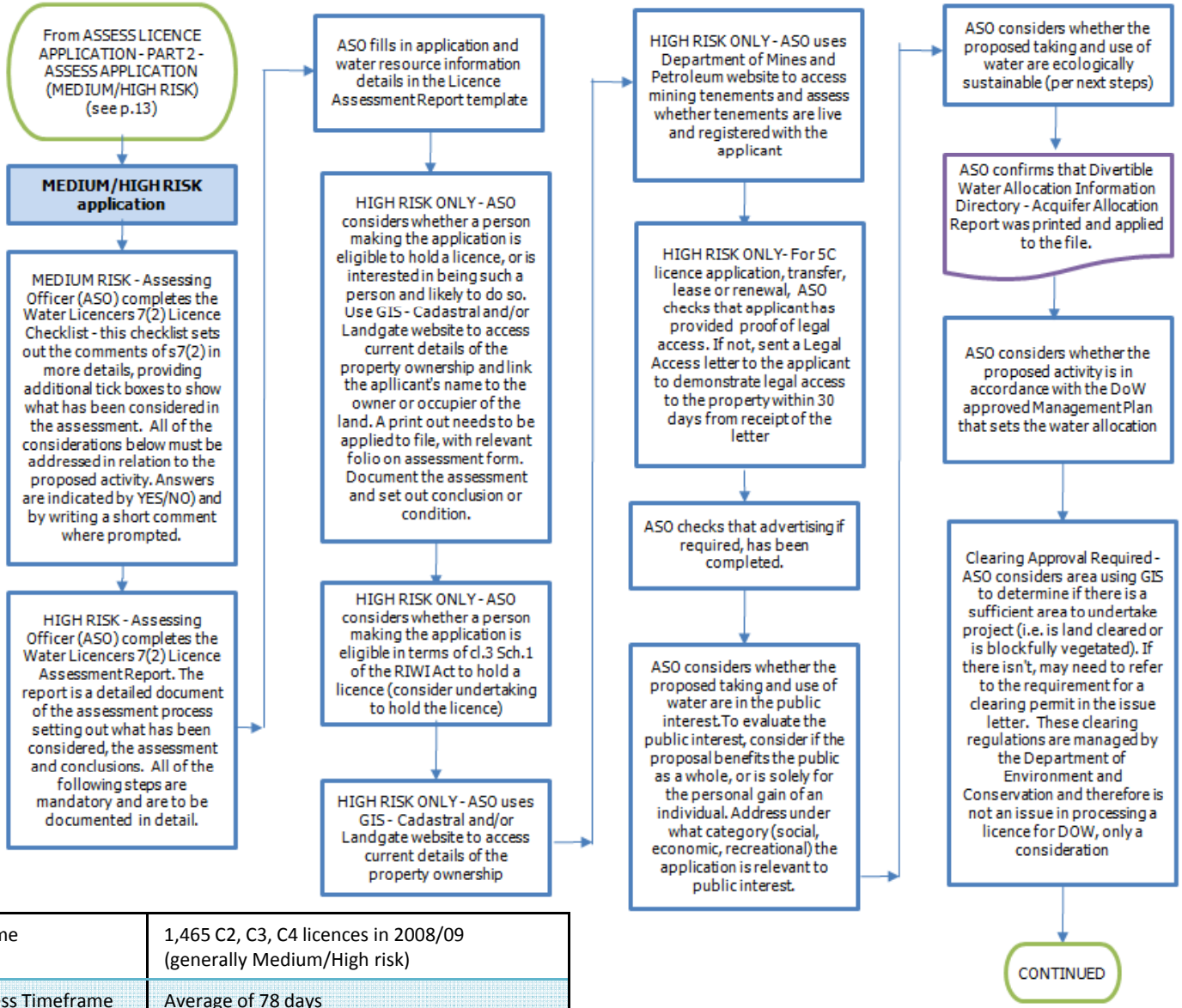


ASSESS LICENCE APPLICATION : SUB-PROCESS – MEDIUM/HIGH RISK APPLICATIONS (1 OF 5)



Volume	1,465 C2, C3, C4 licences in 2008/09 (generally Medium/High risk)
Process Timeframe	Average of 78 days Source: DoW Annual Report 2008/09

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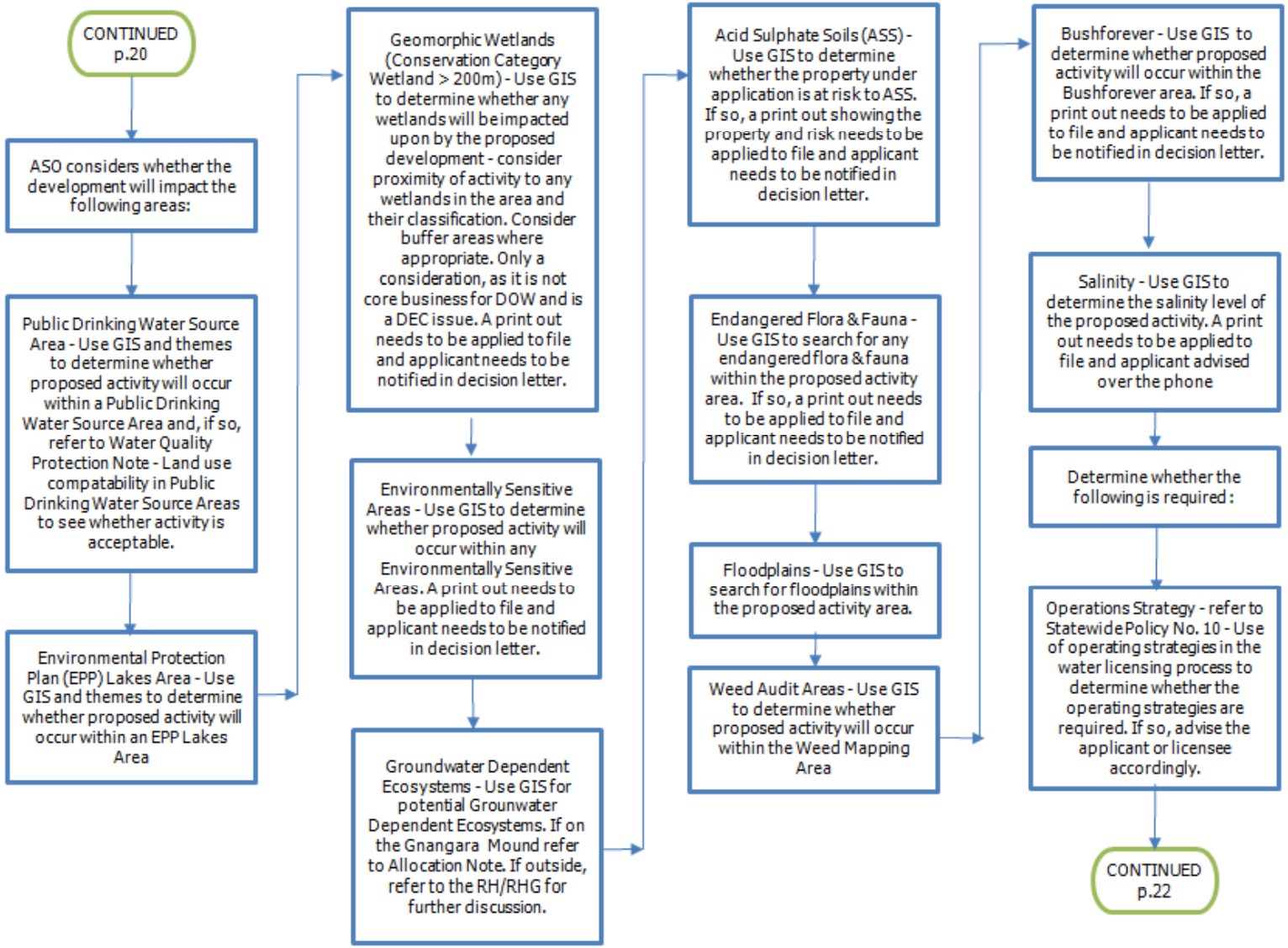

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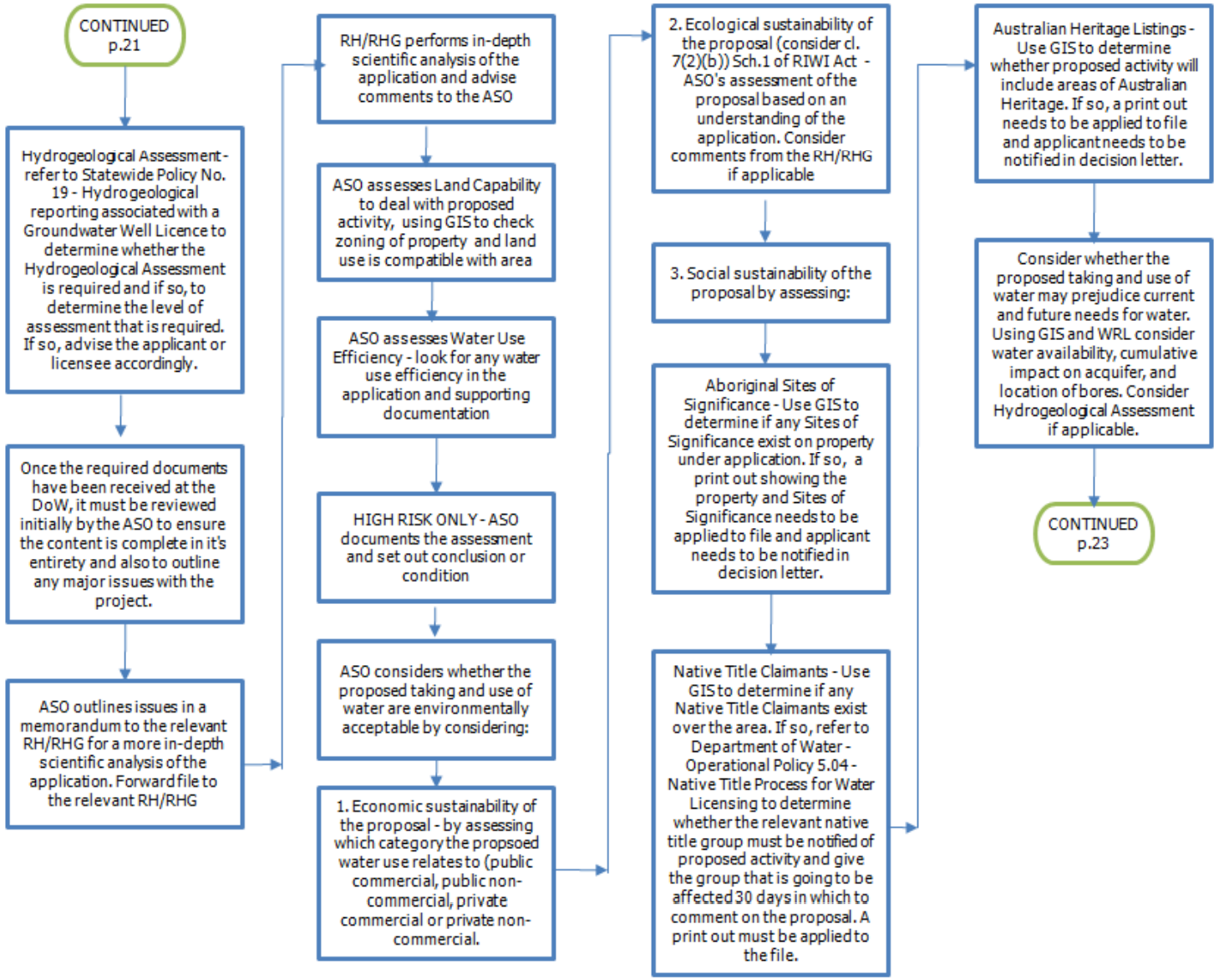

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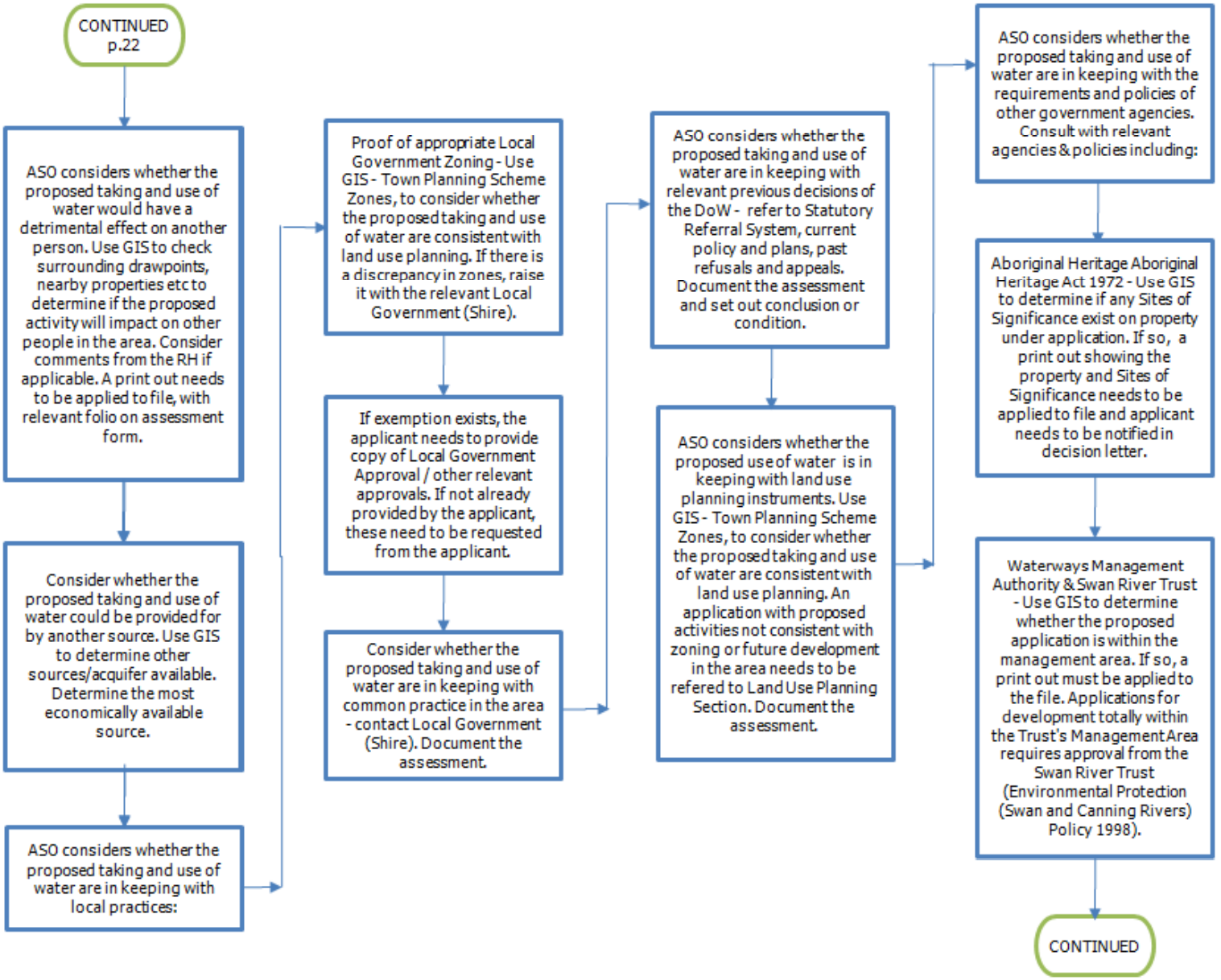

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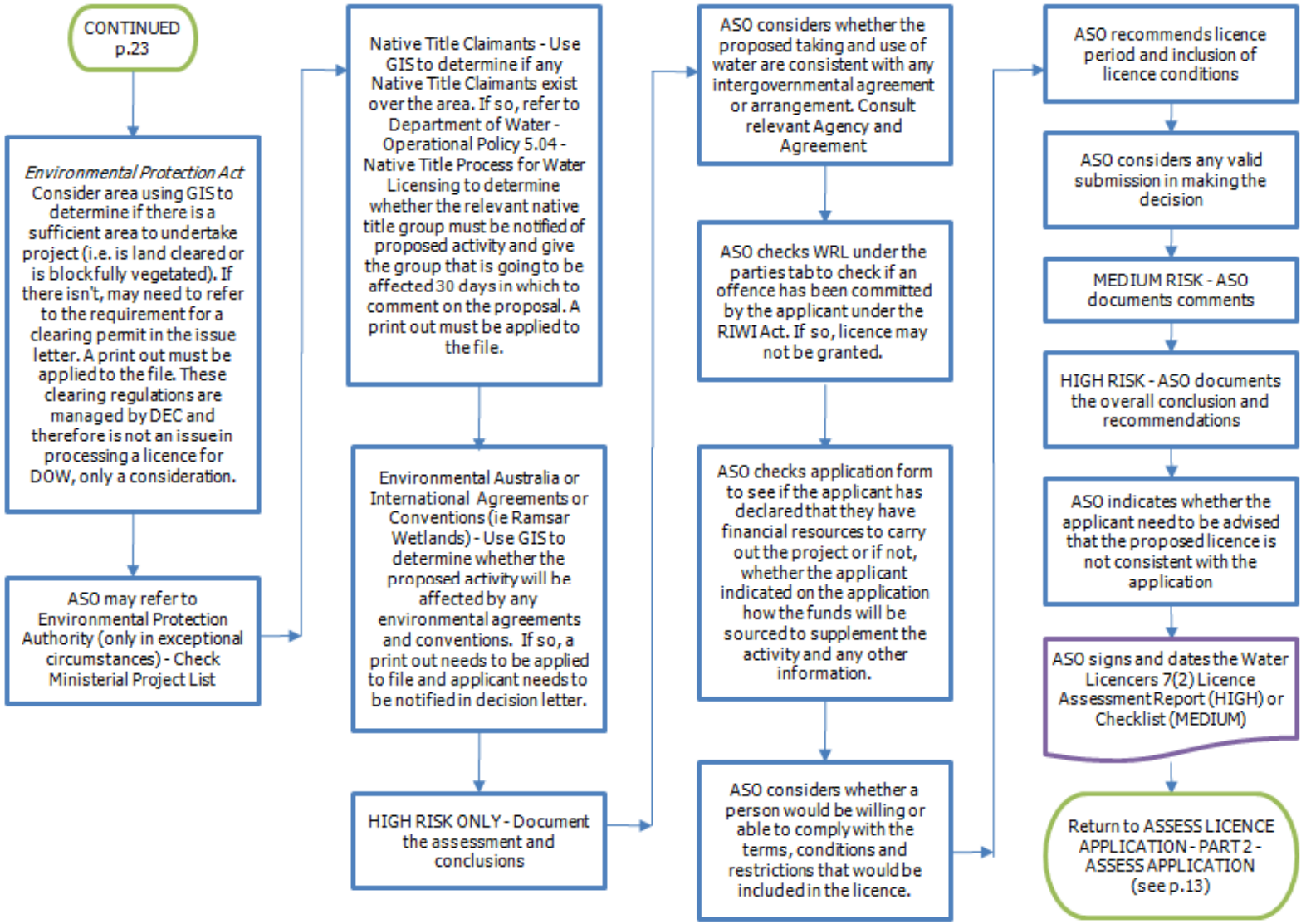
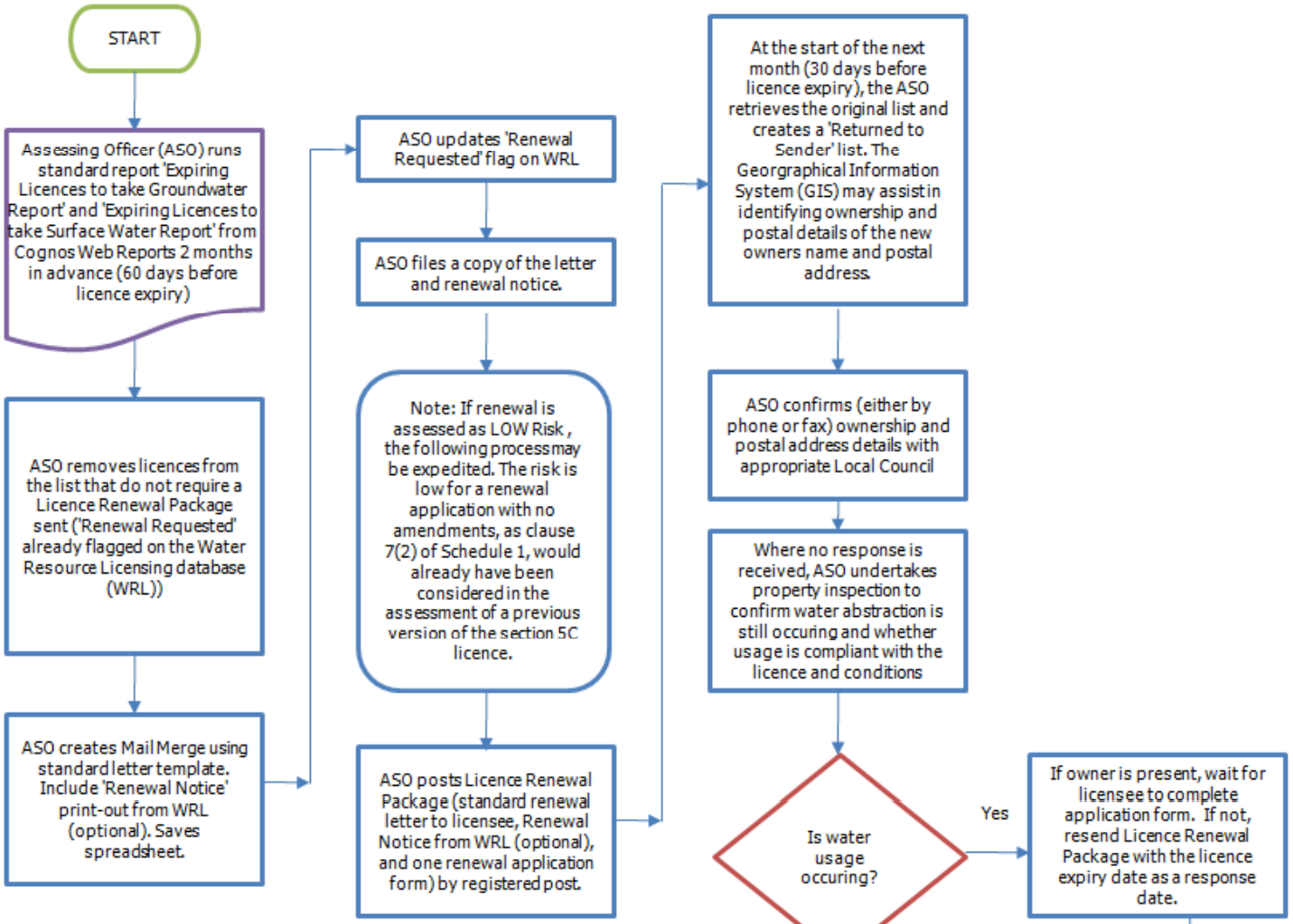
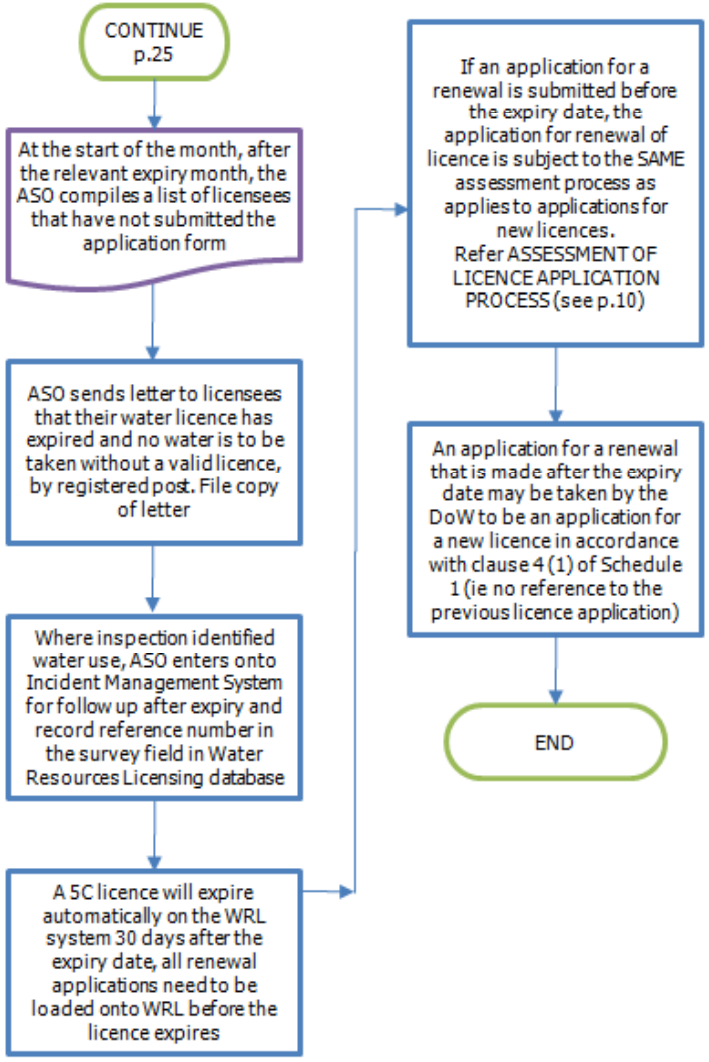


RENEW LICENCE (1 of 2)

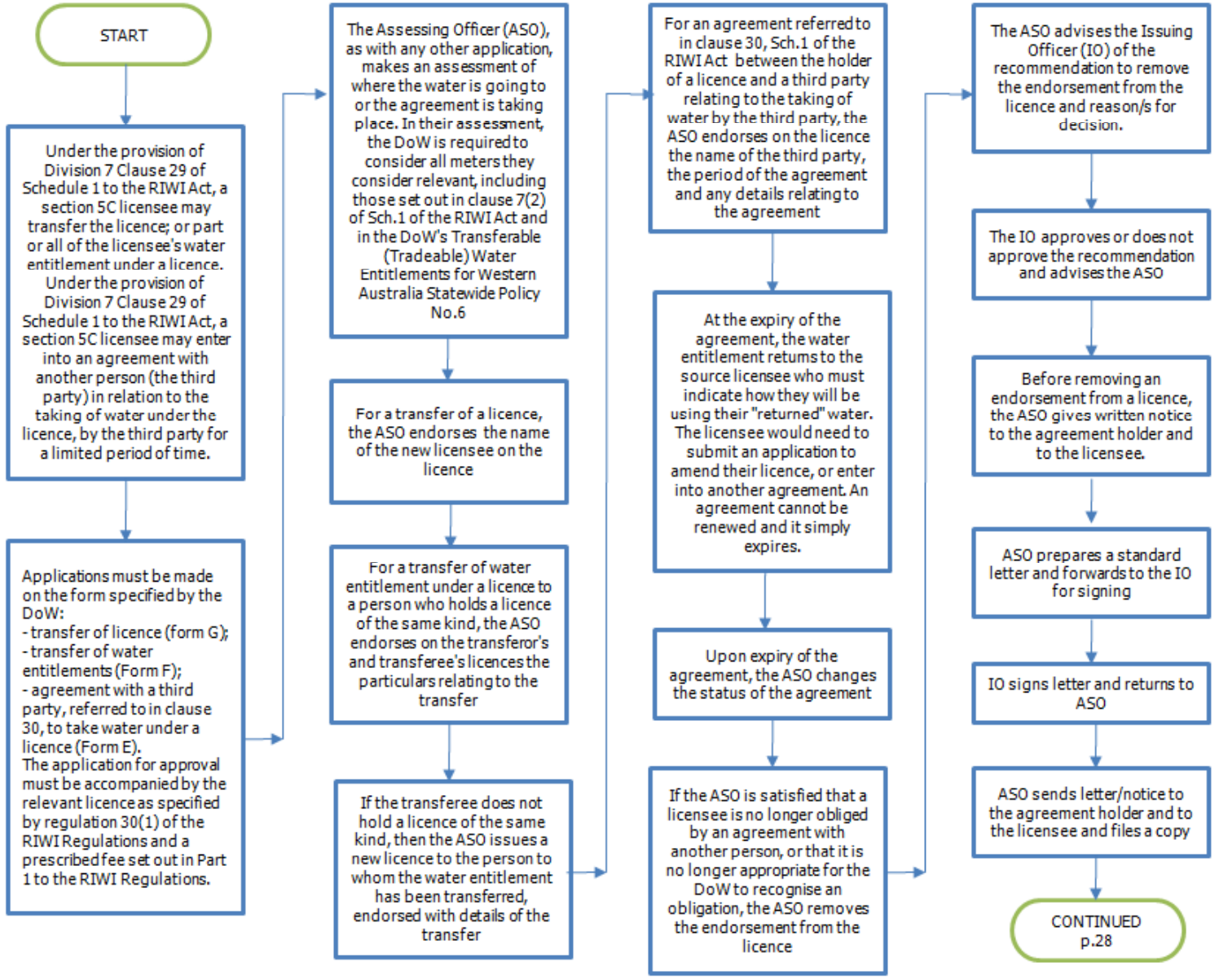


Volume	Not available
Process Timeframe	Not available

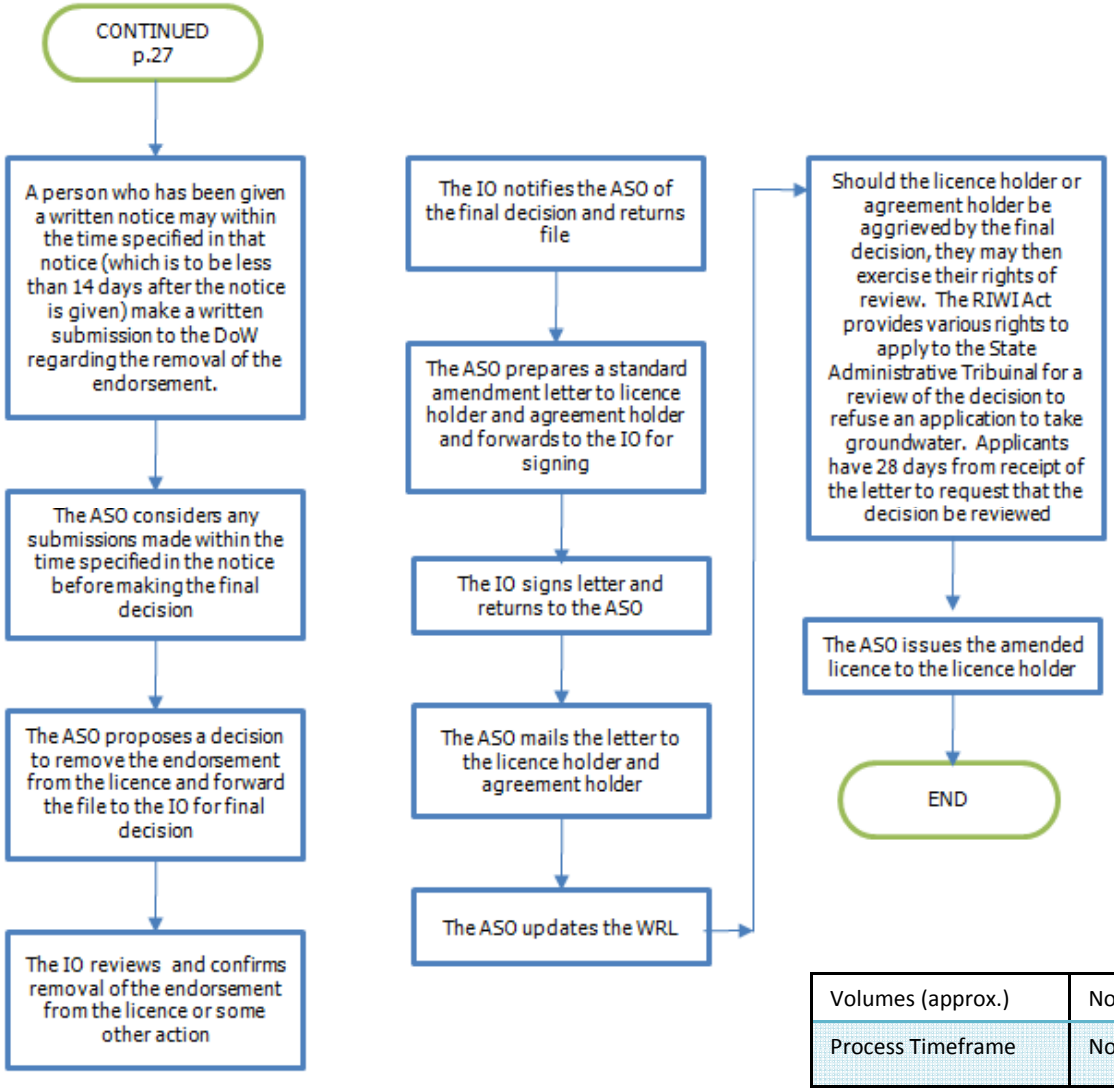
RENEW LICENCE (2 of 2)



TRANSFER LICENCE OR WATER AGREEMENT (1 OF 2)

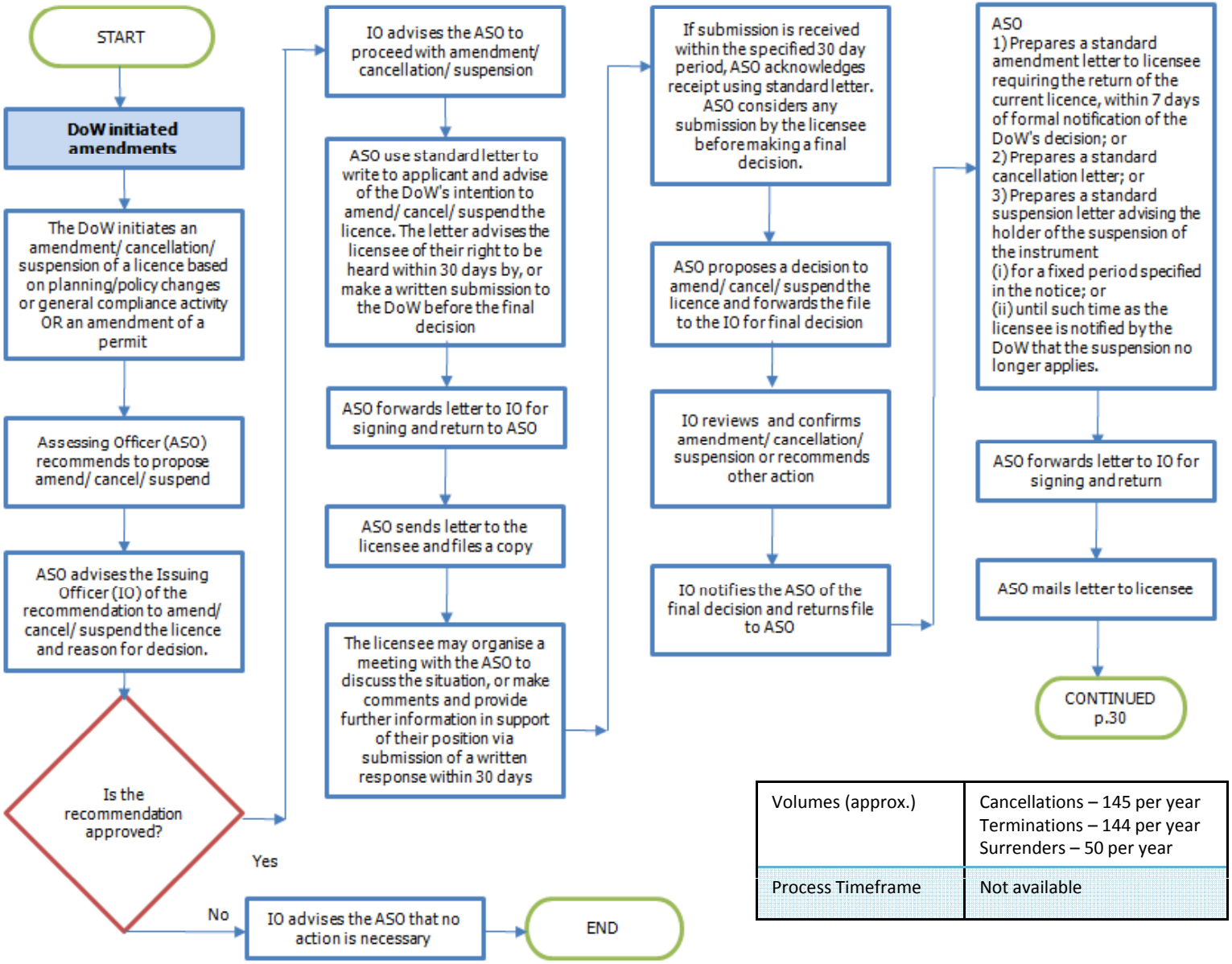


TRANSFER LICENCE OR WATER AGREEMENT (2 OF 2)



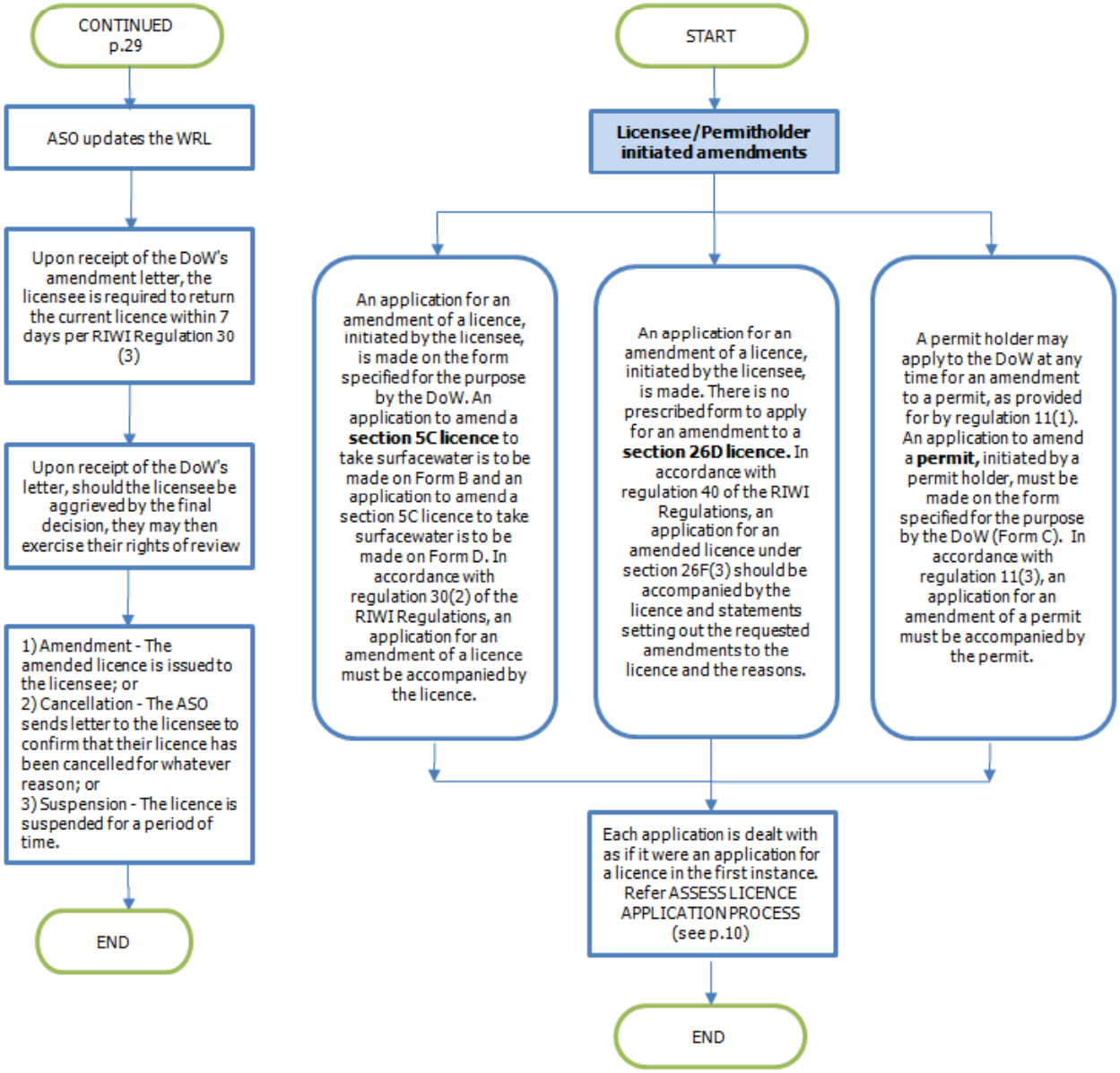
Volumes (approx.)	Not available
Process Timeframe	Not available

AMEND /CANCEL/SUSPEND/SURRENDER/TERMINATE LICENCE (1 OF 3)

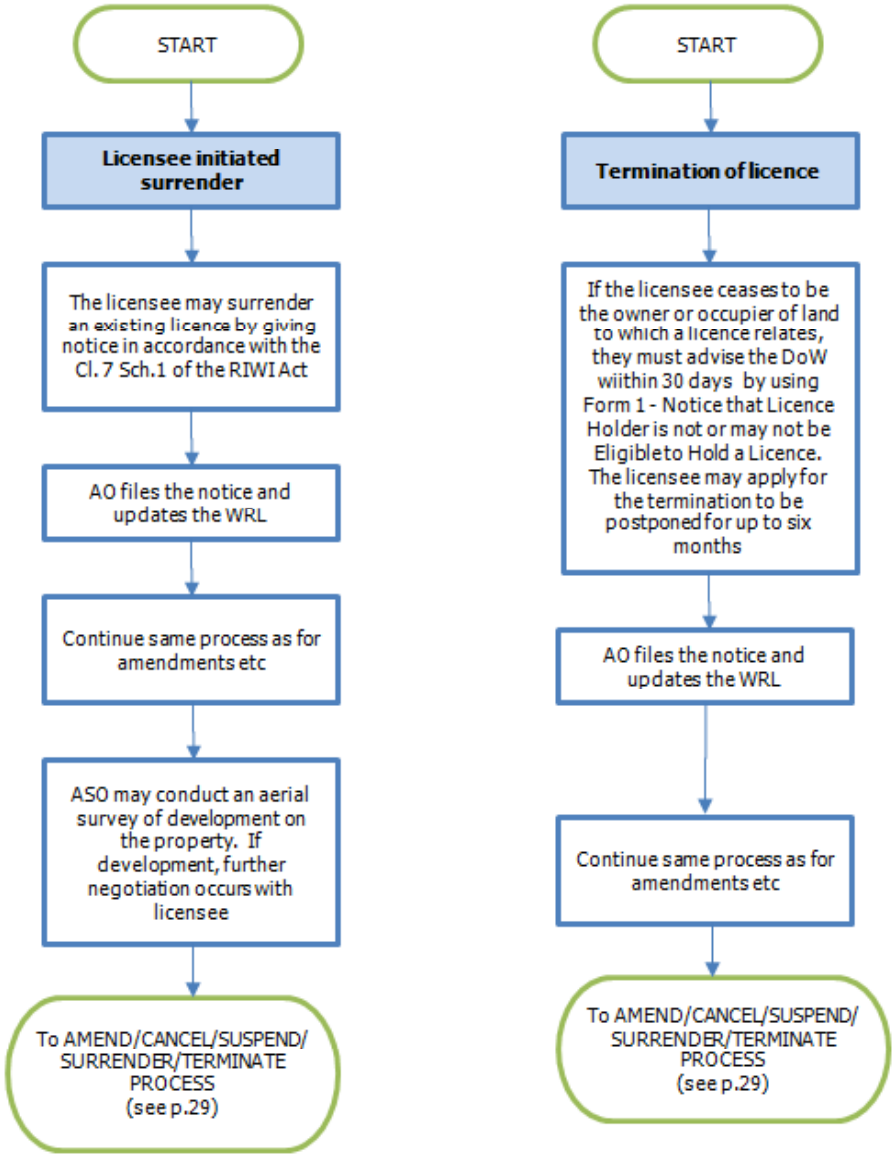


Volumes (approx.)	Cancellations – 145 per year Terminations – 144 per year Surrenders – 50 per year
Process Timeframe	Not available

AMEND/CANCEL/SUSPEND/SURRENDER/TERMINATE LICENCE (2 OF 3)



AMEND/CANCEL/SUSPEND/SURRENDER/TERMINATE LICENCE (3 OF 3)



CASE STUDY – RENEWAL OF LICENCE (LOW RISK)

Application to renew an existing section 5C licence to take groundwater (Low risk assessment)

An application to renew an existing section 5C licence to take groundwater was received from the licensee by the DoW. The applicant requires 131,550 kL per annum from the "surficial aquifer" for household purposes, irrigation of 0.15 ha of lawns and gardens, irrigation of 14.5 hectares of orchard and stock watering. A "surficial aquifer" is a shallow aquifer, usually less than 15 metres underground.

If an application for a renewal is submitted before the expiry date, the application for renewal of licence is to be considered in the same way as if it were an application to grant a new licence. An application for a section 5C licence must be assessed in accordance with the objectives of water management in section 4(1) of the Rights in Water and Irrigation Act 1914 (RIWI Act) and specific matters for consideration including those set out in clause 7(2) of Schedule 1 to the RIWI Act.

The application was assessed as Low risk. A Low level of risk is one where there is unlikely to be a measurable impact on the aquifer, environment or other users and the DoW is unlikely to be exposed in its decision making.

For Low risk assessments, the Assessing Officer completes a Water Resource Impact Assessment checklist that lists the components of clause 7(2) of Schedule 1 to the RIWI Act. The assessment included:

- An ASIC search to confirm that the applicant is a legal entity.
- The Geographical Information System (GIS) was used to access current details of the property ownership, to link the applicant's name to the owner or occupier of the land and to establish that a person making the application is eligible to hold a licence.
- The Assessing Officer established that the proposed activity is in the public interest, environmentally acceptable and consistent with relevant previous decisions of the DoW. Also the relevant Policy or Management Plan was considered to confirm that the proposed activity is suitable.
- The GIS was used to determine that the proposed activity is ecologically sustainable by considering plans and restrictions relating to public drinking water, clearing, catchments, pollution, water source protection and wetlands.
- Using GIS the surrounding drawpoints and nearby properties were checked to determine that the proposed activity will not impact on other people in the area and that the current and future needs for water will not be prejudiced.
- The GIS was also used to ascertain that the proposal is consistent with land use planning and to determine other sources/aquifer available. The nominated water source was considered to be the most economically viable option.
- The Assessing Officer also considered whether the proposed activity is consistent with the requirements and policies of other government requirements, including native title, environmental, inter-government agreements and international agreements.
- The Water Resource Licensing database (WRL) was checked to confirm that no offence has been committed by the applicant under the RIWI Act. There was no indication that the applicant would not comply with the terms and conditions of their licence.
- An aerial survey was undertaken of the property on the GIS and confirmed that the licensee is compliant with the licence.

The assessment process resulted in a recommendation that the renewal application be approved and the licence be issued for a further ten years with regular compliance surveys.

The licence included conditions regarding restricted use of water for non-commercial crops, a limit on the amount of water to be taken annually and if the licensee's draw adversely affects the aquifer or other users in the area, the amount that may be drawn may be reduced.

The assessment of this application took 22 business days to complete.

CASE STUDY – AMENDMENT OF LICENCE (HIGH RISK)

Application to amend a section 5C licence to take underground water (High risk assessment)

A gold mine operator requested an amendment to their current groundwater licence from 300,000 kL to 2.4 GL per annum from the Pilbara Fractured Rock aquifer for dewatering for mining purposes, dust suppression, mineral ore processing and water for mining camp purposes.

The applicant submitted the Operating Strategy and Dewatering Discharge Management Plan with the application. Clause 23(2) of Schedule 1 to the RIWI Act effectively provides that an application to amend a section 5C licence is to be considered in the same way as if it were an application to grant a new licence. Application for a section 5C licence must be assessed in accordance with the objectives of water management in section 4(1) of the RIWI Act and clause 7(2) of Schedule 1 to the RIWI Act.

The application was assessed as High risk due to the large allocation requested and over 100% resource allocation. Also, large-scale dewatering over a long term can be an unsustainable practice.
A high risk is defined by the DoW as one where there is likely to be a measurable impact on the aquifer, environment or other users and the DoW may be exposed in its decision making with redress limited and/or expensive.

For high level assessments, the Assessing Officer completes a Water Licensers 7(2) Licence Assessment Report that includes a detailed assessment of the following considerations:

- An ASIC search was completed to confirm that the applicant is a legal entity.
- The GIS was used to access current details of the property ownership.
- The Department of Mines and Petroleum website was checked to confirm that all properties under the application are live tenements registered in the name of the applicant.
- The licensee was required to advertise the application being for more than 100,000 kL. There were no submissions made in the 15-day time period.
- The applicant's Operating Strategy and Dewatering Discharge Management Plan was reviewed and approved by DoW's Regional Hydrologist.
- The Assessing Officer and Regional Hydrologist established that the proposed activity is in the public interest and used the GIS to determine that the proposed activity is ecologically sustainable and the land is capable of supporting the proposed activity.
- The Assessing Officer and Regional Hydrologist determined that the proposed activity is environmentally acceptable by considering economic, social and ecological sustainability.
- It was recognised that the proposed activity will not compromise current or future needs for water as the allocation limit within the Pilbara Fractured Rock aquifer may be amended to allow additional abstraction in the local area, if needed.
- Using GIS the surrounding drawpoints and nearby properties were checked to determine that the proposed activity will not impact on other people in the area.
- The GIS was also used to ascertain that the proposal is consistent with land use planning and to determine other sources/aquifer available.
- The applicant has declared that they have the financial resources to carry out the proposed project. The Water Resource Licensing database (WRL) was checked to confirm that no offence has been committed by the applicant under the RIWI Act.

The assessment process resulted in a recommendation that the application for additional water be approved and the licence be issued for a further two years. The licence conditions included complying with the operating strategy and dewatering discharge management plan submitted with the application and annual reporting to the DoW.

The assessment took 59 business days.

COMPLIANCE AND ENFORCEMENT

SUMMARY

The Compliance and Enforcement Unit is responsible for:

Investigations

- To conduct and provide advice in relation to investigations into breaches of statutes to ensure that if substantiated, those responsible are identified and sufficient evidence is gathered to support the required enforcement action.

Quality Assurance and Reporting

- To ensure that the enforcement and compliance practices of the DoW are established in accordance with best practice to contribute to the success of investigative outcomes.

Policy and Planning

- To develop policy and guidelines to ensure the DoW undertakes best practice in enforcement and compliance.

KEY PROCESS (attached)

- Complaints and Investigations

STAFFING

Current staffing (Full-Time Equivalent)	6.0
Funded staffing (in 2009/10 budget)	6.0

CASE STUDY

Licensing issue

In 2008, the DoW received advice from the City of Swan that a resident had interfered with a bed and bank of a tributary of the Swan River. Evidence was provided showing that two crossings of the tributary had been constructed. The DoW had not received any applications to make any changes to the river bed and banks at this location.

Two officers of the Compliance and Enforcement unit travelled to the location to examine the crossings.

Upon inspection and taking of evidentiary photographs, it was determined that the structures caused no negative environmental impact affecting water flow.

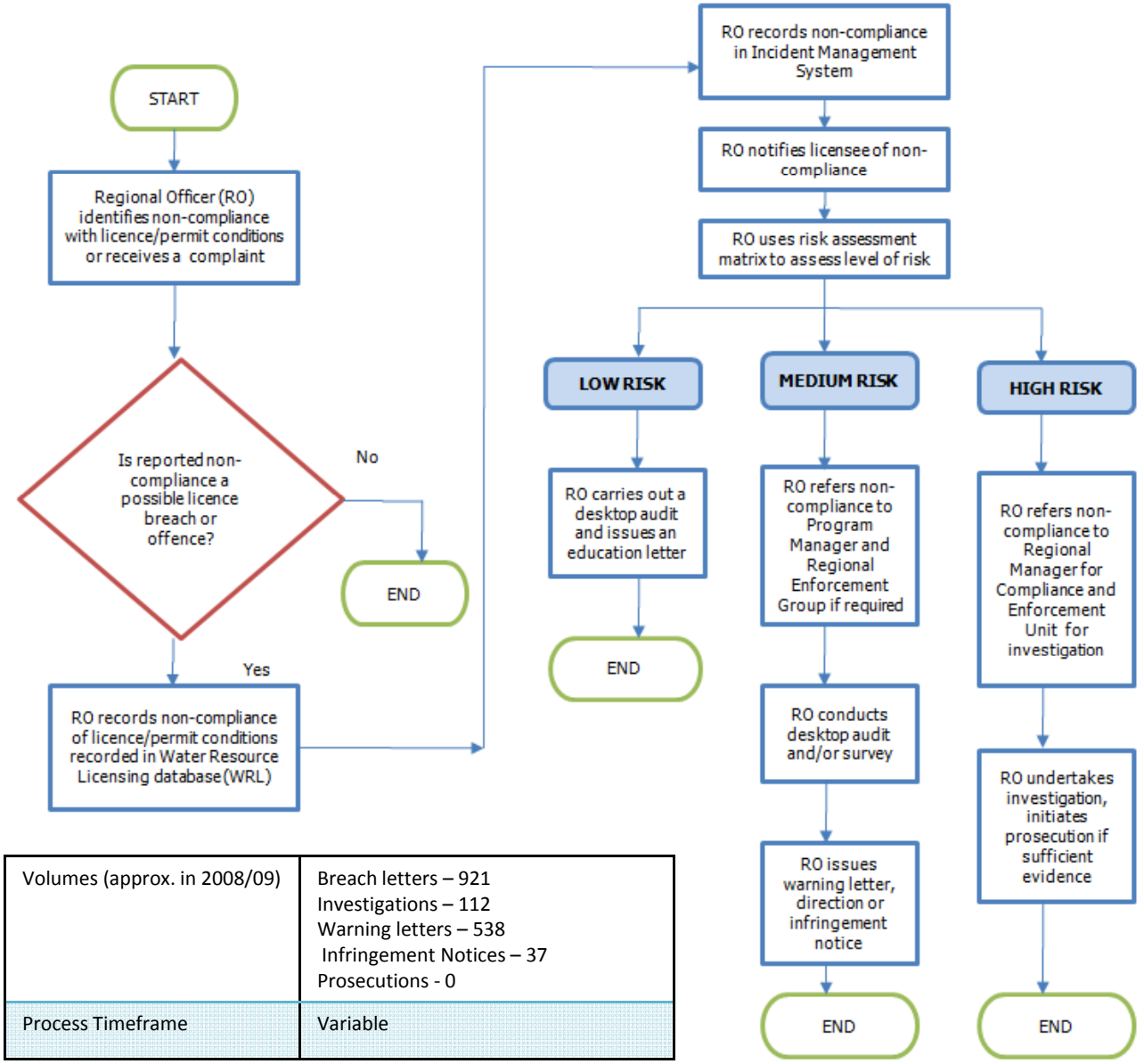
The Officers liaised with the City of Swan and later provided formal advice by letter that the matter did not contravene DoW license conditions and that no further inquiries would be undertaken by the DoW.

Unlawful use of water

In 2008, a DoW officer conducting surveys in the Kwinana Peel region noted a property with sprinklers irrigating pasture at 2pm in the afternoon. The property did not have a licence so the use of water for irrigation was in breach of the Rights in Water and Irrigation Act 1914.

A warning letter was sent advising of the breach and suggesting that the property owner apply for a licence but no response was received. Several further letters were sent but no application was received. In April 2009, an infringement notice was issued for $500. An application to take irrigation water was subsequently received.

COMPLAINTS AND INVESTIGATIONS



Volumes (approx. in 2008/09)	Breach letters – 921 Investigations – 112 Warning letters – 538 Infringement Notices – 37 Prosecutions - 0
Process Timeframe	Variable

ALLOCATION PLANNING

SUMMARY

Allocation plans are developed by the DoW in order to determine the amount of water that can be taken by all water users including licenceable and unlicenseable use in a given area, taking into account environmental water requirements and the potential impacts of water use on the environment and other water users. The cost of allocation planning is much higher in areas where most, if not all, of the water resources have been allocated. Costs may therefore, vary between regions of category of water resource allocation (based on the estimated available supplies).

The Allocation Planning Branch carries out water allocation planning under the Rights in Water and Irrigation Act 1914. The Branch develops groundwater and surface water allocation plans for the State, including environmental and social water requirement investigations of water resources.

The Branch coordinates and encourages improvements in the water allocation business, including the maintenance of allocation limits for the water resources of the State.

KEY PROCESSES (attached)

- Risk Assessment for Allocation Planning
- Initial Planning and Assessment
- Low Risk Allocation Plans
- Medium to High Risk Allocation Plans

STAFFING

Current staffing (Full-Time Equivalent)	29.9 *
Funded staffing (in 2009/10 budget)	39.4*

* Including Regional staff

CASE STUDY

Gingin surface water allocation plan

The Gingin surface water area is located approximately 70km north of Perth and covers over 1,429 square km.

The surface water resources include Gingin, Moondah and Lennard brooks. These resources flow all year, with water supplied from groundwater springs and seeps. The Gingin surface water area has been divided into 12 resource units.

In September 2008, the DoW commenced development of the Gingin Surface Water Allocation Plan. The plan contains allocation limits that define how much water can be abstracted from the water resource units each year. It includes policies for how DoW will allocate and manage water resources and informs how DoW will monitor, measure and evaluate the objectives of the plan.

The Plan was developed to address the water allocation issues raised by the local community and to provide a consistent and clear way forward when allocating water.

Since 1975 there has been a decreasing trend in average annual stream flow throughout most of the plan area. Water users are concerned about the impact of upstream abstraction on downstream water users and the environment. The critical issue is managing abstraction during the low flow (summer) period when demand for water is high.

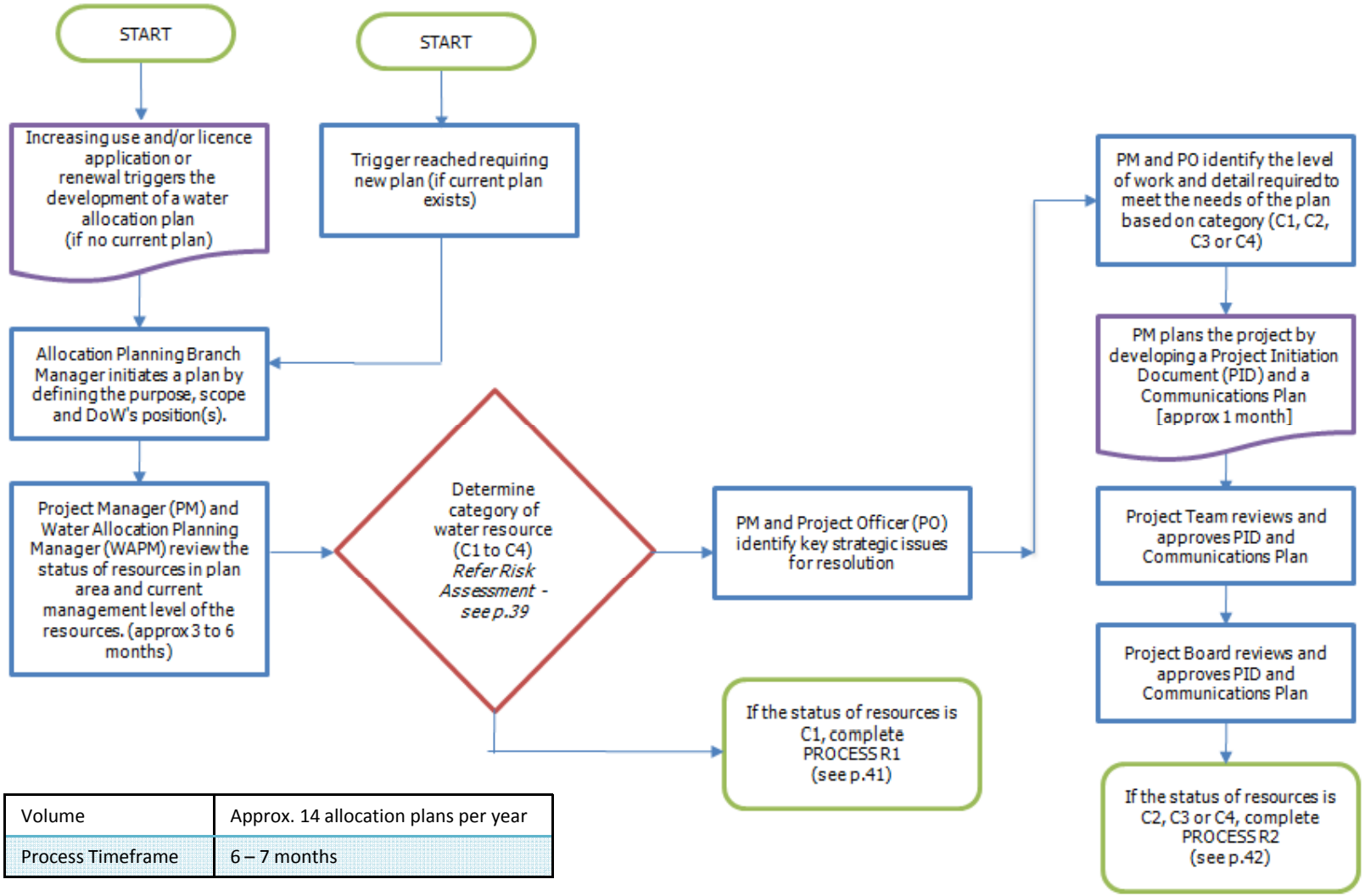
The plan recognises and aims to protect existing riparian rights, horticulture and agricultural use of the surface water resources.

The draft Plan was released in September 2009 for public comment by December 2009 . The final plan is expected to be released by June 2010.

RISK ASSESSMENT FOR ALLOCATION PLANNING

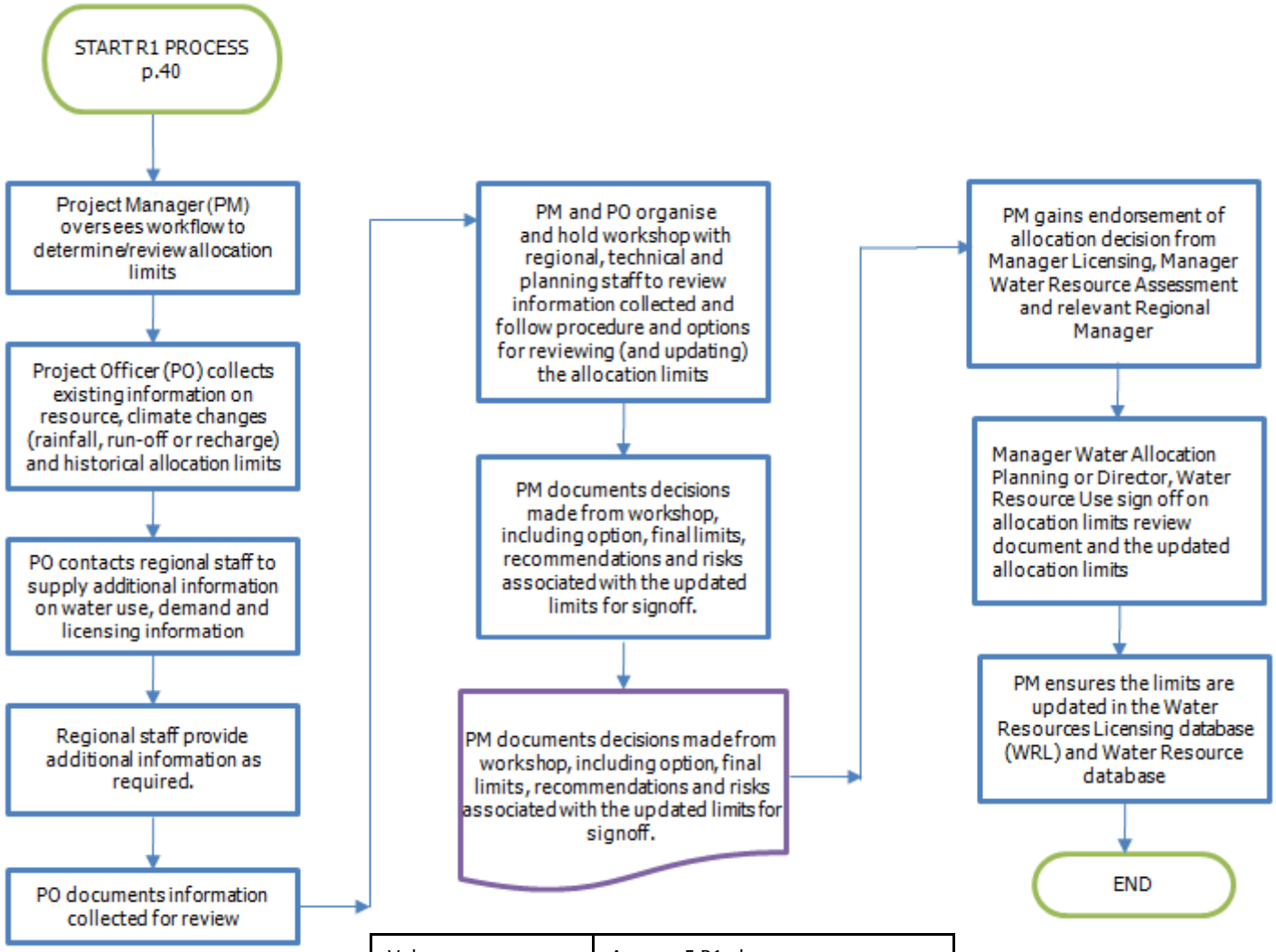
RISK CATEGORY	RISK RESPONSE
C1 - **relatively low use, 0-30% of allocation limit used** - **low risk to environment** - **low consequences of current and short-medium term use**	R1 - use managed by DoW s5C licences on issued up to an allocation limit and in line with state wide policy - allocation limits reviewed and updated within the last ten years in line with rainfall and recharge data and available resource information
C2 - **medium use, 31-70% of allocation limit used, or** - **medium risk to assets and users, or medium consequences if use changes, or** - **potential to jump quickly to high use**	R2 - managed by DoW s5C licences issued up to an allocation limit and within the policy of the allocation plan - allocation plan based on the most current investigation and assessment work - risk based allocation limit maximises water availability while protecting in situ values at a broad scale - plan applies State-wide policy on a local scale and specifies new local area policy
C3 - **high use, 70 to less than 100% allocation limit used, or** - **high risk or high consequences if level of use increases without improvements to management**	R3 - managed by DoW s5C licences issued up to an allocation limit and within the policy of the allocation plan - allocation plan based on newly commissioned investigation and assessment work - water availability optimised - in situ values protected through specified water regime in key parts of the plan area - plan applies State-wide policy on a local scale and specifies new local area policy to manage impacts between users and on the in situ values.
C4 - **100% or greater than 100% allocation limit used (fully or over allocated) for any management area in a plan area**	R4 - a recovery approach specified within an R2 or R3 plan for management areas that are over-allocated - level of recovery response varies depending on circumstances: (i) cap use at current levels, recover water through passive licence and land use changes (ii) targeted compliance and efficiency strategies (iii) (active recovery program)
Source: DoW Water Allocation - Guidance note: planning response to resource category April 2009	

INITIAL PLANNING AND ASSESSMENT



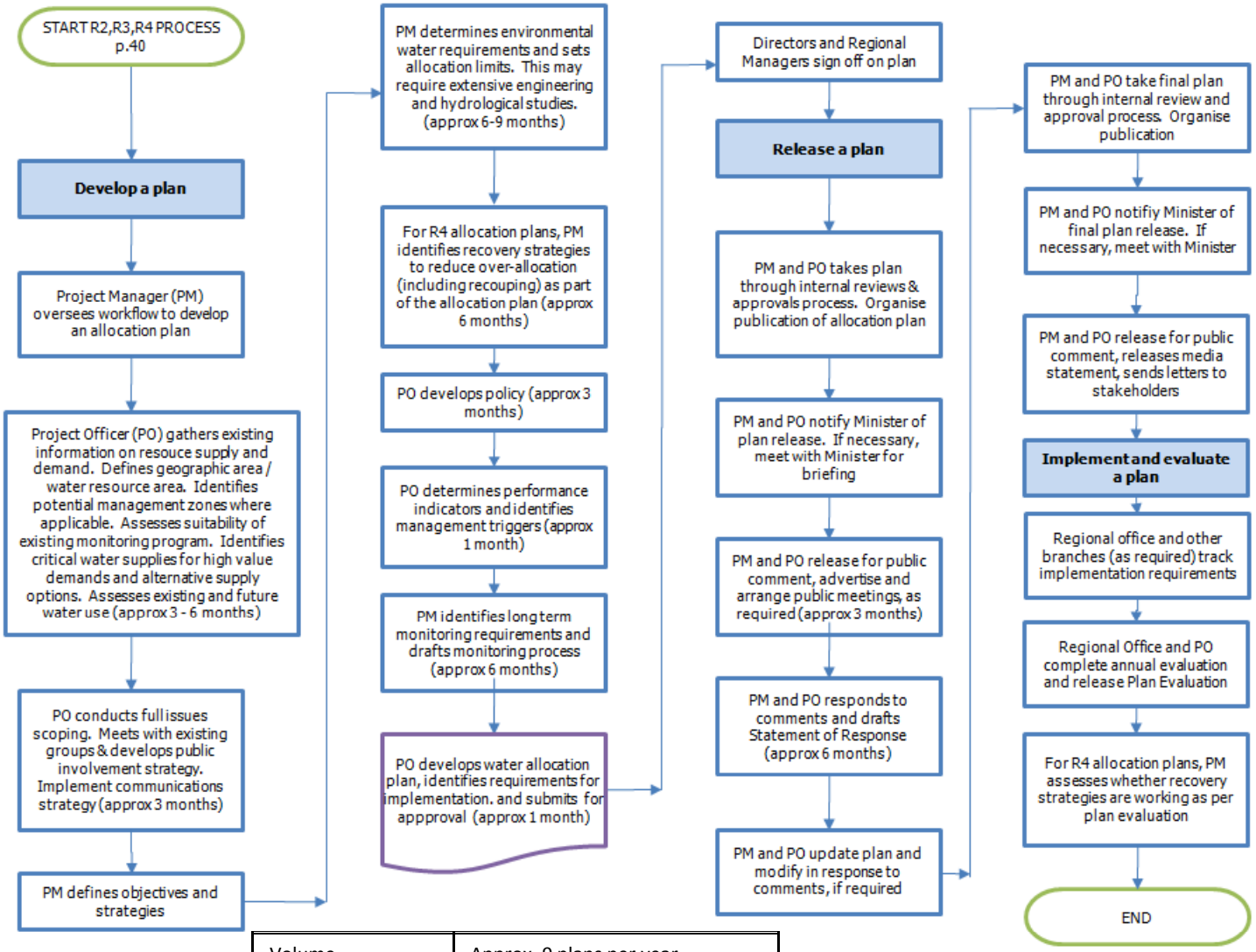
Volume	Approx. 14 allocation plans per year
Process Timeframe	6 – 7 months

LOW RISK ALLOCATION PLANS (R1)



Volume	Approx. 5 R1 plans per year
Process Timeframe	Approx 4 months

MEDIUM TO HIGH RISK ALLOCATION PLANS (R2, R3, R4)



Volume	Approx. 9 plans per year
Process Timeframe	Approx 12 – 18 months (R2 plan), 18 – 24 months (R3, R4 plan)

GROUNDWATER ASSESSMENT, INVESTIGATION AND REVIEW

SUMMARY

The Water Resource Assessment Branch is responsible for the assessment of water resources across Western Australia covering five fields: groundwater investigation, groundwater assessment and review , surface water assessment and flood plain management. This section of the report outlines the groundwater assessment, investigation and review functions.

The groundwater assessment functions are:

- knowledge development of the State's groundwater resources and undertaking technical groundwater assessments for use by water managers and water users
- providing advice and assessments of the availability, distribution and quality of the State's groundwater resources
- providing hydrogeological support and assistance for developing policies and strategies to enable the management, protection and development of the State's groundwater resources in a sustainable manner
- conducting local and regional groundwater assessments
- advising government agencies on technical groundwater issues
- provide groundwater training.

Groundwater investigations are driven from the DoW's *15 year action plan - Investigating Western Australia's Groundwater Resources - A 15 year plan of action (2006*). Investigations are undertaken to support allocation planning.

Groundwater review is a relatively new section that commenced in September 2008. The function is primarily to undertake detailed groundwater resource reviews that support the pre-planning and implementation phases of the allocation planning process.

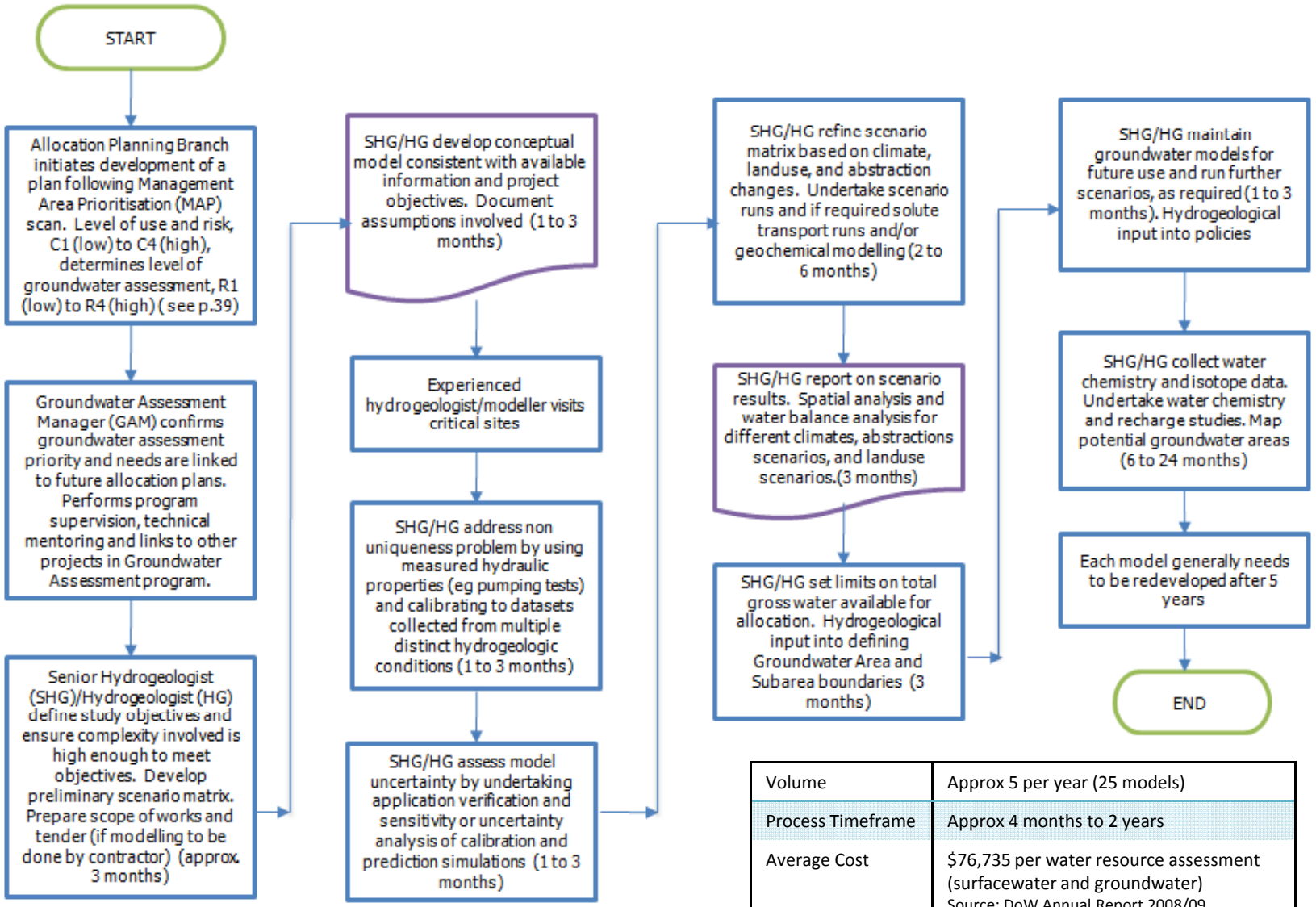
KEY PROCESSES (attached)

- Groundwater assessment for water allocation planning
- Groundwater assessment advice for stakeholders
- Groundwater investigation
- Groundwater review
- Case studies

STAFFING

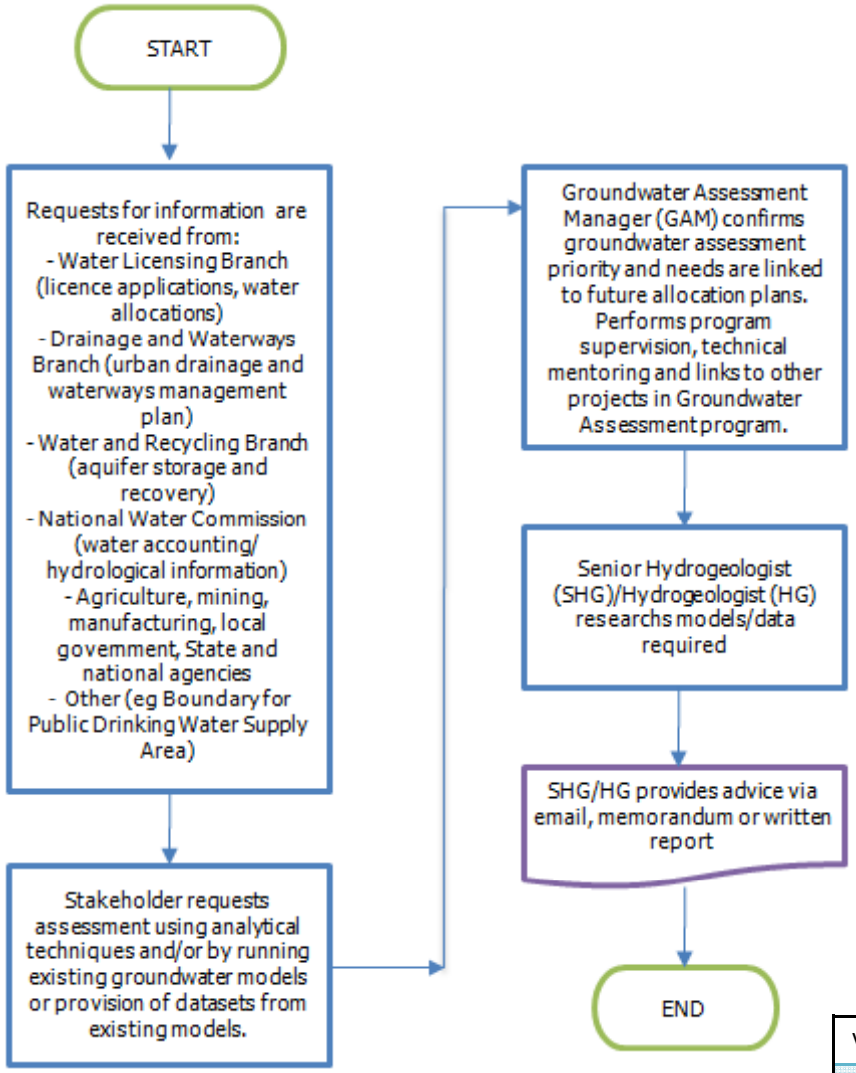
Current staffing (Full-Time Equivalent)	24.5
Funded staffing (in 2009/10 budget)	28.5

GROUNDWATER ASSESSMENT FOR WATER ALLOCATION PLANNING



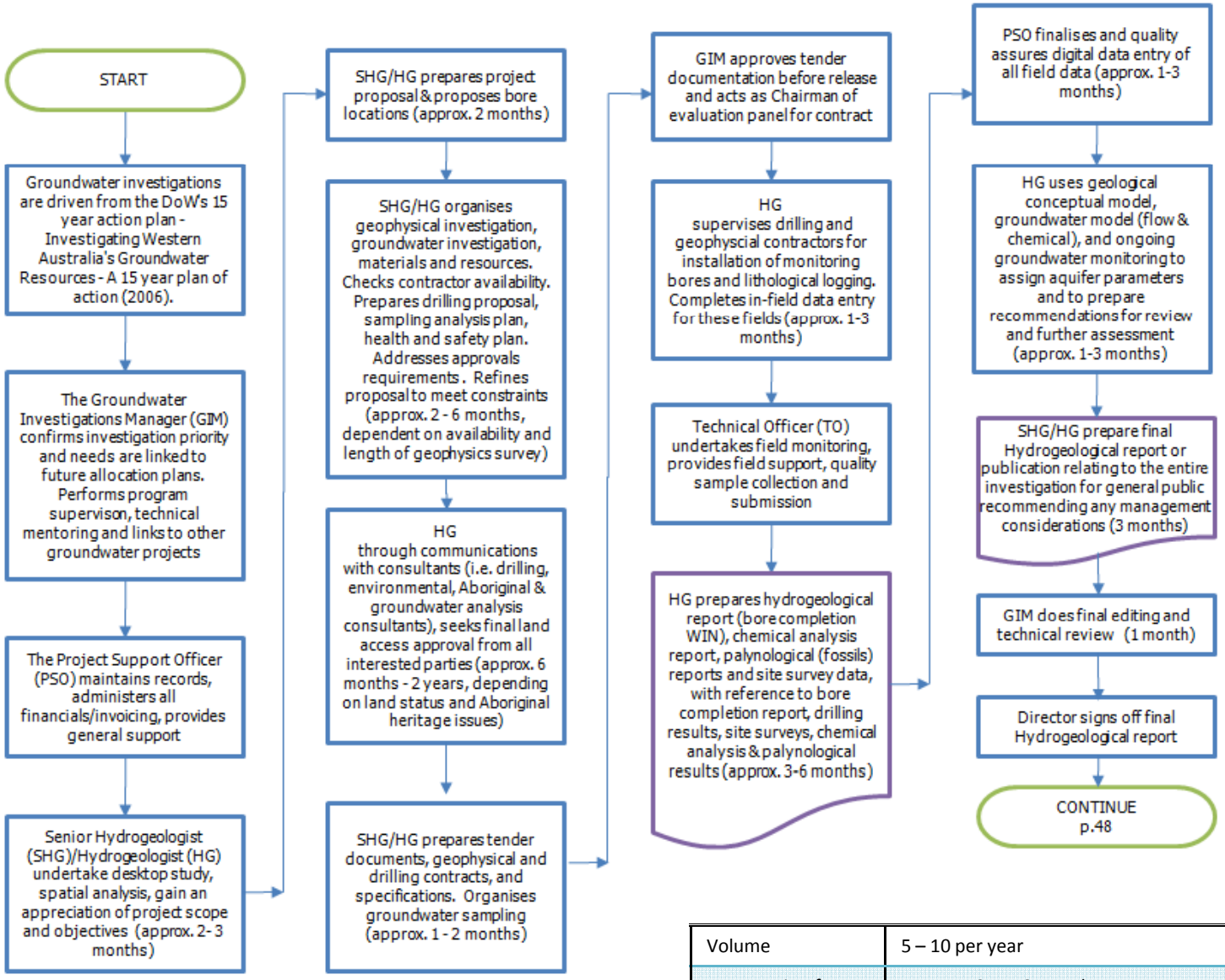
Volume	Approx 5 per year (25 models)
Process Timeframe	Approx 4 months to 2 years
Average Cost	$76,735 per water resource assessment (surfacewater and groundwater) Source: DoW Annual Report 2008/09

GROUNDWATER ASSESSMENT ADVICE FOR STAKEHOLDERS



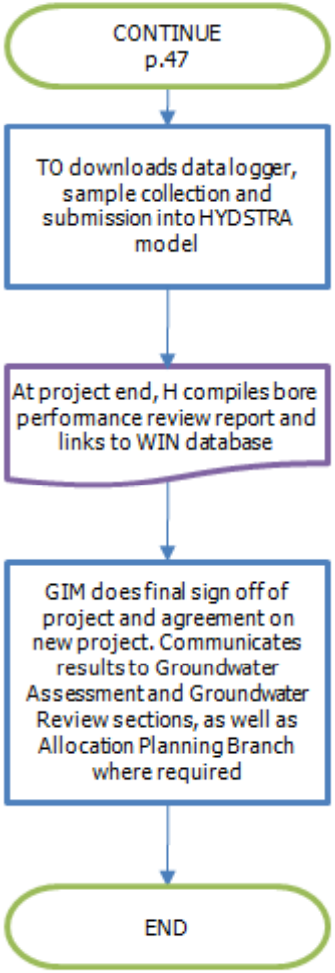
Volume	Approx 60 requests per year
Process Timeframe	Approx 2 to 90 days depending on complexity

GROUNDWATER INVESTIGATION (1 OF 2)

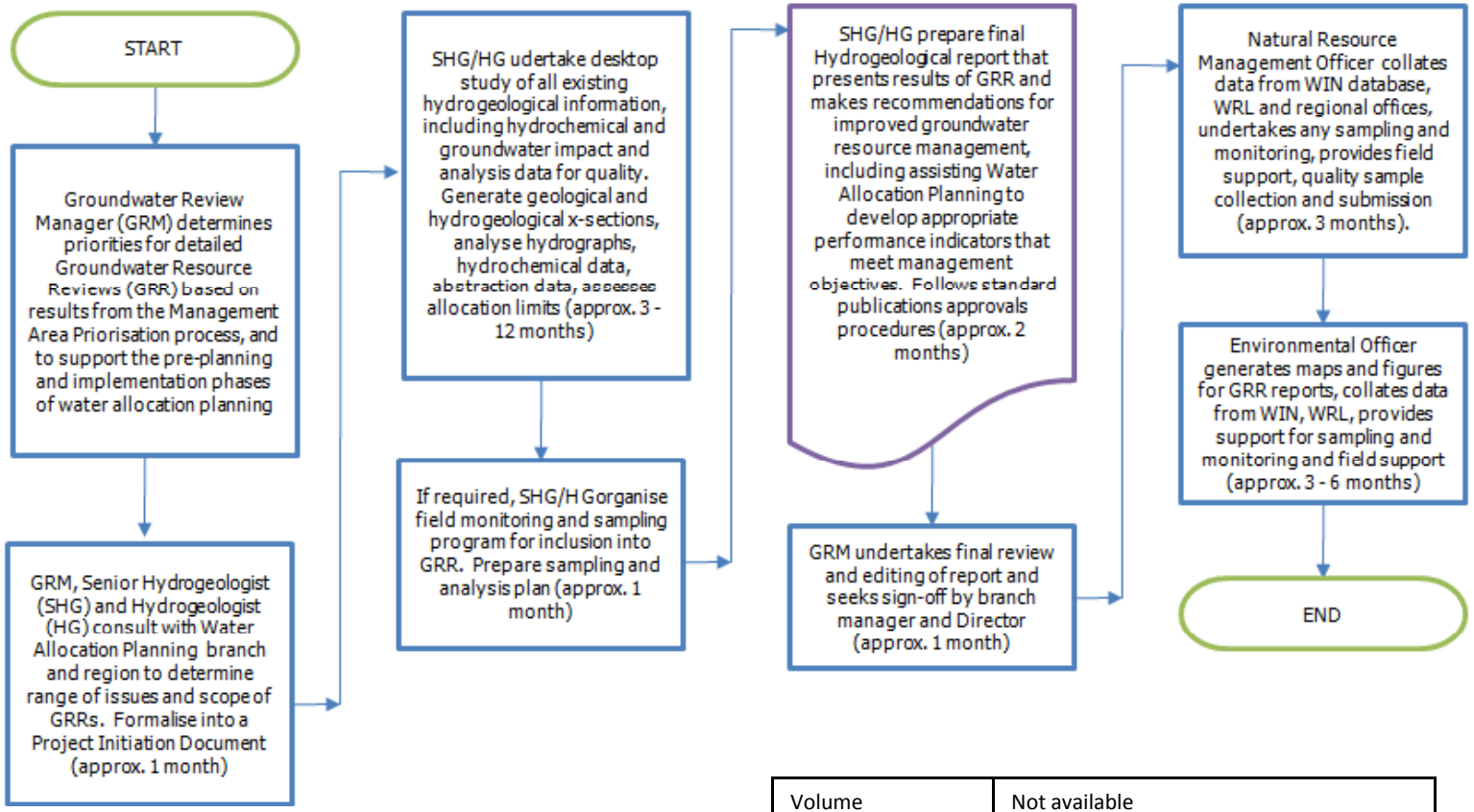


Volume	5 – 10 per year
Process Timeframe	Approx 12 to 18 months

GROUNDWATER INVESTIGATION (2 OF 2)



GROUNDWATER REVIEW



Volume	Not available
Process Timeframe	Approx 3 to 12 months

CASE STUDY – GROUNDWATER ASSESSMENT

Groundwater assessment for Perth region

The Perth Region Aquifer Modelling System (PRAMS) is a complex state of the art interactive and predictive tool for quantitative water resource assessment. The model was developed jointly with the Water Corporation to help evaluate the impacts of climate variability, land use changes and abstraction regimes for sustainable water resource management.

This powerful modelling tool has many applications including;

- Predicting future groundwater levels
- Providing the inputs for National Water Accounting
- Setting groundwater area boundaries for equitable allocations
- Saline intrusion prediction to protect users
- Improving hydrogeological understanding (synthesis of data) to optimise sustainable development for users
- Aquifer simulation and visualisation to evaluate options
- Optimising allocation limits and impacts for economic efficiency and account for environmental effects (optimisation)
- Evaluating recharge, discharge and aquifer storage processes (water resources assessment)
- Evaluating aquifer storage and recovery for recycled water
- Predicting impacts of alternative hydrological or development scenarios to assist decision making (eg water source protection)
- Evaluate urban and land drainage issues
- Quantifying the sustainable yield (economically, socially, environmentally sound allocation policies)
- Resource management (assessment of alternative policies)
- Sensitivity and uncertainty analysis (for risk-based decisions)

PRAMS was used to evaluate development scenarios for the Gnangara Sustainability Strategy, leading to the Gnangara Statutory Plan. It is also used for water licensing, water trading, urban and land drainage, water quality protection, aquifer storage/reclamation and environmental water planning.

CASE STUDY – GROUNDWATER INVESTIGATION

Cowaramup groundwater investigation

Since early 1999, the Department of Water refused groundwater licence applications from the Leederville aquifer in the Cowaramup subarea, as licensed allocations exceed the existing allocation limits. A groundwater resource assessment was completed in 2000 indicating that substantial groundwater resources may be available from the Leederville aquifer for use by the local viticultural industry.

A project proposal was developed in 2005 to conduct an investigation to better define the hydrogeology and groundwater resources of the shallow and deep groundwater systems in the aquifer. More specific objectives were to determine the location of the groundwater-flow divide, identify areas of groundwater recharge and discharge, understand groundwater-surface water interaction, and estimate sustainable yield.

There was a comprehensive review of existing groundwater and coal exploration data, before the installation of monitoring bores into the Leederville aquifer. Fourteen monitoring bores at seven sites were constructed in January to May 2006 to redefine the stratigraphy of the Leederville aquifer and undertake ongoing monitoring of water levels.

Following bore development, water samples were collected for chemical analysis. An isotopic and hydrochemical study was later undertaken to assess groundwater residence times in the Leederville aquifer. The study involved the use of carbon-14 and chlorofluorocarbon (CFC) dating techniques to assess recharge and groundwater flow patterns.

Monthly water level measurements were collected in 2006-2008 to establish baseline information. A three-dimensional groundwater flow model, using Modflow, was developed in 2008 to assess groundwater resources and potential impacts related to increasing allocation limits

The investigation and subsequent assessment demonstrated that groundwater allocations in the Cowaramup subarea could be increased by 1.5 GL/year. There is a high level confidence in the groundwater model with ongoing monitoring and reviews being critical for future management of the groundwater resource. The investigation produced two high-quality hydrogeological reports and informed the South West groundwater areas allocation plan released in May 2009.

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SURFACEWATER ASSESSMENT

SUMMARY

The Surfacewater assessment functions are to:

- undertake surface water hydrology studies to support water allocation planning and licensing
- assess drying climate impacts
- provide advice on water licence applications in areas without a water allocation plan

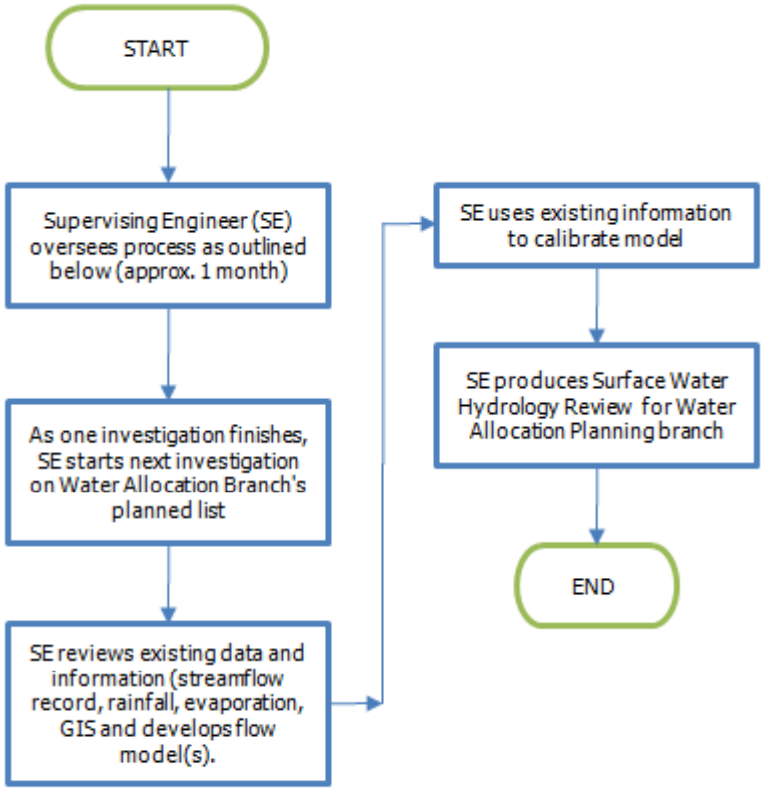
KEY PROCESSES (attached)

- Surfacewater assessment for allocation planning
- Surfacewater assessment for licensing
- Case studies

Note: Other activities such as conducting studies have not been mapped as they vary with each study

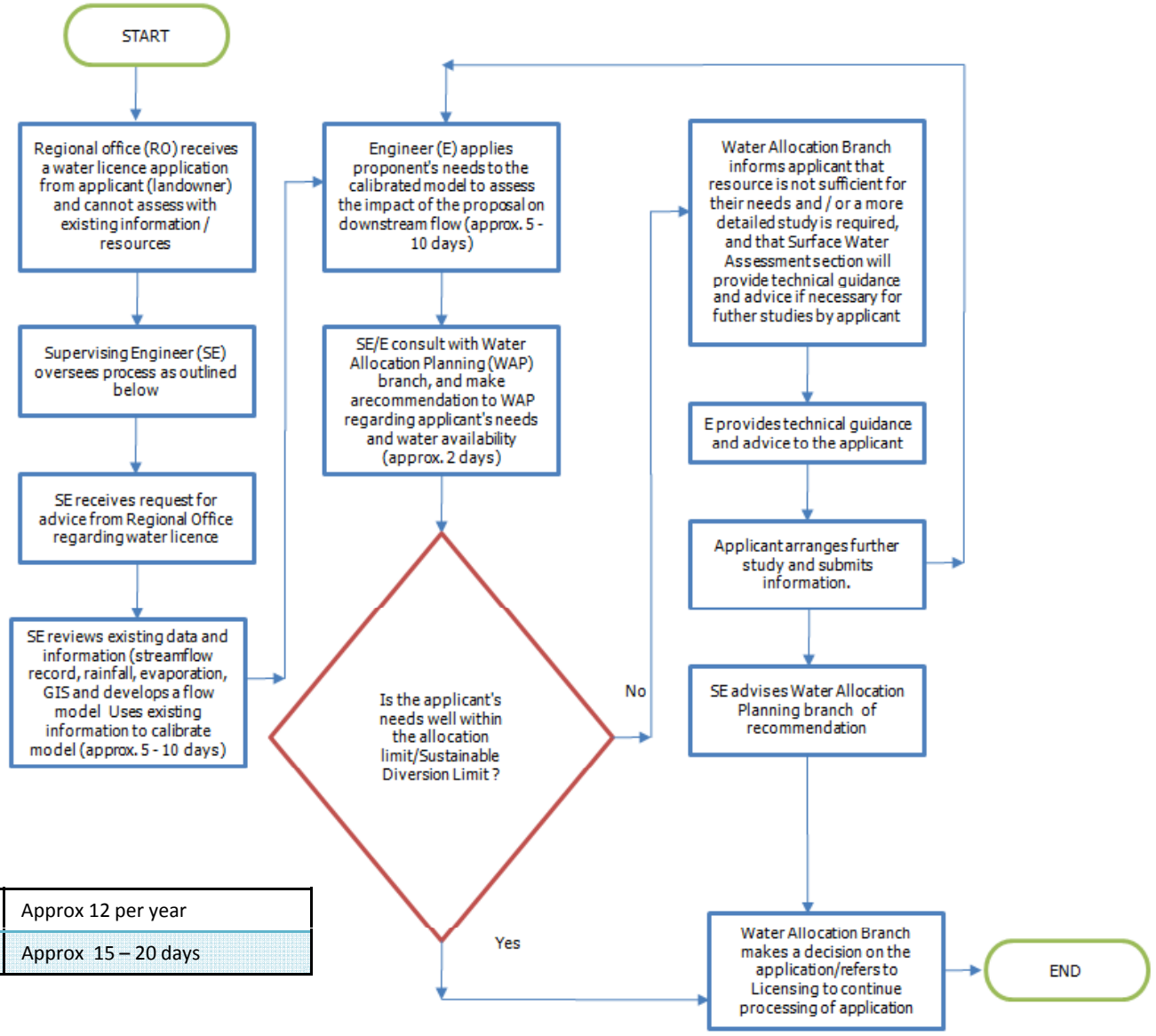
STAFFING

Current staffing (Full-Time Equivalent)	7.0
Funded staffing (in 2009/10 budget)	7.0



Volume	Approx 4 – 5 per year
Process Timeframe	Approx 3 – 12 months
Average Cost	$76,735 per water resource assessment (surfacewater and groundwater) Source: DoW Annual Report 2008/09

SURFACEWATER ASSESSMENT FOR LICENSING



Volume	Approx 12 per year
Process Timeframe	Approx 15 – 20 days

CASE STUDY – SURFACEWATER ASSESSMENT

Hydrological assessment for a licence application

An applicant submitted a licence application to construct three dams on a river system in South Western Australia. A licence to take 50,000 kL of water per year had been previously approved.

The rainfall site has recorded rainfall from 1925 to present. There has been a recognised decline of 11% in rainfall since 1975 in the South Western Australia and this was adjusted in the data provided by the applicant's consultant. The DoW estimates of mean annual flow were 30 to 55% less than those provided in the consultant's hydrology reports and it was recommended that the consultant reviews the estimates of mean annual flow in light of the differences in catchment area, clearing and rainfall.

The impact of the three proposed dams was assessed with daily flow modelling of the proposed system using the DoW's River Manager model. The modelling showed that the demand cannot be met in most years with 48% of the demand met at the upstream site, 35% of the demand met at the middle site and 87% of the

demand met at the downstream site in half of the years. As the downstream dam already has a license, then any development upstream can not impact on their ability to achieve their supply. Daily flow modelling with the downstream site only (ie, no upstream or middle dam) shows that the downstream dam currently meets their demand only 32% of the time.

The DoW concluded that the proposed dams and demand volumes would not be acceptable when assessing the downstream impacts on the hydrographs. It would also impact on the reliability of supply of the license already approved at the downstream site. It was recommended that the applicants consider revising the volume requested and pumping to an off-stream storage if possible.

Water Management Plan for the Ord River

The DoW developed a Water Management Plan in 2006 to prescribe how the water of the Ord River was to be shared over the next three years. The plan was released in 2006. In 2008, a comprehensive study was released outlining how much water is needed to maintain the ecology of the lower Ord River. This study provided more accurate, detailed data on ecological water requirements and supports the next phase of water management planning for the Ord River. Further studies are continuing.

The Water Management Plan was developed to:

- protect the environment of the lower Ord River, taking into account the environmental changes since the construction of the Ord River dam
- provide secure water supplies for irrigation and hydro-power generation
- provide planning guidance for the Western Australian portion of the new WA-Northern Territory irrigation area (M2) and irrigation developments on the lower Ord River downstream of House Roof Hill
- identify the potential for further hydro-electricity generation at the Ord River and Kununurra diversion dams
- indicate the potential for additional irrigation allocations

METERING

SUMMARY

The Metering program facilitates the installation and maintenance of State-owned water meters, and the verification of privately-owned water meters, of licensed water users.

The Metering program, first initiated as the Gnangara Mound Metering Project (GMMP) in mid 2004, currently installs, maintains and monitors flow meters on bores within high use and high risk groundwater sub-areas on the Gnangara Mound, the principle source of potable water for the Perth Metropolitan area.

Monitoring data has indicated that groundwater levels on the Gnangara Mound have been in steady decline over the last decade and the GMMP was first established to assist in the investigation and management of this important issue in line with Western Australia's commitments under the State Water Strategy (2003).

Currently, the GMMP has fitted more than 1250 meters across 18 groundwater sub-areas.

KEY PROCESSES (attached)

- Assessing sites for meter installation
- Meter reading
- Managing contractors for design, installation and maintenance of meters

STAFFING

Current staffing (Full-Time Equivalent)	6.0
Funded staffing (in 2009/10 budget)	7.7

CASE STUDY

New meters

A groundwater sub-area is selected for metering based on the level of groundwater abstraction (balance of water available for future licensing) and extent of environmental/ecological sensitivity.

Once the groundwater sub-area has been selected a report is run within the DoW licensing database identifying all groundwater licences within that sub-area with allocation equal to or greater than 5,000 kL. Only these licences are targeted for metering.

A preliminary site inspection is completed and then installation of the meter is arranged with the licensee and the relevant installation contractor (sub-area specific).

Relevant details of the meter are added to the metering database.

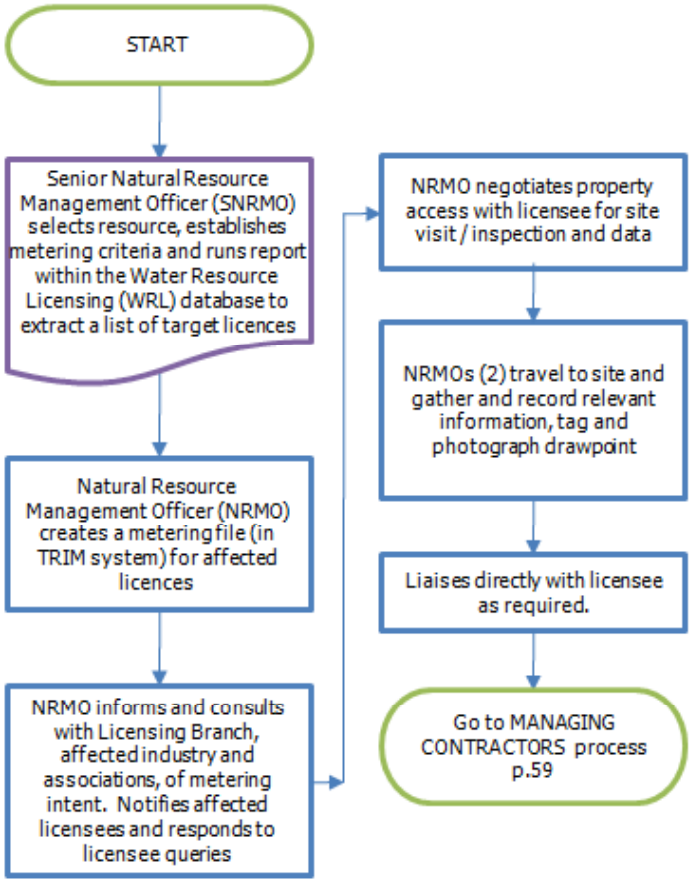
Maintenance of the meter is carried out as required.

Meter reading

The new meter is added to the meter reading spreadsheet and will be monitored during the course of the next meter reading run (bi-annually). A project officer enters the property with a handheld device (IPAC) and manually enters the reads of all installed meters into an Excel spreadsheet. A usage card is left at each property outlining the calculated usage of that particular bore from the time of the previous read, as well as the total metered volume.

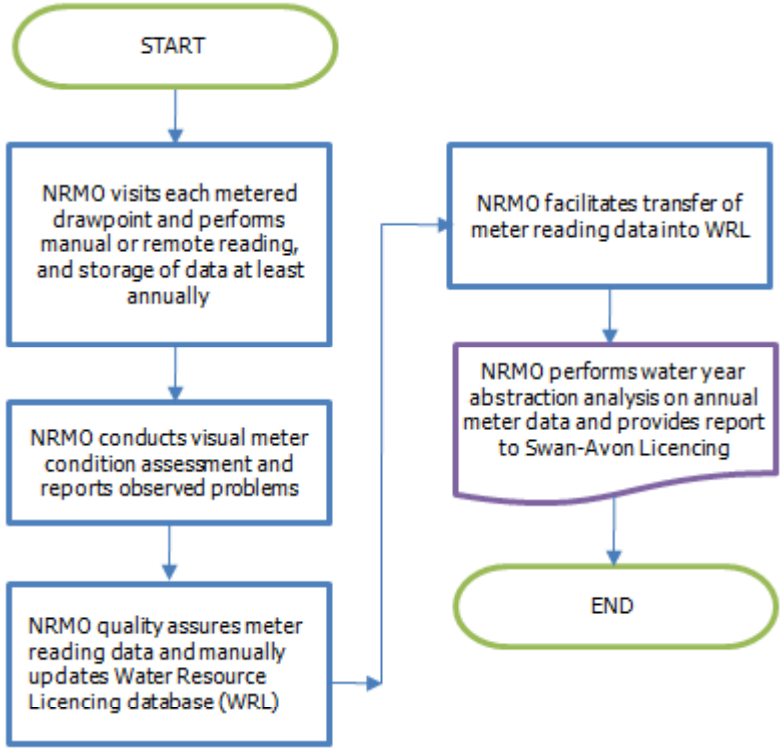
Once the meter reading is complete, the observed readings are then transferred manually into the DoW licensing database against the relevant groundwater licence. These readings are then interrogated at the conclusion of a pre-determined water year to assess actual annual usage against licensed allocation. Data is submitted to Swan-Avon Licensing who then utilise this water use data for compliance and enforcement purposes.

ASSESSING SITES FOR METER INSTALLATION



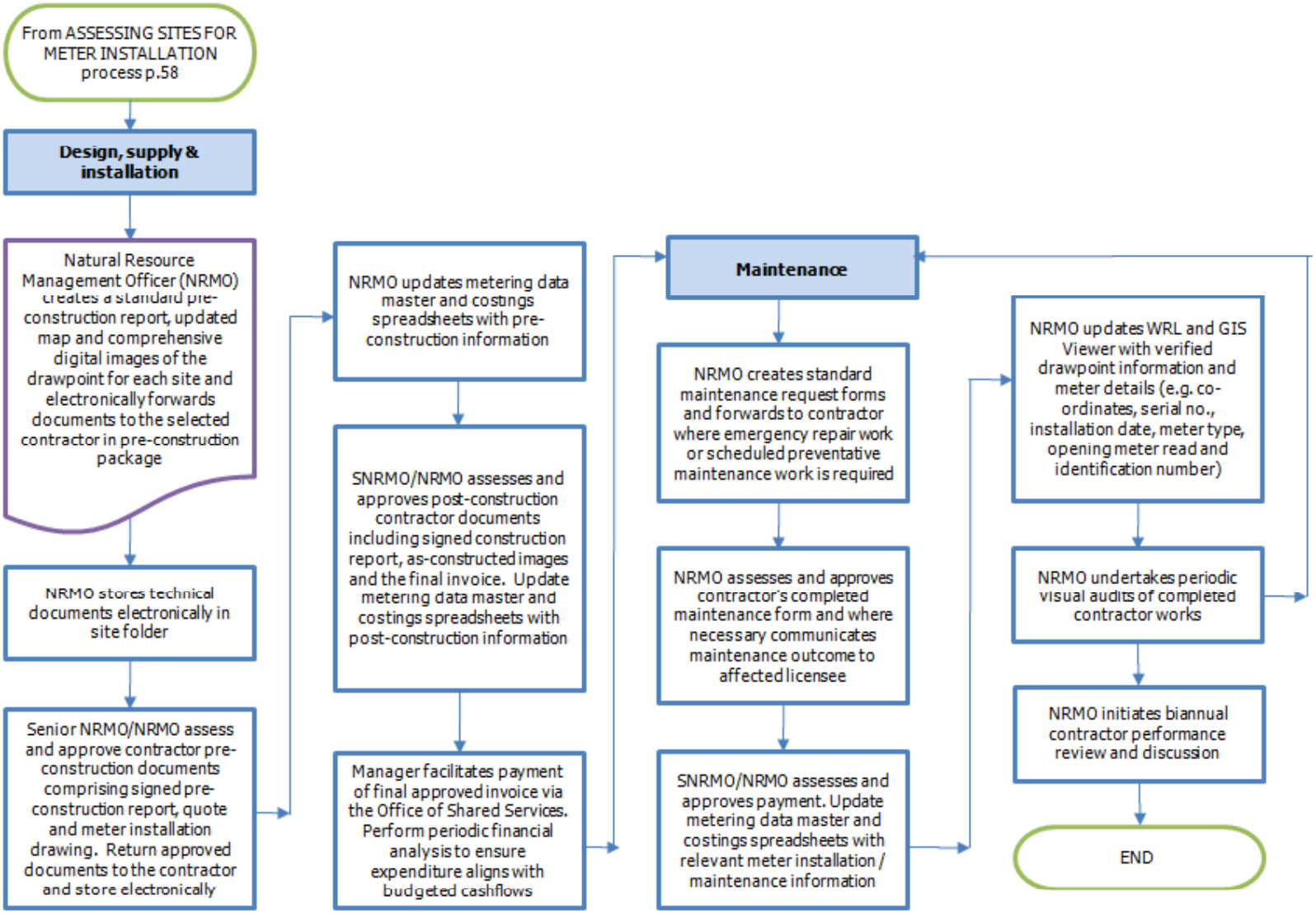
Volume	Approx. 350 meters per year
Process Timeframe	Approx 4 to 5 weeks (including installation)

METER READING



Volume	Approx. 1,250 meters read bi-annually
Process Timeframe	Approx 2 weeks per run plus planning and data entry
Average Cost	Not available

MANAGING CONTRACTORS



WATER AND LAND USE COORDINATION

SUMMARY

The Water and Land Use Coordination functions are to:

- integrate land and water planning
- identify strategic and statutory mechanisms under land planning legislation to deliver water resource management outcomes
- provide land use planning leadership in the Department of Water
- identify town planning mechanisms for the delivery of strategic drainage and water plans
- ensure land planning advice to other decision making authorities is appropriate, consistent, targeted and maximises use of the Departments land planning resources
- provide an internal centre of expertise in land use planning.

KEY PROCESSES (attached)

- Assessment of technical reports
- Clearance of sub-division condition
- Assessment of statutory referrals

STAFFING

Current staffing (Full-Time Equivalent)	8.8
Funded staffing (in 2009/10 budget)	8.8

CASE STUDY

Clearance of Subdivision Condition Request

A land developer requested the clearance of subdivision conditions set by the Western Australian Planning Commission (WAPC).

In January 2007, the developer had submitted a subdivision application to the WAPC for an urban land development (Stage 1). The DoW reviewed the statutory referral and requested that a condition for an Urban Water Management Plan (UWMP) be applied.

The WAPC approved the subdivision application in February 2007 with one of the conditions requiring a UWMP.

In January 2010 the developer submitted a DoW clearance request form for the clearance of the condition requiring an UWMP (subdivision stage report) for the development for Stage 8. The DoW officer located the UWMP and DoW approval and checked that the Deposited Plans were within the area covered by the UWMP and in accordance with the report.

The DoW stamped the deposited plans and provided a letter to the developer and the WAPC advising that the DoW requirements for the clearance of the condition had been satisfied.

Assessment of Statutory Referral

The WAPC referred a development application to the DoW for a response within 30 days. A consultant on behalf of the land owner had applied to build a caretaker's residence on his property which has an existing residence and farm buildings. The property is bordered by the Swan River with Jane Brook running through the property. Both waterways are part of the Swan River Trust Management Area.

The Water and Land Use Coordination section undertook an assessment of the proposal and sought advice from the Floodplain Management section. This section provided advice on appropriate building heights for flood protection. A response was sent to the WAPC advising of DoW recommended building heights and floor levels for flood protection. The referral was completed in 20 calendar days.

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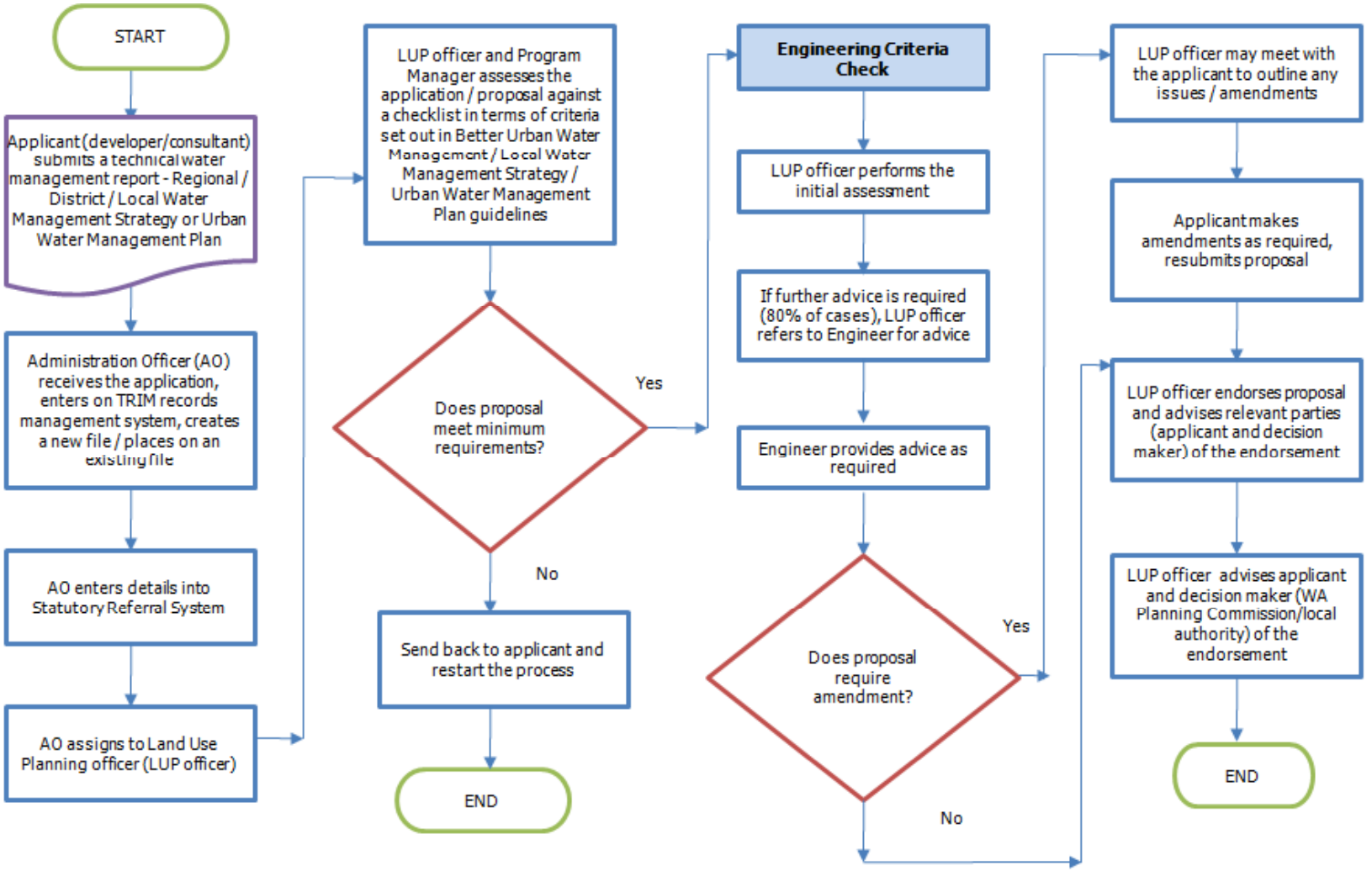
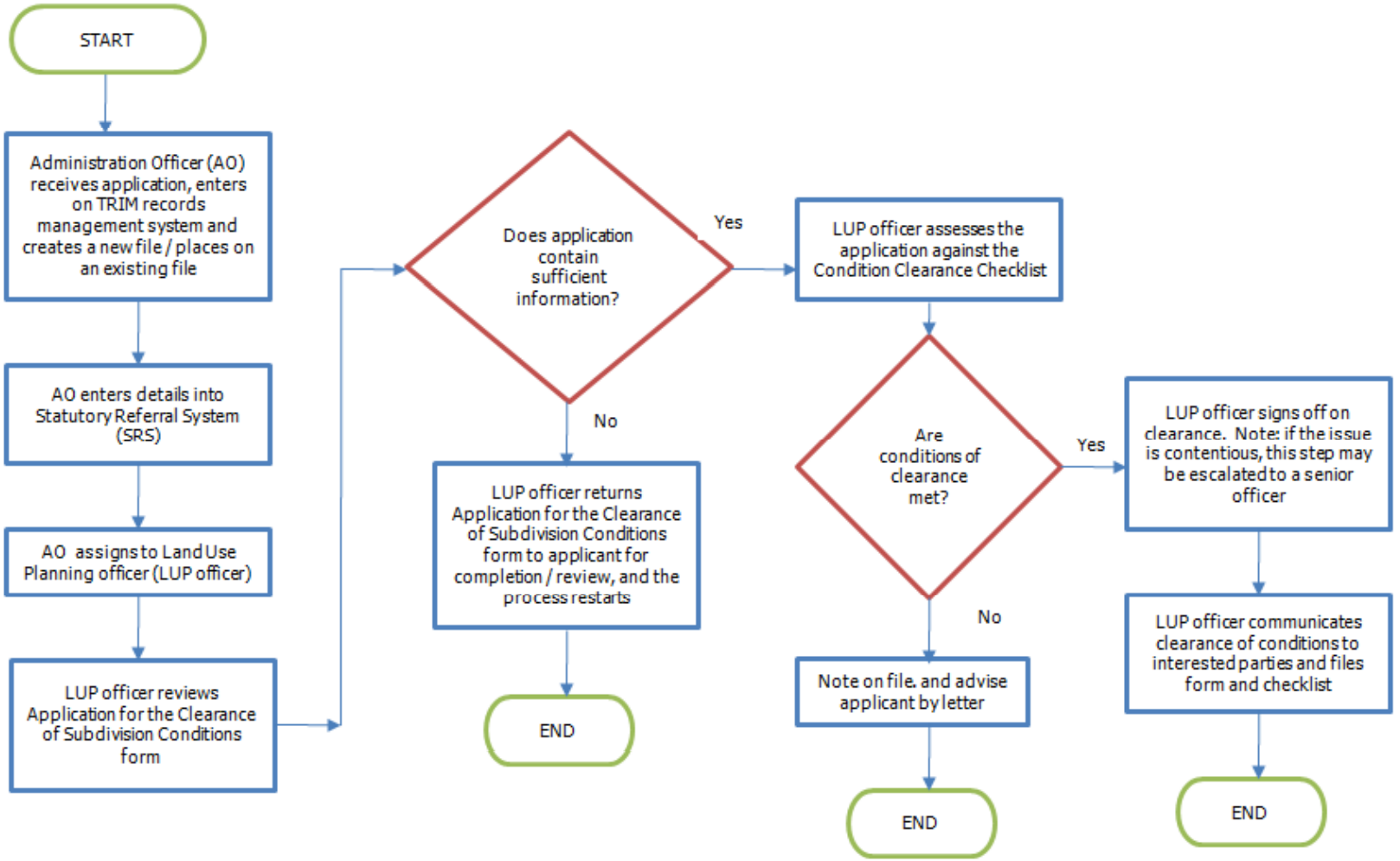
ASSESSMENT OF TECHNICAL REPORTS



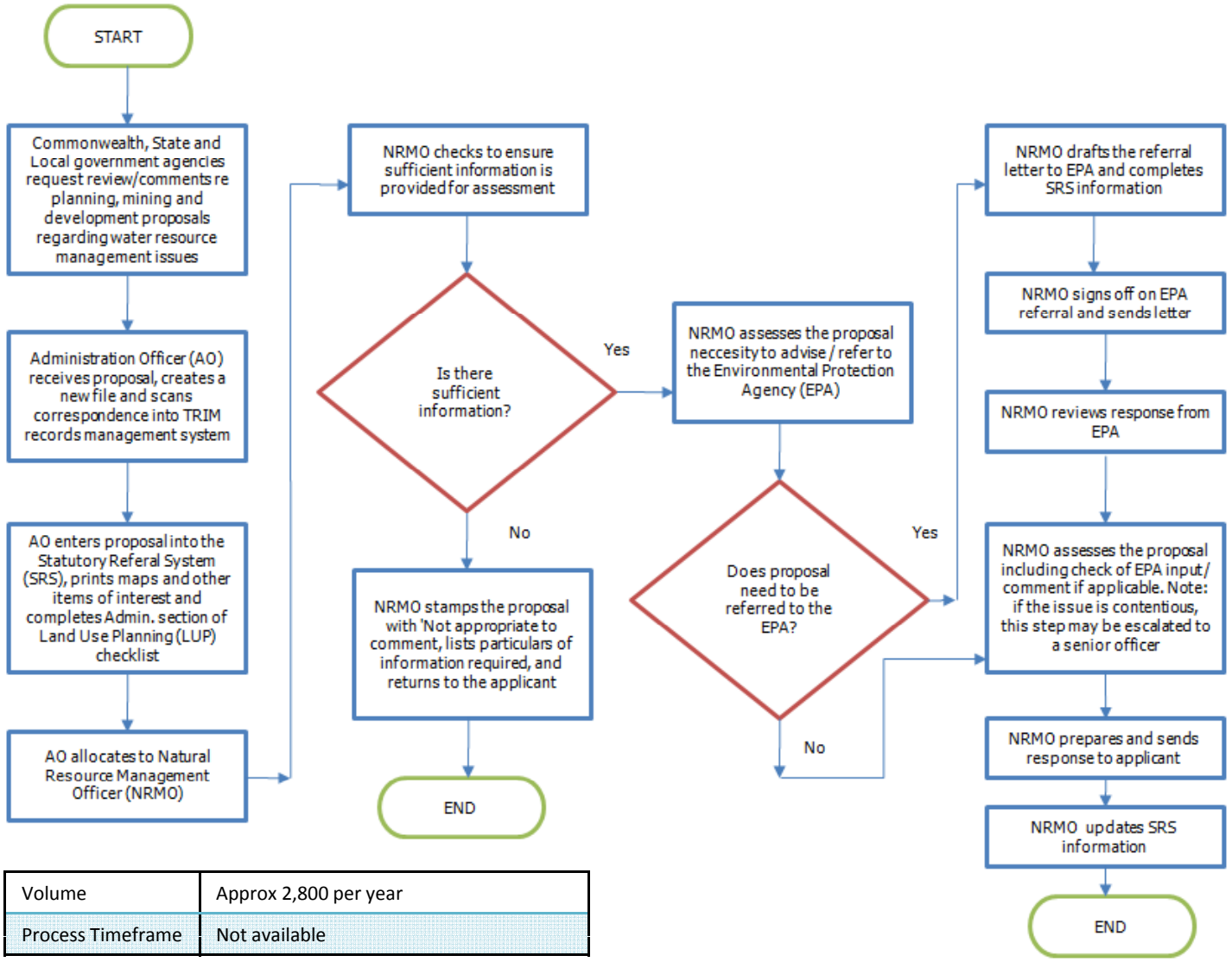
Volume	Approx 200 per year
Process Timeframe	Not available

CLEARANCE OF SUB-DIVISION CONDITIONS



Volume	160 in 2008/09 but expected to increase in 2009/10
Process Timeframe	Not available

ASSESSMENT OF STATUTORY REFERRALS



Volume	Approx 2,800 per year
Process Timeframe	Not available

WATER SOURCE PROTECTION

SUMMARY

The Water Source Protection program is responsible for providing advice on the protection of public and private water supplies. The program involves extensive public consultation via the development of Drinking Water Source Protection Plans that sets out recommendations for:

- the protection of the public drinking water source
- prepares guidance documents on groundwater contamination risks and land use activities that could affect drinking water quality.

The program also provides catchment management and protection services for public drinking water source areas defined under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* and the *Country Areas Water Supply Act 1947*. It also carries out investigations and provides published and development application guidance on the protection of the quality of water resources.

There are approximately 150 proclaimed drinking water sources in WA. This number will significantly increase if Indigenous community source and mine site sources are proclaimed in the future.

KEY PROCESS (attached)

- Development of Drinking Water Source Protection Plan

STAFFING

Current staffing (Full-Time Equivalent)	17.6
Funded staffing (in 2009/10 budget)	23.4

CASE STUDY

Preparation of Drinking Water Source Protection Plan

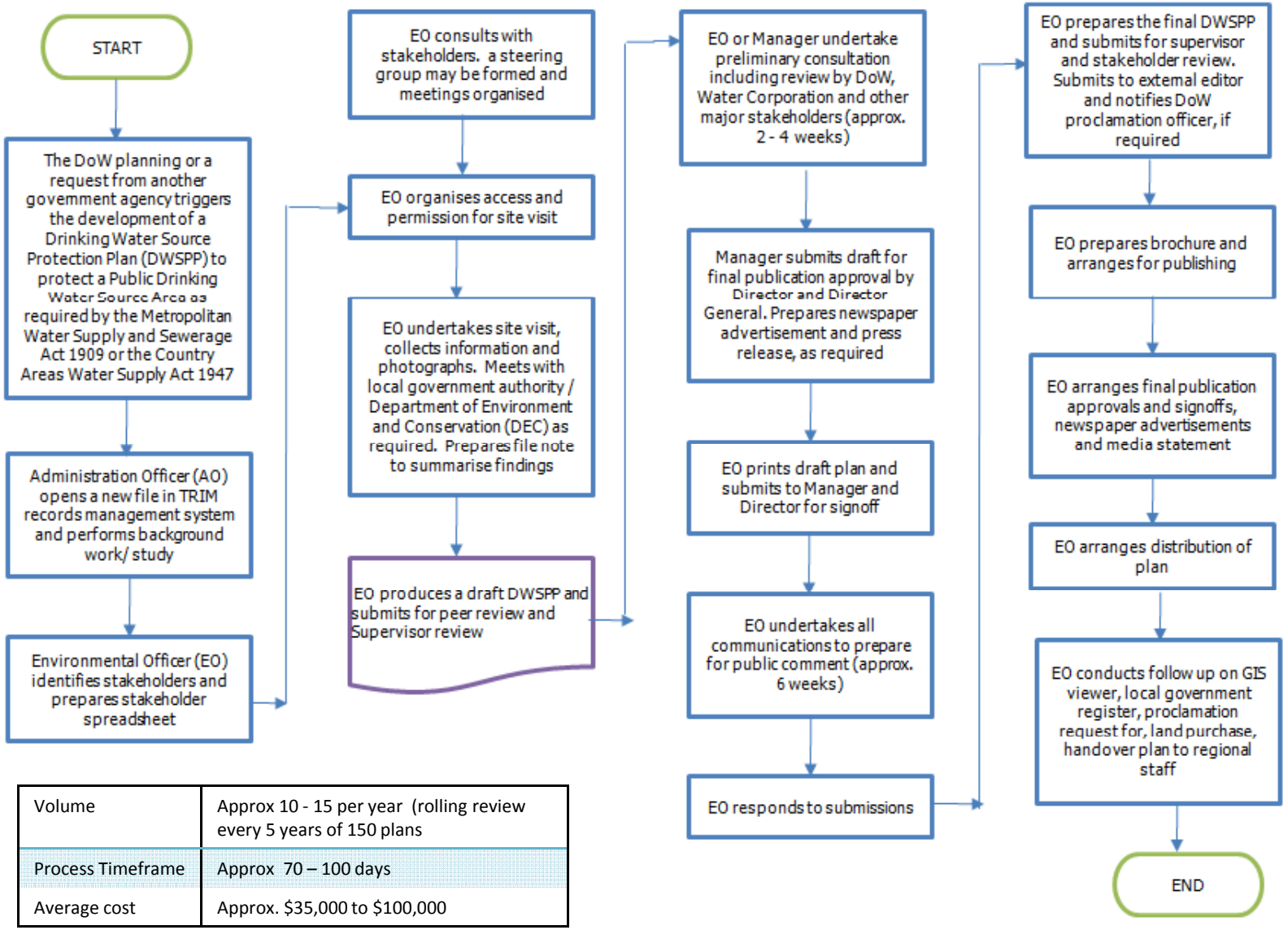
The preparation of drinking water source protection plans (DWSPP) is recommended by the Australian Drinking Water Guidelines 2004, and was a key recommendation of the 1994 and 2000 Parliamentary Committee reviews into water supply management matters in WA. DWSPP assess the risks to public water quality in a surface or underground public drinking water source area (PDWSA) and they recommend how to prevent, minimise or manage those risks. A DWSPP is used to guide land use planning agencies (and land owners/developers) in the appropriate development of land within a PDWSA.

It is known that land use intensification/development increases contaminant loads (and risks) in an area. The DWSPP aims to apply a risk based assessment of the contamination threats and apply mitigation measures that prevent, minimise or manage those risks to ensure the ongoing availability of a reliable (24/7), low cost, safe, good quality drinking water resource to protect public health now and in the future.

As an example the Hopetoun water reserves DWSPP was completed in 2008/09. It reviewed the town water supply reserve looking at existing and future land use planning options. This source is in an area with limited fresh water supply so the protection of this existing water reserve is a high priority for the future development potential of Hopetoun. The local shire and land owners were consulted during the preparation of this protection plan. A mix of priority areas was established within the water reserve to prevent, minimise and/or manage land use contamination threats (depending on site specific circumstances). The Shire will adopt the recommended PDWSA and its related priority areas and protection zones in the next update of its local planning strategy. This will mean that properly considered development and planning can occur that recognises the significance of this drinking water source.

The DWSPP process is an input to the State land use planning decision making process through other government agencies. Accordingly other important values in an area (eg agriculture, ecosystem) are also considered before decisions are made. This also ensures that the land owners rights are dealt with through established land use planning processes to ensure equity and consistency.

DEVELOPMENT OF DRINKING WATER SOURCE PROTECTION PLAN



Volume	Approx 10 - 15 per year (rolling review every 5 years of 150 plans
Process Timeframe	Approx 70 – 100 days
Average cost	Approx. $35,000 to $100,000

POTENTIAL AREAS FOR EFFICIENCY REVIEW

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The Authority's Draft Report *Inquiry into Water Resource Management and Planning Charges* dated 3 December 2009 includes recommendations that:

1. Efficient costs incurred by the Department of Water that are directly related to the provision of licences be recovered from licence holders.
2. The Department to recover from users all of the efficient costs incurred to prepare water source protection plans, the assessment of subdivision referrals and the undertaking of water metering activities, once the Authority has determined the level of efficient water resource management and planning costs incurred by the Department.

As part of this engagement, Quantum was requested to note any potential areas for an efficiency review of the water resource management and planning activities.

Quantum has not conducted any detailed analysis of potential areas nor assessed any developments that are in progress to improve business processes at the DoW. However, some suggestions from our preliminary understanding of the business processes are provided as follows:

1. Review the number and complexity of activities involved in licensing assessment in order to determine activities that can be eliminated or streamlined to reduce the cycle time for licence approvals, fast track lower risk applications and to reduce the backlog of licence applications (approximately 1,500 applications).
2. Review the risk assessment methodology applied to determine the extent and depth of assessment performed on licence applications and water allocation plans to identify any improvements that may streamline assessments within acceptable risk levels (compare with other States or national benchmarks if possible).
3. Benchmark the licensing assessment process and other resource intensive processes with similar government agencies in other States.
4. Assess the reasonableness (extent and levels) of corporate overhead costs related to the water resource management and planning functions (includes land information functions, policy and planning and corporate division activities).
5. Assess the effectiveness of the project management of major studies including the mechanisms to link scientific research and investigations to the desired outcomes.
6. Consider whether any water resource management and planning functions could be performed more efficiently or at lower cost if outsourced to other providers or government agencies.