

# LANDFILL LICENCING AND LINERS

JG Palm, Managing Member at Jan Palm Consulting Engineers CC, South Africa, janpalm@jpce.co.za  
JL Visser, Technical Manager at Jan Palm Consulting Engineers CC, South Africa, wihan@jpce.co.za

## ABSTRACT

The Waste Act has changed the licencing process for landfills and the Norms and Standards for Waste Disposal by Landfill has changed the design of base liners as well as the procedure of obtaining a Technical Record of Decision. Has these changes resulted in an improved licensing process or has it resulted in more frustrations for the role players?

## 1 BACKGROUND

### 1.1 ENVIRONMENT CONSERVATION ACT

#### 1.1.1 MINIMUM REQUIREMENTS

With the promulgation of the Environment Conservation Act in 1989 the operation of waste disposal sites (or landfills) needed to be permitted. Since no official guidelines or standards for the operation and/or design and construction of landfills existed in South Africa, the then Department of Water Affairs and Forestry, who was entrusted with the permitting function since the then Department of Environmental Affairs and Tourism had limited technical capacity, developed a set of guidelines called “The Minimum Requirements of Waste Disposal by Landfill”. The first set of these documents were published in 1994 and although not prescriptive, provided a graded approach to the design and operation of landfills based on their size, climatic conditions and waste type. These “Minimum Requirements” were, at the time, considered to be quite progressive as it provided minimum guidelines, but also left sufficient space for the design engineer to perform an appropriate design for the site specific conditions.

1998 saw the publishing of the 2<sup>nd</sup> edition of the “Minimum Requirements” with modifications to, amongst others, the size classification.

The permitting procedure basically consisted of an Environmental Authorisation phase in accordance with the Environmental Impact Assessment Regulations, in terms of the National Environmental Management Act, via the Department of Environmental Affairs and a permit application phase in accordance with the “Minimum Requirements” via the Department of Water Affairs.

In January 2006 the permitting function reverted back to the Department of Environmental Affairs and Tourism.

### 1.2 THE NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (ACT 59 OF 2008)

The National Environmental Management: Waste Act (Waste Act) came into effect on 1 July 2009 and effectively replaced the permit application procedure with a Waste Licence application procedure. Whereas the permitting procedure consisted of an Environmental Authorisation phase and a permit application phase, the waste licencing procedure intended to combine the two phases.

Due to the fact that the Department of Environmental Affairs (National and Provincial) have shortages with respect to engineering and technical skills, the Department of Water Affairs assist by scrutinising the liner designs for landfills and provide a Technical Record of Decision.

### 1.2.1 LISTED ACTIVITIES

On 3 July 2009 the Minister published a list of activities that could have a detrimental effect on the environment and should any of these activities be executed then an environmental authorisation process would be triggered, depending on the perceived severity of the environmental impact. The severity of the perceived impact would either require a Basic Assessment (BA) or an Environmental Impact Assessment (EIA) to be performed. Although this approach streamlined the applications for waste management facilities such as Transfer Stations and Recycling Facilities it did not change much for landfills since all new landfills larger than 200m<sup>2</sup> (that is the area of a medium size house!) required an EIA. Although the extension of an existing landfill required only a BA, the interpretation of some case officers are that if the extension was more than 200m<sup>2</sup> then an EIA was required.

The Listed Activities were amended on 29 November 2013, but with no amendments to the activities of landfilling and again on 2 May 2014, but also not where landfilling was concerned.

In terms of the Listed Activities a BA is required when:

- The disposal of inert waste to land in excess of 25 tons but not exceeding 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation.
- The disposal of general waste to land covering an area of more than 50m<sup>2</sup> but less than 200m<sup>2</sup> and with a total capacity not exceeding 25 000 tons.
- The disposal of domestic waste generated on premises in areas not serviced by municipal service where the waste disposed exceeds 500kg per month.

And an EIA is required when:

- The disposal of any quantity of hazardous waste to land.
- The disposal of general waste to land covering an area in excess of 200m<sup>2</sup> and with a total capacity exceeding 25 000 tons.
- The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation.

The difference between a BA and an EIA is the time required for the process since the EIA requires more interaction with the public. The technical requirements for these two processes do not differ significantly. Current experience indicate that a BA takes approximately 7-9 months to complete whereas an EIA takes approximately 18-24 months to complete. The latest legislation, however, lists the time required for an EIA as 300 days or 10 months, but that is discussed further under paragraph 2.

### 1.2.2 NATIONAL NORMS AND STANDARDS FOR DISPOSAL OF WASTE TO LANDFILL

On 23 August 2013 the Department of Environmental Affairs published the National Norms and Standards for Disposal of Waste to Landfill. This document is a partial replacement of the "Minimum Requirements" and basically results in three significant departures from the "Minimum Requirements" in that:

- the graded classification system for size and climatic conditions was replaced with a one size fits all – only dependent on the waste type,
- the liner design is stipulated to be a minimum specification and not a guideline anymore, and
- a Design Report signed off by a Professionally Registered Civil Engineer (Pr.Eng.) to be submitted with design drawings of the liner. Previously only a conceptual design was required at waste licence application stage.

The above is a requirement for all new landfills as well as all new developments or new cells on already licenced footprints.

#### 1.2.2.1 WASTE TYPE ONLY CLASSIFICATION AND MINIMUM SPECIFICATION

With the waste type being the only classification it means that a Class B landfill in Cape Town receiving, say, 3000 tonnes of general waste per day requires the same base liner than a 48 tonne per day Class B

landfill in, say, Vredendal. Since the base liners included in the said Norms and Standards are specified as the MINIMUM base liner, it means that even the hypothetical general waste landfill in Vredendal with an annual rainfall of 102mm per year, must have a 150mm stone leachate drainage system above the liner. In other words, the fact that the climatic moisture may be less than the storage capacity between the levels of moisture content and field capacity of the waste body, is not taken into account and the minimum leachate drainage system can in such an event be considered as another safety factor.

Whereas the “Minimum Requirements” was a guideline and the design engineer could, with proper proof, negotiate a less stringent liner, the Norms and Standards do not allow that opportunity in locations that are geotechnically and geohydrologically very suitable for the establishment of a landfill or not even in locations where many years of geohydrological monitoring indicate that the local geological conditions combined with only a mineral liner without a leachate drainage system has no impact on the geohydrology of the area.

The only difference now is that the design engineer must prove that the statutory minimum 150mm leachate drainage system is sufficient to handle the expected leachate flow, or if not, design a system that can handle the expected leachate flow.

It reminds of the permits under ECA and even most of the new waste licenses that specify a storm water drainage system capable of accommodating a 1:50 year storm PLUS a freeboard of 500mm. What about the local conditions, e.g. slopes, catchment area and local climatic conditions that result in a flow depth of, say, 25mm under design storm conditions and then 500mm must be added as free board. To what effect? Why not stipulate a 1:50 year design storm and a freeboard to accommodate a 1:200 year storm, or a 1: 500 year design storm? But an empirical 500mm?

It is understandable that the environment should and must be protected and there is no problem with the specified minimum liner for large landfills, but to apply the same standard to communal sites in arid conditions raises affordability questions.

#### 1.2.2.2 DESIGN REPORT

The concept of having a Design Report is sound quality management procedure and is recommended. However in the transitional period all consulting engineers who has been appointed as part of a licensing process before 23 August 2013 have not included these costs (and the costs of the meeting) in their licence application proposals, simply because the waste licence applications until that time only required a conceptual design of the layout and liner composition. The final design drawings had (and still have) to be submitted to the Competent Authority for approval before a tender for the construction thereof could be advertised.

The Norms and Standards stipulate the following:

“ (2) The following containment barrier requirements must be included in an application for waste management licence approval of a landfill site or cell –

- (a) Design reports and drawings that must be certified by a registered, professional civil engineer prior to submission to the competent authority;
- (b) Service life considerations that must be quantified taking into account temperature effects on containment barriers;
- (c) Total solute seepage (inorganic and organic) that must be calculated in determining acceptable leakage rates and action leakage rates;
- (d) Alternative elements of proven equivalent performance which has been considered, such as the replacement of –
  - i. Granular filters or drains with geosynthetic filters or drains;
  - ii. Protective soil layers with geotextiles;
  - iii. Clay components with geosynthetic clay liners;
- (e) All drainage layers must contain drainage pipes of adequate size, spacing and strength to ensure atmospheric pressure within the drainage application for the service life of the landfill;

- (f) Alternative design layouts for slopes exceeding 1:4 (vertical:horizontal) may be considered provided equivalent performance is demonstrated;
- (g) Construction Quality Assurance during construction;
- (h) Geosynthetic materials must comply with relevant South African National Standards specifications, or any prescribed management practice or standards which ensure equivalent performance; and
- (i) Consideration of the compatibility of liner material with the waste stream, in particular noting the compatibility of natural and modified clay soils exposed to waste containing salts.”

The preparation of the Design Report to include the above requirements and the design drawings are not the problem, it is the required funding of the work that has not been provided for in some of the older appointments that is creating the frustration since some municipalities will not accommodate deviations on costs. This is a short term frustration.

### 1.2.2.3 DESIGN MEETING AND TECHNICAL RECORD OF DECISION

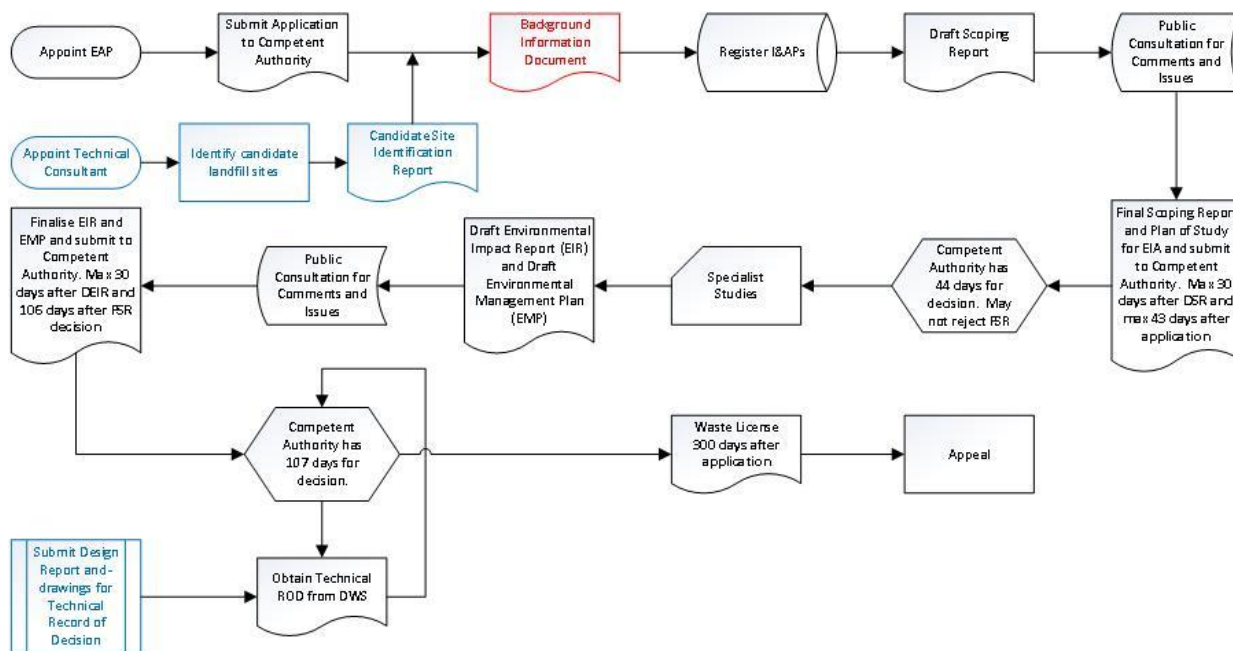
The concept of having a design meeting with DWS whom has to provide DEA with a Technical Record of Decision is commended. However, this meeting is not a requirement of the Norms and Standards, but rather a rule introduced by DWS and due to the capacity challenges of DWS the current scheduling of these meetings are a major frustration to the industry. Although it is appreciated that the DWS staff are doing everything within their power to address the continuous demand on their time, more resources are critically needed.

The current (September 2015) waiting list for these meetings are 7 months, which is equal to 213 days which means that to be able to submit the Design Report to the Competent Authority at the same time as the FEIR, the request for the meeting must be made 20 days BEFORE the application date of the project.

The Design Report can only be commenced with after completion of the Specialist Studies – which informs the design - which means that in order to include the findings and recommendations of the Specialist Studies, especially the geohydrological and geotechnical studies, the available time to complete the Design Report with all the design drawings, is very limited.

## 2 LICENCING PROCESS

The process to obtain a waste licence is graphically indicated in Figure 1 in a simplified form.



**Figure 1: Flowchart of Waste Licence Application Process**

The red items are not legal requirements and the blue items are technical engineering input into the process.

The image in Figure 1 implies that the Scoping and Assessment phases of the Waste Licence application process must be completed within 300 days from the application date. Clearly it is then assumed that there will not be public negativity on both consultation occasions and that the Competent Authority can obtain a Technical Record of Decision within 107 days.

### 3 AFFECT ON STAKEHOLDERS

The above licencing process impacts differently on the various stakeholders since each stakeholder has different key performance indicators and their modus operandi are subject to different legislation.

#### 3.1 LANDFILL OWNER

In most cases the landfill owner is a municipality and municipalities are subject to municipal legislation such as the Municipal Finance Management Act. As such municipalities operate on a budgetary system that only allows for the following three years.

Considering a new landfill – Class B Listed Activity – the process timeline can be indicated as such:

Appointment of Environmental Assessment Practitioner (EAP) through a Supply Chain Management process, inclusive of appeal period – 5 months.

EIA process, without any appeals – 18 months (although new legislation indicate 300 days, or 10 months)

Design Report Meeting - 7 months of which 4 months overlap with the EIA

Technical ROD – 2 months

Waste Licence – 1 month and assume no appeals

Final Design of whole facility – 2 months and starts after licence appeal period has ended

Design Approval Meeting – 7 months from date of Waste Licence

Construction Tender and appeal period – 4 months assuming that Design is approved immediately after the meeting

Construction – 9 months assume no seasonal delay

The above timeline spans 47 - 49 months and assumes no appeals, no public opposition, in other words it reflects the (very) optimistic route.

Having the above timeline and considering the fact that no municipality may make a financial commitment beyond 3 years means that the Solid Waste Manager at a municipality must appoint an EAP to identify a potential new landfill site and obtain a waste licence for that site without having any guarantee that his future council will actually approve the budget to construct such a facility!

The culprit is therefore not only the waiting list for Design Report meetings, but rather the whole lengthy process that has been made even longer by the current bottleneck that are being experienced with obtaining a Technical ROD.

It is therefore extremely difficult for a municipality to properly plan the financial requirements of the project from start to finish.

### 3.2 CONSULTING ENGINEER

The consulting engineers are generally appointed for the waste licencing process only since an appointment beyond three years requires a Section 33 process in terms of the Municipal Systems Act. This means that the consulting engineer compiles a Design Report and designs the base liner for submission to the competent authority for obtaining a Technical ROD.

After the waste licence has been issued, the municipality then put the design, contract administration, construction monitoring and quality assurance for the liner installation out on tender. Should another consulting engineer be appointed for this Supply Chain Management tender, which is generally awarded to the tenderer with the best combination of price and compliance level of Broad Based Black Economic Empowerment, then he has to take the design of the previous consulting engineer into his final design. This raises the question of whose Professional Indemnity Insurance is applicable for the design.

Also recent waste licences have stipulated that the construction monitoring must be conducted by a Pr Eng. In reality very few Pr Eng registered engineers conduct construction monitoring since most are employed as design engineers with the exception of a few that remain resident engineers their whole professional life. Construction Monitoring is generally conducted by unregistered civil engineering technicians, - technologists or graduate engineers as part of the required experience for professional registration, but under the mentorship of a professionally registered person. After registration it is mostly the Pr Techni Eng or Pr Tech Eng staff that conducts the construction monitoring. This licence condition to have a Pr Eng conduct the construction monitoring is also not a Norms and Standards requirement.

There are a number of Geosynthetic Accreditation Institute certified Construction Quality Assurance Inspectors in South Africa for the installation of geosynthetic materials and compacted clay liners. The Construction Quality Assurance should/must be conducted by these inspectors and not necessarily by a Pr Eng registered engineer.

### 3.3 PUBLIC

Throughout the waste licencing process the public are consulted two times to obtain their concerns regarding the location of the proposed new landfill. Firstly the public is consulted after issuing the Draft Scoping Report, generally by having public meetings and public open days and requested to forward all issues and concerns. These issues and concerns are then included in the Final Scoping Report and helps to inform the decision on which specialist studies to be conducted. Secondly the public is again consulted after the specialist studies have been completed and the Draft Environmental Impact Report and the Draft Environmental Management Report have been compiled, again via public meetings and/or public open days and again requested to submit their comments. Then, if the waste licence application was successful, the public are informed of the decision and reminded that they have the right to appeal to issuing of the licence. In both cases the time limitation between the draft and final reports are 30 days which could create the perception amongst the public that the project is being steamrollered.

A common mistake made by the public is the fact that they think they can make the decision whether or not a licence should be issued. That decision is made by the competent authority, which is the Department or Environmental Affairs (National or Provincial) and their decision is informed by the various reports submitted in the process, inclusive of the public's concerns and issues and measures how to address these concerns and issues.

Since the above process generally takes more than three years (historically), the public changes as people leave or enter the area and almost always there are outcries of not being involved in the project. A shorter process period could assist in solving this issue.

#### 4 CONCLUSION

The question that was asked in the abstract was whether the recent changes to the Waste Licence application and the Base Liner design requirements were an improvement or a source of frustration.

The simple answer is that it is both an improvement and a frustration.

The changes in the process by the Competent Authority to shorten the time schedule to 300 days is commendable, but the question remains whether it can be achieved, considering demands from especially the public.

The changes brought on by the Norms and Standards with respect to the Design Report is commendable, but the affordability of a minimum specification liner design for smaller landfills remains a critical question.

The methodology of having a design meeting, although not a legal requirement, is not problematic in itself, but the long waiting list to get a meeting appointment is simply unacceptable. The Competent Authority critically needs to improve their technical capacity to process the applications faster.

The condition in recent waste licences that construction monitoring may only be done by professionally registered civil engineers should be revisited. Construction Quality Assurance by a certified Construction Quality Assurance Inspector should be pursued.