

Llay Industrial Estate & Former Sharp Site

Ecological Assessment for BREEAM
26 August 2015



Quality Management

Job No	CS/076689		
Project	Llay Industrial Estate & Former Sharp Site		
Location	F:\-Projects\SAP\076 176689 JMJ BREEAM\06 REPORTS		
Title	Ecological Assessment for BREEAM		
Date	26 August 2015		
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Rev	Date	Issue / Purpose/ Comment	Prepared	Checked	Authorised
1.0	27.08.2015	Issue	RB	BHJ	WDR
1.1	16.09.2015	Revision of BREEAM elements	RB		

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1. Ecological Requirements of BREEAM¹

1.1 Introduction

1.1.1 In order to comply with BREEAM, a report must consist of:

- Site survey and ecological assessment;
- Complete list of plant species within construction zone;
- A report detailing protection of the site's biodiversity features;
- Recommendations for enhancement;
- A landscape and habitat management plan covering five years after completion.

1.2 Components of BREEAM

1.2.1 The requirements of BREEAM, and the credits available under New Construction guidelines are shown in Table 1:

Table 1 BREEAM credits for accommodation facilities²

Land Use & Ecology		
LE	TERM	FIXED CREDITS
LE 01	Site selection	2
LE 02	Ecological Value & Protection of Ecological features	2
LE 03	Mitigating ecological impact	2
LE 04	Enhancing site ecology	2
LE 05	Long-term impact on biodiversity	2
TOTAL		10

1.2.2 The definition of the five BREEAM criteria is:

1.2.2.1 LE 01: Site selection (2 credits)

Use of previously-developed/contaminated land and avoidance of land which has been previously developed (at least 75% of proposed development is on land which has been previously developed).

1.2.2.2 LE 02: Ecological value of site & protection of ecological features (2 credit)

Development on land which has limited value to wildlife and protection of existing ecological features.

1.2.2.3 LE 03: Mitigating ecological impact (2 credits)

To minimise the impact of development on existing site ecology.

¹ BREEAM: Building Research Establishment Environmental Assessment Method

² The number of credits is dependent on the category of building and may vary from the figures in the table

1.2.2.4 LE 04: Enhancing site ecology (2 credits)

To encourage actions taken to maintain and enhance the ecological value of the site as a result of development.

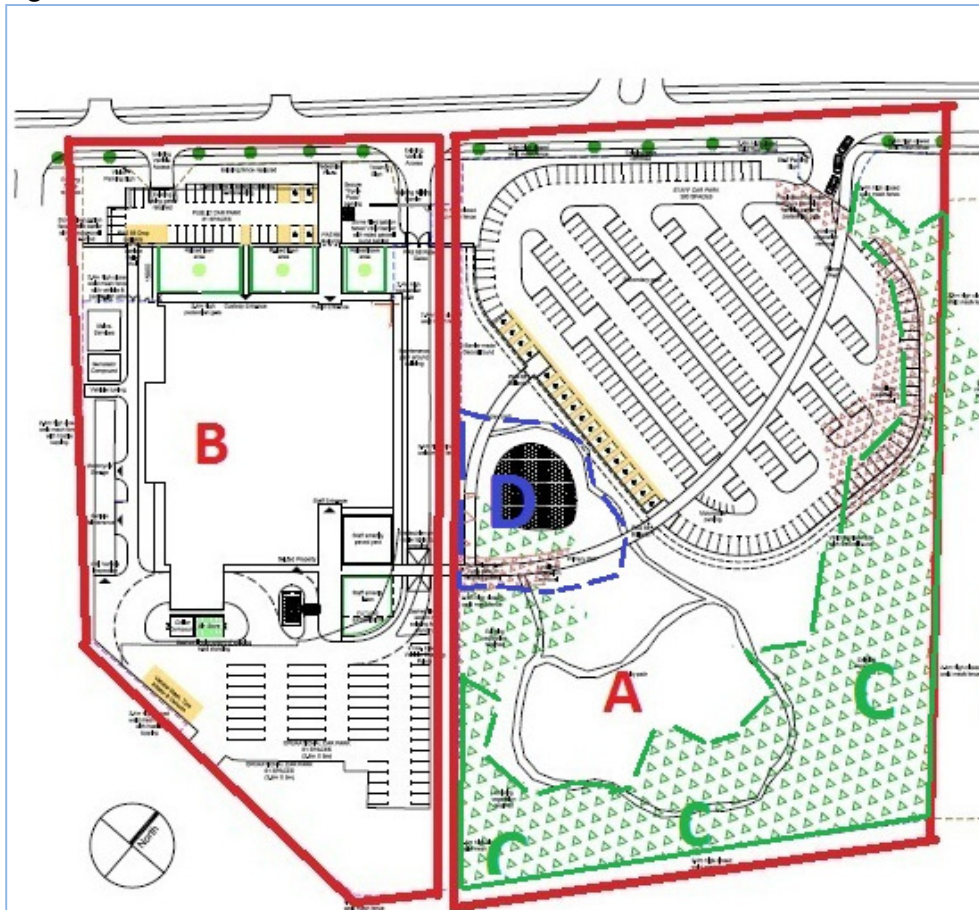
1.2.2.5 LE 05: Long-term impact on biodiversity (2 credits)

To minimise the long-term impact of the development on the site (and surrounding area's) biodiversity.

1.3 Area of Proposed Development

1.3.1 The areas included in the BREEAM assessment are shown in Figure 1:

Figure 1 Site areas



1.3.2 The plot is divided into four units (A-D) defining construction and habitat type:

- Area A = $24,657\text{m}^2$
- Area B = $16,539\text{m}^2$
- Area C = $6,385\text{m}^2$
- Area D = $1,618\text{m}^2$

1.3.3 The total area (sum of A+B) = $41,196\text{m}^2$

2. BREEAM assessment

2.1 LE.01 Site Selection

2.1.1 The total site area (to be developed) is **41,196m²**

LE 01 SITE SELECTION	
Number of credits available	Criterion
2	At least 75% of proposed development is on land which has been previously developed within the previous 50 years. (An additional credit is available for development on contaminated land).
Credits not available	

2.1.2 Within the last 50 years, a total of **16,539m²** has been occupied by the Sharp industrial building (including hard standing and mown grassland). This equates to approximately **40%** of the land having been previously developed.

2.1.3 None of the land shows evidence of being contaminated, although material has been dumped on Area A.

2.2 LE.02 Ecological Value of Site

2.2.1 The Ecological value of the whole site is regarded as **high**. The first credit would only be available if works were entirely contained within existing hard standing.

LE 02 ECOLOGICAL VALUE OF SITE	
Number of credits available	Criteria
2	Development on land which has limited value to wildlife and protection of existing ecological features
One credit available	

2.2.2 The 2nd credit would require that the following conditions are met:

- Figure 2 Areas of species-rich lawn to be maintained**



2.3.1 The change in ecological value of a site is calculated by:

- Defining the total area of the construction site footprint;
- Dividing the area into plots defined by its habitat (e.g. hard standing / buildings = 1; Scrub = 2, grassland = 3 etc);
- Producing a list of vascular plant species for each plot type
- Calculating the area of the plot;
- Then applying the elements into an equation:

$$(\text{No. of species in plot}) \times (\text{area of plot} / \text{total area of site}) = \text{ecological value of plot}$$

- The sum of the ecological value of each plot type = total ecological value of site.

2.3.2 This is done before and after construction and the difference between the ecological values of the site is the change in ecological value.

LE 03 MITIGATING ECOLOGICAL IMPACT	
Number of credits available	Criteria
2	To minimise the impact of development on existing site ecology
One credit available	

2.3.3 The total area for the site is **41,196m²**

Table 2 BREEAM LE3 calculator

Broad Habitat type	Plant species Richness	Pre-Development area of Plot (m ²)	Post-Development area of Plot (m ²)
MARSHY GRASSLAND (& FEN)	40	1618	1618
SEMI-IMPROVED NEUTRAL GRASSLAND	41	16654	7741
SPECIES-RICH GRASSLAND	40	6130	0
SCRUB	10	6385	6183
HARD STANDING	0	10409	25654
Total site area (m2)		41,196	41,196
Ecological Value (Area weighted plant species richness)	41,196	25.65	10.78
Change in Ecological Value	14.87		
Total LE03 BREEAM credits achieved	1		

2.3.4 The main factors influencing the change in ecological value are:

- The loss of the species-rich grassland associated with site clearance of the former Sharp factory;
- Loss of half the area of species-rich semi-improved neutral grassland.

2.3.5 The additional credit can only be acquired by:

- Ensuring protection of species-rich grassland on the former factory site (e.g. no net loss);
- A real increase in species, achievable by increasing the diversity of scrub planting from an average of 10 species post-construction to 15 or more *without* impacting on other habitats (achieved by planting trees and hedges along car park edges or as features).

- Non-native ornamental species of wildlife value can be included in island beds to increase the overall species richness, but choice of plants must be advised by a qualified ecologist. A list of species suitable for BREEAM planting schemes is shown in Table 3:

Table 3 Species of known wildlife value appropriate for formal and informal planting schemes

CODE	COMMON NAME	LATIN NAME	ECOLOGICAL IMPORTANCE
S/SS	Berberis	<i>Berberis</i> varieties	Birds eat the berries in winter
S	Buddleia	<i>Buddleia davidii</i>	Butterflies moths and bees feed on the nectar-rich flowers, but only the standard. Hybrids not favoured.
S	Cornelian cherry	<i>Cornus mas</i>	Birds eat the berries
S/SS	Cotoneaster	<i>Cotoneaster</i> varieties	Berries in autumn and winter. Flowers favoured by bees
T	Crab apple	<i>Malus sylvestris</i>	Windfall apples in autumn provide food for birds, butterflies and wasps. Many moth species feed on the leaves.
S	Firethorn	<i>Pyracantha</i> varieties	Birds eat the berries in winter
S	Guelder rose	<i>Viburnum opulus</i> & varieties	Birds eat the berries and the flowers are attractive to insects
T	Hawthorn	<i>Crataegus</i> varieties	Over 150 species of moth caterpillar feed on the foliage, and berries important for birds. Flowers attract bees. Cultivars not as good, but still support most of the species.
CS	Honeysuckle	<i>Lonicera periclymenum</i> & varieties	Honeysuckle flowers are very good source of food for moths, and many forms are good, except the hedging plant <i>L. japonica</i> .
S	Roses	<i>Rosa floribunda</i> , climbers, scramblers	Many insects and fungi feed on roses, particularly the 'cottage garden' varieties.
T	Holm oak	<i>Quercus ilex</i>	Provides cover and food for as almost as many species as native oaks. Particularly good for fungal associations.
SS	Lavender	<i>Lavendula</i> species & varieties	Supports many moths and flowers irresistible to bees
H	Ice plant	<i>Sedum spectabile</i>	Flowers very good for insects in late summer
SS	Rosemary	<i>Rosmarinus officinalis</i>	Flowers loved by bees. Many moth caterpillars feed on the foliage
T	Medlar	<i>Mespilus germanica</i>	Fruits are eaten by many species, especially 'bletted' windfalls in autumn
T	Black Mulberry	<i>Morus nigra</i>	Blackberry-like fruits are eaten by birds
S	Lilac	<i>Syringa</i> varieties	Provides food for Privet hawk moth caterpillars. Use sparingly.
S	Spanish broom	<i>Spartium junceum</i>	Provides an alternative source for insects associated with native broom
SS	Caryopteris	<i>Caryopteris xclandonensis</i>	Spikes of blue flowers good for bees.

H	Verbena	<i>Verbena bonariensis</i>	Good for butterflies
H	Globe lily	<i>Echinops ritro</i>	Good for butterflies

2.3.6 This would require additional design input from the Suitably Qualified Ecologist (SQE).

2.4 LE.04 Enhancing Site Ecology

2.4.1 The credits available for enhancing the site ecology are dependent on:

- A Suitably Qualified Ecologist (SQE) has been appointed to report on enhancing and protecting the ecology of the site (evidenced by completion of 'Appendix F')
- The general recommendations of the ecologist's report(s)³ for enhancement and protection of site ecology have been, or will be, implemented. These are summarised under respective headings:

2.4.2 Great crested newt

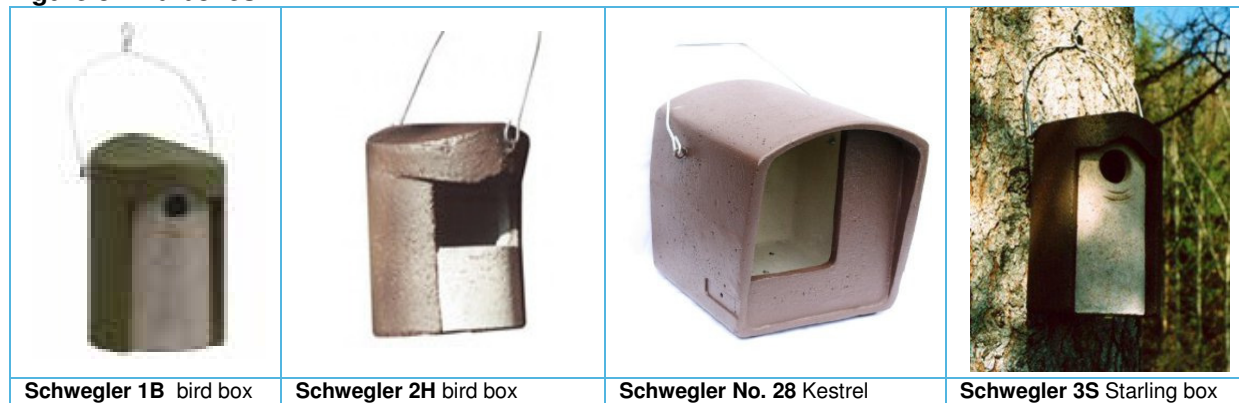
Mitigation as detailed in European Protected Species Licence Method Statement:

- Exclusion barrier during works;
- Ecological presence during site clearance;
- Creation of breeding pond(s) from which *fish have been excluded*.

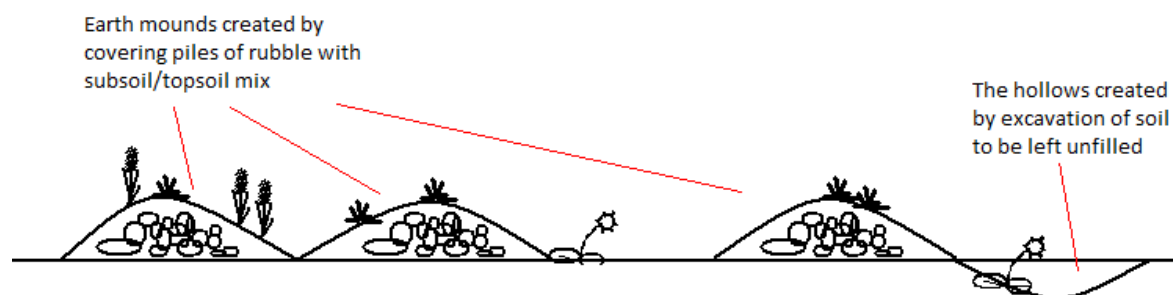
2.4.3 Breeding birds

- 2x hole-type (3S) nest-boxes with an entrance of 45mm (to accommodate starling);
- 2x hole-type (1B) nest-box with an entrance of 28mm (to accommodate blue & great tit);
- 2x open-fronted nest box (2H) for robin and thrush (see Figure 3 Bird boxes);
- 1x kestrel / owl nest-box (No. 28);
- Natural & ornamental tree and shrub planting to provide suitable nesting habitat for thrushes, warblers and finches;
- Marginal planting to provide habitat for reed bunting and grasshopper warbler

³ (1) 'New Police Facility, Llay Industrial Site: Phase 1 Ecological Survey' 17 June 2013 Capita Symonds (2) 'Llay Industrial Estate & Former Sharp Site: Ecological Survey & Report' July 2015 Capita

Figure 3 Bird boxes**2.4.4 Invertebrates (particularly Dingy skipper *Erynnis tages*)**

- Avoidance of direct impacts on areas of raised banks and short vegetation dominated by bird's foot trefoil (*Lotus corniculatus*) and surrounding scrub which form the known range of the species on site;
- Creation of a suitable habitat of earth banks (20m linear, 400m area) as shown in Figure 4:

Figure 4 Habitat creation for Dingy skipper

- Use of seed mixes RE1 for recreating species rich grassland on habitat mounds as laid out in Llay Industrial Estate & Former Sharp Site: *Ecological Survey & Report* July 2015 (Capita)
- As part of the mitigation, areas where the butterfly has been recorded (see Capita report Phase 1 survey map) must be protected throughout works (including site clearance) by orange demarcation fencing (as advised by SQE).

2.4.5 Additional enhancements

Pond marginal and emergent planting in wetland and pond border to include the following species not already recorded:

- 5x 5litre Marsh marigold (*Caltha palustris*);
- 5x 5 litre Greater spearwort (*Ranunculus lingua*);
- 5x 5 litre Water mint (*Mentha aquatica*);
- 5x 5 litre Skullcap (*Scutellaria galericulata*);

- 5x 5 litre Flowering rush (*Butomus umbellatus*)

Submerged planting (generally supplied as bunches secured by zinc rings) to include:

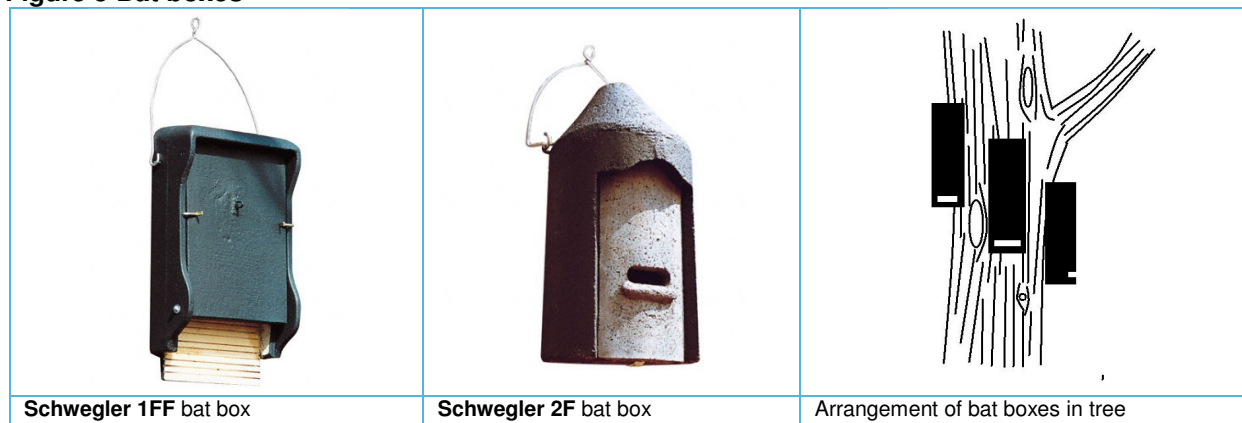
- Broad-leaved pondweed (*Potamogeton natans*);
- Curled Pondweed (*P. crispus*);
- Spiked water milfoil (*Myriophyllum spicatum*);
- Water lily (*Nymphaea* sp.) – can be any selection of flower colour.

Bat boxes to be fitted on a tree at a height of or exceeding 4 metres. This to consist of a cluster of:

- 2x 2F bat boxes;
- 1x 1FF bat box

To be fitted in a tree as selected by the SQE as illustrated in Figure 5:

Figure 5 Bat boxes



LE 04 ENHANCING SITE ECOLOGY

Number of credits available

2

Two credits available

Criteria

To maintain and enhance the ecological value of the site as a result of development.

2.5 Long-term Impact on Biodiversity

2.5.1 To preserve the ecological interest of the site in the long term, the following criteria must apply:

- A suitably qualified ecologist (SQE) has been appointed prior to commencement of activities on site (see Appendix F);

- The SQE confirms that all relevant UK and EU legislation relating to protection and enhancement of ecology has been complied with during the design and construction process (confirmed in post-construction audit);
- A landscape and habitat management plan (in accordance with BS42020) is produced covering at least the first five years after project completion (see Appendix A Five Year Management Plan).

LE 05 LONG TERM IMPACT ON BIODIVERSITY	
Number of credits available	Criteria
2	To minimise the long-term impact on biodiversity
Two credits available	

- 2.5.2 The following measures from BREEAM LE05 are to be implemented to ensure the full credit allocation:

Measure 1: The principal contractor nominates a Biodiversity Champion with the authority to influence site activities and ensure that detrimental impacts on site biodiversity are minimised in line with the recommendations of a Suitably Qualified Ecologist.

Measure 4: Where a new ecologically valuable habitat appropriate to the local area is created. (Pond creation and marginal planting to support great crested newt). This includes a habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself; including any UK Biodiversity Action Plan (UK BAP) priority habitats, Local Biodiversity Action Plan (LBAP) habitats, those protected within statutory sites (e.g. SSSIs), or those within non-statutory sites identified in local plans. Local biodiversity expertise should be sought during the Preparation and Brief (RIBA Stage 1 or equivalent) to help identify species of local biodiversity importance on-site and ensure that the proposals support local priorities.

- 2.5.3 The credits for LE 05 assume that all requirements are met and that an audit of BREEAM compliance (see **Appendix A Compliance audit of all mitigation and enhancement features (including EPS audit and close-out)**), followed by submission of Appendix F, has been undertaken.

2.6 Summary of credits

Table 4 Ecologists assessment of available credits

Land Use & Ecology			
LE	TERM	FIXED CREDITS	ASSESSED
LE 01	Site selection	2	0
LE 02	Ecological Value & Protection of Ecological features	2	0 (1)

LE 03	Mitigating ecological impact	2	1
LE 04	Enhancing site ecology	2	2
LE 05	Long-term impact on biodiversity	2	2
TOTAL		10	5 (6)

NOTE: The BREEAM assessor will determine the actual number of credits awarded to the scheme and Table 4 is based only on the ecologist's assessment of the scheme pre-construction. The final number of credits may be increased or decreased depending on compliance or changes in the design which allow additional credits to be awarded.

Appendix A Five Year Management Plan

Completion & Year 1	
	1. Compliance audit of all mitigation and enhancement features (including EPS audit and close-out) 2. Issue of Appendix F 3. Mowing of raised earth banks to be undertaken only between July and March, not exceeding fortnightly and with mower blades above 100mm 4. All thinning removed from site or composted in a purpose-built facility (left)
Year 2	
	1. Site visit by SQE to undertake Phase II of created habitat where seed mix RE1 was used to determine evolution to Mesotrophic Grassland 5a ('Haymeadow') 2. Survey of pond to determine: Colonisation by amphibians (including great crested newt); Colonisation by aquatic & marginal planting; Absence of fish 3. Walkover by SQE in May-June to assess population of Dingy skipper and effectiveness of management of existing and recreated habitats
Year 3	
	1. SQE to check all bird and bat boxes from October to February for evidence of use 2. Walkover by SQE in May-June to assess population of Dingy Skipper and effectiveness of management of existing and recreated habitats. Amend as required to ensure the minimum standard of no 'net loss'
Year 4	
	1. Pond management in October to clear excessive weed growth and prevent encroachment. Use rake to remove excessive aquatic growth. Leave thinning on dry bank to enable aquatic species (including larvae of great crested & other newt species) to return to water 2. Audit of planting, including repeat of Phase II and checking/replacement of planted trees and shrubs

Year 5	
	1. Bat & breeding bird survey against baseline from 'Llay Industrial Estate & Former Sharp Site: <i>Ecological Survey & Report</i>' (July 2015 Capita) 2. Check all bird and bat boxes from October to February for evidence of use

A.1.1 BREEAM COMPLIANCE AUDIT

DATE OF AUDIT		AUDIT BY	
Item No.	FEATURE	CHECKED (x/✓)	COMMENTS
1	Great crested newt	• Licence audit completed	
		• Effective pond creation (inc. absence of fish)	
2	Breeding birds	• 2x hole-type (3S) nest-boxes	
		• 2x hole-type (1B) nest-boxes	
		• 2x open-fronted nest box (2H)	
		• 1x kestrel / owl nest-box	
		• Natural & ornamental tree and shrub planting	
		• Marginal planting	
3	Invertebrates	• Demarcation fencing fitted before & during site clearance	
		• Creation of suitable habitat of raised banks (define area)	
		• Use of, and establishment of RE1 mix to create mesotrophic grassland (MG5)	
4	Enhancements	• Pond marginal planting	
		• Submerged planting	
		• Bat boxes as specified	
		• Removal of material or effective defined compost procedure in place	
		• Additional planting schemes (list)	
		• Implementation of additional measures as recommended in LE05	

Appendix F

A.2 (on completion)

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