

Building with Nature & Beyond

Assignment 4: Building with Nature Design Assignment

Additional Assignment Form

Building with Nature Design Assignment – using the H-E-principles

In Part I of the book *Building with Nature & Beyond* (Slinger, 2021), the focus lies on designing your own integrated and ecosystem-friendly hydraulic infrastructure. This is undertaken in six stages, namely:

1. Identify functional requirements
2. Sketch both a conventional and a nature based solution
3. Apply the Hydraulic Engineering Design Principles
4. Apply the Ecological Design Principles
5. Address monitoring and risk assessment
6. Explicate trade-offs

This form is provided as an extract from the book *Building with Nature & Beyond* (Slinger, 2021) to enable you to apply the Hydraulic Engineering (H) and Ecological (E) Design Principles to multiple cases.

You are advised to consult chapters 2 to 5 before attempting the assignment. In particular pages 2-67 to 2-73 and

3-118 to 3-126 provide explanations of the Hydraulic Engineering Design Principles and the Ecological Design Principles, respectively, as do the following videos:

Slinger, J.H. (Jill) (2016). *Engineering: Building with Nature 101x video #07 – Distilling Engineering Design Principles*. 4TU.Dataset. <http://dx.doi.org/10.4121/uuid:f9099686-7dab-42ec-8da9-8cc961f393f3>

Slinger, J.H. (Jill); Nava Guerrero, G.d.C. (Graciela) (2016). *Engineering: Building with Nature 101x video #08 – Distilling Ecological Design Principles*. 4TU.Dataset. <http://dx.doi.org/10.4121/uuid:20576f6c-e439-4a79-abc4-ad13742c7b48>

You may cite this form as:

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Assignment 4: Building with Nature Design Assignment

Case Title & Location

Functional requirements (list at least 4)

-
-
-
-

Conventional solution (annotated):

Sketch

BwN design (annotated sketch, indicating anticipated changes over time):

Sketch

Consider the following principles, then rate (with an X in one of the five boxes) the extent to which you have taken this principle into account in your new design. Remember, this is an exercise in trade-offs, so you will not be able to meet every principle fully.

Then explain why you have rated your design accordingly.

On this page you'll find the Engineering Principles, on the next the Ecological Principles.

Engineering Principles

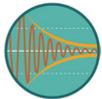
Checkboxes
Minimum-maximum

Explanation

1. Requisite standard



2. Control variability



3. Reasonable costs



4. Structural integrity



5. Reliability



6. Implementability



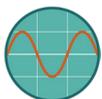
7. Adaptability



8. Resilience



9. Appropriate boundary conditions and loads



Ecological Principles

Checkboxes
Minimum-maximum

Explanation

1. Continuity



2. No direct human disturbance



3. Endogeneity



4. Viability of populations



5. Opportunity for threatened species



6. Trophic web integrity



7. Opportunity for ecological succession



8. Zone integrity



9. Characteristic (in) organic cycles



10. Characteristic physical-chemical water quality



11. Resilience



Monitoring and Risk assessment

In a short paragraph, discuss any future monitoring and risk assessment required for your Building with Nature design.

Trade-offs

Comment on any trade-offs you made in order to introduce more ecological principles. In other words, describe how your Building with Nature sketch differs from the conventional approach (max 200 words).