Reducing Geosynthetic Liner Waste Through Integrated Construction Quality Assurance

Inkerman Landfill, South Australia

Beyond Compliance

308,977 m²	2.8 %	21,519 m²	$250k
MATERIAL CONSUMPTION	MATERIAL SURPLUS	MATERIAL SAVED	ESTIMATED COST AVOIDED

Presented by ***Sindi Honstender*** - **Cleanaway Waste Management**

CLEANAWAY

From design need to actual consumption

MEASURE INSTALLATION DEMAND BEFORE ADDING CONTINGENCY

01 DESIGN NOMINAL

280,795 m²

Base design area

→

02 INSTALLATION REQUIREMENT

300,451 m²

Overlaps, anchor trenches + sampling

→

03 CONVENTIONAL ALLOWANCE

330,496 m²

Calculated demand + 10% allowance

WHAT THE PROJECT ACTUALLY USED

308,977 m²

+2.8%

above calculated installation demand

−7.2%

below conventional wastage allowance

TAKEAWAY | Right-sized procurement reduces allowance-based surplus without compromising installation requirements.

Five decisions that drive liner waste

Most avoidable losses originate upstream — installation often reveals the consequences.

01	**DESIGN & LAYOUT**	Roll widths versus panel geometry
02	**PROCUREMENT**	Quantity, dimensions and lead times
03	**HANDLING & STORAGE**	Damage, laydown and exposure
04	**SEQUENCING**	Access, rework and replacement
05	**COORDINATION**	Interfaces and late decisions

Typical Industry Norm Allowance

10 to 15%

" of geosynthetic material is wasted on typical landfill liner projects – 10 to 15 square meters lost for every 100 installed.

"Typical to conservative allowance %, variable according to complexity or installations constrains.

KEY MESSAGE | A contingency used in estimating — not a measured waste rate for every project.

From a compliance function to an engineering strategy.

CQA moves upstream

TRADITIONAL

CQA as compliance

After design / inspection & records
Find non-conformance
Document compliance

INKERMAN

CQA as engineering

From inception / design & procurement
Prevent material waste
Verify quality and efficiency

Same quality standard. Earlier engineering decisions.

KEY MESSAGE | Earlier engagement → better decisions

Five pillars. One material outcome.

Preventing geosynthetic waste through coordinated decisions at every stage

01	02	03	04	05
PRE-QUALIFY	**OPTIMISE**	**PROTECT**	**SEQUENCE**	**ALIGN**
Verify material before order	Design offcuts out	Coordinate logistics	Enforce quality gates	One shared objective

DESIGN → PROCUREMENT & SUPPLY → CONSTRUCTION & INSTALLATION → AS-BUILT & COMMISSIONING

KEY MESSAGE | Waste is prevented through integrated planning — not inspection alone.

Verify the material before it reaches the gate

01 Confirm compliance

Review specifications and supplier test documentation.

02 Check roll suitability

Confirm dimensions, grades and installation requirements.

03 Agree acceptance criteria

Resolve non-conformances before ordering and delivery.

PRE-DELIVERY QUALITY GATE

- Specification review
- Supplier documentation
- **Acceptance confirmed**

DECISION | Identify material issues before procurement and delivery.

Design the offcuts out

Match the roll to the cell

Consider available roll widths and actual cell geometry.

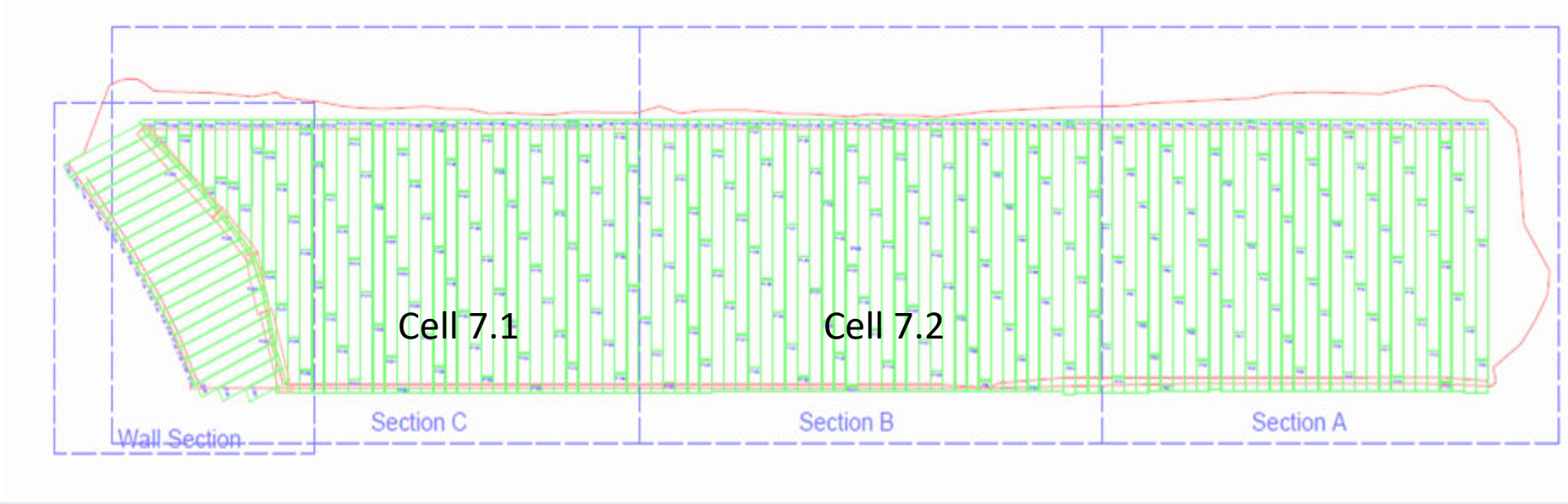
Plan the installation

Coordinate overlaps, anchor trenches and panel sequencing.

Minimise unnecessary cuts

Review layout with designer, supplier and installer.

Actual panel layout
Cells 7.1 and 7.2



Deliver to the programme, not just the gate

CONTROLLED MATERIAL FLOW

01 PLAN

Sequence deliveries to match installation and avoid early stockpiling.

02 VERIFY

Inspect, log and release each roll against agreed acceptance criteria.

03 PROTECT

Use clean, drained laydown areas; minimise exposure and unnecessary handling.

04 DEPLOY

Lift using approved methods and release materials in installation sequence.

SITE LOGISTICS EVIDENCE

Staged deliveries

Roll quantities and laydown areas coordinated with installation readiness.



Planned laydown zoning



Controlled roll storage

KEY TAKEAWAY | Material protection and installation sequencing reduce avoidable handling and damage.

Quality gates the sequence, not paperwork

Each hold point requires clear acceptance criteria, evidence and responsibility.

01

Subgrade approved

→

02

Geosynthetics installed

03

Testing and inspections

→

04

Release next activity

QUALITY HOLD POINTS

No stage starts until the previous one is signed off.

HP1	**Subgrade**	No geosynthetic deployed until approved.
HP2	**Deployment & layout**	Installed against the approved panel plan.
HP3	**Seam testing**	All seam test results closed out.
HP4	**Leak location survey**	Completed before the protection layer.
HP5	**Protection layer**	Closing out the installed liner.

Five parties, one quality objective



- **Everyone in the room from inception** — owner, designer, contractor, geosynthetic supplier and CQA team.
- **Pre-construction risk workshop** — potential risks identified and mitigated before construction commenced.
- **One governance table —** one dashboard, one set of records, no parallel versions of the truth.
- **Authority to act —** coordination that can change sequence and material handling, not just report on it.

KEY TAKEAWAY | Resolve technical interfaces before they become site problems.

Three actions that make a difference

Practical changes that can be transferred to the next project

01 PLAN EARLY

Bring CQA into design; align panels to real roll dimensions

02 CONTROL QUALITY

Confirm acceptance criteria; enforce installation hold points

03 WORK TOGETHER

Coordinate supplier, designer, owner, contractor and CQA

The Project Team

Project Designer

Jarryd Visser
Senior Engineer
Waste and Environment Team
Jarryd.Visser@tonkin.com.au
Office +61 8 8273 3100
Direct +61 8 8132 7545
Mobile +61 422 285 921
tonkin

Patrick Doheny
Director
P 03 9108 4838
M 0415 620 949
E patrick.doheny@crecivilgroup.com
CRE group

Project Construction

Project CQA

Christian Lisle
MEng, BEngTEnv, CQA INSP, CPESC
Managing Director | Principal Engineer
14/53 Metroplex av Murarrie Qld 4172
0431 363 113
christian.lisle@sigma-geo.com.au
SIGMA Geo Environment

Siamak Paulson
BSc, MSc, MIEAust, MAusIMM, CPEng, APEC Eng.
Principal Geotechnical Engineer
0459 310 482
SIGMA Geo Environment

Warren Hornsey Pr. Eng.
Director
whornsey@tri-env.com.au
Mob: +61 419 145 750
Office: +61 7 5535 7227
TRI AUSTRALASIA

Liner Test Integrity

Leachate Infrastructure Connection

Dr Ben Dearman PhD
Managing Director
ennovo

Caleb Wood
Operations Manager
M 0413 288 064
T 1300 343 501
E caleb.wood@ennovo.com.au

ROD FYFE | SALES MANAGER SA
T 08 8219 2900
M 0408 100 225
E r.fyfe@geofabrics.com.au
GEOFABRICS Sustainable solutions

Key Materials Suppliers

Gas Infrastructure

Richard Andrews
Project Manager
0417 642 337
runenergy

Andrew Crisafulli
Sales Manager – Australia / New Zealand
(d) +61 29 821 2977 | (m) +61 4 1962 9046
E acrisafulli@solmax.com
SOLMAX

Bringing the Design to Life – Cell Construction at Inkerman



Reducing Geosynthetic Liner Waste Through Integrated Construction Quality Assurance

Thank you – Questions Welcome

Inkerman Landfill, South Australia

Presented by ***Sindi Honstender*** - **Cleanaway Waste Management**

Material consumption by geosynthetic type

Comparison against allowance-based quantities | m^2

Material	10% Allowance	Consumption	Difference
Single-carrier GCL – floor	75,034	70,124	-4,910
Double-carrier GCL – sidewall	5,708	5,640	-68
Smooth HDPE – floor	76,152	70,560	-5,592
Textured HDPE – sidewall	5,885	5,880	-5
Cushion geotextile	82,037	75,600	-6,437
Separation geotextile	73,504	69,300	-4,204
Drainage geocomposite	5,650	4,693	-957
Reinforcement geogrid	5,650	6,240	+590
GCL sealing strips – combined	877	940	+63
TOTAL	**330,496**	**308,977**	**−21,519**