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AÇUDE PÚBLICO UBALDINHO CEDRO - CE

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REVISÃO DO PROJETO EXECUTIVO - FASE B ANEXOS D, E, F

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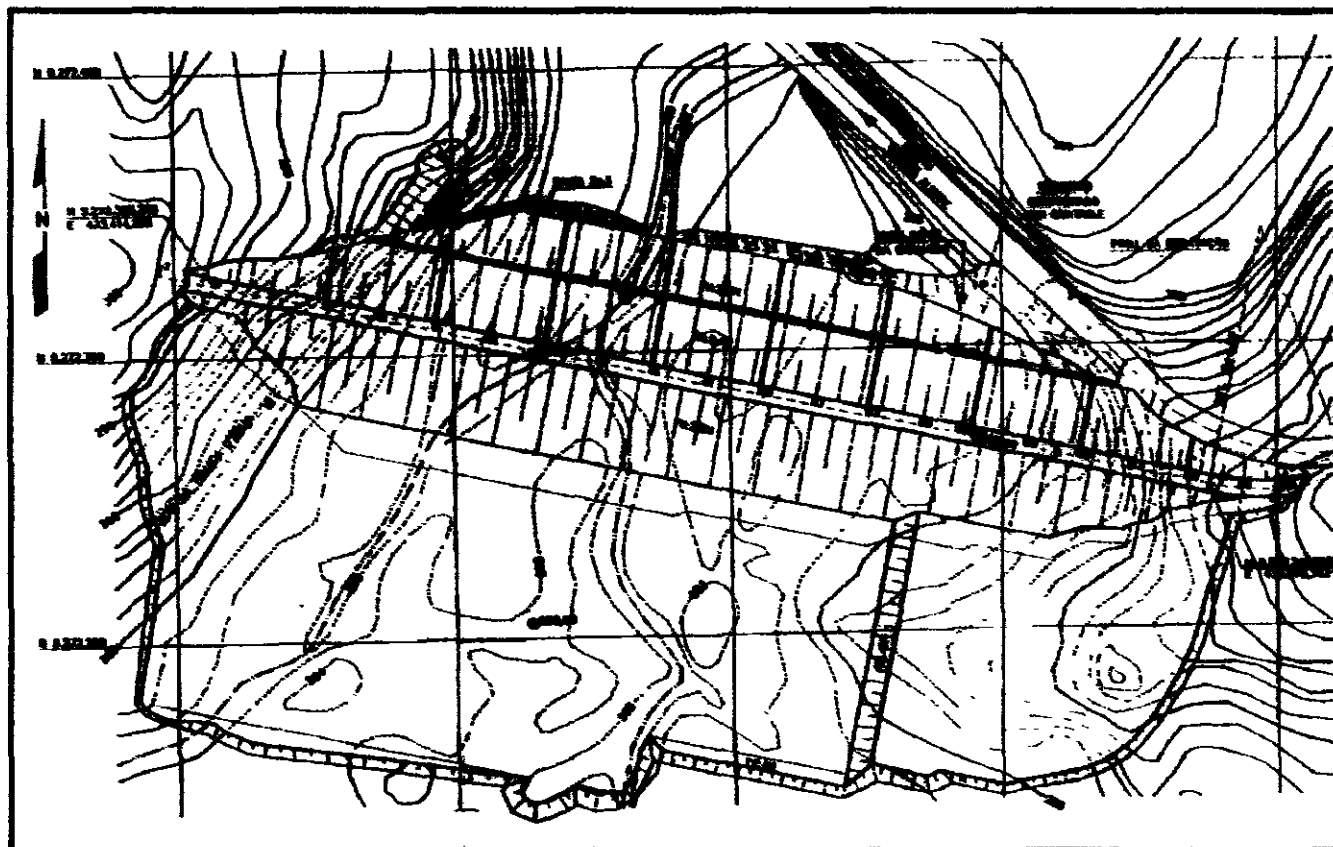
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PROURB/CE



**AÇUDE PÚBLICO UBALDINHO
CEDRO - CE**

**REVISÃO DO PROJETO EXECUTIVO - FASE B
VOLUME 2/4 ANEXOS D, E e F**



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ANEXO D

ESTUDOS DE PERCOLAÇÃO

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1. OBJETIVOS

Este relatório tem por objetivos apresentar os estudos de percolação e cálculos realizados para avaliar as perdas d'água pela fundação, gradientes e demais parâmetros de projeto, resultantes da adoção de tapete impermeável a montante, como o tratamento de fundação a ser empregado no Açude Ubaldinho, a ser construído no riacho São Miguel, no município de Cedro, Estado do Ceará

2. CONSIDERAÇÕES INICIAIS

A área onde será implantado o Açude de Ubaldinho é formada topograficamente por dois morrotes constituindo as ombreiras direita e esquerda, com a porção central representada por uma planície fluvial onde correm dois riachos com leitos de pequena profundidade o São Miguel e seu afluente, pela margem esquerda, o do Saco

As ombreiras apresentam-se com declividades bastante íngremes, onde podem ser observados pequenos blocos de rocha aflorando. O maciço rochoso da área é constituído por granito pouco alterado. Por sua vez, a planície fluvial é recoberta por aluviões recentes inconsolidados, onde o lençol freático é sub-superficial

No local do barramento a planície aluvionar tem largura variável entre 240 e 300m, aproximadamente, e sua superfície oscila geralmente entre as cotas 282m e 284m. A profundidade máxima é estimada em até 18m, na região onde ocorre o "canalão" O contato entre a planície aluvionar e os morrotes das ombreiras se dá ao redor da cota 284m

O pacote aluvionar é essencialmente arenoso, podendo-se encontrar as frações de areia média, grossa e fina, e ocasionalmente e em teores reduzidos, a fração cascalho. Constata-se também a presença de finos, geralmente em baixos teores

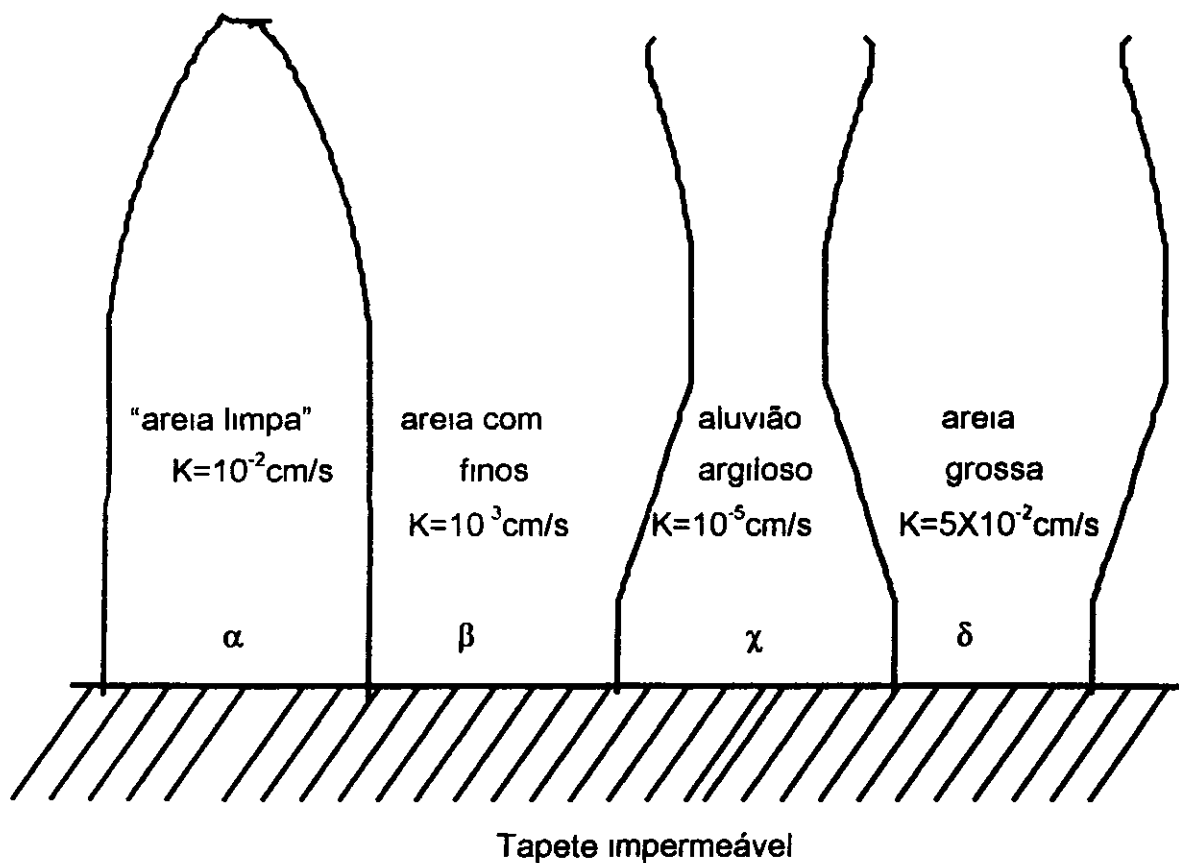
Apesar de se contar com duas campanhas de investigações de campo e laboratório, como as já realizadas, ainda não se logrou completo êxito na caracterização das diferentes camadas aluvionares que compõem a fundação da barragem, sobretudo quanto à granulometria e permeabilidade. Esta dificuldade é realçada nas seções geológicas, interpretadas a partir das sondagens, pela não continuidade de uma mesma camada em sondagens adjacentes

A intenção explícita na segunda campanha de sondagens, de complementar a identificação visual-táctil dos solos, por vezes enganosa, pela granulometria realizada em laboratório sobre o material retido nos amostradores SPT, também não foi possível em profundidades superiores a 3m. Finalmente, o mapeamento de superfície da área de inserção do barramento não fez distinções das fácies granulométricas, sendo tudo classificado de "aluvião".

Este quadro de conhecimento pouco detalhado das diferentes camadas, granulometria e permeabilidade, que compõem a fundação da barragem em superfície e em profundidade, conduziram à adoção de hipóteses conservadoras, ou pessimistas, em relação aos parâmetros de permeabilidade empregados nos estudos de percolação. À falta do conhecimento da fundação, foi necessário realizar mais estudos paramétricos, para cercar mais possibilidades, que montaram a mais de 20 processamentos.

Julgou-se compensador estudar à exaustão a percolação pela fundação da barragem por ser o problema geotécnico de maior relevância do projeto Ubaldinho, seja na concepção anterior com *cutoff* no controle do fluxo d'água pela fundação, seja atualmente com tratamento por tapete impermeável a montante.

Vale destacar uma última observação em relação à forma de funcionamento do tapete que tende a ser mais eficiente que as simulações e previsões através dos estudos de percolação. O modelo adotado pressupõe cada camada como "infinita" e a água pode entrar nela, a montante do tapete, em grande extensão. Entretanto, as deposições aluvionares em Ubaldinho, como sugerido pela visita ao local, parecem ter uma certa alternância granulométrica em planta, a dizer, o acesso da água a uma camada mais permeável não é ilimitado. Isto, entretanto, para ser considerado nos estudos de percolação, exigiria um mapeamento granulométrico e/ou de permeabilidades, em planta, como ilustrado a seguir, esquematicamente.



No exemplo, a camada α não se estende indefinidamente para montante, permitindo uma entrada d'água inferior a que seria adotada no modelo de percolação. Já a camada χ funciona como tapete natural. Uma avaliação mais realista seria a integração das diferentes situações, ponderadamente à sua expressão em área.

3. SITUAÇÕES ESTUDADAS

3.1 Seções Típicas

Para efeito dos estudos de percolação há, e portanto foram consideradas, duas situações distintas: uma na região do "canalão", onde como já foi dito a espessura de aluvião pode atingir pelo menos 18 m e outra fora do "canalão", onde a espessura média do aluvião está ao redor de 8 m.

A figura 1 mostra uma seção esquemática da fundação para cada uma das situações citadas

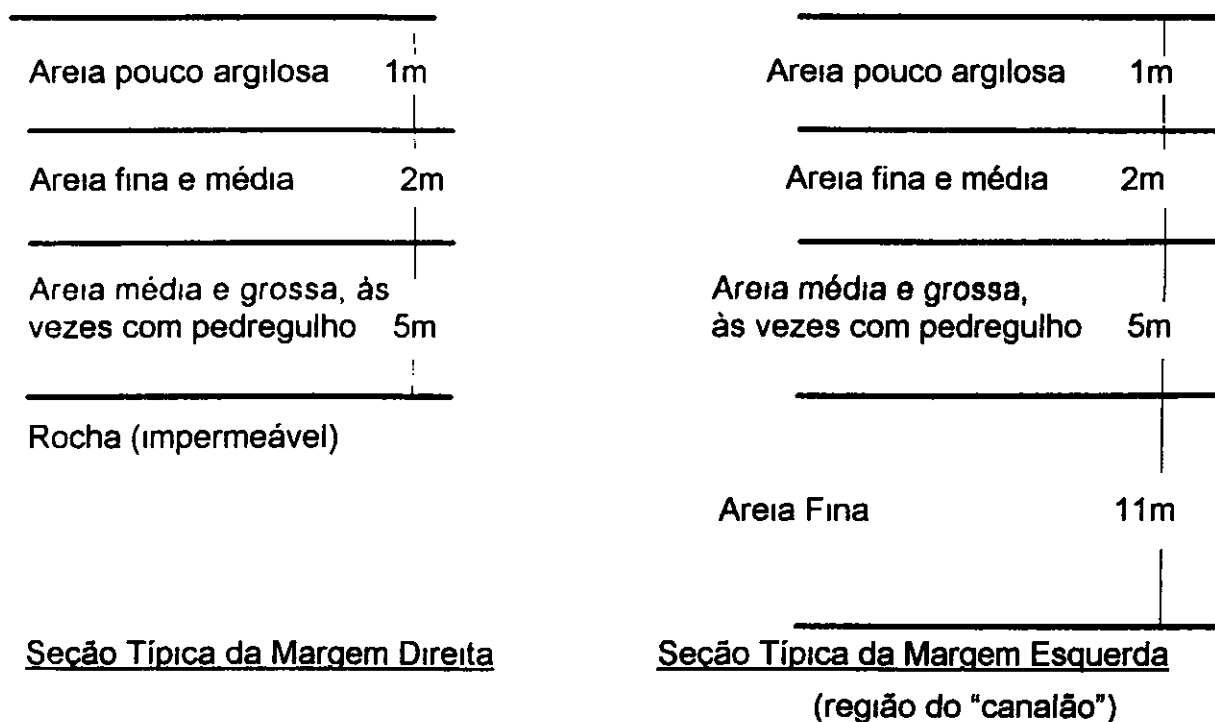


Figura 1 - Seções típicas do subsolo

Com as espessuras de aluvião acima citadas e com a altura prevista para o açude, a construção de um sistema de controle de percolação pela fundação através de um "cutoff", em condições construtivas seguras, mostra-se economicamente inviável, pois quase equivalerá à construção de um outro aterro invertido, na fundação

Dessa maneira, a solução proposta pelo próprio corpo de Consultores e consolidada no "Relatório Justificativo da Solução Adotada", é a de utilização de um "tapete impermeabilizante", mesmo sabendo-se que sua eficiência é inferior a do "cutoff". O custo da sua execução porém é também muito inferior e a sua construção permitirá que se tenha uma redução do gradiente hidráulico médio sob o açude e condições de operação satisfatórias

Para efeito de estudo de percolação foi adotado a montante o nível d'água máximo maximorum previsto, ou seja 296,00 m. Para jusante admitiu-se que o nível d'água estará no máximo na superfície natural do terreno, ou seja, 282,00 m

3.2 Parâmetros Adotados

A figura 2 apresenta uma seção esquemática da barragem e da fundação.

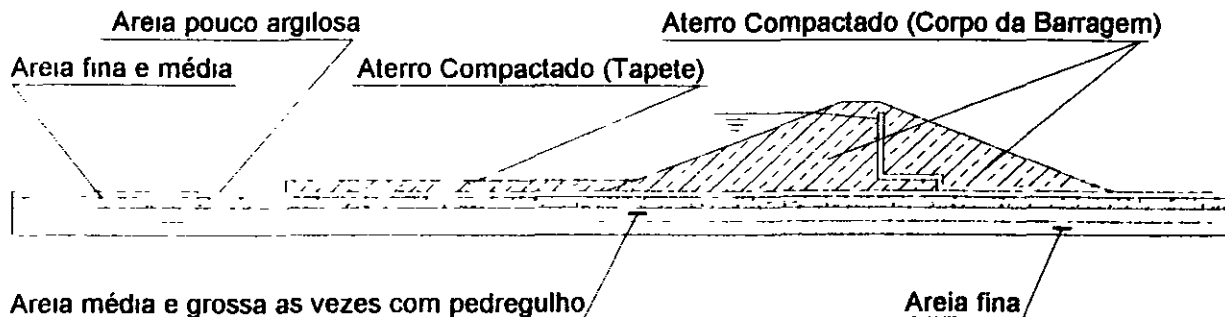


Figura 2 - Seção esquemática da barragem para análise de percolação

Em função dos comentários já feitos no "Relatório Geológico-Geotécnico Complementar" a respeito dos valores dos coeficientes de permeabilidade obtidos nos ensaios de infiltração realizados, optou-se por fazer um estudo paramétrico de percolação pela fundação. Os resultados obtidos deste estudo permitirão a fixação das características geométricas básicas do "tapete impermeabilizante" em função dos benefícios de cada uma das alternativas analisadas

A tabela 1 apresenta um resumo dos coeficientes de permeabilidade adotados para cada um dos materiais. Nesta tabela já estão apresentados, também, os valores máximos dos coeficientes de permeabilidade que se considera, os materiais poderão apresentar

Tabela 1 - coeficientes de permeabilidade dos materiais da fundação

Material	Coefficiente de Permeabilidade (cm/s) - Margem Direita	Coefficiente de Permeabilidade (cm/s) - Margem Esquerda
Aterro compactado do açude e do tapete	1×10^{-6}	1×10^{-6}
Areia (pouco argilosa)***	1×10^{-5} a 1×10^{-3}	5×10^{-2} a 1×10^{-3}
Areia fina e média	1×10^{-3}	5×10^{-2}
Areia média e grossa, às vezes com pedregulho	5×10^{-2}	1×10^{-2}
Areia fina	-----	1×10^{-3}
Trincheira Drenante	1×10^{-1}	1×10^{-1}

***fração argilosa existente ou não

4. ANÁLISES EFETUADAS

Em função da elevada permeabilidade apresentada pelos materiais da fundação na região de implantação do Açude Ubaldinho, a vazão que passa pelo corpo do açude é desprezível perante a que passa pela fundação. Assim, para facilitar a análise de percolação, foi considerado que em termos práticos o aterro seja "impermeável" e que todo fluxo de água ocorra exclusivamente pela fundação. As variáveis analisadas foram seções transversais, conjuntos de permeabilidades, espessuras e comprimentos do tapete.

Os estudos de percolação foram feitos para as duas margens e com as variações dos coeficientes de permeabilidade dos materiais indicadas na tabela 1.

Para avaliar a eficiência do tapete impermeabilizante e definir suas características geométricas, fizeram-se análises de percolação com e sem tapete. Para verificar a sensibilidade da eficiência do tapete às suas dimensões foi variada sua espessura em 2 e 3 m, e seu comprimento em 80 e 100 m. A eficiência do tapete está definida como

$$E = \frac{Q_1 - Q_2}{Q_1} 100 (\%)$$

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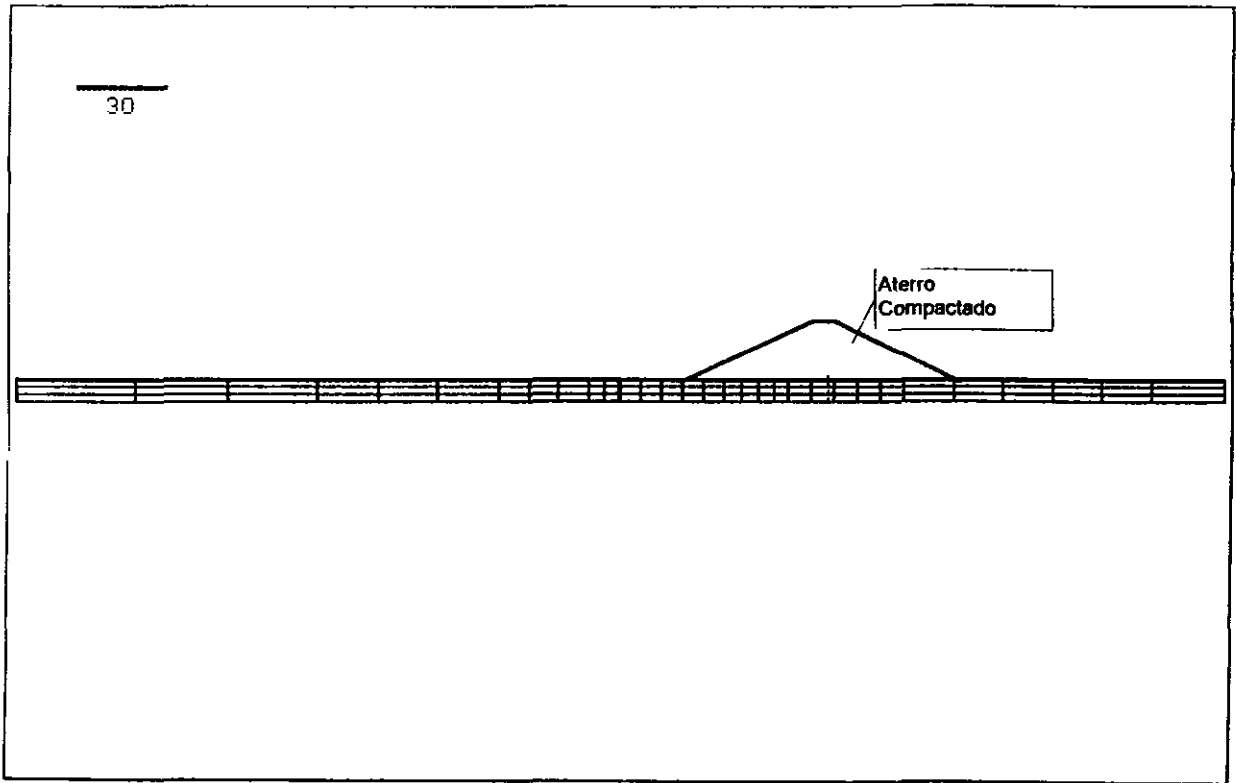
Q_1 = Vazão que passa pela fundação sem tapete,

Q_2 = Vazão que passa pela fundação com tapete.

Inicialmente, na análise paramétrica e com resultados a favor da segurança (quadro mais pessimista), não se considerou a presença da trincheira drenante no pé de jusante da barragem e a entrada d'água, franca no limite montante da malha (equipotencial). Nas análises para as seções definitivas e para obtenção das grandezas de dimensionamento dos elementos de projeto, introduziu-se a trincheira drenante no pé de jusante, até 3m de profundidade e considerou-se o limite montante da malha, uma linha de fluxo.

Todas as análises de percolação foram efetuadas com auxílio do programa de elementos finitos PERCPLAN, implantado em micro-computador padrão IBM-PC.

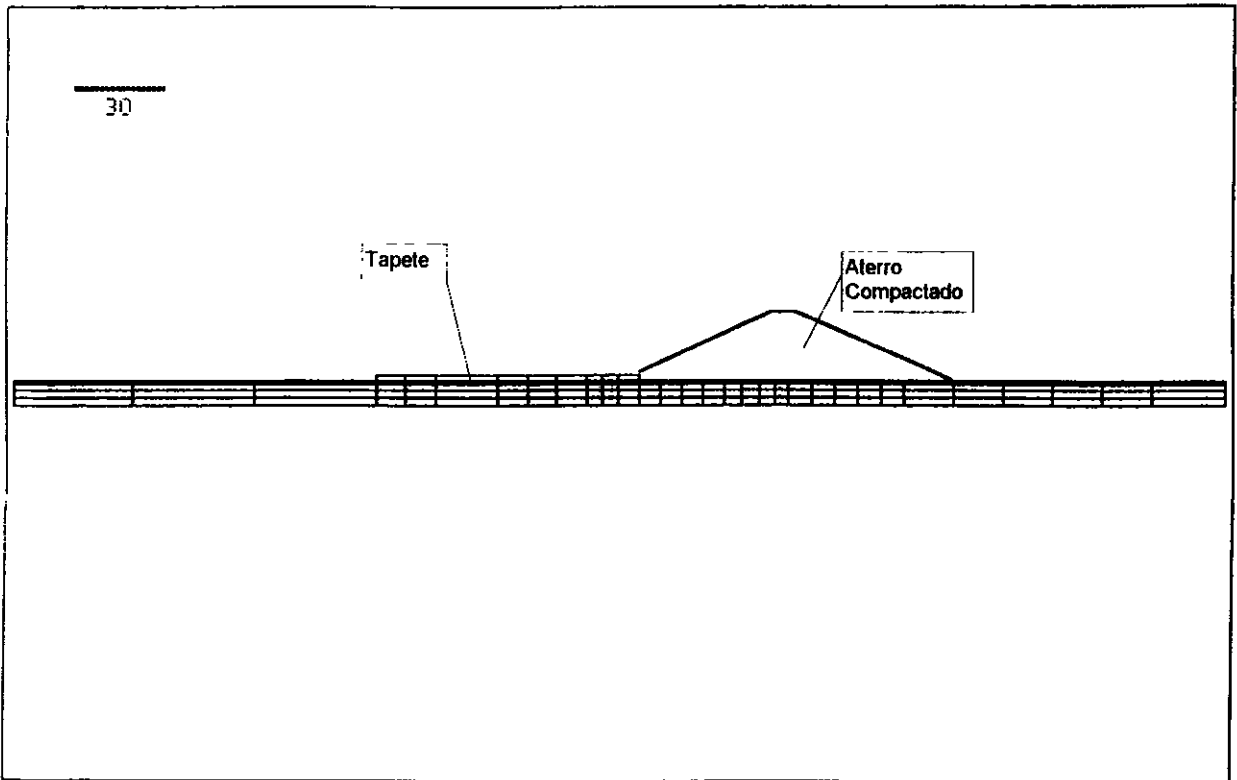
A figura 3 mostra a malha de elementos finitos para a análise de percolação sem tapete, e a figura 4 para a condição com tapete impermeabilizante. A figura 5 mostra a malha de elementos finitos com a numeração dos nós e elementos.



*** ENGEOS *** - Barragem de Ubaldinho - Ceara - 50

PERCPLAN

Figura 3 - Malha de Elementos Finitos para análise de percolação pela fundação sem tapete

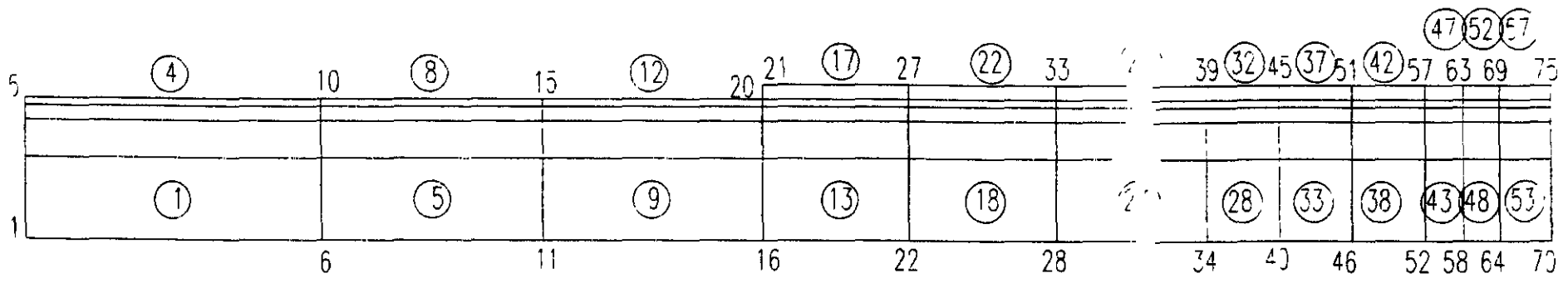


*** ENGEOS *** - Barragem de Ubaldinho - Ceara - 10

PERCPLAN

Figura 4 - Malha de Elementos Finitos para análise de percolação pela fundação com tapete

10



11 - NO
 ⑨ - ELEMENTO

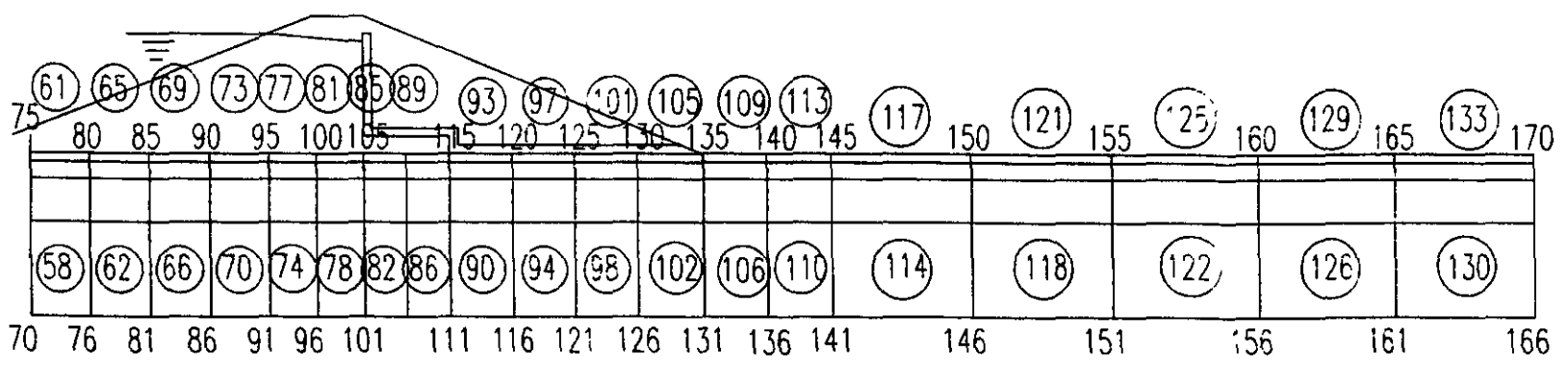


Figura 5 - Malha de elementos finitos com a numeração dos nós e elementos

000014

Apresenta-se a seguir, um resumo das características básicas de cada processamento que foi realizado, assim como a referência ao anexo em que ele está apresentado

MARGEM DIREITA

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-05			
3	Areia fina a Areia grossa	1E-03	0.0	0.0	Anexo 1
4	Areia média e grossa	5E-02			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-03			
3	Areia fina a Areia grossa	1E-03	0.0	0.0	Anexo 2
4	Areia média e grossa	5E-02			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-05			
3	Areia fina a Areia grossa	1E-03	2.0	80.0	Anexo 3
4	Areia média e grossa	5E-02			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-05			
3	Areia fina a Areia grossa	1E-03	3.0	80.0	Anexo 4
4	Areia média e grossa	5E-02			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-03			
3	Areia fina a Areia grossa	1E-03	2 0	80.0	Anexo 5
4	Areia média e grossa	5E-02			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-03			
3	Areia fina a Areia grossa	1E-03	3.0	80.0	Anexo 6
4	Areia média e grossa	5E-02			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-05			
3	Areia fina a Areia grossa	1E-03	2.0	100.0	Anexo 7
4	Areia média e grossa	5E-02			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-05			
3	Areia fina a Areia grossa	1E-03	3 0	100 0	Anexo 8
4	Areia média e grossa	5E-02			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-03			
3	Areia fina a Areia grossa	1E-03	2 0	100 0	Anexo 9
4	Areia média e grossa	5E-02			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-03			
3	Areia fina a Areia grossa	1E-03	3.0	100 0	Anexo 10
4	Areia média e grossa	5E-02			

Material n°	Descrição	k (cm/s)	Espessura do Comprimento		Processamento
			Tapete (m)	do Tapete (m)	
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-05			
3	Areia fina a Areia grossa	1E-03	2 0	80.0	Anexo 11
4	Areia média e grossa	5E-02			
5	Trincheira Drenante	1E-01			

Material n°	Descrição	k (cm/s)	Espessura do Comprimento		Processamento
			Tapete (m)	do Tapete (m)	
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-03			
3	Areia fina a Areia grossa	1E-03	2 0	80.0	Anexo 12
4	Areia média e grossa	5E-02			
5	Trincheira Drenante	1E-01			

Material n°	Descrição	k (cm/s)	Espessura do Comprimento		Processamento
			Tapete (m)	do Tapete (m)	
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-05			
3	Areia fina a Areia grossa	1E-03	2 0	80 0	Anexo 11A
4	Areia média e grossa	5E-02			Limite de mon-
5	Trincheira Drenante	1E-01			tante como Linha de Fluxo

Material n°	Descrição	k (cm/s)	Espessura do Comprimento		Processamento
			Tapete (m)	do Tapete (m)	
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-03			
3	Areia fina a Areia grossa	1E-03	2 0	80 0	Anexo 12A
4	Areia média e grossa	5E-02			Limite de mon-
5	Trincheira Drenante	1E-01			tante como Linha de Fluxo

MARGEM ESQUERDA

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	5E-02			
3	Areia fina a Areia grossa	5E-02	0 0	0 0	Anexo 13
4	Areia média e grossa	1E-03			
5	Areia fina	1E-03			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	5E-02			
3	Areia fina a Areia grossa	5E-02	2.0	80 0	Anexo 14
4	Areia média e grossa	1E-03			
5	Areia fina	1E-03			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	5E-02			
3	Areia fina a Areia grossa	5E-02	3.0	80.0	Anexo 15
4	Areia média e grossa	1E-03			
5	Areia fina	1E-03			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	5E-02			
3	Areia fina a Areia grossa	5E-02	2.0	100 0	Anexo 16
4	Areia média e grossa	1E-03			
5	Areia fina	1E-03			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	5E-02			
3	Areia fina a Areia grossa	5E-02	3 0	100.0	Anexo 17
4	Areia média e grossa	1E-03			
5	Areia fina	1E-03			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	5E-02			
3	Areia fina a Areia grossa	5E-02	2.0	100 0	Anexo 18
4	Areia média e grossa	1E-03			
5	Areia fina	1E-03			
6	Trincheira Drenante	1E-01			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-03			
3	Areia fina a Areia grossa	5E-02	2.0	100 0	Anexo 19
4	Areia média e grossa	1E-03			
5	Areia fina	1E-03			
6	Trincheira Drenante	1E-01			

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)	Comprimento do Tapete (m)	Processamento
1	Aterro/tapete	1E-06			
2	Areia com finos	5E-02			
3	Areia fina a Areia grossa	5E-02	2.0	100 0	Anexo 18A
4	Areia média e grossa	1E-03			Limite de mon-
5	Areia fina	1E-03			tante como
6	Trincheira Drenante	1E-01			Linha de Fluxo

Material nº	Descrição	k (cm/s)	Espessura do Tapete (m)		Processamento
				Comprimento do Tapete (m)	
1	Aterro/tapete	1E-06			
2	Areia com finos	1E-03			
3	Areia fina a Areia grossa	5E-02	2 0	100 0	Anexo 19A
4	Areia média e grossa	1E-03			Limite de mon-
5	Areia fina	1E-03			tante como Linha de Fluxo
6	Trincheira Drenante	1E-01			

5. RESULTADOS OBTIDOS

5.1 Margem Direita

Apresentam-se, a seguir, os principais resultados obtidos das análises de percolação realizadas com o perfil do subsolo típico da margem direita

Como pode ser observado pela relação de processamentos realizados (apresentada anteriormente), fez-se uma avaliação inicial da vazão que passaria pela fundação no caso de não ser executado qualquer tipo de tratamento, e para cada uma das possibilidades de permeabilidade da camada superficial de aluvião (ou seja, existindo ou não uma camada argilosa) com coeficientes de permeabilidade $k=1 \times 10^{-5}$ cm/s ou $k = 1 \times 10^{-3}$ cm/s

Para cada uma dessas condições foram estudadas variações das características geométricas do tapete impermeabilizante. Os principais resultados obtidos estão apresentados a seguir na tabela 2

Tabela 2 - Resumo dos resultados obtidos nas análise de percolação
na Margem Direita

Processamento		Vazão (m ³ /s/m)	Vazão (l/min/m)	Eficiência do Tapete (%)	Gradiente Médio de	
Nome	Número no Gráfico				Entrada no Filtro Horizontal	Saída no pé do Açude
Anexo 1	1	8 70E-05	5 22	0 00	6 67	5.90
Anexo 3	2	7 79E-05	4 67	10 51	6 58	5 81
Anexo 4	3	7 77E-05	4.66	10 73	6.56	5.80
Anexo 7	4	7 69E-05	4 61	11 67	6.49	5.74
Anexo 8	5	7 67E-05	4 60	11 91	6 47	5.72
Anexo 2	6	3 58E-04	21 48	0 00	1 09	0.35
Anexo 5	7	1 95E-04	11 68	45.61	0.60	0 19
Anexo 6	8	1 94E-04	11.66	45.70	0 59	0 19
Anexo 9	9	1 77E-04	10 61	50 61	0 54	0.18
Anexo 10	10	1 77E-04	10 59	50 70	0 54	0 17

onde a eficiência do tapete está definida como

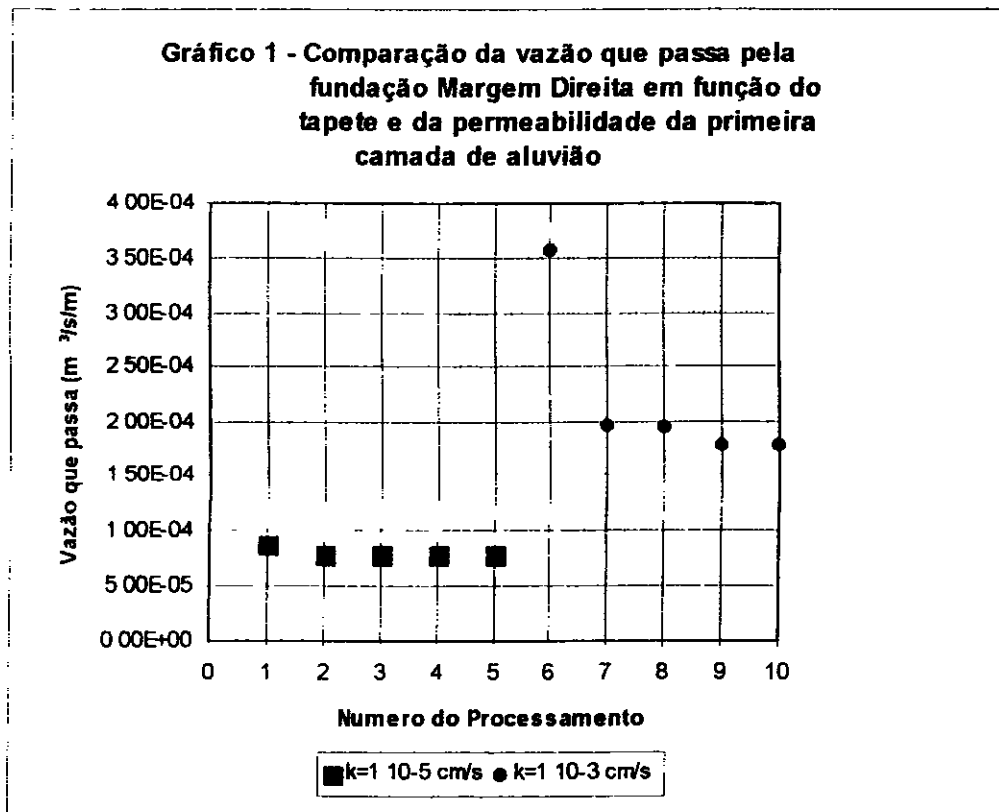
$$E = \frac{Q_1 - Q_2}{Q_1} 100 (\%)$$

com

Q_1 = Vazão que passa pela fundação sem tapete,

Q_2 = Vazão que passa pela fundação com tapete, e

os gradientes hidráulicos foram obtidos como a média da diferença de carga hidráulica entre nós do elemento junto à superfície e a distância entre esses nós



As principais conclusões que se pode obter dos resultados apresentados na tabela 2 e no gráfico 1 são

- o tapete compactado não tem praticamente eficiência no caso da permeabilidade da camada superior de aluvião ser da ordem de $k=1 \cdot 10^{-5}$ cm/s ou menor. Isso decorre do fato que nestas condições, essa camada já funciona, em termos práticos, como se fosse um "tapete natural",
- por outro lado, no caso da camada superior de aluvião apresentar permeabilidade da ordem de $k=1 \cdot 10^{-3}$ cm/s ou maior, a eficiência do tapete com relação à vazão que passa pela fundação é da ordem de 50 %,
- no caso da permeabilidade ser da ordem de $k=1 \cdot 10^{-5}$ cm/s os gradientes hidráulicos de saída são bastante elevados, sendo essencial a construção de uma trincheira drenante para captação e controle da água de percolação,
- já para permeabilidade da ordem de $k=1 \cdot 10^{-3}$ cm/s os gradientes hidráulicos de saída são baixos, mas a trincheira continua sendo importante para ordenar e controlar a vazão de percolação,
- a espessura do tapete impermeabilizante (2,0 ou 3,0 m) não tem influência significativa quer na diminuição da vazão quer nos gradientes hidráulicos de saída,
- do mesmo modo que a espessura, o comprimento do tapete impermeabilizante (80,0 ou 100,0 m) também não tem influência significativa quer na diminuição da vazão quer nos gradientes hidráulicos de saída

Em função das conclusões acima o projeto do açude deverá prever na Margem Direita a construção de um tapete impermeabilizante de 80 m de comprimento com uma espessura da ordem de 2,0 m. Completando o tratamento da fundação, é essencial a construção de uma trincheira drenante junto ao pé de jusante do açude.

Definidas as características geométricas do tapete e a necessidade de execução da trincheira drenante, procedeu-se a novos processamentos, já com as características finais, que forneceram as grandezas necessárias ao dimensionamento dos elementos de projeto. A tabela 3 resume os principais resultados obtidos com o tapete de 2,0 m de espessura e 80 m de comprimento e com uma trincheira drenante no pé do açude, simulada por um material com permeabilidade de $k=1 \cdot 10^{-1}$ cm/s. A condição de contorno de montante, assimilada a uma linha de fluxo, é dada pelos processamentos 11A e 12A.

Tabela 3 - Resumo das análises de percolação na Margem Direita, com tapete de 2,0 m de espessura e 80 m de comprimento e trincheira drenante a jusante

Processamento Nome	Vazão (m ³ /s/m)	Vazão (l/min/m)	Eficiência do Tapete (%)	Gradiente Médio de	
				Entrada no Filtro Horizontal	Saída no pé do Açude
Anexo 11	1,33E-04	8,00	-----	1,47	0,02
Anexo 12	1,99E-04	11,95	44,39	0,50	0,02
Anexo 11A	8,86E-5	5,31	-----	0,98	0,02
Anexo 12A	1,99E-4	11,95	44,39	0,50	0,02

a eficiência do tapete e gradientes hidráulicos determinados da mesma maneira como já mencionado.

5.2- Margem Esquerda

Apresentam-se, a seguir, os principais resultados obtidos das análises de percolação realizadas com o perfil do subsolo típico da margem esquerda.

No caso da margem esquerda, mais precisamente na região do "canalão", a camada superficial de aluvião apresenta-se aparentemente mais homogênea, conforme pôde ser visto no local. Assim, os cálculos para avaliação da eficiência do tapete impermeabilizante foram realizados com apenas um coeficiente de permeabilidade para a camada aluvionar superficial ($k=5 \cdot 10^{-2}$ cm/s).

Os principais resultados obtidos dessas análises estão apresentados a seguir na tabela 4

Tabela 4 - Resumo dos resultados obtidos nas análise de percolação na Margem Esquerda

Processamento		Vazão (m ³ /s/m)	Vazão (l/min/m)	Eficiência do Tapete (%)	Gradiente Médio de	
Nome	Número no Gráfico				Entrada no Filtro Horizontal	Saída no pé do Açude
Anexo 13	1	4 55E-04	27 30	0 00	0 08	~0.00
Anexo 14	2	1 71E-04	10 27	62 37	0.03	~0.00
Anexo 15	3	1 71E-04	10.25	62.44	0.03	~0 00
Anexo 16	4	1 50E-04	8 98	67 10	0.03	~0 00
Anexo 17	5	1 49E-04	8.96	67 19	0.03	~0 00

onde a eficiência do tapete está definida como

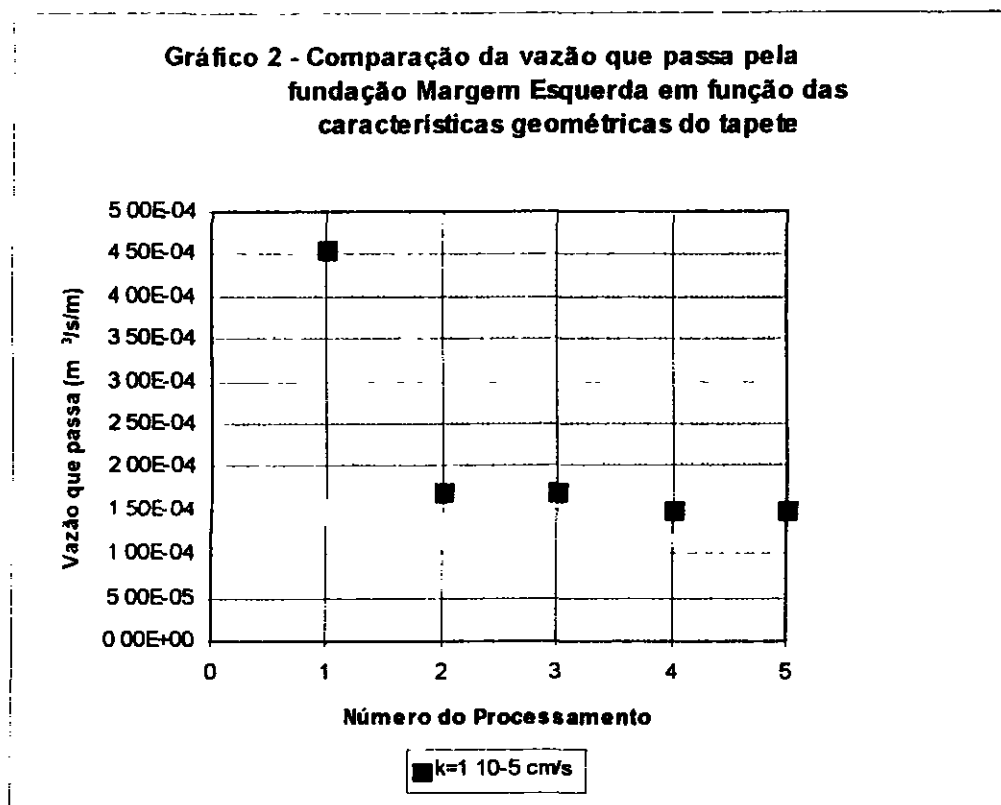
$$E = \frac{Q_1 - Q_2}{Q_1} 100 (\%)$$

com

Q_1 = Vazão que passa pela fundação sem tapete,

Q_2 = Vazão que passa pela fundação com tapete, e

os gradientes hidráulicos foram obtidos como a média da diferença de carga hidráulica entre nós do elemento junto à superfície e a distância entre esses nós.



As principais conclusões que se pode obter dos resultados apresentados na tabela 4 e no gráfico 2 são

- em função da permeabilidade mais elevada da camada superficial de aluvião neste trecho, em comparação com a da Margem Direita, a eficiência do tapete com relação à vazão que passa pela fundação é também superior e está na faixa de 65 %,
- os gradientes hidráulicos de saída são bastante baixos, mas a trincheira drenante no pé do açude continua sendo importante para ordenar e controlar a vazão de percolação,
- a espessura do tapete impermeabilizante (2,0 ou 3,0 m) não tem influência significativa quer na diminuição da vazão quer nos gradientes hidráulicos de saída,
- do mesmo modo que na Margem Direita o comprimento do tapete impermeabilizante (80,0 ou 100,0 m) também não tem influência significativa quer na diminuição da vazão quer nos gradientes hidráulicos de saída. Entretanto, neste trecho será adotado um comprimento da ordem de 100 m, pelo fato de não se conhecer, efetivamente a profundidade do "canalão", visto que nenhuma das sondagens executadas chegou até o topo rochoso nessa região; tendo a espessura de aluvião sido inferida

Em função das conclusões acima o projeto da barragem deverá prever, na Margem Esquerda, a construção de um tapete impermeabilizante de 100 m de comprimento

com uma espessura da ordem de 2,0 m. Continua sendo essencial a construção de uma trincheira drenante junto ao pé de jusante do açude.

Definidas as características geométricas do tapete e a necessidade de execução da trincheira drenante, procedeu-se a novos processamentos, já com as características finais, que forneceram as grandezas necessárias ao dimensionamento dos elementos de projeto.

Em particular neste caso decidiu-se, também, executar um processamento com a camada superficial de aluvião um pouco menos permeável ($k=1.10^{-3}$ cm/s) para verificar o comportamento da fundação e do tapete numa eventualidade, estes resultados estão apresentados no Anexo 19.

A tabela 5 resume os principais resultados obtidos para a condição de tapete com 2,0 m de espessura e 100 m de comprimento e com uma trincheira drenante no pé do açude, simulada por um material com permeabilidade de $k=1.10^{-1}$ cm/s. A condição de contorno de montante, assimilada a uma linha de fluxo, é dada pelos processamentos 18A e 19A.

Tabela 5 - Resumo das análises de percolação na Margem Esquerda, com tapete de 2,0 m de espessura e 100 m de comprimento e trincheira drenante a jusante.

Processamento Nome	Vazão (m ³ /s/m)	Vazão (l/min/m)	Eficiência do Tapete (%)	Gradiente Médio de	
				Entrada no Filtro Horizontal	Saída no pé do Açude
Anexo 18	1.50E-04	8.98	67.10	0.03	~0.00
Anexo 19	9.71E-05	5.82	78.67	0.55	~0.00
Anexo 18A	1.49E-04	8.90	67.40	0.03	~0.00
Anexo 19A	9.71E-05	5.82	78.67	0.55	~0.00

a eficiência do tapete e gradientes hidráulicos determinados da mesma maneira como já mencionado.

6. AVALIAÇÃO DA PERDA D'ÁGUA TOTAL

Com os resultados obtidos nos diversos processamentos cujos resumos estão apresentados no item 5, em conjunto com o perfil longitudinal que está apresentado no Anexo II dos "Estudos Geológico-Geotécnicos", pode-se proceder a uma

avaliação da perda d'água total que deve ocorrer pela fundação quando da operação do Açude Ubaldinho

A análise do perfil longitudinal pelo eixo do açude, permite que se distinga os dois trechos analisados (Margens Direita e Esquerda) e que apresentem um comprimento representativo de aproximadamente

Margem Direita \approx 180 m, e

Margem Esquerda \approx 60 m

Considerando-se as situações finais, isto é, com o tapete com as dimensões fixadas para cada margem e com a trincheira drenante tem-se que a vazão que deve-se esperar passe pela fundação seja da ordem de

a- Caso mais favorável (Anexos 11A e 19A)

$$Q = 8,83 \cdot 10^{-5} \cdot 180 + 9,70 \cdot 10^{-5} \cdot 60 = 0,0218 \text{ m}^3/\text{s} = 21,8 \text{ l/s}$$

b- Caso mais desfavorável (Anexos 12 e 18)

$$Q = 1,99 \cdot 10^{-4} \cdot 180 + 1,50 \cdot 10^{-4} \cdot 60 = 0,0448 \text{ m}^3/\text{s} = 44,8 \text{ l/s}$$

É importante notar que esses valores são muito elevados, correspondendo a 6,2% e 12,8%, respectivamente, em relação à vazão regularizada de 0,35 m³/s ou 350 l/s, quando o reservatório se encontra em seu N.A máx

É muito possível que os valores para a perda d'água sejam superestimados. Dadas as incertezas na caracterização das permeabilidades das variadas camadas que compõem a fundação da barragem, naturalmente se adotam valores a favor da segurança e que acabam por exagerar as previsões de perda d'água. Deve-se lembrar ainda que no decurso da operação do açude, as perdas tendem a diminuir devido ao processo natural de siltagem do reservatório

Se os valores estimados da perda d'água pela fundação da barragem correspondem ao reservatório no N.A máx, à medida que as águas baixam, a perda d'água reduz-se proporcionalmente bem como a parcela em relação à vazão regularizada. Convém, portanto, integrar as perdas d'água ao longo do ciclo hidrológico para compará-las à vazão regularizada

O quadro a seguir foi obtido a partir da simulação da operação do reservatório e apresenta a permanência relativa, ao longo do ciclo hidrológico, dos níveis d'água no reservatório

Tabela 6 - Permanência dos Níveis D'água no Reservatório

COTA, m	% DE PERMANÊNCIA
285	0,2
286	2,6
287	10,3
288	11,4
289	10,0
290	12,5
291	10,1
292	10,1
293	12,3
294	10,0
295	9,0
296	1,4
297	0,1

Como a perda d'água é diretamente proporcional à carga hidráulica, as vazões determinadas nos estudos de percolação consideraram-na em 14m (296-282m) Tomada como referência a vazão de 21,8 l/s, pode-se estimar as perdas correspondentes aos níveis de permanência e integrá-las pelo tempo de permanência, obtendo-se uma avaliação mais realista

A tabela 7 traz os resultados obtidos com tal procedimento

Tabela 7 - Perdas d'Água ao Longo do Ciclo Hidrológico

CARGA HIDRÁULICA m	PERDA D'ÁGUA l/s	% DE PERMANÊNCIA	PERDA D'ÁGUA TOTAL NA COTA, l/s
3	4,7	0,2	-
4	6,2	2,6	0,2
5	7,8	10,3	0,8
6	9,3	11,4	1,07
7	10,9	10,0	1,09
8	12,5	12,5	1,56
9	14,0	10,1	1,42
10	15,6	10,1	1,57
11	17,1	12,3	2,11
12	18,7	10,0	1,87
13	20,2	9,0	1,8
14	21,8	1,4	0,3
15	23,3	0,1	-
TOTAL			13,79

Uma avaliação realista das perdas d'água por percolação indica uma perda de 13,8l/s que corresponde a 3,9% da vazão regularizada, um valor bastante aceitável

7. CONSIDERAÇÕES FINAIS

A solução adotada para o controle da percolação pela fundação permeável do açude Ubaldinho foi a de um tapete impermeável a montante, motivadas pelas dificuldades construtivas e custos envolvidos. A avaliação do seu desempenho foi objeto das análises de percolação que compõem o presente relatório

Compensando o conhecimento parcial dos campos de permeabilidades associados ao pacote aluvionar, fundação de grande extensão da barragem, foram realizadas mais de 20 análises paramétricas, testando a sensibilidade das diversas variáveis, primordialmente as permeabilidades e a geometria do tapete. Como ocorre nestes casos, o desconhecimento de um parâmetro conduz à adoção de valores conservadores, a favor da segurança, e no caso, não foi diferente. Suspeita-se, portanto, que as perdas d'água obtidas possam estar superestimadas.

As perdas d'água máximas estimadas ocorrem quando o reservatório está cheio e montam a 21,8 l/s e 44,8 l/s, respectivamente para os dois cenários analisados, denominados "caso mais favorável" e "caso mais desfavorável". Estas perdas d'água máximas correspondem a 6,2% e 12,8% da vazão regularizada de 350 l/s. Representam valores bastante elevados. Entretanto, analisando a perda d'água ao longo da operação do reservatório, com níveis variáveis ao longo do ciclo hidrológico da subacia contribuinte, seu valor cai para a 3,9% da vazão regularizada, no "caso mais favorável", valor considerado aceitável. Estas estimativas poderão ser eventualmente aferidas com as informações que serão obtidas a partir dos ensaios de bombeamento, ora em execução nos três poços de abastecimento existentes na área de fundação da barragem

Por outro lado, os demais aspectos do fluxo d'água pela fundação e sua captação pelo sistema de drenagem são plenamente satisfatórios, com gradientes reduzidos e drenos eficientes. A eficiência do tapete, considerada como a taxa de redução da vazão de percolação, é de cerca de 50% na margem direita e de 70% no "canalão"

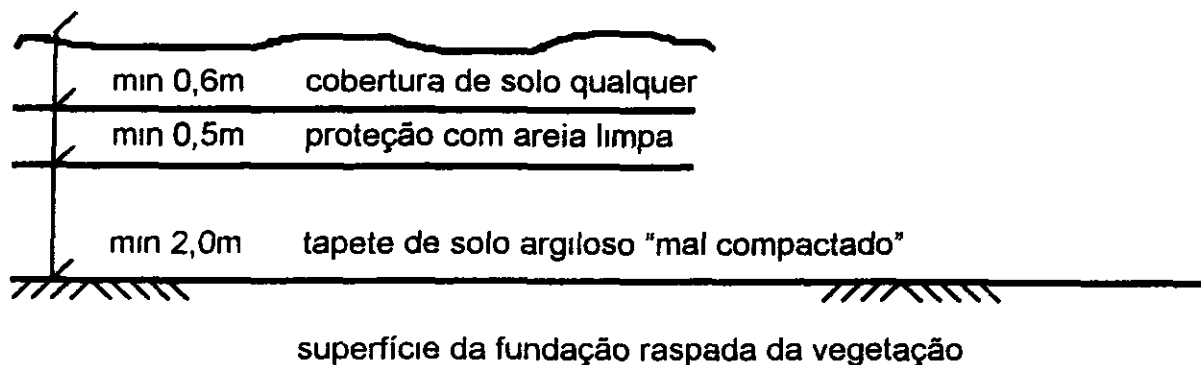
Este quadro permite corroborar a adoção do tapete impermeável de montante como o elemento de controle da percolação pela fundação da barragem Ubaldinho

Quanto às dimensões do tapete, recomenda-se 2m de espessura do solo de vedação compactado e 80m e 100m de comprimento, respectivamente na margem direita e margem esquerda - "canalão". Estes valores poderiam ser otimizados se e onde a inspeção e mapeamento geológico de superfície indicarem a presença de um tapete natural impermeável

A eficiência do tapete depende de sua integridade, de sua continuidade. Em mais de uma barragem um tapete impermeável bem executado deixou de exibir

desempenho satisfatório devido a seu trincamento ao sol, antes do enchimento do reservatório. Preservar a integridade do tapete em Ubaldinho deve merecer maiores cuidados ainda. Transcendendo o período executivo, ciclicamente, a cada alguns anos, o reservatório sofrerá rebaixamento total, expondo o tapete ao sol e podendo na ocasião, sofrer trincamento, vindo a comprometer seu posterior desempenho.

Recomenda-se a proteção do tapete impermeável com um material resistente ao trincamento, como por exemplo, uma areia limpa, abundante na região. Por sua vez, reforçando este papel e espessando o colchão térmico, a superfície deve ser coberta por meio metro de solo solto, de qualquer natureza, exceto contendo blocos, podendo ser material de bota-fora. O material de bota-fora teria um papel adicional de desencorajar o acesso de pessoas que inadvertidamente poderiam danificar o tapete. Uma placa de esclarecimentos seria oportuna. Na construção do tapete recomenda-se uma compactação leve, evitando-se a obtenção de material super compactado ($GC > 98\%$ do Proctor Normal) rígido e naturalmente mais suscetível a trincamento. O esquema proposto é ilustrado esquematicamente abaixo.



São Paulo, 5 de dezembro de 1996


Engº Jaime Domingos Marzionna


Engª Shoshana Signer

Referências

Os elementos que serviram de referência à elaboração deste estudo foram .

Estudos geológicos-geotécnicos relatórios e anexos 1 e 2

Topografia da região de implantação do açude

Seção transversal típica do açude

ANEXO 1

=====
Barragem de Ubaldinho - Ceara - Anexo 1
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

NUMERO DE MATERIAIS 4
NUMERO DE NOS 170
NUMERO DE ELEMENTOS 133
LARGURA DE BANDA MAXIMA 8
LARGURA DE BANDA MEDIA 6 98

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS		ANGULO ENTRE K1 E OX
	K1	K2	
1	1 00000E-0007	1 00000E-0007	0 00
2	1 00000E-0007	1 00000E-0007	0 00
3	1 00000E-0005	1 00000E-0005	0 00
4	5 00000E-0004	5 00000E-0004	0 00

DADOS DOS NOS

NO	COORDENADAS DOS NOS		COND.	CARGA	VAZAO
N R	X	Y	CONT.	HIDRAULICA	
1	0 00	274 00	1	296 00	0.000
2	0 00	276 50	1	296 00	0.000
3	0 00	279 00	1	296 00	0.000
4	0 00	281 00	1	296 00	0 000
5	0 00	282 00	1	296.00	0 000
6	40 00	274 00	0	0 00	0 000
7	40 00	276 50	0	0 00	0 000
8	40 00	279.00	0	0 00	0 000
9	40.00	281 00	0	0.00	0 000
10	40.00	282 00	1	296 00	0.000
11	70 00	274 00	0	0.00	0.000
12	70 00	276 50	0	0 00	0 000
13	70 00	279 00	0	0 00	0 000
14	70 00	281 00	0	0 00	0.000
15	70 00	282 00	1	296.00	0 000
16	100 00	274.00	0	0.00	0.000
17	100 00	276.50	0	0 00	0.000
18	100 00	279 00	0	0.00	0.000
19	100 00	281.00	0	0 00	0.000
20	100 00	281 90	1	296.00	0.000
21	100 00	282 00	1	296 00	0.000
22	120 00	274 00	0	0 00	0 000
23	120.00	276.50	0	0.00	0.000
24	120.00	279 00	0	0 00	0.000
25	120.00	281 00	0	0.00	0 000
26	120 00	281 50	0	0 00	0.000
27	120 00	282 00	1	296 00	0.000
28	140 00	274 00	0	0 00	0 000
29	140 00	276 50	0	0.00	0.000
30	140 00	279 00	0	0.00	0 000
31	140 00	281 00	0	0 00	0.000
32	140 00	281.50	0	0 00	0.000
33	140 00	282.00	1	296 00	0.000
34	160 00	274 00	0	0 00	0.000
35	160 00	276 50	0	0 00	0.000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	281 50	0	0 00	0 000
39	160 00	282 00	1	296.00	0 000
40	170 00	274 00	0	0 00	0.000
41	170 00	276 50	0	0 00	0.000
42	170 00	279.00	0	0 00	0.000
43	170 00	281 00	0	0 00	0.000
44	170 00	281 50	0	0 00	0.000
45	170 00	282 00	1	296.00	0.000
46	180 00	274.00	0	0 00	0.000
47	180 00	276.50	0	0 00	0.000
48	180 00	279 00	0	0 00	0.000
49	180 00	281 00	0	0 00	0 000
50	180 00	281 50	0	0 00	0.000
51	180 00	282 00	1	296.00	0.000
52	190 00	274 00	0	0 00	0 000
53	190 00	276 50	0	0 00	0.000
54	190.00	279.00	0	0.00	0.000

55	190 00	281 00	0	0.00	0 000
56	190 00	281.50	0	0.00	0.000
57	190 00	282 00	1	296 00	0.000
58	195 00	274 00	0	0 00	0 000
59	195 00	276.50	0	0 00	0 000
60	195 00	279 00	0	0 00	0 000
61	195 00	281.00	0	0 00	0 000
62	195 00	281 50	0	0 00	0 000
63	195 00	282 00	1	296 00	0 000
64	200 00	274 00	0	0 00	0 000
65	200 00	276 50	0	0.00	0 000
66	200 00	279.00	0	0 00	0 000
67	200 00	281 00	0	0 00	0 000
68	200 00	281 50	0	0 00	0 000
69	200 00	282 00	1	296 00	0 000
70	207 00	274 00	0	0 00	0 000
71	207 00	276.50	0	0 00	0.000
72	207 00	279 00	0	0 00	0 000
73	207 00	281.00	0	0.00	0 000
74	207 00	281 90	0	0 00	0 000
75	207 00	282.00	1	296 00	0.000
76	214 00	274.00	0	0 00	0 000
77	214 00	276 50	0	0 00	0 000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0.00	0 000
80	214 00	282 00	0	0.00	0.000
81	221 00	274 00	0	0 00	0.000
82	221 00	276 50	0	0 00	0.000
83	221.00	279 00	0	0 00	0.000
84	221 00	281.00	0	0 00	0.000
85	221.00	282 00	0	0 00	0.000
86	228 00	274 00	0	0 00	0 000
87	228.00	276 50	0	0.00	0 000
88	228 00	279.00	0	0 00	0 000
89	228 00	281.00	0	0 00	0.000
90	228 00	282.00	0	0 00	0.000
91	235.00	274 00	0	0.00	0 000
92	235.00	276.50	0	0 00	0.000
93	235 00	279.00	0	0 00	0.000
94	235 00	281 00	0	0.00	0 000
95	235.00	282.00	0	0.00	0 000
96	240 50	274.00	0	0 00	0.000
97	240.50	276 50	0	0 00	0.000
98	240.50	279 00	0	0.00	0.000
99	240.50	281 00	0	0 00	0.000
100	240 50	282 00	0	0 00	0.000
101	246.00	274 00	0	0 00	0.000
102	246 00	276 50	0	0 00	0.000
103	246 00	279 00	0	0 00	0.000
104	246 00	281 00	0	0 00	0 000
105	246.00	282 00	0	0.00	0 000
106	251.00	274 00	0	0.00	0 000
107	251 00	276.50	0	0.00	0 000
108	251 00	279.00	0	0 00	0.000
109	251 00	281 00	0	0 00	0.000
110	251 00	282 00	0	0 00	0 000
111	256 00	274 00	0	0.00	0 000
112	256 00	276 50	0	0.00	0 000
113	256 00	279 00	0	0.00	0 000
114	256 00	281.00	0	0.00	0 000
115	256 00	282 00	1	282 00	0 000
116	263.50	274 00	0	0 00	0 000
117	263 50	276 50	0	0 00	0.000
118	263 50	279 00	0	0 00	0 000
119	263 50	281.00	0	0.00	0 000
120	263 50	282.00	1	282 00	0 000
121	271 00	274 00	0	0 00	0.000
122	271 00	276 50	0	0 00	0.000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0.000
125	271 00	282 00	1	282 00	0 000
126	278 50	274 00	0	0 00	0 000
127	278 50	276 50	0	0 00	0 000
128	278.50	279 00	0	0 00	0.000
129	278.50	281 00	0	0 00	0.000
130	278 50	282.00	1	282 00	0.000
131	286 00	274 00	0	0 00	0 000
132	286 00	276 50	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0.000
135	286.00	282 00	1	282 00	0.000
136	293 50	274 00	0	0 00	0 000
137	293 50	276 50	0	0 00	0 000
138	293.50	279 00	0	0 00	0 000
139	293 50	281 00	0	0.00	0.000

140	293 50	282 00	1	282.00	0 000
141	310 00	274 00	0	0 00	0 000
142	310 00	276 50	0	0 00	0.000
143	310 00	279 00	0	0 00	0.000
144	310 00	281 00	0	0 00	0.000
145	310 00	282 00	1	282 00	0 000
146	326 50	274 00	0	0 00	0 000
147	326 50	276 50	0	0 00	0.000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0.000
150	326 50	282.00	1	282 00	0 000
151	343 00	274 00	0	0.00	0 000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281.00	0	0 00	0.000
155	343 00	282 00	1	282 00	0 000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0 00	0.000
158	359.50	279 00	0	0 00	0 000
159	359 50	281 00	0	0.00	0.000
160	359 50	282 00	1	282 00	0 000
161	376 00	274 00	0	0 00	0 000
162	376 00	276 50	0	0 00	0 000
163	376 00	279 00	0	0.00	0.000
164	376 00	281 00	0	0 00	0.000
165	376 00	282 00	1	282.00	0 000
166	400 00	274 00	0	0.00	0.000
167	400 00	276 50	0	0.00	0.000
168	400 00	279 00	0	0.00	0.000
169	400 00	281 00	0	0.00	0 000
170	400.00	282 00	1	282.00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4
49	59	65	66	60	4

50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	90	95	96	91	4
75	91	96	97	92	4
76	92	97	98	93	4
77	93	98	99	94	3
78	94	99	100	95	2
79	96	101	102	97	4
80	97	102	103	98	4
81	98	103	104	99	3
82	99	104	105	100	2
83	101	106	107	102	4
84	102	107	108	103	4
85	103	108	109	104	3
86	104	109	110	105	2
87	106	111	112	107	4
88	107	112	113	108	4
89	108	113	114	109	3
90	109	114	115	110	2
91	111	116	117	112	4
92	112	117	118	113	4
93	113	118	119	114	3
94	114	119	120	115	2
95	116	121	122	117	4
96	117	122	123	118	4
97	118	123	124	119	3
98	119	124	125	120	2
99	121	126	127	122	4
100	122	127	128	123	4
101	123	128	129	124	3
102	124	129	130	125	2
103	126	131	132	127	4
104	127	132	133	128	4
105	128	133	134	129	3
106	129	134	135	130	2
107	131	136	137	132	4
108	132	137	138	133	4
109	133	138	139	134	3
110	134	139	140	135	2
111	136	141	142	137	4
112	137	142	143	138	4
113	138	143	144	139	3
114	139	144	145	140	2
115	141	146	147	142	4
116	142	147	148	143	4
117	143	148	149	144	3
118	144	149	150	145	2
119	146	151	152	147	4
120	147	152	153	148	4
121	148	153	154	149	3
122	149	154	155	150	2
123	151	156	157	152	4
124	152	157	158	153	4
125	153	158	159	154	3
126	154	159	160	155	2
127	156	161	162	157	4
128	157	162	163	158	4
129	158	163	164	159	3
130	159	164	165	160	2
131	161	166	167	162	4
132	162	167	168	163	4
133	163	168	169	164	3
	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
	1	1 086E-0005
	2	2 172E-0005
	3	1 103E-0005
	4	1 721E-0007
	5	3 436E-0007
	10	2 263E-0006
	15	3 759E-0006
	20	3.804E-0006
	21	9 493E-0007
	27	4 472E-0006
	33	3 474E-0006
	39	1 718E-0006
	45	3 479E-0006
	51	3 763E-0006
	57	3 017E-0006
	63	2 107E-0006
	69	2 664E-0006
	75	2.492E-0006
	115	-4 179E-0006
	120	-5 416E-0006
	125	-5 246E-0006
	130	-5 088E-0006
	135	-4.941E-0006
	140	-7 631E-0006
	145	-1 000E-0005
	150	-9 532E-0006
	155	-9 161E-0006
	160	-8 887E-0006
	165	-1 068E-0005
	170	-6 272E-0006

FLUXOS TOTAIS DO SISTEMA
ENTRANDO = 8 704E-0005
SAINDO = -8 704E-0005

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 Barragem de Ubaldinho - Ccata - Anexo I
 *** ENGEOS *** Engenharia e Geotecnia S/C Ltda
 PERPLAN - programa de analise de percolacao plana - MEF
 G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
 =====

CARGAS HIDRAULICAS E PRESSOES NEUTRAS					
NO	COORDENADAS DOS NOS		CARGA	PRESSAO NEUTRA	FUNCAO
NUMERO	X	Y	HIDRAULICA	(UNID DE CARGA)	FLUXO
1	0 00	274 00	296 00	22 00	5.432E-0006
2	0 00	276 50	296 00	19.50	2 172E-0005
3	0 00	279 00	296 00	17 00	3 810E-0005
4	0 00	281 00	296 00	15 00	4 370E-0005
5	0 00	282 00	296 00	14 00	4 396E-0005
6	40 00	274 00	295 30	21 30	0.000E+0000
7	40 00	276 50	295 30	18 80	2 300E-0005
8	40 00	279.00	295.30	16 30	4 598E-0005
9	40.00	281 00	295.31	14 31	4.531E-0005
10	40.00	282 00	296.00	14 00	4.527E-0005
11	70.00	274 00	294 75	20 75	0.000E+0000
12	70 00	276 50	294 75	18 25	2 386E-0005
13	70 00	279 00	294 75	15 75	4 118E-0005
14	70 00	281 00	294 77	13 77	4 827E-0005
15	70 00	282 00	296 00	14 00	4.828E-0005
16	100 00	274 00	294 15	20 15	0.000E+0000
17	100 00	276 50	294.15	17 65	2 586E-0005
18	100 00	279 00	294 15	15.15	5.170E-0005
19	100 00	281 00	294 19	13 19	5.206E-0005
20	100 00	281 90	296 00	14.10	5.206E-0005
21	100.00	282 00	296 00	14 00	5 443E-0005
22	120 00	274 00	293.71	19 71	0 000E+0000
23	120 00	276 50	293 71	17 21	2.863E-0005
24	120 00	279 00	293.71	14 71	5 727E-0005
25	120 00	281 00	293 76	12.76	5.775E-0005
26	120 00	281 50	294.86	13 36	5 775E-0005
27	120 00	282 00	296 00	14.00	5.715E-0005
28	140 00	274 00	293 24	19 24	0 000E+0000
29	140 00	276 50	293 24	16 74	3.075E-0005
30	140.00	279 00	293 24	14 24	6 150E-0005
31	140 00	281 00	293 30	12 30	6 198E-0005
32	140.00	281 50	294 65	13 15	6.198E-0005
33	140 00	282 00	296 00	14 00	6 209E-0005
34	160 00	274 00	292 73	18.73	0.000E+0000
35	160 00	276 50	292 73	16 23	3 336E-0005
36	160 00	279 00	292 73	13 73	6.668E-0005
37	160.00	281 00	292 79	11.79	6 718E-0005
38	160 00	281 50	294.40	12 90	6 718E-0005
39	160 00	282 00	296 00	14 00	6.716E-0005
40	170.00	274 00	292 45	18 45	0 000E+0000
41	170 00	276 50	292 45	15 95	3.532E-0005
42	170.00	279 00	292 45	13 45	7 066E-0005
43	170 00	281 00	292 52	11.52	7 124E-0005
44	170 00	281 50	294 26	12 76	7 125E-0005
45	170 00	282 00	296 00	14 00	7 125E-0005
46	180 00	274 00	292.16	18.16	0 000E+0000
47	180 00	276 50	292.16	15 66	3 712E-0005
48	180 00	279 00	292 16	13 16	7.426E-0005
49	180 00	281 00	292 24	11.24	7 487E-0005
50	180 00	281 50	294 12	12 62	7 487E-0005
51	180 00	282 00	296 00	14.00	7 487E-0005
52	190 00	274 00	291 86	17.86	0 000E+0000
53	190 00	276 50	291 86	15 36	3.890E-0005
54	190 00	279 00	291 86	12.86	7 772E-0005
55	190 00	281 00	291 94	10.94	7 827E-0005
56	190 00	281 50	293.97	12.47	7.827E-0005
57	190 00	282 00	296 00	14 00	7.826E-0005
58	195 00	274 00	291 70	17 70	0.000E+0000
59	195 00	276 50	291 70	15 20	4.006E-0005
60	195 00	279 00	291 70	12.70	8 015E-0005
61	195 00	281 00	291 79	10.79	8 086E-0005
62	195 00	281 50	293 88	12 38	8 087E-0005
63	195 00	282 00	296 00	14.00	8.083E-0005
64	200 00	274 00	291 54	17 54	0 000E+0000
65	200 00	276 50	291 54	15.04	4.121E-0005
66	200 00	279 00	291 54	12 54	8 232E-0005
67	200 00	281 00	291 63	10 63	8 287E-0005
68	200 00	281 50	293 91	12.41	8.286E-0005
69	200 00	282 00	296 00	14 00	8.321E-0005
70	207 00	274 00	291 30	17.30	0 000E+0000
71	207 00	276 50	291.30	14.80	4.290E-0005
72	207 00	279 00	291 30	12.30	8 607E-0005
73	207 00	281 00	291 38	10 38	8 698E-0005
74	207 00	281 90	295 08	13 18	8 704E-0005

75	207 00	282 00	296 00	14 00	8.579E-0005
76	214.00	274 00	291 06	17 06	0 000E+0000
77	214 00	276 50	291 06	14.56	4.319E-0005
78	214 00	279 00	291 06	12 06	8 637E-0005
79	214 00	281 00	291 05	10 05	8 704E-0005
80	214 00	282 00	290 44	8 44	8 704E-0005
81	221 00	274 00	290 82	16 82	0 000E+0000
82	221 00	276 50	290 82	14 32	4.317E-0005
83	221 00	279 00	290 82	11 82	8.634E-0005
84	221 00	281 00	290 82	9 82	8.703E-0005
85	221 00	282.00	290 92	8 92	8.704E-0005
86	228 00	274 00	290 58	16 58	0.000E+0000
87	228 00	276 50	290 58	14.08	4.317E-0005
88	228 00	279 00	290 58	11 58	8.634E-0005
89	228 00	281 00	290 58	9 58	8.703E-0005
90	228 00	282 00	290 56	8 56	8.704E-0005
91	235 00	274 00	290 34	16 34	0 000E+0000
92	235 00	276 50	290 34	13.84	4 317E-0005
93	235 00	279.00	290 34	11 34	8.634E-0005
94	235 00	281 00	290.34	9.34	8.703E-0005
95	235 00	282 00	290 34	8 34	8.704E-0005
96	240 50	274 00	290 15	16.15	0 000E+0000
97	240 50	276 50	290 15	13 65	4 317E-0005
98	240 50	279 00	290 15	11 15	8.634E-0005
99	240 50	281 00	290 15	9 15	8 703E-0005
100	240 50	282 00	290 17	8 17	8 704E-0005
101	246 00	274 00	289 96	15 96	0.000E+0000
102	246 00	276 50	289 96	13 46	4 316E-0005
103	246 00	279 00	289 96	10 96	8.636E-0005
104	246 00	281 00	289 96	8.96	8 704E-0005
105	246 00	282.00	289 81	7.81	8 704E-0005
106	251 00	274 00	289 78	15 78	0 000E+0000
107	251 00	276 50	289 78	13.28	4 294E-0005
108	251 00	279 00	289 78	10.78	8 611E-0005
109	251 00	281 00	289.79	8.79	8 698E-0005
110	251 00	282 00	290.86	8 86	8.704E-0005
111	256 00	274 00	289 61	15 61	0.000E+0000
112	256 00	276 50	289 61	13 11	4.202E-0005
113	256 00	279 00	289 61	10 61	8.418E-0005
114	256 00	281 00	289 47	8 47	8 493E-0005
115	256 00	282 00	282.00	0.00	8 495E-0005
116	263 50	274 00	289 37	15 37	0 000E+0000
117	263 50	276 50	289 37	12.87	3 973E-0005
118	263 50	279.00	289.36	10.36	7 949E-0005
119	263 50	281 00	289 22	8 22	8.014E-0005
120	263 50	282 00	282 00	0 00	8.015E-0005
121	271 00	274 00	289 14	15 14	0.000E+0000
122	271 00	276 50	289 13	12 63	3.712E-0005
123	271 00	279 00	289 13	10 13	7 423E-0005
124	271 00	281 00	288 99	7 99	7 482E-0005
125	271 00	282 00	282 00	0 00	7 482E-0005
126	278 50	274 00	288 92	14 92	0 000E+0000
127	278 50	276.50	288 92	12.42	3 456E-0005
128	278 50	279 00	288 92	9 92	6.911E-0005
129	278 50	281 00	288 78	7 78	6.965E-0005
130	278 50	282 00	282 00	0 00	6 965E-0005
131	286 00	274 00	288 72	14 72	0 000E+0000
132	286 00	276 50	288 72	12 22	3 198E-0005
133	286 00	279 00	288.72	9 72	6 404E-0005
134	286 00	281.00	288.59	7 59	6.461E-0005
135	286 00	282 00	282 00	0 00	6.464E-0005
136	293 50	274 00	288 54	14 54	0.000E+0000
137	293 50	276 50	288 54	12 04	2 904E-0005
138	293 50	279 00	288 53	9 53	5 798E-0005
139	293 50	281 00	288.41	7.41	5.837E-0005
140	293 50	282 00	282 00	0.00	5 835E-0005
141	310 00	274 00	288 18	14.18	0 000E+0000
142	310 00	276 50	288 18	11.68	2 454E-0005
143	310 00	279 00	288.18	9 18	4.911E-0005
144	310 00	281 00	288 06	7 06	4.952E-0005
145	310 00	282 00	282 00	0 00	4 953E-0005
146	326 50	274 00	287 89	13 89	0 000E+0000
147	326 50	276 50	287 89	11 39	1 973E-0005
148	326 50	279 00	287 88	8 88	3 945E-0005
149	326 50	281 00	287 77	6 77	3 976E-0005
150	326 50	282 00	282 00	0 00	3 976E-0005
151	343 00	274 00	287 66	13 66	0 000E+0000
152	343 00	276 50	287 66	11 16	1 510E-0005
153	343 00	279 00	287 66	8.66	3.019E-0005
154	343 00	281 00	287 54	6 54	3.043E-0005
155	343 00	282 00	282 00	0 00	3.042E-0005
156	359 50	274 00	287 49	13.49	0 000E+0000
157	359 50	276 50	287 49	10.99	1 056E-0005
158	359 50	279 00	287 49	8.49	2.111E-0005
159	359 50	281 00	287 38	6 38	2.128E-0005

160	359 50	262 00	282 00	0 00	2.139E-0005
161	376 00	274 00	287 38	13 38	0 000E+0000
162	376 00	276 50	287 38	10 88	6.081E-0006
163	376 00	279 00	287 38	8.38	1.215E-0005
164	376 00	281 00	287 27	6.27	1.225E-0005
165	376 00	282 00	282 00	0.00	1 161E-0005
166	400 00	274.00	287 32	13 32	0 000E+0000
167	400.00	276 50	287 32	10 82	0.000E+0000
168	400 00	279 00	287.32	8.32	0 000E+0000
169	400 00	281 00	287 21	6 21	-2.801E-0015
170	400 00	282 00	282 00	0 00	3 136E-0006

ANEXO 2

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Barragem de Ubaldinho - Ceara - Anexo 2
 *** ENGEOS *** Engenharia e Geotecnia S/C Ltda
 PERCPAN - programa de analise de percolacao plana - MEF
 G E O E X P E R T - W Hachich Engenharia S/C Ltda. - (011) 570 3737

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TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

NUMERO DE MATERIAIS 4
 NUMERO DE NOS 170
 NUMERO DE ELEMENTOS 133
 LARGURA DE BANDA MAXIMA 8
 LARGURA DE BANDA MEDIA 6 98

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS K1	PERMEABILIDADES PRINCIPAIS K2	ANGULO ENTRE K1 E OX
1	1 00000E-0005	1 00000E-0005	0 00
2	1 00000E-0005	1 00000E-0005	0 00
3	1 00000E-0005	1 00000E-0005	0 00
4	5 00000E-0004	5 00000E-0004	0 00

DADOS DOS NOS

NO N R	COORDENADAS DOS NOS X	COORDENADAS DOS NOS Y	COND. CONT	CARGA HIDRAULICA	VAZAO
1	0 00	274 00	1	296.00	0 000
2	0.00	276 50	1	296.00	0 000
3	0 00	279.00	1	296.00	0.000
4	0 00	281.00	1	296.00	0.000
5	0 00	282.00	1	296.00	0.000
6	40.00	274.00	0	0.00	0.000
7	40.00	276 50	0	0 00	0.000
8	40.00	279 00	0	0 00	0 000
9	40 00	281 00	0	0.00	0 000
10	40 00	282 00	1	296 00	0 000
11	70 00	274.00	0	0.00	0.000
12	70.00	276.50	0	0 00	0.000
13	70 00	279 00	0	0.00	0 000
14	70.00	281 00	0	0.00	0 000
15	70.00	282.00	1	296.00	0.000
16	100.00	274.00	0	0 00	0.000
17	100 00	276.50	0	0 00	0.000
18	100.00	279 00	0	0.00	0.000
19	100.00	281 00	0	0.00	0.000
20	100.00	281 90	1	296.00	0 000
21	100 00	282.00	1	296 00	0.000
22	120 00	274 00	0	0 00	0.000
23	120.00	276 50	0	0.00	0.000
24	120.00	279 00	0	0 00	0.000
25	120 00	281 00	0	0.00	0 000
26	120.00	281 50	0	0.00	0.000
27	120 00	282 00	1	296.00	0 000
28	140.00	274 00	0	0.00	0.000
29	140 00	276.50	0	0 00	0.000
30	140 00	279 00	0	0 00	0.000
31	140 00	281 00	0	0.00	0 000
32	140.00	281 50	0	0.00	0 000
33	140 00	282 00	1	296.00	0.000
34	160 00	274 00	0	0 00	0.000
35	160 00	276 50	0	0 00	0.000
36	160 00	279 00	0	0.00	0.000
37	160 00	281 00	0	0.00	0 000
38	160 00	281 50	0	0.00	0 000
39	160 00	282.00	1	296 00	0.000
40	170 00	274 00	0	0 00	0.000
41	170 00	276 50	0	0 00	0.000
42	170 00	279 00	0	0.00	0 000
43	170 00	281 00	0	0.00	0 000
44	170 00	281 50	0	0.00	0 000
45	170 00	282 00	1	296.00	0 000
46	180 00	274 00	0	0.00	0 000
47	180 00	276 50	0	0.00	0.000
48	180 00	279 00	0	0 00	0.000
49	180 00	281 00	0	0 00	0.000
50	180 00	281 50	0	0 00	0 000
51	180 00	282 00	1	296 00	0.000
52	190 00	274 00	0	0 00	0.000
53	190.00	276.50	0	0 00	0.000
54	190 00	279 00	0	0 00	0.000

55	190 00	281 00	0	0 00	0 000
56	190 00	281 50	0	0.00	0.000
57	190 00	282.00	1	296 00	0 000
58	195 00	274 00	0	0.00	0.000
59	195 00	276 50	0	0.00	0.000
60	195 00	279 00	0	0 00	0 000
61	195.00	281 00	0	0.00	0.000
62	195 00	281.50	0	0 00	0 000
63	195 00	282 00	1	296 00	0 000
64	200 00	274.00	0	0.00	0.000
65	200 00	276 50	0	0.00	0 000
66	200 00	279.00	0	0.00	0 000
67	200 00	281 00	0	0 00	0 000
68	200.00	281 50	0	0.00	0 000
69	200 00	282.00	1	296.00	0.000
70	207 00	274 00	0	0.00	0.000
71	207 00	276 50	0	0.00	0.000
72	207 00	279.00	0	0.00	0.000
73	207 00	281.00	0	0.00	0.000
74	207 00	281.90	0	0.00	0.000
75	207 00	282 00	1	296 00	0.000
76	214 00	274 00	0	0 00	0.000
77	214 00	276 50	0	0 00	0 000
78	214 00	279 00	0	0 00	0.000
79	214 00	281 00	0	0 00	0.000
80	214 00	282 00	0	0.00	0 000
81	221.00	274 00	0	0.00	0 000
82	221 00	276 50	0	0 00	0.000
83	221 00	279.00	0	0.00	0 000
84	221.00	281 00	0	0.00	0.000
85	221 00	282 00	0	0 00	0.000
86	228 00	274 00	0	0.00	0 000
87	228.00	276 50	0	0.00	0 000
88	228 00	279.00	0	0.00	0.000
89	228 00	281 00	0	0.00	0.000
90	228 00	282.00	0	0.00	0.000
91	235.00	274.00	0	0.00	0 000
92	235 00	276.50	0	0.00	0.000
93	235 00	279.00	0	0.00	0.000
94	235.00	281 00	0	0.00	0 000
95	235 00	282 00	0	0 00	0.000
96	240.50	274 00	0	0.00	0 000
97	240 50	276.50	0	0 00	0.000
98	240 50	279 00	0	0.00	0.000
99	240 50	281.00	0	0 00	0.000
100	240.50	282.00	0	0.00	0.000
101	246 00	274 00	0	0 00	0.000
102	246 00	276.50	0	0.00	0.000
103	246 00	279 00	0	0.00	0 000
104	246 00	281.00	0	0 00	0.000
105	246 00	282 00	0	0.00	0 000
106	251 00	274.00	0	0 00	0.000
107	251.00	276.50	0	0 00	0 000
108	251 00	279.00	0	0.00	0 000
109	251.00	281 00	0	0.00	0 000
110	251 00	282 00	0	0.00	0 000
111	256 00	274 00	0	0.00	0.000
112	256 00	276 50	0	0.00	0.000
113	256 00	279 00	0	0.00	0.000
114	256 00	281.00	0	0.00	0 000
115	256 00	282 00	1	282 00	0.000
116	263.50	274 00	0	0 00	0.000
117	263 50	276 50	0	0.00	0 000
118	263 50	279 00	0	0 00	0.000
119	263 50	281.00	0	0.00	0.000
120	263 50	282 00	1	282.00	0.000
121	271.00	274 00	0	0.00	0.000
122	271 00	276 50	0	0.00	0 000
123	271.00	279 00	0	0.00	0.000
124	271 00	281 00	0	0.00	0 000
125	271 00	282 00	1	282 00	0.000
126	278 50	274 00	0	0.00	0 000
127	278 50	276 50	0	0 00	0.000
128	278 50	279 00	0	0.00	0.000
129	278 50	281 00	0	0.00	0 000
130	278.50	282 00	1	282.00	0.000
131	286 00	274 00	0	0 00	0.000
132	286.00	276 50	0	0 00	0.000
133	286 00	279 00	0	0.00	0.000
134	286.00	281 00	0	0.00	0.000
135	286 00	282 00	1	282.00	0 000
136	293 50	274.00	0	0.00	0.000
137	293 50	276 50	0	0 00	0 000
138	293 50	279 00	0	0.00	0.000
139	293 50	281 00	0	0 00	0.000

140	293 50	282 00	1	282.00	0.000
141	310 00	274 00	0	0 00	0 000
142	310 00	276 50	0	0 00	0 000
143	310 00	279 00	0	0 00	0.000
144	310 00	281 00	0	0 00	0.000
145	310 00	282 00	1	282 00	0 000
146	326 50	274 00	0	0 00	0 000
147	326 50	276 50	0	0 00	0.000
148	326 50	279 00	0	0 00	0 000
149	343 00	281 00	0	0 00	0 000
150	343 00	282 00	1	282.00	0.000
151	343 00	274 00	0	0 00	0 000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0.00	0.000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0 00	0 000
158	359 50	279 00	0	0 00	0 000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	274 00	0	0.00	0.000
162	376 00	276 50	0	0 00	0 000
163	376 00	279 00	0	0 00	0.000
164	376 00	281 00	0	0 00	0.000
165	376 00	282 00	1	282 00	0.000
166	400 00	274.00	0	0 00	0.000
167	400 00	276 50	0	0 00	0 000
168	400 00	279 00	0	0.00	0 000
169	400 00	281 00	0	0 00	0 000
170	400 00	282 00	1	282.00	0.000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4
49	59	65	66	60	4

50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	4
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	4
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	4
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS
NO

NUMERO	VAZAO
1	7 810F-0008
2	1 555F-0007
3	7 814E-0008
4	6 127E-0010
5	1 116E-0007
10	8.582E-0007
15	2 586E-0006
20	3 846E-0006
21	1.940E-0006
27	1 028E-0005
33	1 47E-0005
40	3 078E-0005
51	4 441F-0005
57	4 558E-0005
63	3 783E-0005
69	5 634E-0005
75	7.180E-0005
115	-7 211E-0005
120	-6 818E-0005
125	-5 172E-0005
130	-3 937E-0005
135	-2.992E-0005
140	-3.409E-0005
145	-2 838E-0005
150	-1 558E-0005
155	-8.611E-0006
160	-4 867E-0006
165	-3 533E-0006
170	-1 595E-0006

FLUXOS TOTAIS DO SISTEMA
ENTRANDO = 3 580E-0004
SAINDO = -3.580E-0004

NO NUMERO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	274 00	296 00	22 00	3.905E-0008
2	0,00	276.50	296.00	19.50	1.559E-0007
3	0 00	279.00	296 00	17 00	2 727E-0007
4	0 00	281 00	296 00	15.00	3 121E-0007
5	0 00	282 00	296 00	14.00	3 682E-0007
6	40 00	274 00	295 99	21 99	0.000E+0000
7	40 00	276 50	295.99	19 49	4 370E-0007
8	40 00	279 00	295 99	16 99	8 687E-0007
9	40 00	281 00	296 00	15 00	8 647E-0007
10	40 00	282 00	296 00	14 00	8.531E-0007
11	70 00	274 00	295 98	21 98	0.000E+0000
12	70 00	276 50	295 98	19 48	1 267E-0006
13	70 00	279 00	295.98	16 98	2.538E-0006
14	70 00	281 00	295 99	14.99	2 561E-0006
15	70 00	282 00	296 00	14 00	2 575E-0006
16	100 00	274 00	295 93	21 93	0.000E+0000
17	100 00	276 50	295 93	19.43	2.930E-0006
18	100 00	279 00	295 93	16 93	5.803E-0006
19	100 00	281 00	295 98	14.98	5.811E-0006
20	100 00	281 90	296 00	14 10	5 791E-0006
21	100 00	282 00	296 00	14 00	8.685E-0006
22	120 00	274 00	295 85	21.85	0 000E+0000
23	120 00	276 50	295.85	19 35	7 724E-0006
24	120 00	279 00	295 86	16 86	1 541E-0005
25	120 00	281 00	295 95	14.95	1.551E-0005
26	120 00	281 50	295.98	14 48	1 553E-0005
27	120 00	282 00	296.00	14 00	1 479E-0005
28	140 00	274 00	295.69	21 69	0 000E+0000
29	140 00	276 50	295 70	19 20	1.514E-0005
30	140 00	279 00	295 70	16.70	3 023E-0005
31	140 00	281 00	295.90	14 90	3 045E-0005
32	140 00	281 50	295 95	14 45	3 049E-0005
33	140 00	282 00	296 00	14 00	3.067E-0005
34	160 00	274 00	295 36	21 36	0.000E+0000

Anexos Fl 15/186

000046

35	160 00	276.50	295.37	18.87	2 836E-0005
36	160 00	279 00	295 37	16 37	5.630E-0005
37	160 00	281 00	295 79	14 79	5.647E-0005
38	160 00	281 50	295 90	14 40	5 642E-0005
39	160 00	282 00	296.00	14.00	5 631E-0005
40	170 00	274 00	295.08	21 08	0 000E+0000
41	170 00	276 50	295 08	18 58	4.306E-0005
42	170 00	279 00	295 09	16 09	8.590E-0005
43	170 00	281.00	295.70	14.70	8 644E-0005
44	170 00	281 50	295 85	14 35	8.653E-0005
45	170 00	282 00	296 00	14 00	8.661E-0005
46	180 00	274 00	294 67	20 67	0 000E+0000
47	180.00	276.50	294.68	18.18	6 150E-0005
48	180 00	279.00	294.69	15.69	1 228E-0004
49	180 00	281 00	295.56	14.56	1 238E-0004
50	180 00	281 50	295 78	14 28	1 240E-0004
51	180 00	282 00	296 00	14 00	1 242E-0004
52	190 00	274 00	294 08	20 08	0 000E+0000
53	190 00	276 50	294 09	17 59	8.565E-0005
54	190 00	279 00	294 12	15 12	1.698E-0004
55	190 00	281 00	295 37	14 37	1.699E-0004
56	190 00	281 50	295 69	14 19	1.696E-0004
57	190 00	282 00	296 00	14 00	1.692E-0004
58	195 00	274 00	293 70	19 70	0.000E+0000
59	195 00	276 50	293 71	17.21	1 046E-0004
60	195 00	279 00	293 74	14 74	2.088E-0004
61	195 00	281 00	295 24	14 24	2.110E-0004
62	195 00	281 50	295 62	14.12	2 119E-0004
63	195 00	282 00	296 00	14.00	2 109E-0004
64	200 00	274 00	293 24	19 24	0.000E+0000
65	200 00	276 50	293 25	16 75	1.275E-0004
66	200.00	279 00	293 29	14 29	2.518E-0004
67	200 00	281.00	295 13	14.13	2.505E-0004
68	200 00	281 50	295 58	14.08	2 486E-0004
69	200 00	282 00	296 00	14 00	2.580E-0004
70	207.00	274 00	292 44	18.44	0.000E+0000
71	207 00	276.50	292.46	15.96	1 683E-0004
72	207 00	279.00	292.49	13.49	3.429E-0004
73	207 00	281 00	294 64	13.64	3.510E-0004
74	207 00	281 90	295 71	13 81	3.580E-0004
75	207.00	282 00	296 00	14.00	3.221E-0004
76	214 00	274.00	291.49	17.49	0 000E+0000
77	214 00	276 50	291 49	14.99	1.770E-0004
78	214 00	279 00	291 49	12 49	3.544E-0004
79	214 00	281.00	291 39	10.39	3.570E-0004
80	214 00	282 00	291.24	9.24	3.580E-0004
81	221 00	274 00	290 50	16.50	0.000E+0000
82	221 00	276 50	290 50	14.00	1.769E-0004
83	221 00	279.00	290 50	11.50	3 537E-0004
84	221 00	281 00	290 50	9 50	3.565E-0004
85	221 00	282 00	290 52	8.52	3.580E-0004
86	228 00	274.00	289 51	15.51	0 000E+0000
87	228 00	276.50	289.51	13.01	1 769E-0004
88	228 00	279.00	289 51	10.51	3 537E-0004
89	228 00	281 00	289 51	8.51	3 565E-0004
90	228.00	282 00	289 51	7.51	3 580E-0004
91	235 00	274 00	288 52	14 52	0.000E+0000
92	235.00	276 50	288 52	12.02	1.769E-0004
93	235 00	279 00	288 52	9.52	3.537E-0004
94	235 00	281 00	288 52	7.52	3 565E-0004
95	235 00	282 00	288 52	6 52	3.580E-0004
96	240 50	274 00	287 74	13 74	0.000E+0000
97	240.50	276 50	287 74	11.24	1.769E-0004
98	240 50	279 00	287.74	8.74	3 537E-0004
99	240 50	281 00	287.74	6.74	3 565E-0004
100	240 50	282 00	287 74	5.74	3.580E-0004
101	246 00	274.00	286 96	12.96	0 000E+0000
102	246 00	276 50	286.96	10.46	1 765E-0004
103	246 00	279 00	286 96	7 96	3.536E-0004
104	246 00	281 00	286 97	5.97	3.566E-0004
105	246 00	282 00	286 95	4.95	3 580E-0004
106	251 00	274 00	286.26	12 26	0.000E+0000
107	251 00	276 50	286 26	9 76	1.721E-0004
108	251 00	279 00	286 25	7.25	3.474E-0004
109	251 00	281 00	286 16	5.16	3 529E-0004
110	251 00	282 00	286 29	4 29	3.580E-0004
111	256.00	274 00	285 59	11 59	0.000E+0000
112	256 00	276.50	285 58	9.08	1 574E-0004
113	256 00	279 00	285.54	6.54	3.163E-0004
114	256 00	281 00	283 30	2 30	3.197E-0004
115	256 00	282 00	282 00	0.00	3.219E-0004
116	263 50	274 00	284 73	10 73	0.000E+0000
117	263.50	276 50	284 72	8.22	1 252E-0004
118	263 50	279 00	284 69	5.69	2 498E-0004
119	263 50	281 00	282 88	1 88	2.513E-0004

120	263 50	282 00	282 00	0 00	2.518E-0004
121	271 00	274 00	284 08	10 08	0 000E+0000
122	271 00	276 50	284 07	7 57	9 576E-0005
123	271 00	279 00	284 05	5 05	1.907E-0004
124	271 00	281 00	282 69	1 69	1.917E-0004
125	271 00	282 00	282 00	0 00	1 918E-0004
126	278 50	274.00	283 58	9 58	0 000E+0000
127	278 50	276.50	283.58	7 08	7 301E-0005
128	278 50	279 00	283.56	4.56	1.454E-0004
129	278 50	281 00	282 52	1 52	1 462E-0004
130	278 50	282 00	282.00	0 00	1.463E-0004
131	286 00	274 00	283 20	9 20	0.000E+0000
132	286 00	276.50	283 20	6 70	5 528E-0005
133	286.00	279 00	283.18	4.18	1.104E-0004
134	286 00	281 00	282.40	1.40	1.112E-0004
135	286 00	282 00	282 00	0 00	1.116E-0004
136	293 50	274 00	282.91	8 91	0.000E+0000
137	293 50	276 50	282 91	6 41	4.023E-0005
138	293 50	279 00	282 90	3 90	7.977E-0005
139	293 50	281 00	282 30	1.30	7.991E-0005
140	293 50	282 00	282.00	0.00	7.961E-0005
141	310 00	274 00	282.50	8 50	0 000E+0000
142	310 00	276 50	282 50	6.00	2.392E-0005
143	310 00	277 50	282 49	3 49	4 781E-0005
144	310 00	281 00	282 16	1 16	4 819E-0005
145	310 00	282 00	282.00	0 00	4 838E-0005
146	326 50	274 00	282 27	8.27	0.000E+0000
147	326 50	276 50	282 27	5 77	1.320E-0005
148	326.50	279.00	282.27	3 27	2 628E-0005
149	326 50	281 00	282.09	1 09	2 640E-0005
150	326 50	282 00	282 00	0 00	2.639E-0005
151	343 00	274 00	282 15	8 15	0 000E+0000
152	343 00	276 50	282.15	5.65	7.135E-0006
153	343 00	279 00	282 15	3 15	1 421E-0005
154	343 00	281 00	282.05	1 05	1 429E-0005
155	343 00	282 00	282 00	0.00	1 430E-0005
156	359.50	274 00	282 09	8 09	0.000E+0000
157	359 50	276 50	282 09	5 59	3 759E-0006
158	359 50	279 00	282 08	3.08	7.488E-0006
159	359 50	281.00	282 03	1 03	7 528E-0006
160	359 50	282 00	282 00	0 00	7 561E-0006
161	376.00	274.00	282 05	8 05	0.000E+0000
162	376 00	276 50	282 05	5 55	1 760E-0006
163	376 00	279 00	282.05	3.05	3 504E-0006
164	376 00	281 00	282 02	1.02	3 521E-0006
165	376 00	282.00	282 00	0 00	3.361E-0006
166	400 00	274 00	282.04	8 04	0.000E+0000
167	400 00	276 50	282 04	5 54	0 000E+0000
168	400 00	279 00	282 04	3.04	0.000E+0000
169	400 00	281 00	282 01	1 01	5 687E-0017
170	400 00	282 00	282 00	0.00	7 973E-0007

ANEXO 3



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Barragem de Ubaldinho - Ceara - Anexo 3
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

NUMERO DE MATERIAIS	4
NUMERO DE NOS	170
NUMERO DE ELEMENTOS	133
LARGURA DE BANDA MAXIMA	8
LARGURA DE BANDA MEDIA	6 98

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS		ANGULO ENTRE
	K1	K2	K1 E OX
1	1 00000E-0008	1 00000E-0008	0 00
2	1 00000E-0007	1 00000E-0007	0 00
3	1 00000E-0005	1 00000E-0005	0 00
4	5 00000E-0004	5 00000E-0004	0 00

DADOS DOS NOS

NO	COORDENADAS DOS NOS		COND	CARGA	VAZAO
N R	X	Y	CONT	HIDRAULICA	
1	0 00	274 00	1	296 00	0 000
2	0 00	276 50	1	296 00	0 000
3	0 00	279 00	1	296 00	0 000
4	0 00	281 00	1	296 00	0 000
5	0 00	282 00	1	296 00	0 000
6	40 00	274 00	0	0 00	0 000
7	40 00	276 50	0	0 00	0 000
8	40 00	279 00	0	0 00	0 000
9	40 00	281 00	0	0 00	0 000
10	40 00	282 00	1	296 00	0 000
11	80 00	274 00	0	0 00	0 000
12	80 00	276 50	0	0 00	0 000
13	80 00	279 00	0	0 00	0 000
14	80 00	281 00	0	0 00	0 000
15	80 00	282 00	1	296 00	0 000
16	120 00	274 00	0	0 00	0 000
17	120 00	276 50	0	0 00	0 000
18	120 00	279 00	0	0 00	0 000
19	120 00	281 00	0	0 00	0 000
20	120 00	282 00	1	296 00	0 000
21	120 00	284 00	1	296 00	0 000
22	130 00	274 00	0	0 00	0 000
23	130 00	276 50	0	0 00	0 000
24	130 00	279 00	0	0 00	0 000
25	130 00	281 00	0	0 00	0 000
26	130 00	282 00	0	0 00	0 000
27	130 00	284 00	1	296 00	0 000
28	140 00	274 00	0	0 00	0 000
29	140 00	276 50	0	0 00	0 000
30	140 00	279 00	0	0 00	0 000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0 00	0 000
33	140 00	284 00	1	296 00	0 000
34	160 00	274 00	0	0 00	0 000
35	160 00	276 50	0	0 00	0 000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	282 00	0	0 00	0 000
39	160 00	284 00	1	296 00	0 000
40	170 00	274 00	0	0 00	0 000
41	170 00	276 50	0	0 00	0 000
42	170 00	279 00	0	0 00	0 000
43	170 00	281 00	0	0 00	0 000
44	170 00	282 00	0	0 00	0 000
45	170 00	284 00	1	296 00	0 000
46	180 00	274 00	0	0 00	0 000
47	180 00	276 50	0	0 00	0 000
48	180 00	279 00	0	0 00	0 000
49	180 00	281 00	0	0 00	0 000
50	180 00	282 00	0	0 00	0 000
51	180 00	284 00	1	296 00	0 000
52	190 00	274 00	0	0 00	0 000
53	190 00	276 50	0	0 00	0 000
54	190 00	279 00	0	0 00	0 000
55	190 00	281 00	0	0 00	0 000

56	190 00	282 00	0	0.00	0.000
57	190 00	284.00	1	296 00	0.000
58	195.00	274.00	0	0 00	0 000
59	195 00	276 50	0	0 00	0 000
60	195 00	279 00	0	0.00	0 000
61	195 00	281 00	0	0.00	0 000
62	195 00	282 00	0	0.00	0.000
63	195 00	284 00	1	296 00	0.000
64	200 00	274.00	0	0 00	0 000
65	200 00	276 50	0	0 00	0 000
66	200 00	279 00	0	0 00	0 000
67	200 00	281 00	0	0.00	0 000
68	200 00	282 00	0	0 00	0 000
69	200 00	284 00	1	296.00	0.000
70	207 00	274 00	0	0.00	0 000
71	207.00	276 50	0	0 00	0 000
72	207 00	279 00	0	0.00	0 000
73	207 00	281.00	0	0 00	0.000
74	207 00	282 00	0	0.00	0.000
75	207 00	284 00	1	296.00	0.000
76	214 00	274 00	0	0 00	0 000
77	214 00	276 50	0	0 00	0 000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0.00	0 000
80	211 00	282 00	0	0 00	0 000
81	221 00	274 00	0	0 00	0.000
82	221 00	276 50	0	0 00	0.000
83	221.00	279 00	0	0 00	0.000
84	221 00	281 00	0	0 00	0.000
85	221 00	282 00	0	0 00	0 000
86	228 00	274 00	0	0.00	0 000
87	228 00	276.50	0	0.00	0.000
88	228 00	279.00	0	0.00	0.000
89	228.00	281 00	0	0 00	0.000
90	228 00	282 00	0	0.00	0 000
91	235 00	274 00	0	0.00	0 000
92	235 00	276 50	0	0.00	0.000
93	235 00	279 00	0	0.00	0.000
94	235 00	281 00	0	0.00	0 000
95	235 00	282.00	0	0 00	0.000
96	240 50	274 00	0	0 00	0.000
97	240 50	276 50	0	0.00	0 000
98	240 50	279 00	0	0.00	0 000
99	240 50	281.00	0	0.00	0.000
100	240.50	282 00	0	0 00	0.000
101	246 00	274 00	0	0 00	0 000
102	246 00	276 50	0	0.00	0 000
103	246 00	279.00	0	0.00	0 000
104	246 00	281 00	0	0.00	0.000
105	246 00	282 00	0	0 00	0 000
106	251 00	274 00	0	0 00	0 000
107	251 00	276 50	0	0.00	0.000
108	251 00	279 00	0	0.00	0 000
109	251 00	281 00	0	0 00	0.000
110	251 00	282 00	0	0 00	0 000
111	256 00	274 00	0	0 00	0.000
112	256 00	276 50	0	0 00	0.000
113	256.00	279.00	0	0 00	0 000
114	256.00	281 00	0	0.00	0 000
115	256.00	282 00	1	282 00	0 000
116	263 50	274 00	0	0 00	0 000
117	263 50	276 50	0	0 00	0 000
118	263 50	279 00	0	0 00	0 000
119	263 50	281 00	0	0.00	0.000
120	263 50	282 00	1	282.00	0.000
121	271 00	274 00	0	0 00	0.000
122	271 00	276 50	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0.00	0.000
125	271 00	282 00	1	282.00	0.000
126	278 50	274.00	0	0 00	0.000
127	278 50	276.50	0	0 00	0.000
128	278 50	279 00	0	0 00	0.000
129	278 50	281 00	0	0.00	0 000
130	278 50	282 00	1	282.00	0 000
131	286 00	274 00	0	0 00	0.000
132	286.00	276.50	0	0 00	0.000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282.00	0 000
136	293 50	274.00	0	0 00	0.000
137	293 50	276 50	0	0.00	0 000
138	293 50	279 00	0	0 00	0 000
139	293 50	281 00	0	0 00	0.000
140	293 50	282 00	1	282 00	0 000

141	310 00	274 00	0	0 00	0.000
142	310 00	276 50	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0.000
145	310 00	282 00	1	282 00	0.000
146	326 50	274 00	0	0 00	0.000
147	326 50	276 50	0	0.00	0.000
148	326 50	279 00	0	0.00	0.000
149	326 50	281 00	0	0 00	0.000
150	326 50	282.00	1	282 00	0 000
151	343 00	274.00	0	0 00	0 000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0.000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	274 00	0	0 00	0.000
157	359 50	276 50	0	0 00	0 000
158	359.50	279 00	0	0 00	0 000
159	359 50	281.00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	274 00	0	0 00	0 000
162	376 00	276 50	0	0 00	0 000
163	376 00	279 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0.000
165	376 00	282 00	1	282.00	0.000
166	400 00	274 00	0	0 00	0 000
167	400 00	276 50	0	0 00	0 000
168	400 00	279 00	0	0 00	0 000
169	400.00	281 00	0	0 00	0 000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4
49	59	65	66	60	4
50	60	66	67	61	3

51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	4
75	93	98	99	94	3
76	94	99	100	95	2
77	96	101	102	97	4
78	97	102	103	98	4
79	98	103	104	99	3
80	99	104	105	100	2
81	101	106	107	102	4
82	102	107	108	103	4
83	103	108	109	104	3
84	104	109	110	105	2
85	106	111	112	107	4
86	107	112	113	108	4
87	108	113	114	109	3
88	109	114	115	110	2
89	111	116	117	112	4
90	112	117	118	113	4
91	113	118	119	114	3
92	114	119	120	115	2
93	116	121	122	117	4
94	117	122	123	118	4
95	118	123	124	119	3
96	119	124	125	120	2
97	121	126	127	122	4
98	122	127	128	123	4
99	123	128	129	124	3
100	124	129	130	125	2
101	126	131	132	127	4
102	127	132	133	128	4
103	128	133	134	129	3
104	129	134	135	130	2
105	131	136	137	132	4
106	132	137	138	133	4
107	133	138	139	134	3
108	134	139	140	135	2
109	136	141	142	137	4
110	137	142	143	138	4
111	138	143	144	139	3
112	139	144	145	140	2
113	141	146	147	142	4
114	142	147	148	143	4
115	143	148	149	144	3
116	144	149	150	145	2
117	146	151	152	147	4
118	147	152	153	148	4
119	148	153	154	149	3
120	149	154	155	150	2
121	151	156	157	152	4
122	152	157	158	153	4
123	153	158	159	154	3
124	154	159	160	155	2
125	156	161	162	157	4
126	157	162	163	158	4
127	158	163	164	159	3
128	159	164	165	160	2
129	161	166	167	162	4
130	162	167	168	163	4
131	163	168	169	164	3
132	164	169	170	165	2

CICLO NUMERO 1

Anexos Fl 22/186

000053

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
	1	1 439E-0005
	2	2 878E-0005
	3	1 461E-0005
	4	2 271E-0007
	5	4 551E-0007
	10	3 667E-0006
	15	7 564E-0006
	20	6 447E-0006
	21	2 356E-0008
	27	1 562E-0007
	33	2 644E-0007
	39	2 966E-0007
	41	3 355E-0007
	51	1 824E-0007
	63	1 262E-0007
	69	1 564E-0007
	75	9 512E-0008
	115	-3 740E-0006
	120	-4 847E-0006
	125	-4 695E-0006
	130	-4 553E-0006
	135	-4 422E-0006
	140	-6 829E-0006
	145	-8 953E-0006
	150	-8 530E-0006
	155	-8 198E-0006
	160	-7 953E-0006
	165	-9 555E-0006
	170	-5 612E-0006

FLUXOS TOTAIS DO SISTEMA
ENTRANDO = 7.789E-0005
SAINDO = -7.789E-0005

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	274 00	296 00	22.00	7 195E-0006
2	0 00	276 50	296 00	19 50	2 878E-0005
3	0 00	279 00	296 00	17 00	5 047E-0005
4	0 00	281 00	296 00	15 00	5 789E-0005
5	0 00	282 00	296 00	14 00	5.823E-0005
6	40 00	274 00	295 07	21 07	0 000E+0000
7	40 00	276 50	295 07	18 57	3 055E-0005
8	40 00	279 00	295 07	16 07	6 107E-0005
9	40 00	281 00	295 09	14 09	6 035E-0005
10	40 00	282 00	296 00	14 00	6 030E-0005
11	80 00	274 00	294 09	20 09	0 000E+0000
12	80 00	276 50	294 09	17 59	3 258E-0005
13	80 00	279 00	294 09	15 09	6.517E-0005
14	80 00	281 00	294 12	13 12	6 590E-0005
15	80 00	282 00	296 00	14 00	6 591E-0005
16	120 00	274 00	292 98	18 98	0 000E+0000
17	120 00	276 50	292 98	16 48	3.623E-0005
18	120 00	279 00	292 98	13.98	7 243E-0005
19	120 00	281 00	293 04	12 04	7 292E-0005
20	120 00	282 00	296 00	14.00	7 292E-0005
21	120 00	284 00	296 00	12.00	7.615E-0005
22	130 00	274 00	292 68	18.68	0 000E+0000
23	130 00	276 50	292 68	16.18	3.789E-0005
24	130 00	279 00	292 68	13.68	7.594E-0005
25	130 00	281 00	292 67	11.67	7.666E-0005
26	130 00	282 00	292 38	10 38	7.670E-0005
27	130 00	284 00	296 00	12 00	7.624E-0005
28	140 00	274 00	292 37	18 37	0 000E+0000
29	140 00	276 50	292 37	15 87	3.792E-0005
30	140 00	279 00	292 37	13.37	7 582E-0005
31	140 00	281 00	292 38	11 38	7.641E-0005
32	140 00	282 00	292 60	10.60	7.640E-0005
33	140 00	284 00	296 00	12 00	7.645E-0005
34	160 00	274 00	291 77	17 77	0.000E+0000
35	160 00	276 50	291 77	15 27	3 806E-0005

36	160 00	279 00	291 77	12 77	7 613E-0005
37	160 00	281 00	291 77	10 77	7 674E-0005
38	160 00	282 00	291 96	9 96	7.674E-0005
39	160 00	284 00	296 00	12 00	7 673E-0005
40	170 00	274 00	291 46	17 46	0 000E+0000
41	170 00	276 50	291.46	14 96	3 819E-0005
42	170 00	279 00	291 46	12.46	7 637E-0005
43	170 00	281 00	291 47	10.47	7 698E-0005
44	170 00	282 00	291 68	9 68	7.699E-0005
45	170 00	284 00	296 00	12.00	7.699E-0005
46	180 00	274 00	291 16	17.16	0.000E+0000
47	180 00	276 50	291 16	14.66	3.830E-0005
48	180 00	279 00	291 16	12 16	7.659E-0005
49	180 00	281 00	291 16	10 16	7 721E-0005
50	180 00	282 00	291 39	9 39	7 721E-0005
51	180 00	284 00	296 00	12.00	7.721E-0005
52	190 00	274 00	290.85	16 85	0.000E+0000
53	190 00	276 50	290 85	14 35	3.841E-0005
54	190 00	279 00	290.85	11.85	7.681E-0005
55	190 00	281 00	290 85	9.85	7.742E-0005
56	190 00	282 00	291 10	9 10	7 742E-0005
57	190 00	284 00	296 00	12.00	7.742E-0005
58	195 00	274 00	290 70	16 70	0.000E+0000
59	195 00	276 50	290 70	14 70	3.841E-0005
60	195 00	279 00	290 70	11 70	7 695E-0005
61	195 00	281 00	290 70	9 70	7 757E-0005
62	195 00	282 00	290 95	8 95	7.757E-0005
63	195 00	284 00	296.00	12 00	7.757E-0005
64	200 00	274.00	290.54	16 54	0.000E+0000
65	200 00	276 50	290 54	14 04	3.854E-0005
66	200 00	279 00	290 54	11.54	7.708E-0005
67	200 00	281 00	290 55	9.55	7.770E-0005
68	200 00	282 00	290 83	8 83	7 770E-0005
69	200 00	284 00	296 00	12.00	7.771E-0005
70	207 00	274 00	290 33	16.33	0 000E+0000
71	207 00	276 50	290 33	13 83	3 862E-0005
72	207 00	279 00	290 33	11 33	7 725E-0005
73	207 00	281 00	290 33	9 33	7 788E-0005
74	207 00	282 00	290 47	8 47	7 789E-0005
75	207 00	284 00	296.00	12 00	7.784E-0005
76	214 00	274 00	290 11	16 11	0 000E+0000
77	214 00	276 50	290 11	13 61	3.863E-0005
78	214 00	279 00	290 11	11 11	7 727E-0005
79	214 00	281.00	290.11	9.11	7.788E-0005
80	214 00	282 00	290.09	8.09	7.789E-0005
81	221 00	274 00	289 89	15.89	0.000E+0000
82	221 00	276 50	289 89	13.39	3.863E-0005
83	221 00	279 00	289.89	10 89	7.727E-0005
84	221 00	281 00	289 89	8 89	7 788E-0005
85	221 00	282 00	289 90	7 90	7 789E-0005
86	228 00	274 00	289 68	15 68	0 000E+0000
87	228 00	276 50	289 68	13 18	3 863E-0005
88	228 00	279 00	289.68	10 68	7 727E-0005
89	228 00	281 00	289 68	8.68	7.788E-0005
90	228 00	282 00	289 68	7 68	7 789E-0005
91	235 00	274 00	289.46	15.46	0 000E+0000
92	235 00	276 50	289 46	12 96	3 863E-0005
93	235 00	279 00	289 46	10 46	7 727E-0005
94	235 00	281.00	289.46	8.46	7 788E-0005
95	235 00	282.00	289 46	7.46	7.789E-0005
96	240 50	274 00	289 29	15 29	0.000E+0000
97	240 50	276 50	289 29	12.79	3.863E-0005
98	240 50	279 00	289 29	10 29	7.727E-0005
99	240.50	281.00	289.29	8 29	7.788E-0005
100	240 50	282 00	289 31	7 31	7.789E-0005
101	246 00	274 00	289.12	15 12	0.000E+0000
102	246 00	276 50	289 12	12.62	3.863E-0005
103	246.00	279 00	289.12	10.12	7.728E-0005
104	246 00	281 00	289 12	8 12	7 789E-0005
105	246 00	282 00	288 99	6 99	7 789E-0005
106	251 00	274 00	288 97	14 97	0 000E+0000
107	251 00	276 50	288 97	12.47	3 843E-0005
108	251 00	279 00	288.97	9 97	7 706E-0005
109	251 00	281 00	288 97	7 97	7 784E-0005
110	251 00	282 00	289 93	7 93	7 789E-0005
111	256 00	274 00	288 81	14 81	0 000E+0000
112	256 00	276 50	288 81	12 31	3 761E-0005
113	256 00	279 00	288 81	9 81	7 533E-0005
114	256 00	281 00	288.69	7.69	7.600E-0005
115	256 00	282 00	282 00	0 00	7 602E-0005
116	263 50	274 00	288 59	14 59	0 000E+0000
117	263.50	276 50	288 59	12 09	3 555E-0005
118	263 50	279 00	288 59	9 59	7 113E-0005
119	263 50	281 00	288 46	7 46	7 172E-0005
120	263.50	282 00	282 00	0 00	7 172E-0005

121	271 00	274 00	288 39	14 39	0 000E+0000
122	271.00	276 50	288 38	11.88	3 322E-0005
123	271 00	279 00	288 38	9.38	6.643E-0005
124	271 00	281 00	288 26	7 26	6 695E-0005
125	271 00	282 00	282 00	0.00	6 695E-0005
126	278 50	274 00	288 19	14.19	0.000E+0000
127	278 50	276 50	288 19	11 69	3 093E-0005
128	278 50	279 00	288 19	9 19	6.185E-0005
129	278 50	281 00	288 07	7 07	6.233E-0005
130	278 50	282 00	282 00	0.00	6 233E-0005
131	286 00	274 00	288 01	14.01	0 000E+0000
132	286 00	276 50	288 01	11.51	2 862E-0005
133	286 00	279 00	288 01	9.01	5 730E-0005
134	286 00	281 00	287 89	6 89	5.782E-0005
135	286 00	282 00	282.00	0 00	5.784E-0005
136	293 50	274 00	287 85	13 85	0 000E+0000
137	293 50	276 50	287 85	11 35	2.599E-0005
138	293 50	279 00	287.85	8 85	5 188E-0005
139	293 50	281 00	287 73	6 73	5 223E-0005
140	293 50	282 00	282 00	0.00	5.222E-0005
141	310 00	274 00	287 53	13 53	0 000E+0000
142	310 00	276 50	287 53	11 03	2 196E-0005
143	310 00	279 00	287 53	8 53	4 395E-0005
144	310 00	281 00	287 47	6 47	4.432E-0005
145	310 00	282 00	282 00	0 00	4 432E-0005
146	326 50	274 00	287 27	13 27	0 000E+0000
147	326 50	276 50	287 27	10 77	1 766E-0005
148	326 50	279 00	287 27	8 27	3.531E-0005
149	326 50	281 00	287 16	6 16	3 558E-0005
150	326 50	282 00	282.00	0 00	3 558E-0005
151	343 00	274 00	287.06	13 06	0 000E+0000
152	343 00	276 50	287 06	10 56	1 351E-0005
153	343.00	279 00	287 06	8 06	2 702E-0005
154	343 00	281 00	286.96	5 96	2.724E-0005
155	343 00	282 00	282.00	0.00	2.722E-0005
156	359 50	274 00	286.91	12.91	0.000E+0000
157	359 50	276 50	286.91	10.41	9.447E-0006
158	359 50	279 00	286 91	7.91	1 889E-0005
159	359 50	281 00	286.81	5.81	1.904E-0005
160	359 50	282 00	282.00	0.00	1.914E-0005
161	376 00	274 00	286.81	12 81	0 000E+0000
162	376 00	276 50	286.81	10.31	5.442E-0006
163	376 00	279 00	286 81	7.81	1.088E-0005
164	376 00	281 00	286.72	5 72	1 096E-0005
165	376 00	282 00	282.00	0.00	1.039E-0005
166	400 00	274 00	286 76	12 76	0.000E+0000
167	400 00	276.50	286 76	10 26	0 000E+0000
168	400 00	279 00	286.76	7 76	0 000E+0000
169	400 00	281 00	286 66	5 66	-6 480E-0016
170	400 00	282.00	282.00	0 00	2 806E-0006

ANEXO 4

```
=====
Barragem de Ubaldinho - Ceara - Anexo 4
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PEPCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda. - (011) 570 3737
=====
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```
NUMERO DE MATERIAIS      4
NUMERO DE NOS            170
NUMERO DE ELEMENTOS     133
LARGURA DE BANDA MAXIMA 8
LARGURA DE BANDA MEDIA 6 98
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS		ANGULO ENTRE K1 E OX
	K1	K2	
1	1 00000E-0008	1 00000E-0008	0 00
2	1 00000E-0007	1 00000E-0007	0 00
3	1 00000E-0005	1 00000E-0005	0 00
4	5 00000E-0004	5 00000E-0004	0 00

DADOS DOS NOS

NO	COORDENADAS DOS NOS		COND	CARGA	VAZAO
N R	X	Y	CONT	HIDRAULICA	
1	0 00	274 00	1	296 00	0 000
2	0 00	276 50	1	296 00	0 000
3	0 00	279 00	1	296 00	0 000
4	0 00	281 00	1	296 00	0 000
5	0 00	282 00	1	296 00	0 000
6	40 00	274 00	0	0 00	0 000
7	40 00	276 50	0	0 00	0 000
8	40 00	279 00	0	0 00	0 000
9	40 00	281 00	0	0 00	0 000
10	40 00	282 00	1	296 00	0 000
11	80 00	274 00	0	0 00	0 000
12	80 00	276 50	0	0 00	0 000
13	80 00	279 00	0	0 00	0 000
14	80 00	281 00	0	0 00	0 000
15	80 00	282 00	1	296 00	0 000
16	120 00	274 00	0	0 00	0 000
17	120 00	276 50	0	0 00	0 000
18	120 00	279 00	0	0 00	0 000
19	120 00	281 00	0	0 00	0 000
20	120 00	282 00	1	296 00	0 000
21	120 00	285 00	1	296 00	0 000
22	130 00	274 00	0	0 00	0 000
23	130 00	276 50	0	0 00	0 000
24	130 00	279 00	0	0 00	0 000
25	130 00	281 00	0	0 00	0 000
26	130 00	282 00	0	0 00	0 000
27	130 00	285 00	1	296 00	0 000
28	140 00	274 00	0	0 00	0 000
29	140 00	276 50	0	0 00	0 000
30	140 00	279 00	0	0 00	0 000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0 00	0 000
33	140 00	285 00	1	296 00	0 000
34	160 00	274 00	0	0 00	0 000
35	160 00	276 50	0	0 00	0 000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	282 00	0	0 00	0 000
39	160 00	285 00	1	296 00	0 000
40	170 00	274 00	0	0 00	0 000
41	170 00	276 50	0	0 00	0 000
42	170 00	279 00	0	0 00	0 000
43	170 00	281 00	0	0 00	0 000
44	170 00	282 00	0	0 00	0 000
45	170 00	285 00	1	296 00	0 000
46	180 00	274 00	0	0 00	0 000
47	180 00	276 50	0	0 00	0 000
48	180 00	279 00	0	0 00	0 000
49	180 00	281 00	0	0 00	0 000
50	180 00	282 00	0	0 00	0 000
51	180 00	285 00	1	296 00	0 000
52	190 00	274 00	0	0 00	0 000
53	190 00	276 50	0	0 00	0 000

54	190 00	279 00	0	0 00	0 000
55	190 00	281 00	0	0 00	0.000
56	190 00	282 00	0	0 00	0 000
57	190 00	285 00	1	296 00	0 000
58	195.00	274 00	0	0.00	0 000
59	195 00	276 50	0	0.00	0 000
60	195 00	279.00	0	0.00	0 000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0.00	0 000
63	195 00	285 00	1	296 00	0.000
64	200 00	274 00	0	0 00	0 000
65	200.00	276 50	0	0 00	0.000
66	200 00	279.00	0	0.00	0.000
67	200 00	281.00	0	0 00	0 000
68	200.00	282.00	0	0 00	0 000
69	200.00	285 00	1	296 00	0.000
70	207 00	274 00	0	0.00	0.000
71	207 00	276 50	0	0.00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0.000
74	207 00	282 00	0	0 00	0 000
75	207 00	285 00	1	296 00	0 000
76	214 00	274 00	0	0 00	0.000
77	214 00	276 50	0	0 00	0 000
78	214 00	281 00	0	0 00	0.000
79	214 00	282 00	0	0 00	0.000
80	214 00	282 00	0	0 00	0 000
81	221 00	274 00	0	0 00	0 000
82	221 00	276 50	0	0.00	0.000
83	221 00	279 00	0	0.00	0 000
84	221 00	281 00	0	0 00	0.000
85	221 00	282 00	0	0 00	0.000
86	228.00	274 00	0	0.00	0.000
87	228.00	276.50	0	0 00	0 000
88	228 00	279.00	0	0.00	0 000
89	228 00	281 00	0	0.00	0 000
90	228 00	282 00	0	0.00	0 000
91	235 00	274 00	0	0.00	0 000
92	235.00	276 50	0	0 00	0.000
93	235 00	279 00	0	0 00	0.000
94	235 00	281 00	0	0 00	0.000
95	235 00	282.00	0	0.00	0.000
96	240 50	274 00	0	0.00	0.000
97	240 50	276 50	0	0.00	0.000
98	240 50	279 00	0	0 00	0.000
99	240 50	281 00	0	0 00	0.000
100	240 50	282.00	0	0.00	0 000
101	246 00	274.00	0	0 00	0 000
102	246 00	276.50	0	0.00	0 000
103	246 00	279 00	0	0.00	0.000
104	246 00	281 00	0	0 00	0.000
105	246 00	282.00	0	0 00	0.000
106	251 00	274 00	0	0 00	0 000
107	251 00	276 50	0	0 00	0 000
108	251.00	279 00	0	0.00	0.000
109	251 00	281.00	0	0.00	0.000
110	251 00	282.00	0	0 00	0.000
111	256 00	274.00	0	0.00	0.000
112	256 00	276.50	0	0.00	0 000
113	256 00	279.00	0	0.00	0 000
114	256 00	281 00	0	0 00	0.000
115	256.00	282 00	1	282.00	0.000
116	263 50	274 00	0	0.00	0.000
117	263 50	276 50	0	0 00	0 000
118	263 50	279 00	0	0 00	0 000
119	263 50	281 00	0	0 00	0.000
120	263.50	282 00	1	282 00	0.000
121	271 00	274 00	0	0 00	0 000
122	271 00	276 50	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0.00	0 000
125	271 00	282 00	1	282 00	0.000
126	278 50	274 00	0	0 00	0.000
127	278 50	276 50	0	0 00	0.000
128	278 50	279.00	0	0 00	0 000
129	278 50	281 00	0	0 00	0 000
130	278 50	282 00	1	282.00	0 000
131	286 00	274 00	0	0.00	0.000
132	286 00	276 50	0	0.00	0.000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0.00	0.000
135	286 00	282 00	1	282 00	0.000
136	293 50	274 00	0	0 00	0 000
137	293 50	276 50	0	0 00	0 000
138	293 50	279 00	0	0.00	0.000

Açude Ubaldinho
 Calculos de Percolação
 nov/96

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139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0 000
141	310 00	274 00	0	0 00	0 000
142	310 00	276 50	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0.000
146	326 50	271 00	0	0 00	0 000
147	326 50	276 50	0	0 00	0.000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0 000
150	326 50	282 00	1	282.00	0 000
151	343 00	274 00	0	0.00	0 000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0 00	0 000
158	359 50	279 00	0	0.00	0 000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	274 00	0	0 00	0 000
162	376 00	276 50	0	0 00	0.000
163	376 00	279 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0.000
166	400 00	274 00	0	0 00	0.000
167	400 00	276 50	0	0 00	0.000
168	400 00	279 00	0	0 00	0 000
169	400 00	281 00	0	0 00	0.000
170	400 00	282 00	1	282 00	0.000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4

49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	4
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	4
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	4
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
	1	1 446E-0005
	2	2 892E-0005
	3	1 468E-0005
	4	2 282E-0007
	5	4 573E-0007
	10	3 685E-0006
	15	7 601E-0006
	20	6 481E-0006
	21	1 680E-0008
	33	1 501E-0007
	39	2 019E-0007
	45	1 470E-0007
	51	1 568E-0007
	57	1 241E-0007
	63	8 581E-0008
	69	1 064E-0007
	75	6 423E-0008
	115	-3 731E-0006
	120	-4 835E-0006
	125	-4.684E-0006
	130	-4 543E-0006
	135	-4 412E-0006
	140	-6.813E-0006
	145	-8 932E-0006
	150	-8.510E-0006
	155	-8 179E-0006
	160	-7 934E-0006
	165	-9 532E-0006
	170	-5.599E-0006

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 7 770E-0005
SAINDO = -7 770E-0005

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS		CARGA	PRESSAO NEUTRA	FUNCAO
NUMERO	X	Y	HIDRAULICA	(UNID DE CARGA)	FLUXO
1	0 00	274 00	296.00	22.00	7.230E-0006
2	0 00	276 50	296 00	19.50	2.892E-0005
3	0 00	279.00	296.00	17.00	5 072E-0005
4	0 00	281 00	296 00	15 00	5.818E-0005
5	0 00	282 00	296 00	14.00	5.852E-0005
6	40 00	274.00	295.07	21.07	0 000E+0000
7	40 00	276 50	295.07	18 57	3 070E-0005
8	40 00	279 00	295.07	16.07	6 137E-0005
9	40 00	281 00	295 09	14.09	6 065E-0005
10	40 00	282 00	296.00	14.00	6 059E-0005
11	80 00	274 00	294 08	20.08	0 000E+0000
12	80 00	276.50	294.08	17.58	3 274E-0005
13	80 00	279 00	294.08	15.08	6 549E-0005
14	80 00	281 00	294.11	13.11	6 622E-0005
15	80 00	282 00	296.00	14.00	6 623E-0005
16	120 00	274 00	292.96	18.96	0 000E+0000
17	120 00	276 50	292 96	16.46	3 641E-0005
18	120 00	279 00	292.97	13.97	7 278E-0005
19	120 00	281 00	293.02	12.02	7 328E-0005
20	120 00	282 00	296.00	14.00	7 328E-0005
21	120 00	285 00	296.00	11 00	7.652E-0005
22	130 00	274 00	292 66	18.66	0.000E+0000
23	130 00	276 50	292 66	16.16	3 802E-0005
24	130 00	279 00	292.66	13.66	7 618E-0005
25	130 00	281.00	292.66	11.66	7 691E-0005
26	130 00	282 00	292 30	10 30	7.694E-0005
27	130 00	285 00	296 00	11 00	7.659E-0005
28	140 00	274 00	292 36	18 36	0.000E+0000
29	140 00	276 50	292 36	15.86	3.806E-0005
30	140 00	279 00	292 36	13.36	7 611E-0005
31	140 00	281 00	292 36	11.36	7 670E-0005
32	140 00	282 00	292.53	10.53	7 670E-0005
33	140 00	285 00	296 00	11.00	7 673E-0005

34	160 00	274 00	291 75	17.75	0 000E+0000
35	160 00	276 50	291 75	15 25	3 815E-0005
36	160 00	279 00	291 75	12 75	7 631E-0005
37	160 00	281 00	291 75	10 75	7 692E-0005
38	160 00	282 00	291 88	9 88	7 693E-0005
39	160 00	285 00	296 00	11 00	7 692E-0005
40	170 00	274 00	291 44	17 44	0 000E+0000
41	170 00	276.50	291 44	14 94	3 824E-0005
42	170 00	279 00	291 44	12 44	7.648E-0005
43	170 00	281 00	291.44	10 44	7 709E-0005
44	170 00	282 00	291 59	9 59	7 709E-0005
45	170 00	285 00	296 00	11.00	7.709E-0005
46	180 00	274 00	291 14	17 14	0.000E+0000
47	180 00	276 50	291 14	14 64	3 831E-0005
48	180 00	279 00	291 14	12 14	7 663E-0005
49	180 00	281 00	291 14	10 14	7 724E-0005
50	180 00	282 00	291 30	9 30	7 724E-0005
51	180 00	285 00	296 00	11.00	7 725E-0005
52	190 00	274 00	290 83	16 83	0.000E+0000
53	190 00	276 50	290 83	14.33	3 839E-0005
54	190 00	279 00	290 83	11 83	7.678E-0005
55	190 00	281 00	290 83	9 83	7 739E-0005
56	190 00	282 00	291 00	9 00	7 739E-0005
57	190 00	285 00	296 00	11 00	7.739E-0005
58	195 00	276 50	290 68	16 68	0 000E+0000
59	195 00	279 00	290 68	14.18	3 843E-0005
60	195 00	281 00	290 68	11 68	7.687E-0005
61	195 00	282.00	290.68	9.68	7.749E-0005
62	195 00	285 00	290 85	8 85	7.749E-0005
63	195 00	285 00	296 00	11 00	7 749E-0005
64	200 00	274 00	290 52	16 52	0.000E+0000
65	200 00	276 50	290 52	14 02	3.848E-0005
66	200 00	279 00	290 52	11 52	7.696E-0005
67	200 00	281 00	290 53	9 53	7.758E-0005
68	200 00	282 00	290 72	8 72	7.758E-0005
69	200 00	285 00	296 00	11 00	7.759E-0005
70	207 00	274 00	290 31	16 31	0 000E+0000
71	207 00	276 50	290 31	13 81	3.853E-0005
72	207 00	279 00	290 31	11 31	7 708E-0005
73	207 00	281 00	290 31	9 31	7 770E-0005
74	207 00	282 00	290.40	8.40	7 770E-0005
75	207 00	285 00	296 00	11 00	7 767E-0005
76	214 00	274 00	290 09	16 09	0 000E+0000
77	214 00	276 50	290 09	13 59	3.854E-0005
78	214 00	279 00	290 09	11 09	7 709E-0005
79	214 00	281 00	290 09	9 09	7 770E-0005
80	214 00	282 00	290 07	8.07	7 770E-0005
81	221 00	274 00	289 87	15 87	0.000E+0000
82	221 00	276 50	289 87	13 37	3.854E-0005
83	221 00	279 00	289 87	10 87	7 708E-0005
84	221 00	281 00	289 87	8 87	7 770E-0005
85	221.00	282 00	289 88	7 88	7 770E-0005
86	228 00	274 00	289 66	15 66	0.000E+0000
87	228 00	276 50	289 66	13 16	3 854E-0005
88	228 00	279 00	289 66	10 66	7 708E-0005
89	228.00	281 00	289 66	8.66	7 770E-0005
90	228 00	282 00	289 66	7 66	7 770E-0005
91	235 00	274 00	289 44	15 44	0 000E+0000
92	235 00	276 50	289 44	12 94	3 854E-0005
93	235 00	279 00	289.44	10.44	7 708E-0005
94	235 00	281 00	289 44	8.44	7 770E-0005
95	235 00	282 00	289 44	7 44	7 770E-0005
96	240 50	274 00	289 27	15 27	0.000E+0000
97	240 50	276 50	289 27	12 77	3 854E-0005
98	240 50	279 00	289 27	10 27	7 708E-0005
99	240 50	281 00	289 27	8.27	7 770E-0005
100	240 50	282 00	289 29	7 29	7 770E-0005
101	246 00	274 00	289 10	15.10	0 000E+0000
102	246 00	276 50	289 10	12.60	3 854E-0005
103	246 00	279 00	289 10	10 10	7 710E-0005
104	246 00	281 00	289.10	8.10	7 771E-0005
105	246 00	282 00	288 97	6 97	7 770E-0005
106	251 00	274 00	288 95	14 95	0.000E+0000
107	251 00	276.50	288 95	12.45	3 834E-0005
108	251 00	279 00	288 95	9 95	7 688E-0005
109	251 00	281 00	288 95	7.95	7 765E-0005
110	251 00	282 00	289.91	7.91	7 770E-0005
111	256 00	274 00	288.80	14 80	0 000E+0000
112	256.00	276 50	288.80	12.30	3 752E-0005
113	256 00	279 00	288.79	9.79	7 515E-0005
114	256 00	281 00	288.67	7.67	7 582E-0005
115	256 00	282 00	282 00	0 00	7 584E-0005
116	263 50	274 00	288 58	14 58	0 000E+0000
117	263 50	276 50	288 58	12 08	3 547E-0005
118	263 50	279 00	288 57	9 57	7 097E-0005

119	263 50	281 00	288 44	7 44	7 155E-0005
120	263 50	282 00	282 00	0 00	7 156E-0005
121	271 00	274 00	288 37	14 37	0.000E+0000
122	271 00	276 50	288 37	11.87	3.314E-0005
123	271 00	279 00	288.37	9.37	6 627E-0005
124	271 00	281 00	288 24	7 24	6 680E-0005
125	271 00	282 00	282 00	0 00	6 680E-0005
126	278 50	274 00	288 18	14 18	0.000E+0000
127	278 50	276 50	288 18	11 68	3.086E-0005
128	278 50	279 00	288 18	9 18	6 170E-0005
129	278 50	281.00	288 06	7 06	6 218E-0005
130	278 50	282 00	282 00	0 00	6.218E-0005
131	286 00	274 00	288 00	14 00	0.000E+0000
132	286 00	276 50	288.00	11.50	2 855E-0005
133	286 00	279 00	288 00	9.00	5 717E-0005
134	286 00	281 00	287 88	6.88	5 769E-0005
135	286 00	282 00	282 00	0 00	5 771E-0005
136	293 50	274 00	287 84	13 84	0.000E+0000
137	293 50	276 50	287 83	11 33	2.593E-0005
138	293 50	279 00	287 83	8 83	5 176E-0005
139	293 50	281 00	287 72	6 72	5.211E-0005
140	293 50	282 00	282 00	0 00	5 209E-0005
141	310 00	274 00	287 52	13 52	0 000E+0000
142	310 00	276 50	287 52	11 52	2 191E-0005
143	310 00	279 00	287 51	8 51	4 384E-0005
144	310 00	281 00	287 41	6 41	4 421E-0005
145	310 00	282 00	282 00	0 00	4.422E-0005
146	326 50	274 00	287 26	13 26	0 000E+0000
147	326 50	276 50	287 26	10 76	1.762E-0005
148	326 50	279 00	287.25	8.25	3 522E-0005
149	326 50	281 00	287 15	6 15	3 550E-0005
150	326 50	282 00	282 00	0 00	3 550E-0005
151	343 00	274 00	287 05	13 05	0 000E+0000
152	343 00	276 50	287 05	10.55	1.348E-0005
153	343 00	279 00	287 05	8 05	2 696E-0005
154	343 00	281 00	286 95	5 95	2.717E-0005
155	343 00	282 00	282.00	0.00	2.716E-0005
156	359 50	274 00	286.90	12 90	0 000E+0000
157	359 50	276 50	286 90	10 40	9 425E-0006
158	359 50	279 00	286 90	7 90	1 885E-0005
159	359 50	281 00	286 80	5.80	1.900E-0005
160	359 50	282.00	282 00	0 00	1 910E-0005
161	376 00	274 00	286 80	12 80	0 000E+0000
162	376 00	276 50	286 80	10 30	5.429E-0006
163	376 00	279.00	286 80	7.80	1 085E-0005
164	376 00	281 00	286 71	5 71	1 093E-0005
165	376 00	282 00	282 00	0 00	1 037E-0005
166	400 00	274 00	286 75	12 75	0.000E+0000
167	400 00	276 50	286 75	10 25	0 000E+0000
168	400 00	279 00	286 75	7 75	0 000E+0000
169	400 00	281 00	286 65	5 65	-1 268E-0015
170	400 00	282 00	282 00	0 00	2 800E-0006

ANEXO 5

```
=====
Barragem de Ubaldinho - Ceara - Anexo 5
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```
NUMERO DE MATERIAIS          4
NUMERO DE NOS                170
NUMERO DE ELEMENTOS         133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES K1	PERMEABILIDADES K2	ANGULO ENTRE K1 E OX
1	1 00000E-0008	1 00000E-0008	0 00
3	1 00000E-0005	1 00000E-0005	0 00
4	5 00000E 0004	5 00000E-0004	0 00

DADOS DOS NOS

NO N R	COORDENADAS X	DOS NOS Y	COND CONT	CARGA HIDRAULICA	VAZAO
1	0 00	274 00	1	296 00	0.000
2	0 00	276 50	1	296.00	0.000
3	0 00	279 00	1	296.00	0 000
4	0 00	281 00	1	296 00	0 000
5	0 00	282.00	1	296 00	0.000
6	40 00	274.00	0	0 00	0.000
7	40 00	276 50	0	0 00	0.000
8	40 00	279 00	0	0.00	0 000
9	40 00	281 00	0	0.00	0.000
10	40 00	282 00	1	296.00	0 000
11	80 00	274 00	0	0 00	0.000
12	80 00	276 50	0	0.00	0.000
13	80 00	279 00	0	0.00	0 000
14	80 00	281 00	0	0.00	0 000
15	80 00	282 00	1	296.00	0 000
16	120 00	274 00	0	0.00	0.000
17	120 00	276 50	0	0.00	0.000
18	120 00	279 00	0	0 00	0.000
19	120 00	281 00	0	0 00	0.000
20	120 00	282 00	1	296 00	0.000
21	120.00	284.00	1	296.00	0.000
22	130 00	274 00	0	0 00	0 000
23	130 00	276 50	0	0 00	0 000
24	130 00	279 00	0	0 00	0 000
25	130 00	281.00	0	0 00	0.000
26	130 00	282.00	0	0.00	0 000
27	130 00	284.00	1	296 00	0.000
28	140 00	274.00	0	0 00	0.000
29	140 00	276 50	0	0 00	0.000
30	140 00	279 00	0	0 00	0.000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0.00	0 000
33	140 00	284 00	1	296.00	0 000
34	160 00	274 00	0	0 00	0 000
35	160 00	276.50	0	0 00	0.000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	282 00	0	0.00	0 000
39	160 00	284 00	1	296.00	0 000
40	170 00	274 00	0	0.00	0 000
41	170 00	276 50	0	0 00	0.000
42	170 00	279 00	0	0 00	0.000
43	170 00	281 00	0	0.00	0 000
44	170 00	282 00	0	0 00	0 000
45	170 00	284 00	1	296 00	0.000
46	180 00	274 00	0	0 00	0 000
47	180 00	276 50	0	0 00	0 000
48	180 00	279 00	0	0.00	0 000
49	180 00	281 00	0	0 00	0.000
50	180.00	282.00	0	0 00	0.000
51	180 00	284 00	1	296.00	0 000
52	190 00	274 00	0	0.00	0 000
53	190 00	276 50	0	0 00	0.000
54	190 00	279 00	0	0 00	0 000

55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	284 00	1	296 00	0.000
58	195 00	274 00	0	0 00	0.000
59	195 00	276 50	0	0 00	0 000
60	195 00	279 00	0	0 00	0 000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0 00	0.000
63	195 00	284 00	1	296 00	0.000
64	200 00	274 00	0	0 00	0.000
65	200 00	276 50	0	0.00	0.000
66	200 00	279 00	0	0 00	0.000
67	200 00	281 00	0	0 00	0 000
68	200 00	282 00	0	0 00	0.000
69	200 00	284 00	1	296 00	0 000
70	207 00	274 00	0	0 00	0 000
71	207 00	276 50	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0.000
74	207 00	282 00	0	0 00	0 000
75	207 00	284 00	1	296 00	0 000
76	214 00	274 00	0	0 00	0 000
77	214 00	276 50	0	0 00	0 000
78	;	;	;	0 00	0.000
79	214 00	281 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0 000
81	221 00	274 00	0	0 00	0 000
82	221 00	276 50	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0 000
86	228 00	274 00	0	0 00	0 000
87	228 00	276 50	0	0 00	0 000
88	228 00	279 00	0	0.00	0 000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	274 00	0	0 00	0 000
92	235 00	276 50	0	0 00	0 000
93	235 00	279 00	0	0 00	0 000
94	235 00	281 00	0	0 00	0 000
95	235 00	282 00	0	0 00	0 000
96	240 50	274 00	0	0 00	0 000
97	240 50	276 50	0	0 00	0 000
98	240 50	279 00	0	0 00	0 000
99	240 50	281 00	0	0 00	0 000
100	240 50	282 00	0	0 00	0 000
101	246 00	274 00	0	0 00	0.000
102	246 00	276 50	0	0 00	0.000
103	246 00	279 00	0	0 00	0.000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0.000
106	251 00	274 00	0	0 00	0 000
107	251 00	276 50	0	0 00	0 000
108	251 00	279 00	0	0 00	0.000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	274 00	0	0 00	0.000
112	256 00	276 50	0	0 00	0.000
113	256 00	279 00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0 000
116	263 50	274 00	0	0 00	0 000
117	263 50	276 50	0	0 00	0 000
118	263 50	279 00	0	0 00	0 000
119	263 50	281 00	0	0 00	0.000
120	263 50	282 00	1	282 00	0 000
121	271 00	274 00	0	0 00	0 000
122	271 00	276 50	0	0 00	0.000
123	271 00	279 00	0	0 00	0.000
124	271 00	281 00	0	0 00	0.000
125	271 00	282 00	1	282.00	0.000
126	278 50	274 00	0	0 00	0.000
127	278 50	276 50	0	0.00	0 000
128	278 50	279 00	0	0.00	0.000
129	278 50	281 00	0	0 00	0.000
130	278 50	282 00	1	282 00	0 000
131	286 00	274 00	0	0 00	0.000
132	286 00	276 50	0	0 00	0.000
133	286 00	279 00	0	0 00	0.000
134	286 00	281 00	0	0 00	0.000
135	286 00	282 00	1	282.00	0.000
136	293 50	274 00	0	0 00	0 000
137	293 50	276 50	0	0 00	0.000
138	293 50	279 00	0	0 00	0 000
139	293 50	281 00	0	0 00	0 000

140	293 50	282 00	1	282.00	0.000
141	310 00	274 00	0	0 00	0 000
142	310 00	276 50	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0.000
145	310 00	282 00	1	282.00	0.000
146	326 50	274 00	0	0.00	0 000
147	326 50	276 50	0	0.00	0.000
148	326 50	279 00	0	0.00	0.000
149	326 50	281 00	0	0.00	0.000
150	326 50	282 00	1	282 00	0.000
151	343 00	274 00	0	0 00	0.000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0.00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	274 00	0	0.00	0 000
157	359 50	276 50	0	0.00	0.000
158	359 50	279 00	0	0 00	0 000
159	359 50	281 00	0	0 00	0.000
160	359 50	282 00	1	282 00	0.000
161	376 00	274 00	0	0 00	0 000
162	376 00	276 50	0	0.00	0 000
163	376 00	279 00	0	0 00	0.000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282.00	0 000
166	400 00	274 00	0	0.00	0 000
167	400 00	276 50	0	0 00	0 000
168	400 00	279.00	0	0 00	0.000
169	400 00	281 00	0	0 00	0.000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4
49	59	65	66	60	4

Anexos

000068

50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
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64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	4
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
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79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	4
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

FASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO NUMERO	VAZAO
1	8 614E-0007
2	1 706E-0006
3	8.423E-0007
4	-1 192E-0008
5	1 231E-0006
10	1 320E-0005
15	6 406E-0005
20	1.107E-0004
21	1 690E-0008
27	1 167E-0007
33	2 522E-0007
37	1 109E-0007
51	3 109E-0007
57	2 583E-0007
63	1 841E-0007
69	2 337E-0007
75	1 426E-0007
115	-3 922E-0005
120	-3 708E-0005
125	-2 813E-0005
130	-2 141E-0005
135	-1 627E-0005
140	-1 854E-0005
145	-1 544E-0005
150	-8 473E-0006
155	-4 683E-0006
160	-2.647E-0006
165	-1.922E-0006
170	-8.673E-0007

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 1 947E-0004
SAINDO = -1 947E-0004

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO NUMERO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	274 00	296 00	22.00	4 307E-0007
2	0 00	276 50	296.00	19.50	1.714E-0006
3	0 00	279.00	296.00	17.00	2 988E-0006
4	0 00	281 00	296.00	15.00	3.403E-0006
5	0 00	282 00	296 00	14 00	4.013E-0006
6	40.00	274 00	295 93	21.93	0 000E+0000
7	40 00	276 50	295.93	19.43	5 729E-0006
8	40 00	279 00	295.93	16 93	1.138E-0005
9	40 00	281 00	295 98	14.98	1 135E-0005
10	40 00	282 00	296.00	14.00	1 123E-0005
11	80 00	274 00	295 64	21.64	0 000E+0000
12	80 00	276 50	295.64	19.14	2.461E-0005
13	80 00	279 00	295 65	16.65	4 921E-0005
14	80 00	281 00	295 88	14.88	4 963E-0005
15	80 00	282 00	296 00	14.00	4.986E-0005
16	120 00	274 00	294 33	20.33	0 000E+0000
17	120 00	276.50	294 34	17 84	6.875E-0005
18	120.00	279 00	294 36	15.36	1 368E-0004
19	120 00	281 00	295 44	14 44	1.373E-0004
20	120 00	282 00	296 00	14 00	1.372E-0004
21	120 00	284 00	296 00	12 00	1.926E-0004
22	130 00	274 00	293 59	19 59	0.000E+0000
23	130 00	276 50	293 59	17 09	9.576E-0005
24	130 00	279 00	293 59	14.59	1.940E-0004
25	130 00	281 00	293 48	12.48	1.974E-0004
26	130 00	282 00	293 40	11.40	2 006E-0004
27	130 00	284 00	296 00	12.00	1 926E-0004
28	140 00	274 00	292 83	18 83	0.000E+0000
29	140 00	276 50	292 83	16 33	9.539E-0005
30	140 00	279 00	292 83	13 83	1 904E-0004
31	140 00	281 00	292 84	11 84	1.917E-0004
32	140 00	282 00	292 85	10 85	1.920E-0004
33	140 00	284 00	296 00	12 00	1.928E-0004
34	160.00	274 00	291 30	17 30	0.000E+0000

35	160 00	276 50	291 30	14 80	9.539E-0005
36	160 00	279 00	291 30	12 30	1 908E-0004
37	160 00	281 00	291 31	10 31	1 924E-0004
38	160 00	282 00	291 31	9 31	1 933E-0004
39	160 00	284 00	296 00	12 00	1 931E-0004
40	170 00	274 00	290 54	16 54	0 000E+0000
41	170 00	276 50	290 54	14.04	9.557E-0005
42	170 00	279 00	290 54	11.54	1.911E-0004
43	170 00	281 00	290 54	9.54	1.927E-0004
44	170 00	282 00	290 55	8.55	1.934E-0004
45	170 00	284 00	296 00	12.00	1.934E-0004
46	180 00	274 00	289 77	15.77	0.000E+0000
47	180 00	276 50	289 77	13 27	9 571E-0005
48	180 00	279 00	289 77	10.77	1 914E-0004
49	180 00	281 00	289 78	8 78	1 929E-0004
50	180 00	282 00	289 78	7 78	1 937E-0004
51	180 00	284 00	296 00	12 00	1 937E-0004
52	190 00	274 00	289 01	15 01	0.000E+0000
53	190 00	276 50	289 01	12 51	9 586E-0005
54	190 00	279 00	289 01	10 01	1 917E-0004
55	190 00	281 00	289 01	8 01	1 932E-0004
56	190 00	282 00	289 02	7 02	1 940E-0004
57	190 00	284 00	296 00	12 00	1.940E-0004
58	195 00	276 50	288 62	14 62	0 000E+0000
59	195 00	279 00	288 62	12 12	9 596E-0005
60	195 00	281 00	288 63	9 62	1 919E-0004
61	195 00	282 00	288 63	7.63	1 935E-0004
62	195 00	282 00	288 63	6 63	1 942E-0004
63	195 00	284 00	296 00	12 00	1 942E-0004
64	200 00	274 00	288.24	14 24	0 000E+0000
65	200 00	276.50	288 24	11.74	9 605E-0005
66	200 00	279 00	288 24	9 24	1 921E-0004
67	200 00	281 00	288 25	7 25	1 936E-0004
68	200 00	282.00	288 25	6 25	1 944E-0004
69	200 00	284 00	296 00	12 00	1.944E-0004
70	207 00	274.00	287 70	13 70	0.000E+0000
71	207.00	276 50	287 70	11 20	9.617E-0005
72	207 00	279.00	287 70	8.70	1.924E-0004
73	207.00	281 00	287 70	6 70	1.939E-0004
74	207 00	282 00	287 71	5.71	1.947E-0004
75	207 00	284 00	296 00	12.00	1.946E-0004
76	214 00	274 00	287 16	13 16	0.000E+0000
77	214 00	276 50	287 16	10 66	9.619E-0005
78	214 00	279 00	287 16	8 16	1.924E-0004
79	214 00	281 00	287 16	6 16	1.939E-0004
80	214 00	282 00	287 16	5 16	1.947E-0004
81	221 00	274 00	286 62	12 62	0.000E+0000
82	221 00	276.50	286 62	10 12	9 619E-0005
83	221 00	279 00	286 62	7.62	1.924E-0004
84	221 00	281 00	286 62	5 62	1 939E-0004
85	221 00	282 00	286 62	4 62	1 947E-0004
86	228 00	274.00	286.08	12 08	0.000E+0000
87	228 00	276 50	286 08	9.58	9.619E-0005
88	228 00	279 00	286 08	7.08	1.924E-0004
89	228 00	281 00	286 08	5 08	1 939E-0004
90	228 00	282 00	286 08	4 08	1 947E-0004
91	235 00	274 00	285 55	11 55	0 000E+0000
92	235 00	276 50	285 55	9 05	9 619E-0005
93	235 00	279 00	285 55	6 55	1 924E-0004
94	235 00	281 00	285 55	4 55	1 939E-0004
95	235 00	282 00	285 55	3 55	1 947E-0004
96	240 50	274 00	285 12	11 12	0.000E+0000
97	240 50	276 50	285 12	8 62	9.620E-0005
98	240.50	279 00	285 12	6 12	1.924E-0004
99	240 50	281 00	285 12	4.12	1.939E-0004
100	240 50	282 00	285 12	3 12	1.947E-0004
101	246 00	274 00	284 70	10 70	0.000E+0000
102	246 00	276 50	284 70	8 20	9.597E-0005
103	246 00	279 00	284 70	5 70	1.923E-0004
104	246 00	281 00	284 70	3.70	1.939E-0004
105	246 00	282 00	284 69	2.69	1 947E-0004
106	251 00	274 00	284 32	10.32	0.000E+0000
107	251 00	276 50	284 32	7 82	9 360E-0005
108	251 00	279 00	284 31	5.31	1 890E-0004
109	251 00	281 00	284 26	3.26	1 920E-0004
110	251 00	282 00	284 33	2 33	1 947E-0004
111	256 00	274 00	283 95	9.95	0 000E+0000
112	256 00	276 50	283 94	7 44	8 560E-0005
113	256 00	279 00	283 92	4.92	1 720E-0004
114	256 00	281 00	282 71	1 71	1 739E-0004
115	256 00	282 00	282 00	0.00	1 751E-0004
116	263 50	274 00	283 49	9 49	0.000E+0000
117	263 50	276 50	283 48	6 98	6.807E-0005
118	263 50	279 00	283 46	4.46	1.358E-0004
119	263 50	281 00	282 48	1 48	1.367E-0004

120	263 50	282 00	282 00	0.00	1 369E-0004
121	271 00	274 00	283 13	9 13	0 000E+0000
122	271 00	276 50	283 13	6 63	5.208E-0005
123	271 00	279 00	283 11	4.11	1.037E-0004
124	271 00	281 00	282 37	1.37	1 043E-0004
125	271 00	282 00	282 00	0.00	1 043E-0004
126	278 50	274 00	282 86	8.86	0 000E+0000
127	278 50	276 50	282 86	6 36	3 971E-0005
128	278 50	279 00	282 85	3 85	7 910E-0005
129	278 50	281 00	282.28	1.28	7 951E-0005
130	278 50	282 00	282 00	0.00	7 955E-0005
131	286 00	274 00	282 65	8 65	0.000E+0000
132	286.00	276 50	282.65	6 15	3.007E-0005
133	286 00	279 00	282 64	3 64	6.005E-0005
134	286 00	281 00	282 21	1 21	6.050E-0005
135	286 00	282 00	282 00	0.00	6 071E-0005
136	293 50	274 00	282.50	8 50	0.000E+0000
137	293 50	276 50	282 49	5.99	2 188E-0005
138	293.50	279.00	282 49	3.49	4.338E-0005
139	293 50	281 00	282 16	1.16	4.346E-0005
140	293.50	282 00	282 00	0.00	4 330E-0005
141	310 00	274 00	282.27	8 27	0.000E+0000
142	310 00	276 50	282 27	5 77	1.301E-0005
143	310 00	274 00	282 27	3.27	2.601E-0005
144	310 00	281 00	282 09	1.09	2 621E-0005
145	310 00	282 00	282 00	0 00	2 631E-0005
146	326 50	274 00	282 15	8.15	0 000E+0000
147	326 50	276 50	282 15	5.65	7 181E-0006
148	326 50	279 00	282 15	3.15	1 429E-0005
149	326.50	281 00	282 05	1 05	1.436E-0005
150	326.50	282.00	282.00	0 00	1 436E-0005
151	343 00	274 00	282 08	8.08	0 000E+0000
152	343 00	276 50	282 08	5.58	3 881E-0006
153	343 00	279 00	282 08	3.08	7.731E-0006
154	343 00	281 00	282 03	1.03	7.773E-0006
155	343 00	282 00	282 00	0.00	7 778E-0006
156	359 50	274 00	282 05	8.05	0 000E+0000
157	359 50	276 50	282 05	5.55	2 045E-0006
158	359 50	279 00	282 05	3 05	4 073E-0006
159	359 50	281 00	282 02	1.02	4 094E-0006
160	359 50	282 00	282.00	0 00	4.112E-0006
161	376 00	274 00	282.03	8.03	0 000E+0000
162	376 00	276 50	282 03	5.53	9.571E-0007
163	376.00	279 00	282 03	3.03	1.906E-0006
164	376.00	281 00	282.01	1 01	1.915E-0006
165	376 00	282 00	282 00	0 00	1.828E-0006
166	400 00	274 00	282 02	8 02	0.000E+0000
167	400 00	276 50	282.02	5 52	0.000E+0000
168	400 00	279 00	282.02	3 02	0.000E+0000
169	400 00	281 00	282 01	1 01	-1.061E-0015
170	400 00	282 00	282 00	0 00	4.336E-0007

ANEXO 6

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Barragem de Ubaldinho - Ceara - Anexo 6
 *** ENGEOS *** Engenharia e Geotecnia S/C Ltda
 PERCPLAN - programa de analise de percolacao plana - MEF
 G E O E X P E R T - W Hachich Engenharia S/C Ltda. - (011) 570 3737

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TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

NUMERO DE MATERIAIS	4
NUMERO DE NOS	170
NUMERO DE ELEMENTOS	133
LARGURA DE BANDA MAXIMA	8
LARGURA DE BANDA MEDIA	6 98

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS	ANGULO ENTRE K1 E OX
	K1 K2	
1	1 00000E-0008 1 00000E-0008	0.00
	1 00000E-0005 1 00000E-0005	0.00
1	5 00000E-0004 5 00000E-0004	0.00

DADOS DOS NOS

NO N R	COORDENADAS DOS NOS X Y	COND CONT.	CARGA HIDRAULICA	VAZAO
1	0 00 274 00	1	296 00	0.000
2	0.00 276 50	1	296 00	0.000
3	0 00 279 00	1	296 00	0.000
4	0.00 281 00	1	296 00	0.000
5	0 00 282 00	1	296 00	0.000
6	40 00 274 00	0	0.00	0.000
7	40 00 276 50	0	0.00	0.000
8	40 00 279 00	0	0.00	0.000
9	40 00 281 00	0	0.00	0.000
10	40 00 282 00	1	296 00	0.000
11	80 00 274 00	0	0.00	0.000
12	80 00 276 50	0	0.00	0.000
13	80.00 279 00	0	0.00	0.000
14	80 00 281.00	0	0.00	0.000
15	80 00 282 00	1	296.00	0.000
16	120 00 274 00	0	0.00	0.000
17	120.00 276 50	0	0.00	0.000
18	120 00 279 00	0	0.00	0.000
19	120 00 281 00	0	0.00	0.000
20	120 00 282.00	1	296 00	0.000
21	120 00 285.00	1	296.00	0.000
22	130 00 274 00	0	0.00	0.000
23	130.00 276 50	0	0.00	0.000
24	130 00 279 00	0	0.00	0.000
25	130 00 281 00	0	0.00	0.000
26	130 00 282.00	0	0.00	0.000
27	130 00 285 00	1	296 00	0.000
28	140 00 274 00	0	0.00	0.000
29	140 00 276 50	0	0.00	0.000
30	140 00 279 00	0	0.00	0.000
31	140 00 281 00	0	0.00	0.000
32	140 00 282 00	0	0.00	0.000
33	140 00 285 00	1	296.00	0.000
34	160 00 274 00	0	0.00	0.000
35	160 00 276 50	0	0.00	0.000
36	160 00 279 00	0	0.00	0.000
37	160 00 281 00	0	0.00	0.000
38	160 00 282.00	0	0.00	0.000
39	160 00 285 00	1	296 00	0.000
40	170 00 274 00	0	0.00	0.000
41	170 00 276 50	0	0.00	0.000
42	170 00 279 00	0	0.00	0.000
43	170 00 281 00	0	0.00	0.000
44	170 00 282 00	0	0.00	0.000
45	170 00 285 00	1	296 00	0.000
46	180 00 274 00	0	0.00	0.000
47	180 00 276 50	0	0.00	0.000
48	180 00 279 00	0	0.00	0.000
49	180 00 281 00	0	0.00	0.000
50	180 00 282 00	0	0.00	0.000
51	180 00 285 00	1	296 00	0.000
52	190 00 274 00	0	0.00	0.000
53	190.00 276 50	0	0.00	0.000
54	190 00 279 00	0	0.00	0.000

55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	285 00	1	296 00	0 000
58	195 00	274 00	0	0 00	0 000
59	195 00	276 50	0	0 00	0.000
60	195 00	279 00	0	0 00	0 000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0 00	0 000
63	195 00	285 00	1	296 00	0 000
64	200 00	274 00	0	0 00	0 000
65	200 00	276 50	0	0 00	0 000
66	200 00	279 00	0	0 00	0.000
67	200 00	281 00	0	0 00	0.000
68	200 00	282 00	0	0.00	0 000
69	200 00	285 00	1	296 00	0 000
70	207 00	274 00	0	0 00	0 000
71	207 00	276.50	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0 000
75	207 00	285 00	1	296 00	0.000
76	214 00	274 00	0	0 00	0 000
77	214 00	276 50	0	0 00	0 000
78	;	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0.000
81	221 00	274 00	0	0 00	0 000
82	221 00	276 50	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0.000
86	228 00	274 00	0	0 00	0 000
87	228 00	276 50	0	0 00	0 000
88	228 00	279 00	0	0 00	0 000
89	228 00	281 00	0	0.00	0 000
90	228 00	282 00	0	0.00	0 000
91	235 00	274.00	0	0 00	0 000
92	235 00	276 50	0	0 00	0 000
93	235 00	279 00	0	0 00	0.000
94	235 00	281 00	0	0 00	0.000
95	235 00	282 00	0	0 00	0.000
96	240 50	274 00	0	0 00	0.000
97	240 50	276 50	0	0.00	0.000
98	240 50	279 00	0	0.00	0.000
99	240 50	281 00	0	0 00	0 000
100	240 50	282 00	0	0 00	0 000
101	246 00	274.00	0	0 00	0 000
102	246 00	276 50	0	0 00	0 000
103	246 00	279 00	0	0 00	0 000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0 000
106	251 00	274 00	0	0 00	0.000
107	251 00	276 50	0	0 00	0.000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0.00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	274 00	0	0 00	0.000
112	256 00	276 50	0	0.00	0 000
113	256.00	279 00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0 000
116	263 50	274 00	0	0 00	0.000
117	263 50	276 50	0	0 00	0.000
118	263 50	279 00	0	0 00	0.000
119	263 50	281.00	0	0 00	0.000
120	263 50	282 00	1	282 00	0.000
121	271 00	274 00	0	0 00	0.000
122	271 00	276 50	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282 00	0 000
126	278 50	274 00	0	0 00	0 000
127	278 50	276 50	0	0.00	0.000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0.000
130	278 50	282 00	1	282 00	0.000
131	286 00	274 00	0	0.00	0.000
132	286 00	276 50	0	0 00	0.000
133	286 00	279 00	0	0 00	0.000
134	286 00	281 00	0	0 00	0.000
135	286 00	282 00	1	282 00	0 000
136	293 50	274 00	0	0 00	0.000
137	293 50	276 50	0	0 00	0 000
138	293 50	279 00	0	0 00	0 000
139	293 50	281 00	0	0 00	0.000

140	293 50	282.00	1	282 00	0 000
141	310 00	274 00	0	0 00	0 000
142	310 00	276 50	0	0 00	0.000
143	310 00	279 00	0	0 00	0.000
144	310 00	281 00	0	0 00	0.000
145	310 00	282 00	1	282 00	0 000
146	326 50	274 00	0	0 00	0 000
147	326 50	276 50	0	0 00	0 000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0 000
150	326 50	282 00	1	282 00	0.000
151	343 00	274 00	0	0 00	0.000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0.000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0 00	0.000
158	359 50	279 00	0	0.00	0 000
159	359 50	281 00	0	0 00	0.000
160	359 50	282 00	1	282 00	0 000
161	376 00	274.00	0	0 00	0.000
162	376 00	276 50	0	0 00	0 000
163	376 00	279 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0 000
166	400 00	274 00	0	0 00	0.000
167	400 00	276 50	0	0 00	0.000
168	400 00	279 00	0	0 00	0.000
169	400 00	281 00	0	0 00	0 000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4
49	59	65	66	60	4

50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	90	95	97	92	4
75	91	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	4
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	4
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
1	8	632E-0007
2	1	709E-0006
3	8	441E-0007
4	-1	196E-0008
5	1	234E-0006
10	1	323E-0005
15	6	420E-0005
20	1	109E-0004
21	1	184E-0008
27	7	756E-0008
30	1	256E-0007
45	1	822E-0007
51	2	077E-0007
57	1	725E-0007
63	1	230E-0007
69	1	560E-0007
75	9	501E-0008
115	-3	916E-0005
120	-3	703E-0005
125	-2	809E-0005
130	-2	138E-0005
135	-1	625E-0005
140	-1	852E-0005
145	-1	541E-0005
150	-8	461E-0006
155	-4	676E-0006
160	-2	643E-0006
165	-1	919E-0006
170	-8	660E-0007

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 1 944E-0004
SAINDO = -1 944E-0004

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS		CARGA	PRESSAO NEUTRA	FUNCAO
NUMERO	X	Y	HIDRAULICA	(UNID DE CARGA)	FLUXO
1	0 00	274 00	296.00	22 00	4 316E-0007
2	0 00	276 50	296 00	19 50	1 718E-0006
3	0.00	279 00	296 00	17 00	2 995E-0006
4	0 00	281 00	296 00	15 00	3 411E-0006
5	0 00	282 00	296 00	14 00	4.021E-0006
6	40 00	274 00	295 93	21 93	0 000E+0000
7	40 00	276 50	295 93	19.43	5 740E-0006
8	40 00	279 00	295.93	16.93	1 140E-0005
9	40 00	281 00	295 98	14.98	1.138E-0005
10	40 00	282 00	296 00	14.00	1 125E-0005
11	80 00	274 00	295 64	21.64	0.000E+0000
12	80 00	276 50	295 64	19.14	2.467E-0005
13	80 00	279 00	295 65	16 65	4.933E-0005
14	80 00	281 00	295 88	14 88	4 974E-0005
15	80 00	282 00	296 00	14 00	4 997E-0005
16	120 00	274 00	294 33	20 33	0 000E+0000
17	120 00	276 50	294.33	17.83	6 885E-0005
18	120 00	279 00	294 35	15.35	1 370E-0004
19	120.00	281 00	295.44	14 44	1 376E-0004
20	120 00	282 00	296.00	14 00	1.375E-0004
21	120 00	285 00	296.00	11.00	1.930E-0004
22	130 00	274 00	293 59	19.59	0.000E+0000
23	130 00	276 50	293 59	17 09	9.529E-0005
24	130 00	279 00	293.58	14.58	1.930E-0004
25	130 00	281 00	293.47	12.47	1.963E-0004
26	130 00	282 00	293 39	11 39	1.993E-0004
27	130 00	285 00	296 00	11.00	1.930E-0004
28	140 00	274 00	292.82	18.82	0.000E+0000
29	140 00	276 50	292.82	16.32	9 561E-0005
30	140 00	279 00	292.82	13 82	1.909E-0004
31	140 00	281 00	292 83	11 83	1 922E-0004
32	140 00	282 00	292 84	10 84	1 926E-0004
33	140 00	285 00	296.00	11 00	1 932E-0004

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34	160 00	274 00	291 29	17.29	0 000E+0000
35	160 00	276 50	291 29	14 79	9 549E-0005
36	160 00	279 00	291 29	12 29	1 910E-0004
37	160 00	281 00	291 29	10 29	1 926E-0004
38	160 00	282 00	291 29	9 29	1 935E-0004
39	160 00	285 00	296 00	11 00	1 933E-0004
40	170 00	274 00	290 53	16 53	0 000E+0000
41	170 00	276 50	290 53	14 03	9 563E-0005
42	170 00	279 00	290 53	11 53	1 913E-0004
43	170 00	281 00	290 53	9 53	1.928E-0004
44	170 00	282 00	290 53	8 53	1.935E-0004
45	170 00	285 00	296 00	11 00	1 936E-0004
46	180 00	274 00	289 76	15 76	0 000E+0000
47	180 00	276 50	289 76	13 26	9 572E-0005
48	180 00	279 00	289 76	10 76	1 914E-0004
49	180 00	281 00	289 77	8 77	1 930E-0004
50	180 00	282 00	289 77	7 77	1 937E-0004
51	180 00	285 00	296 00	11 00	1.937E-0004
52	190.00	274 00	289 00	15.00	0.000E+0000
53	190 00	276 50	289 00	12 50	9 583E-0005
54	190 00	279 00	289 00	10 00	1 916E-0004
55	190 00	281 00	289 00	8 00	1 932E-0004
56	190 00	282 00	289 00	7 00	1 939E-0004
57	190 00	285 00	296 00	11 00	1 939E-0004
58	195 00	274 00	288 61	14 61	0 000E+0000
59	195 00	276 50	288 61	12 11	9.589E-0005
60	195 00	279 00	288 61	9 61	1 918E-0004
61	195 00	281 00	288 62	7 62	1 933E-0004
62	195 00	282 00	288 62	6 62	1.941E-0004
63	195 00	285 00	296 00	11 00	1.941E-0004
64	200 00	274 00	288 23	14 23	0.000E+0000
65	200 00	276 50	288 23	11 73	9 595E-0005
66	200 00	279 00	288 23	9 23	1 919E-0004
67	200 00	281 00	288 24	7.24	1 934E-0004
68	200 00	282 00	288 24	6.24	1 942E-0004
69	200 00	285 00	296 00	11 00	1.942E-0004
70	207 00	274 00	287 69	13 69	0.000E+0000
71	207 00	276 50	287 69	11 19	9 603E-0005
72	207 00	279 00	287 69	8 69	1 921E-0004
73	207 00	281 00	287 69	6.69	1 936E-0004
74	207 00	282 00	287 70	5.70	1 944E-0004
75	207 00	285 00	296 00	11 00	1.944E-0004
76	214 00	274 00	287 15	13 15	0 000E+0000
77	214 00	276 50	287 15	10 65	9 605E-0005
78	214 00	279 00	287 15	8 15	1 921E-0004
79	214 00	281 00	287 15	6.15	1 936E-0004
80	214 00	282 00	287 15	5.15	1 944E-0004
81	221 00	274 00	286 62	12.62	0.000E+0000
82	221 00	276 50	286 62	10 12	9.605E-0005
83	221 00	279 00	286 62	7 62	1 921E-0004
84	221 00	281 00	286 62	5 62	1 936E-0004
85	221 00	282 00	286 62	4 62	1 944E-0004
86	228 00	274 00	286 08	12.08	0 000E+0000
87	228 00	276 50	286 08	9 58	9 605E-0005
88	228 00	279 00	286 08	7 08	1 921E-0004
89	228 00	281 00	286 08	5.08	1.936E-0004
90	228 00	282 00	286 08	4 08	1 944E-0004
91	235 00	274 00	285 54	11.54	0.000E+0000
92	235 00	276 50	285 54	9.04	9 605E-0005
93	235 00	279 00	285 54	6.54	1 921E-0004
94	235 00	281 00	285 54	4 54	1.936E-0004
95	235 00	282 00	285 54	3 54	1 944E-0004
96	240 50	274 00	285 12	11 12	0 000E+0000
97	240 50	276 50	285.12	8 62	9 605E-0005
98	240 50	279.00	285.12	6 12	1 921E-0004
99	240 50	281 00	285 12	4.12	1 936E-0004
100	240 50	282 00	285 12	3 12	1 944E-0004
101	246 00	274 00	284 70	10 70	0.000E+0000
102	246 00	276 50	284 70	8 20	9 583E-0005
103	246 00	279 00	284 70	5 70	1 920E-0004
104	246 00	281 00	284 70	3 70	1 936E-0004
105	246 00	282 00	284 69	2.69	1 944E-0004
106	251 00	274 00	284 31	10 31	0.000E+0000
107	251 00	276 50	284 31	7 81	9 346E-0005
108	251 00	279 00	284 31	5 31	1 887E-0004
109	251 00	281 00	284 26	3.26	1 917E-0004
110	251 00	282 00	284 33	2 33	1 944E-0004
111	256 00	274 00	283 95	9 95	0 000E+0000
112	256 00	276 50	283.94	7 44	8 548E-0005
113	256 00	279 00	283 92	4 92	1 718E-0004
114	256 00	281 00	282 70	1 70	1 736E-0004
115	256 00	282 00	282 00	0 00	1 748E-0004
116	263 50	274 00	283.49	9 49	0 000E+0000
117	263 50	276 50	283 48	6 98	6 797E-0005
118	263 50	279 00	283 46	4 46	1.356E-0004

Acude Ubaldinho
 Cálculos de Percolação
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119	263 50	281 00	282 48	1 48	1.365E-0004
120	263 50	282 00	282 00	0.00	1 367E-0004
121	271 00	274 00	283 13	9 13	0 000E+0000
122	271 00	276 50	283 13	6 63	5.201E-0005
123	271 00	279 00	283.11	4 11	1.036E-0004
124	271 00	281 00	282.37	1 37	1.041E-0004
125	271 00	282 00	282 00	0.00	1.042E-0004
126	278 50	274 00	282 86	8.86	0 000E+0000
127	278 50	276 50	282.86	6 36	3 965E-0005
128	278 50	279 00	282 85	3.85	7.898E-0005
129	278 50	281 00	282 28	1.28	7.939E-0005
130	278 50	282 00	282 00	0 00	7 943E-0005
131	286 00	274 00	282.65	8 65	0 000E+0000
132	286 00	276 50	282 65	6.15	3.002E-0005
133	286 00	279 00	282 64	3 64	5.996E-0005
134	286 00	281 00	282 21	1 21	6 040E-0005
135	286 00	282 00	282 00	0 00	6.062E-0005
136	293 50	274 00	282 50	8.50	0 000E+0000
137	293 50	276 50	282 49	5 99	2.185E-0005
138	293 50	279 00	282.49	3 49	4.332E-0005
139	293 50	281 00	282 16	1 16	4.340E-0005
140	293 50	282 00	282 00	0.00	4.324E-0005
141	310 00	274 00	282 27	8.27	0.000E+0000
142	310 00	276 50	282 27	5.77	1.299E-0005
143	310 00	279 00	282 27	3 27	2 597E-0005
144	310 00	281 00	282 09	1.09	2 617E-0005
145	310 00	282 00	282 00	0.00	2 627E-0005
146	326 50	274 00	282 15	8 15	0 000E+0000
147	326 50	276 50	282 15	5.65	7.171E-0006
148	326 50	279 00	282 15	3.15	1.427E-0005
149	326 50	281 00	282 05	1.05	1.434E-0005
150	326 50	282 00	282 00	0.00	1 433E-0005
151	343 00	274 00	282.08	8 08	0 000E+0000
152	343 00	276 50	282 08	5.58	3.875E-0006
153	343 00	279 00	282 08	3.08	7.719E-0006
154	343 00	281 00	282.03	1.03	7.761E-0006
155	343 00	282 00	282.00	0 00	7.766E-0006
156	359 50	274 00	282 05	8.05	0.000E+0000
157	359 50	276.50	282 05	5.55	2.042E-0006
158	359 50	279 00	282 05	3.05	4.067E-0006
159	359 50	281 00	282 02	1.02	4 088E-0006
160	359 50	282 00	282 00	0 00	4.106E-0006
161	376 00	274 00	282 03	8.03	0.000E+0000
162	376 00	276 50	282 03	5.53	9.556E-0007
163	376 00	279 00	282 03	3.03	1.903E-0006
164	376 00	281 00	282 01	1.01	1 912E-0006
165	376 00	282 00	282.00	0 00	1 825E-0006
166	400 00	274 00	282 02	8.02	0.000E+0000
167	400 00	276 50	282 02	5.52	0.000E+0000
168	400 00	279 00	282.02	3.02	0 000E+0000
169	400 00	281 00	282.01	1 01	-7 963E-0016
170	400 00	282 00	282 00	0 00	4.330E-0007

ANEXO 7

=====
Barragem de Ubaldinho - Ceara - Anexo 7
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de análise de percolação plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

NUMERO DE MATERIAIS 4
NUMERO DE NOS 170
NUMERO DE ELEMENTOS 133
LARGURA DE BANDA MAXIMA 8
LARGURA DE BANDA MEDIA 6 98

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES	PRINCIPAIS	ANGULO ENTRE
	K1	K2	K1 E OX
1	1 00000E-0008	1 00000E-0008	0 00
3	1 00000E-0005	1 00000E-0005	0 00
4	5 00000E-0004	5 00000E-0004	0 00

DADOS DOS NOS

NO	COORDENADAS DOS NOS		COND.	CARGA	VAZAO
N R	X	Y	CONT	HIDRAULICA	
1	0 00	274 00	1	296 00	0 000
2	0 00	276 50	1	296 00	0 000
3	0 00	279 00	1	296 00	0 000
4	0 00	281.00	1	296 00	0 000
5	0 00	282 00	1	296 00	0 000
6	40 00	274.00	0	0 00	0.000
7	40 00	276 50	0	0 00	0 000
8	40 00	279 00	0	0 00	0.000
9	40 00	281 00	0	0 00	0.000
10	40 00	282 00	1	296 00	0.000
11	70 00	274.00	0	0 00	0.000
12	70 00	276.50	0	0 00	0.000
13	70 00	279 00	0	0 00	0.000
14	70 00	281.00	0	0.00	0.000
15	70 00	282 00	1	296 00	0.000
16	100 00	274 00	0	0.00	0.000
17	100 00	276 50	0	0.00	0.000
18	100.00	279.00	0	0 00	0.000
19	100 00	281.00	0	0 00	0.000
20	100 00	282 00	1	296 00	0 000
21	100 00	284 00	1	296 00	0.000
22	120 00	274 00	0	0 00	0 000
23	120.00	276 50	0	0 00	0 000
24	120 00	279 00	0	0 00	0 000
25	120 00	281 00	0	0 00	0.000
26	120 00	282 00	0	0.00	0 000
27	120 00	284 00	1	296.00	0 000
28	140.00	274 00	0	0.00	0.000
29	140 00	276.50	0	0.00	0.000
30	140 00	279 00	0	0.00	0 000
31	140 00	281 00	0	0 00	0.000
32	140 00	282.00	0	0.00	0.000
33	140 00	284 00	1	296 00	0 000
34	160 00	274.00	0	0 00	0.000
35	160 00	276 50	0	0 00	0.000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	282.00	0	0 00	0 000
39	160 00	284 00	1	296 00	0.000
40	170 00	274.00	0	0 00	0 000
41	170 00	276 50	0	0 00	0.000
42	170 00	279.00	0	0 00	0.000
43	170 00	281.00	0	0 00	0 000
44	170 00	282 00	0	0 00	0.000
45	170 00	284 00	1	296.00	0.000
46	180.00	274 00	0	0.00	0.000
47	180 00	276 50	0	0.00	0 000
48	180 00	279 00	0	0.00	0 000
49	180 00	281 00	0	0 00	0.000
50	180 00	282 00	0	0 00	0.000
51	180 00	284 00	1	296 00	0 000
52	190 00	274 00	0	0 00	0 000
53	190 00	276 50	0	0.00	0 000
54	190 00	279 00	0	0.00	0 000

55	190 00	281 00	0	0 00	0.000
56	190 00	282 00	0	0 00	0 000
57	190 00	284 00	1	296 00	0 000
58	195 00	274 00	0	0 00	0 000
59	195 00	276 50	0	0 00	0.000
60	195 00	279 00	0	0 00	0 000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0.00	0 000
63	195 00	284 00	1	296 00	0.000
64	200 00	274 00	0	0 00	0.000
65	200 00	276 50	0	0 00	0 000
66	200 00	279 00	0	0 00	0 000
67	200 00	281 00	0	0 00	0.000
68	200 00	282 00	0	0 00	0 000
69	200 00	284 00	1	296 00	0 000
70	207 00	274 00	0	0 00	0 000
71	207 00	276 50	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0.000
75	207 00	284 00	1	296 00	0 000
76	214 00	274 00	0	0 00	0 000
77	214 00	276 50	0	0 00	0 000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0.000
80	214 00	282 00	0	0 00	0.000
81	221 00	274 00	0	0 00	0 000
82	221 00	276 50	0	0 00	0 000
83	221 00	279 00	0	0.00	0.000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0.000
86	228 00	274 00	0	0 00	0.000
87	228 00	276 50	0	0 00	0.000
88	228 00	279 00	0	0 00	0.000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	274 00	0	0 00	0.000
92	235 00	276 50	0	0 00	0.000
93	235 00	279 00	0	0 00	0 000
94	235 00	281 00	0	0 00	0.000
95	235 00	282 00	0	0 00	0 000
96	240 50	274 00	0	0 00	0 000
97	240 50	276 50	0	0 00	0.000
98	240 50	279 00	0	0 00	0.000
99	240 50	281 00	0	0 00	0.000
100	240 50	282 00	0	0.00	0 000
101	246 00	274 00	0	0.00	0.000
102	246 00	276 50	0	0 00	0.000
103	246 00	279 00	0	0 00	0.000
104	246 00	281 00	0	0 00	0.000
105	246 00	282 00	0	0.00	0 000
106	251 00	274 00	0	0 00	0 000
107	251 00	276 50	0	0 00	0.000
108	251 00	279 00	0	0 00	0.000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	274 00	0	0 00	0.000
112	256 00	276 50	0	0 00	0.000
113	256 00	279 00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0.000
116	263 50	274 00	0	0 00	0.000
117	263 50	276 50	0	0 00	0 000
118	263 50	279 00	0	0.00	0 000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0.000
121	271 00	274 00	0	0 00	0.000
122	271 00	276 50	0	0 00	0 000
123	271 00	279 00	0	0.00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282 00	0.000
126	278 50	274 00	0	0.00	0.000
127	278 50	276 50	0	0.00	0 000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0 000
130	278 50	282 00	1	282.00	0 000
131	286 00	274 00	0	0.00	0 000
132	286 00	276 50	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282 00	0.000
136	293 50	274 00	0	0 00	0 000
137	293 50	276 50	0	0.00	0 000
138	293 50	279 00	0	0 00	0 000
139	293 50	281 00	0	0 00	0 000

140	293 50	282 00	1	282 00	0.000
141	310 00	274 00	0	0 00	0.000
142	310 00	276 50	0	0 00	0.000
143	310 00	279 00	0	0 00	0.000
144	310 00	281 00	0	0 00	0.000
145	310 00	282 00	1	282 00	0.000
146	326 50	274 00	0	0 00	0.000
147	326 50	276 50	0	0 00	0.000
148	326 50	279 00	0	0.00	0.000
149	326 50	281 00	0	0 00	0.000
150	326 50	282 00	1	282.00	0.000
151	343 00	274 00	0	0 00	0.000
152	343 00	276 50	0	0 00	0.000
153	343 00	279 00	0	0 00	0.000
154	343 00	281 00	0	0 00	0.000
155	343 00	282 00	1	282 00	0.000
156	359 50	274 00	0	0 00	0.000
157	359 50	276 50	0	0 00	0.000
158	359 50	279 00	0	0 00	0.000
159	359 50	281 00	0	0 00	0.000
160	359 50	282 00	1	282 00	0.000
161	376 00	274 00	0	0 00	0.000
162	376 00	276 50	0	0 00	0.000
163	376 00	279 00	0	0 00	0.000
164	376 00	281 00	0	0 00	0.000
165	376 00	282 00	1	282.00	0.000
166	400 00	274 00	0	0 00	0.000
167	400 00	276 50	0	0.00	0.000
168	400 00	279.00	0	0.00	0.000
169	400 00	281 00	0	0 00	0.000
170	400.00	282 00	1	282.00	0.000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4
49	59	65	66	60	4

50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	4
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	4
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	4
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
1	1	509E-0005
2	3	017E-0005
3	1	532E-0005
4	2	385E-0007
5	4	772E-0007
10	3	143E-0006
15	5	140E-0006
20	5	262E-0006
21	4	322E-0008
27	3	002E-0007
33	3	579E-0007
34	3	579E-0007
35	3	579E-0007
36	3	579E-0007
37	3	579E-0007
38	3	579E-0007
39	3	579E-0007
40	3	579E-0007
41	3	579E-0007
42	3	579E-0007
43	3	579E-0007
44	3	579E-0007
45	3	579E-0007
46	3	579E-0007
47	3	579E-0007
48	3	579E-0007
49	3	579E-0007
50	3	579E-0007
51	2	361E-0007
57	1	865E-0007
63	1	288E-0007
69	1	595E-0007
75	9	695E-0008
115	-3	692E-0006
120	-4	784E-0006
125	-4	634E-0006
130	-4	495E-0006
135	-4	365E-0006
140	-6	741E-0006
145	-8	838E-0006
150	-8	420E-0006
155	-8	093E-0006
160	-7	851E-0006
165	-9	432E-0006
170	-5	540E-0006

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 7 688E-0005
SAINDO = -7 688E-0005

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS	DOS NOS	CARGA	PRESSAO NEUTRA	FUNCAO
NUMERO	X	Y	HIDRAULICA	(UNID DE CARGA)	FLUXO
1	0 00	274 00	296 00	22.00	7 544E-0006
2	0 00	276 50	296 00	19.50	3 018E-0005
3	0 00	279.00	296 00	17 00	5 292E-0005
4	0 00	281 00	296 00	15 00	6 071E-0005
5	0 00	282 00	296 00	14.00	6 106E-0005
6	40 00	274 00	295 03	21.03	0.000E+0000
7	40 00	276 50	295 03	18 53	3.194E-0005
8	40 00	279 00	295 03	16.03	6.387E-0005
9	40 00	281 00	295 05	14.05	6 294E-0005
10	40 00	282.00	296 00	14.00	6.287E-0005
11	70 00	274 00	294 26	20 26	0 000E+0000
12	70 00	276 50	294 26	17 76	3.312E-0005
13	70 00	279 00	294 26	15.26	6.623E-0005
14	70 00	281 00	294 29	13 29	6 700E-0005
15	70 00	282 00	296 00	14 00	6 702E-0005
16	100 00	274 00	293.43	19 43	0 000E+0000
17	100 00	276 50	293 43	16 93	3.585E-0005
18	100 00	279 00	293 43	14.43	7.169E-0005
19	100 00	281 00	293 48	12 48	7 222E-0005
20	100 00	282 00	296.00	14 00	7 222E-0005
21	100 00	284 00	296.00	12.00	7.487E-0005
22	120 00	274 00	292 84	18.84	0.000E+0000
23	120 00	276 50	292 84	16.34	3 740E-0005
24	120 00	279 00	292.84	13 84	7 483E-0005
25	120 00	281 00	292.83	11.83	7.547E-0005
26	120 00	282 00	292.58	10 58	7.548E-0005
27	120 00	284 00	296 00	12.00	7 504E-0005
28	140 00	274 00	292 24	18 24	0 000E+0000
29	140 00	276 50	292 24	15 74	3 736E-0005
30	140 00	279 00	292 24	13.24	7 471E-0005
31	140 00	281 00	292 25	11.25	7.530E-0005
32	140 00	282 00	292 49	10 49	7 530E-0005
33	140 00	284 00	296.00	12 00	7.537E-0005
34	160 00	274 00	291.64	17 64	0.000E+0000

35	160 00	276 50	291 64	15 14	3 756E-0005
36	160 00	279 00	291 64	12.64	7 511E-0005
37	160 00	281 00	291 64	10.64	7 572E-0005
38	160 00	282 00	291 84	9.84	7 572E-0005
39	160 00	284 00	296 00	12 00	7 570E-0005
40	170 00	274 00	291 34	17 34	0 000E+0000
41	170 00	276 50	291 34	14 84	3 768E-0005
42	170 00	279 00	291 34	12 34	7 536E-0005
43	170 00	281 00	291 34	10 34	7 596E-0005
44	170 00	282 00	291 57	9 57	7 596E-0005
45	170 00	284 00	296 00	12 00	7.597E-0005
46	180 00	274 00	291 04	17 04	0 000E+0000
47	180 00	276 50	291 04	14 54	3 779E-0005
48	180 00	279 00	291 04	12 04	7 558E-0005
49	180 00	281 00	291 04	10 04	7 619E-0005
50	180 00	282 00	291 28	9 28	7 619E-0005
51	180 00	284 00	296 00	12 00	7 619E-0005
52	190 00	274 00	290 74	16 74	0 000E+0000
53	190 00	276 50	290 74	14 24	3 790E-0005
54	190 00	279 00	290 74	11 74	7 580E-0005
55	190 00	281 00	290 74	9 74	7 641E-0005
56	190 00	282 00	290 99	8.99	7 641E-0005
57	190 00	284 00	296 00	12 00	7 641E-0005
58	195 00	274 00	290 58	16 58	0 000E+0000
59	195 00	276 50	290 58	14 08	3.797E-0005
60	195 00	279 00	290 58	11 58	7 595E-0005
61	195 00	281 00	290 59	9 59	7 656E-0005
62	195 00	282 00	290 84	8 84	7 656E-0005
63	195 00	284 00	296 00	12 00	7.656E-0005
64	200 00	274 00	290 43	16 43	0 000E+0000
65	200 00	276 50	290 43	13.93	3 804E-0005
66	200 00	279 00	290 43	11.43	7.609E-0005
67	200 00	281 00	290 14	9 44	7.669E-0005
68	200 00	282 00	290.73	8 73	7.670E-0005
69	200 00	284 00	296 00	12 00	7 671E-0005
70	207 00	274 00	290 22	16 22	0.000E+0000
71	207 00	276 50	290 22	13 72	3 812E-0005
72	207 00	279 00	290 22	11 22	7 626E-0005
73	207 00	281 00	290 22	9 22	7 688E-0005
74	207 00	282 00	290 36	8 36	7 688E-0005
75	207 00	284 00	296 00	12 00	7 684E-0005
76	214 00	274 00	290 00	16.00	0 000E+0000
77	214 00	276 50	290 00	13 50	3 814E-0005
78	214 00	279 00	290 00	11 00	7 627E-0005
79	214 00	281 00	290 00	9 00	7 688E-0005
80	214 00	282 00	289.98	7 98	7.688E-0005
81	221 00	274 00	289 79	15 79	0 000E+0000
82	221 00	276 50	289.79	13 29	3 814E-0005
83	221 00	279 00	289 79	10 79	7 627E-0005
84	221 00	281 00	289 79	8 79	7 688E-0005
85	221 00	282 00	289 79	7 79	7 688E-0005
86	228 00	274.00	289 58	15 58	0.000E+0000
87	228 00	276 50	289 58	13 08	3 814E-0005
88	228 00	279 00	289 58	10 58	7.627E-0005
89	228 00	281 00	289 58	8 58	7 688E-0005
90	228 00	282 00	289 58	7 58	7 688E-0005
91	235 00	274 00	289 36	15 36	0.000E+0000
92	235 00	276 50	289 36	12 86	3.814E-0005
93	235 00	279 00	289 36	10.36	7.627E-0005
94	235 00	281 00	289 36	8.36	7.688E-0005
95	235 00	282 00	289 36	7.36	7.688E-0005
96	240 50	274 00	289 20	15 20	0.000E+0000
97	240 50	276 50	289 20	12.70	3 814E-0005
98	240 50	279 00	289 20	10.20	7 627E-0005
99	240 50	281 00	289 20	8.20	7 688E-0005
100	240 50	282 00	289 22	7.22	7 688E-0005
101	246 00	274 00	289 03	15 03	0 000E+0000
102	246 00	276 50	289 03	12.53	3 813E-0005
103	246 00	279 00	289 03	10 03	7 628E-0005
104	246 00	281 00	289 03	8 03	7 689E-0005
105	246 00	282 00	288 90	6.90	7 688E-0005
106	251 00	274 00	288 88	14.88	0 000E+0000
107	251 00	276.50	288 88	12 38	3 794E-0005
108	251 00	279 00	288 88	9 88	7 606E-0005
109	251 00	281 00	288 88	7.88	7 683E-0005
110	251 00	282 00	289 83	7.83	7.688E-0005
111	256 00	274 00	288 72	14.72	0.000E+0000
112	256 00	276 50	288 72	12.22	3.712E-0005
113	256 00	279 00	288 72	9.72	7.436E-0005
114	256 00	281 00	288 60	7 60	7 502E-0005
115	256 00	282 00	282 00	0 00	7.504E-0005
116	263 50	274 00	288 51	14 51	0.000E+0000
117	263 50	276 50	288 51	12 01	3 510E-0005
118	263 50	279 00	288 50	9 50	7 022E-0005
119	263 50	281 00	288 38	7 38	7.079E-0005

120	263 50	282 00	282 00	0 00	7 080E-0005
121	271 00	274 00	288 30	14 30	0.000E+0000
122	271 00	276 50	288 30	11 80	3 279E-0005
123	271 00	279 00	288 30	9.30	6.557E-0005
124	271 00	281 00	288 18	7.18	6.609E-0005
125	271 00	282 00	282 00	0 00	6.609E-0005
126	278 50	274 00	288 11	14 11	0 000E+0000
127	278 50	276 50	288.11	11 61	3.053E-0005
128	278 50	279 00	288 11	9 11	6.105E-0005
129	278 50	281 00	287 99	6 99	6 153E-0005
130	278 50	282 00	282 00	0 00	6 153E-0005
131	286 00	274.00	287 94	13.94	0.000E+0000
132	286 00	276 50	287.94	11.44	2 825E-0005
133	286 00	279 00	287 93	8 93	5.657E-0005
134	286 00	281 00	287 82	6 82	5 708E-0005
135	286 00	282 00	282 00	0 00	5 710E-0005
136	293 50	274 00	287.77	13 77	0 000E+0000
137	293.50	276 50	287 77	11 27	2.565E-0005
138	293 50	279 00	287.77	8 77	5.122E-0005
139	293 50	281 00	287 66	6 66	5.156E-0005
140	293 50	282 00	282 00	0 00	5 154E-0005
141	310 00	274 00	287 46	13 46	0 000E+0000
142	310 00	276 50	287 46	10 96	2.168E-0005
143	310 00	279 00	287 46	8.46	4 338E-0005
144	310 00	281 00	287 35	6 35	4.375E-0005
145	310 00	282 00	282 00	0 00	4 375E-0005
146	326 50	274 00	287.20	13.20	0.000E+0000
147	326 50	276 50	287 20	10 70	1 743E-0005
148	326 50	279.00	287 20	8 20	3.485E-0005
149	326 50	281 00	287 10	6.10	3 512E-0005
150	326.50	282 00	282.00	0.00	3.513E-0005
151	343 00	274 00	287 00	13.00	0.000E+0000
152	343 00	276 50	287 00	10 50	1.334E-0005
153	343 00	279 00	287.00	8 00	2.667E-0005
154	343 00	281 00	286.90	5.90	2.688E-0005
155	343 00	282 00	282 00	0 00	2 687E-0005
156	359 50	274 00	286 85	12 85	0 000E+0000
157	359 50	276 50	286 85	10 35	9 326E-0006
158	359 50	279 00	286.85	7.85	1.865E-0005
159	359 50	281 00	286 75	5 75	1.880E-0005
160	359 50	282 00	282 00	0 00	1 890E-0005
161	376 00	274 00	286.75	12.75	0.000E+0000
162	376 00	276 50	286 75	10 25	5.372E-0006
163	376 00	279.00	286.75	7 75	1 074E-0005
164	376 00	281 00	286 66	5.66	1 082E-0005
165	376 00	282 00	282.00	0.00	1.026E-0005
166	400 00	274 00	286.70	12 70	0 000E+0000
167	400 00	276 50	286 70	10.20	0 000E+0000
168	400 00	279 00	286 70	7.70	0.000E+0000
169	400 00	281 00	286 60	5 60	5 862E-0017
170	400 00	282 00	282 00	0 00	2.770E-0006

ANEXO 8

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=====
Barragem de Ubaldinho - Ceara - Anexo 8
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          4
NUMERO DE NOS                170
NUMERO DE ELEMENTOS         133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS		ANGULO ENTRE K1 E OX
	K1	K2	
1	1 00000E-0008	1 00000E-0008	0 00
2	1 00000E-0007	1 00000E-0007	0 00
3	1 00000E-0005	1 00000E-0005	0 00
4	5 00000E-0004	5 00000E-0004	0 00

DADOS DOS NOS

NO	COORDENADAS DOS NOS		COND	CARGA	VAZAO
N R	X	Y	CONT	HIDRAULICA	
1	0 00	274 00	1	296 00	0.000
2	0 00	276 50	1	296 00	0.000
3	0 00	279 00	1	296.00	0.000
4	0 00	281 00	1	296.00	0.000
5	0 00	282 00	1	296.00	0 000
6	40 00	274 00	0	0.00	0 000
7	40 00	276 50	0	0.00	0 000
8	40 00	279 00	0	0.00	0 000
9	40 00	281 00	0	0.00	0 000
10	40 00	282 00	1	296.00	0.000
11	70 00	274.00	0	0 00	0.000
12	70 00	276 50	0	0 00	0.000
13	70 00	279 00	0	0 00	0.000
14	70 00	281 00	0	0 00	0 000
15	70 00	282 00	1	296 00	0.000
16	100 00	274 00	0	0.00	0 000
17	100 00	276 50	0	0.00	0.000
18	100 00	279 00	0	0.00	0.000
19	100 00	281 00	0	0 00	0.000
20	100 00	282 00	1	296 00	0.000
21	100 00	285.00	1	296 00	0.000
22	120 00	274.00	0	0 00	0 000
23	120 00	276 50	0	0 00	0.000
24	120 00	279 00	0	0 00	0.000
25	120 00	281 00	0	0.00	0 000
26	120 00	282 00	0	0.00	0 000
27	120 00	285 00	1	296 00	0 000
28	140 00	274 00	0	0 00	0.000
29	140 00	276 50	0	0 00	0.000
30	140 00	279 00	0	0 00	0.000
31	140 00	281 00	0	0 00	0.000
32	140 00	282 00	0	0 00	0.000
33	140 00	285 00	1	296 00	0.000
34	160 00	274 00	0	0 00	0.000
35	160 00	276 50	0	0.00	0 000
36	160 00	279 00	0	0.00	0 000
37	160 00	281 00	0	0.00	0.000
38	160 00	282 00	0	0 00	0.000
39	160 00	285 00	1	296.00	0.000
40	170 00	274 00	0	0 00	0.000
41	170 00	276 50	0	0 00	0.000
42	170 00	279 00	0	0 00	0.000
43	170 00	281 00	0	0 00	0 000
44	170 00	282 00	0	0 00	0 000
45	170 00	285 00	1	296.00	0 000
46	180 00	274 00	0	0.00	0.000
47	180 00	276 50	0	0 00	0.000
48	180 00	279 00	0	0 00	0 000
49	180 00	281 00	0	0 00	0 000
50	180 00	282 00	0	0 00	0 000
51	180 00	285 00	1	296.00	0 000
52	190 00	274 00	0	0 00	0.000
53	190 00	276 50	0	0 00	0.000
54	190 00	279 00	0	0 00	0.000

55	190 00	281 00	0	0 00	0.000
56	190 00	282 00	0	0 00	0.000
57	190 00	285 00	1	296 00	0.000
58	195 00	274 00	0	0 00	0.000
59	195 00	276 50	0	0 00	0.000
60	195 00	279 00	0	0 00	0 000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0 00	0 000
63	195 00	285 00	1	296.00	0 000
64	200 00	274 00	0	0 00	0 000
65	200 00	276 50	0	0 00	0.000
66	200 00	279 00	0	0 00	0.000
67	200 00	281 00	0	0 00	0 000
68	200 00	282 00	0	0 00	0 000
69	200 00	285 00	1	296.00	0 000
70	207 00	274 00	0	0 00	0 000
71	207 00	276 50	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0.000
74	207 00	282 00	0	0 00	0.000
75	207 00	285 00	1	296.00	0 000
76	214 00	274 00	0	0 00	0 000
77	214 00	276 50	0	0 00	0.000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0 000
81	221 00	274 00	0	0 00	0.000
82	221 00	276 50	0	0.00	0 000
83	221 00	279 00	0	0.00	0.000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0.000
86	228 00	274 00	0	0 00	0 000
87	228 00	276 50	0	0 00	0.000
88	228 00	279 00	0	0.00	0 000
89	228 00	281 00	0	0.00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	274 00	0	0.00	0 000
92	235 00	276 50	0	0 00	0.000
93	235 00	279 00	0	0 00	0 000
94	235 00	281 00	0	0 00	0 000
95	235 00	282 00	0	0 00	0 000
96	240 50	274 00	0	0.00	0 000
97	240 50	276 50	0	0 00	0 000
98	240 50	279 00	0	0 00	0 000
99	240 50	281 00	0	0 00	0 000
100	240 50	282 00	0	0 00	0 000
101	246 00	274 00	0	0 00	0 000
102	246 00	276 50	0	0 00	0.000
103	246 00	279 00	0	0 00	0.000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0 000
106	251 00	274 00	0	0 00	0.000
107	251 00	276 50	0	0 00	0 000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	274 00	0	0.00	0.000
112	256 00	276 50	0	0.00	0 000
113	256 00	279 00	0	0 00	0.000
114	256 00	281 00	0	0 00	0 000
115	256 00	282.00	1	282 00	0 000
116	263 50	274 00	0	0 00	0.000
117	263 50	276.50	0	0 00	0.000
118	263 50	279.00	0	0 00	0 000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0 000
121	271 00	274 00	0	0 00	0 000
122	271 00	276 50	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282 00	0 000
126	278 50	274 00	0	0 00	0 000
127	278 50	276 50	0	0 00	0 000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0 000
130	278 50	282 00	1	282 00	0 000
131	286 00	274 00	0	0 00	0 000
132	286 00	276 50	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282 00	0 000
136	293 50	274 00	0	0 00	0 000
137	293 50	276 50	0	0 00	0.000
138	293 50	279 00	0	0 00	0.000
139	293 50	281 00	0	0.00	0.000

140	293 50	282 00	1	282 00	0.000
141	310 00	274.00	0	0.00	0.000
142	310 00	276 50	0	0 00	0.000
143	310 00	279 00	0	0 00	0.000
144	310 00	281.00	0	0 00	0.000
145	310 00	282 00	1	282 00	0 000
146	326 50	274 00	0	0 00	0.000
147	326 50	276 50	0	0 00	0 000
148	326 50	279 00	0	0.00	0 000
149	326 50	281 00	0	0 00	0.000
150	326 50	282.00	1	282 00	0 000
151	343 00	274 00	0	0 00	0 000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0.00	0.000
155	343 00	282 00	1	282 00	0.000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0.00	0 000
158	359 50	279.00	0	0.00	0.000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	274.00	0	0.00	0.000
162	376 00	276 50	0	0 00	0 000
163	376 00	279 00	0	0 00	0.000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0 000
166	400 00	274 00	0	0.00	0.000
167	400 00	276 50	0	0.00	0.000
168	400 00	279 00	0	0.00	0.000
169	400 00	281 00	0	0.00	0.000
170	400 00	282 00	1	282.00	0.000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4
49	59	65	66	60	4

50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
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64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73		94	95	90	2
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92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
	1	1.518E-0005
	2	3.035E-0005
	3	1.541E-0005
	4	2.398E-0007
	5	4.800E-0007
	10	3.162E-0006
	15	5.170E-0006
	20	5.294E-0006
	21	2.982E-0008
	27	2.042E-0007
	34	1.081E-0007
	45	1.510E-0007
	51	1.607E-0007
	57	1.269E-0007
	63	8.766E-0008
	69	1.086E-0007
	75	6.549E-0008
	115	-3.682E-0006
	120	-4.771E-0006
	125	-4.622E-0006
	130	-4.482E-0006
	135	-4.353E-0006
	140	-6.723E-0006
	145	-8.813E-0006
	150	-8.397E-0006
	155	-8.071E-0006
	160	-7.829E-0006
	165	-9.406E-0006
	170	-5.525E-0006

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 7.667E-0005
SAINDO = -7.667E-0005

CARGAS HIDRAULICAS E PRESSOES NEUTRAS:

NO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID. DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	274 00	296.00	22 00	7.589E-0006
2	0 00	276 50	296.00	19 50	3.035E-0005
3	0 00	279 00	296.00	17.00	5.324E-0005
4	0 00	281 00	296.00	15.00	6.106E-0005
5	0.00	282 00	296.00	14 00	6.142E-0005
6	40 00	274 00	295.02	21 02	0.000E+0000
7	40 00	276.50	295.02	18.52	3.213E-0005
8	40 00	279 00	295.02	16.02	6.424E-0005
9	40 00	281 00	295.04	14.04	6.331E-0005
10	40 00	282 00	296 00	14 00	6.324E-0005
11	70 00	274 00	294.25	20 25	0.000E+0000
12	70 00	276 50	294.25	17.75	3.332E-0005
13	70 00	279 00	294.25	15 25	6.662E-0005
14	70 00	281 00	294.28	13.28	6.739E-0005
15	70 00	282 00	296.00	14 00	6.741E-0005
16	100 00	274 00	293.42	19 42	0.000E+0000
17	100 00	276 50	293.42	16 92	3.606E-0005
18	100 00	279 00	293 42	14.42	7.211E-0005
19	100 00	281 00	293 47	12.47	7.264E-0005
20	100 00	282 00	296.00	14.00	7.264E-0005
21	100 00	285 00	296 00	11.00	7.530E-0005
22	120 00	274 00	292 82	18.82	0.000E+0000
23	120 00	276 50	292 82	16.32	3.758E-0005
24	120 00	279 00	292 82	13.82	7.519E-0005
25	120 00	281 00	292 81	11.81	7.582E-0005
26	120 00	282 00	292.50	10 50	7.583E-0005
27	120 00	285 00	296.00	11 00	7.542E-0005
28	140 00	274 00	292.22	18.22	0.000E+0000
29	140.00	276 50	292 22	15.72	3.750E-0005
30	140 00	279 00	292 22	13.22	7.499E-0005
31	140 00	281 00	292 22	11 22	7.558E-0005
32	140 00	282 00	292 42	10 42	7.558E-0005
33	140 00	285 00	296.00	11 00	7.564E-0005

34	160 00	274 00	291 62	17 62	0 000E+0000
35	160 00	276 50	291 62	15 12	3 764E-0005
36	160 00	279 00	291 62	12 62	7.528E-0005
37	160 00	281 00	291 62	10 62	7 588E-0005
38	160 00	282 00	291 75	9 75	7 588E-0005
39	160 00	285 00	296 00	11 00	7 587E-0005
40	170 00	274 00	291 32	17 32	0 000E+0000
41	170 00	276 50	291 32	14.82	3 772E-0005
42	170 00	279 00	291 32	12 32	7 544E-0005
43	170 00	281 00	291 32	10.32	7 604E-0005
44	170 00	282 00	291 47	9 47	7 605E-0005
45	170 00	285 00	296 00	11 00	7.605E-0005
46	180 00	274 00	291 01	17 01	0 000E+0000
47	180 00	276 50	291 01	14 51	3 780E-0005
48	180 00	279 00	291 01	12 01	7 560E-0005
49	180 00	281 00	291 02	10 02	7 620E-0005
50	180 00	282 00	291 18	9.18	7 620E-0005
51	180 00	285.00	296 00	11.00	7 621E-0005
52	190 00	274.00	290 71	16 71	0 000E+0000
53	190 00	276 50	290 71	14 21	3 787E-0005
54	190 00	279 00	290 71	11 71	7 575E-0005
55	190 00	281 00	290 72	9 72	7 635E-0005
56	190 00	282 00	290 89	8 89	7 635E-0005
57	190 00	285 00	296 00	11 00	7 635E-0005
58	195 00	274 00	290 56	16 56	0 000E+0000
59	195 00	276 50	290 56	14 06	3 792E-0005
60	195 00	279 00	290 56	11 56	7 584E-0005
61	195 00	281 00	290 56	9 56	7 645E-0005
62	195 00	282 00	290 74	8 74	7 645E-0005
63	195 00	285 00	296 00	11.00	7.646E-0005
64	200 00	274 00	290 41	16 41	0 000E+0000
65	200 00	276 50	290 41	13 91	3 797E-0005
66	200 00	279 00	290 41	11.41	7 594E-0005
67	200 00	281 00	290.41	9 41	7.654E-0005
68	200 00	282 00	290 61	8.61	7.655E-0005
69	200 00	285 00	296 00	11.00	7 655E-0005
70	207 00	274 00	290 20	16 20	0 000E+0000
71	207 00	276 50	290.20	13 70	3.802E-0005
72	207 00	279 00	290 20	11 20	7 605E-0005
73	207 00	281 00	290 20	9.20	7 667E-0005
74	207 00	282 00	290 29	8 29	7.667E-0005
75	207 00	285 00	296.00	11 00	7.664E-0005
76	214 00	274 00	289.98	15 98	0 000E+0000
77	214 00	276 50	289 98	13.48	3 803E-0005
78	214 00	279 00	289 98	10 98	7 606E-0005
79	214 00	281 00	289 98	8 98	7.667E-0005
80	214 00	282 00	289 97	7.97	7 667E-0005
81	221 00	274 00	289 77	15.77	0 000E+0000
82	221 00	276 50	289 77	13 27	3 803E-0005
83	221 00	279 00	289 77	10 77	7.606E-0005
84	221 00	281 00	289 77	8.77	7 667E-0005
85	221 00	282 00	289 77	7 77	7 667E-0005
86	228 00	274 00	289 56	15 56	0.000E+0000
87	228 00	276 50	289 56	13 06	3 803E-0005
88	228 00	279 00	289 56	10 56	7.606E-0005
89	228 00	281 00	289 56	8 56	7 667E-0005
90	228 00	282 00	289 56	7.56	7 667E-0005
91	235 00	274 00	289 34	15.34	0 000E+0000
92	235 00	276 50	289 34	12.84	3 803E-0005
93	235 00	279 00	289 34	10 34	7 606E-0005
94	235 00	281 00	289 34	8 34	7.667E-0005
95	235 00	282 00	289 34	7 34	7 667E-0005
96	240 50	274 00	289 18	15 18	0 000E+0000
97	240 50	276 50	289 18	12.68	3 803E-0005
98	240 50	279 00	289 18	10 18	7 606E-0005
99	240 50	281 00	289 18	8 18	7.667E-0005
100	240 50	282 00	289 20	7 20	7 667E-0005
101	246 00	274 00	289 01	15.01	0 000E+0000
102	246 00	276 50	289 01	12 51	3 803E-0005
103	246 00	279 00	289 01	10 01	7 607E-0005
104	246 00	281 00	289 01	8 01	7.668E-0005
105	246 00	282 00	288 88	6.88	7 667E-0005
106	251 00	274 00	288 86	14.86	0 000E+0000
107	251 00	276 50	288 86	12 36	3 783E-0005
108	251 00	279 00	288.86	9.86	7.586E-0005
109	251 00	281 00	288 86	7 86	7.662E-0005
110	251 00	282 00	289 80	7 80	7 667E-0005
111	256 00	274 00	288 71	14 71	0 000E+0000
112	256 00	276 50	288 71	12 21	3.702E-0005
113	256 00	279 00	288 70	9.70	7 415E-0005
114	256 00	281 00	288 58	7 58	7 482E-0005
115	256 00	282 00	282 00	0.00	7 483E-0005
116	263 50	274.00	288 49	14 49	0.000E+0000
117	263 50	276 50	288 49	11 99	3.500E-0005
118	263 50	279 00	288 49	9 49	7 003E-0005

119	263 50	281 00	288 36	7 36	7 060E-0005
120	263 50	282 00	282 00	0 00	7 061E-0005
121	271 00	274 00	288 29	14 29	0.000E+0000
122	271 00	276 50	288 29	11 79	3.270E-0005
123	271 00	279 00	288 28	9 28	6.539E-0005
124	271 00	281 00	288 16	7 16	6.591E-0005
125	271 00	282 00	282 00	0 00	6 591E-0005
126	278 50	274 00	288 10	14 10	0 000E+0000
127	278 50	276 50	288 10	11 60	3 045E-0005
128	278 50	279 00	288 09	9.09	6 088E-0005
129	278 50	281 00	287 97	6.97	6 136E-0005
130	278 50	282 00	282 00	0.00	6 136E-0005
131	286 00	274 00	287 92	13 92	0 000E+0000
132	286.00	276 50	287 92	11.42	2.817E-0005
133	286.00	279 00	287 92	8 92	5 641E-0005
134	286 00	281 00	287 80	6.80	5 692E-0005
135	286 00	282 00	282 00	0.00	5.694E-0005
136	293.50	274 00	287 76	13 76	0.000E+0000
137	293 50	276 50	287 76	11.26	2.558E-0005
138	293 50	279 00	287 76	8 76	5.108E-0005
139	293 50	281 00	287 64	6 64	5 142E-0005
140	293 50	282 00	282 00	0 00	5.140E-0005
141	310 00	274 00	287 44	13.44	0.000E+0000
142	310 00	276 50	287 44	10.94	2.162E-0005
143	310 00	281 00	287 44	8 44	4 326E-0005
144	310 00	281 00	287 33	6.33	4.363E-0005
145	310 00	282 00	282 00	0 00	4.363E-0005
146	326 50	274 00	287.19	13 19	0.000E+0000
147	326 50	276 50	287 19	10 69	1.738E-0005
148	326 50	279 00	287.18	8 18	3.476E-0005
149	326 50	281 00	287 08	6 08	3.503E-0005
150	326 50	282 00	282 00	0 00	3.503E-0005
151	343 00	274 00	286 98	12 98	0 000E+0000
152	343 00	276 50	286 98	10.48	1 330E-0005
153	343 00	279 00	286.98	7.98	2.660E-0005
154	343 00	281.00	286 88	5.88	2.681E-0005
155	343 00	282 00	282 00	0 00	2.680E-0005
156	359 50	274 00	286 84	12.84	0.000E+0000
157	359 50	276.50	286 83	10.33	9.300E-0006
158	359 50	279 00	286 83	7 83	1.860E-0005
159	359 50	281 00	286 74	5.74	1.875E-0005
160	359 50	282 00	282.00	0.00	1 885E-0005
161	376 00	274 00	286 74	12.74	0 000E+0000
162	376 00	276 50	286 74	10.24	5.357E-0006
163	376 00	279 00	286 74	7.74	1.071E-0005
164	376 00	281 00	286 64	5.64	1 079E-0005
165	376 00	282 00	282 00	0.00	1.023E-0005
166	400 00	274 00	286 68	12.68	0.000E+0000
167	400 00	276 50	286 68	10.18	0.000E+0000
168	400 00	279.00	286 68	7 68	0 000E+0000
169	400 00	281 00	286.59	5.59	6.971E-0016
170	400 00	282 00	282 00	0 00	2 762E-0006

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Açude Ubaldinho
Cálculos de Percolação
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ANEXO 9

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Barragem de Ubaldinho - Ceara - Anexo 9
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```
NUMERO DE MATERIAIS          4
NUMERO DE NOS                170
NUMERO DE ELEMENTOS         133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS		ANGULO ENTRE K1 E OX
	K1	K2	
1	1 00000E-0008	1 00000E-0008	0 00
2	1 00000E-0005	1 00000E-0005	0 00
3	1 00000E-0005	1 00000E-0005	0 00
4	5 00000E-0004	5 00000E-0004	0 00

DADOS DOS NOS

NO N R	COORDENADAS DOS NOS		COND CONT	CARGA HIDRAULICA	VAZAO
	X	Y			
1	0 00	274 00	1	296 00	0 000
2	0 00	276 50	1	296 00	0 000
3	0 00	279 00	1	296 00	0 000
4	0 00	281 00	1	296 00	0 000
5	0 00	282 00	1	296 00	0 000
6	40 00	274 00	0	0 00	0 000
7	40 00	276 50	0	0 00	0 000
8	40 00	279 00	0	0 00	0 000
9	40 00	281 00	0	0 00	0 000
10	40 00	282 00	1	296 00	0 000
11	70 00	274 00	0	0 00	0 000
12	70 00	276 50	0	0 00	0 000
13	70 00	279 00	0	0 00	0 000
14	70 00	281 00	0	0 00	0 000
15	70 00	282 00	1	296 00	0 000
16	100 00	274 00	0	0 00	0 000
17	100 00	276 50	0	0 00	0 000
18	100 00	279 00	0	0 00	0 000
19	100 00	281 00	0	0 00	0 000
20	100 00	282 00	1	296 00	0 000
21	100 00	284 00	1	296 00	0 000
22	120 00	274 00	0	0 00	0 000
23	120 00	276 50	0	0 00	0 000
24	120 00	279 00	0	0 00	0 000
25	120 00	281 00	0	0 00	0 000
26	120 00	282 00	0	0 00	0 000
27	120 00	284 00	1	296 00	0 000
28	140 00	274 00	0	0 00	0 000
29	140 00	276 50	0	0 00	0 000
30	140 00	279 00	0	0 00	0 000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0 00	0 000
33	140 00	284 00	1	296 00	0 000
34	160 00	274 00	0	0 00	0 000
35	160 00	276 50	0	0 00	0 000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	282 00	0	0 00	0 000
39	160 00	284 00	1	296 00	0 000
40	170 00	274 00	0	0 00	0 000
41	170 00	276 50	0	0 00	0 000
42	170 00	279 00	0	0 00	0 000
43	170 00	281 00	0	0 00	0 000
44	170 00	282 00	0	0 00	0 000
45	170 00	284 00	1	296 00	0 000
46	180 00	274 00	0	0 00	0 000
47	180 00	276 50	0	0 00	0 000
48	180 00	279 00	0	0 00	0 000
49	180 00	281 00	0	0 00	0 000
50	180 00	282 00	0	0 00	0 000
51	180 00	284 00	1	296 00	0 000
52	190 00	274 00	0	0 00	0 000
53	190 00	276 50	0	0 00	0 000
54	190 00	279 00	0	0 00	0 000

55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	284 00	1	296 00	0 000
58	195 00	274 00	0	0 00	0 000
59	195 00	276 50	0	0 00	0 000
60	195 00	279 00	0	0 00	0 000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0 00	0 000
63	195 00	284 00	1	296 00	0 000
64	200 00	274 00	0	0 00	0 000
65	200 00	276 50	0	0 00	0 000
66	200 00	279 00	0	0 00	0 000
67	200 00	281 00	0	0 00	0 000
68	200 00	282 00	0	0 00	0 000
69	200 00	284 00	1	296 00	0 000
70	207 00	274 00	0	0 00	0 000
71	207 00	276 50	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0 000
75	207 00	284 00	1	296 00	0 000
76	214 00	274 00	0	0 00	0 000
77	214 00	276 50	0	0 00	0 000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0 000
81	221 00	274 00	0	0 00	0 000
82	221 00	276 50	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0 000
86	228 00	274 00	0	0 00	0 000
87	228 00	276 50	0	0 00	0 000
88	228 00	279 00	0	0 00	0 000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	274 00	0	0 00	0 000
92	235 00	276 50	0	0 00	0 000
93	235 00	279 00	0	0 00	0 000
94	235 00	281 00	0	0 00	0 000
95	235 00	282 00	0	0 00	0 000
96	240 50	274 00	0	0 00	0 000
97	240 50	276 50	0	0 00	0 000
98	240 50	279 00	0	0 00	0 000
99	240 50	281 00	0	0 00	0 000
100	240 50	282 00	0	0 00	0 000
101	246 00	274 00	0	0 00	0 000
102	246 00	276 50	0	0 00	0 000
103	246 00	279 00	0	0 00	0 000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0 000
106	251 00	274 00	0	0 00	0 000
107	251 00	276 50	0	0 00	0 000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	274 00	0	0 00	0 000
112	256 00	276 50	0	0 00	0 000
113	256 00	279 00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0 000
116	263 50	274 00	0	0 00	0 000
117	263 50	276 50	0	0 00	0 000
118	263 50	279 00	0	0 00	0 000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0 000
121	271 00	274 00	0	0 00	0 000
122	271 00	276 50	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282 00	0 000
126	278 50	274 00	0	0 00	0 000
127	278 50	276 50	0	0 00	0 000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0 000
130	278 50	282 00	1	282 00	0 000
131	286 00	274 00	0	0 00	0 000
132	286 00	276 50	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282 00	0 000
136	293 50	274 00	0	0 00	0 000
137	293 50	276 50	0	0 00	0 000
138	293 50	279 00	0	0 00	0 000
139	293 50	281 00	0	0 00	0 000

140	293 50	282 00	1	282 00	0 000
141	310 00	274 00	0	0 00	0.000
142	310 00	276 50	0	0.00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0.000
145	310 00	282 00	1	282 00	0.000
146	326 50	274 00	0	0.00	0.000
147	326 50	276 50	0	0.00	0 000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0.000
150	326 50	282 00	1	282.00	0.000
151	343 00	274 00	0	0.00	0 000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0.000
154	343 00	281 00	0	0 00	0.000
155	343 00	282 00	1	282 00	0.000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0 00	0.000
158	359 50	279 00	0	0 00	0.000
159	359 50	281 00	0	0.00	0 000
160	359 50	282 00	1	282.00	0 000
161	376 00	274 00	0	0.00	0 000
162	376 00	276 50	0	0 00	0 000
163	376 00	279 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0.000
165	376 00	282 00	1	282 00	0 000
166	400 00	274 00	0	0 00	0.000
167	400 00	276 50	0	0 00	0 000
168	400 00	279 00	0	0.00	0.000
169	400 00	281 00	0	0.00	0.000
170	400 00	282 00	1	282 00	0.000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4
49	59	65	66	60	4

50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	4
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	4
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	4
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 3
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
1	1	640E-0006
2	3	261E-0006
3	1	631E-0006
4	6	272E-0009
5	2	342E-0006
10	1	797E-0005
15	5	371E-0005
20	9	361E-0005
21	3	798E-0008
27	2	770E-0007
33	4	770E-0007
34	1	227E-0007
45	3	119E-0007
51	3	465E-0007
57	2	827E-0007
63	1	993E-0007
69	2	507E-0007
75	1	519E-0007
115	-3	562E-0005
120	-3	368E-0005
125	-2	555E-0005
130	-1	945E-0005
135	-1	478E-0005
140	-1	684E-0005
145	-1	402E-0005
150	-7	697E-0006
155	-4	254E-0006
160	-2	405E-0006
165	-1	746E-0006
170	-7	878E-0007

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 1 768E-0004
SAINDO = -1 768E-0004

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS		CARGA	PRESSAO NEUTRA	FUNCAO
NUMERO	X	Y	HIDRAULICA	(UNID. DE CARGA)	FLUXO
1	0 00	274 00	296 00	22 00	8 198E-0007
2	0 00	276 50	296 00	19 50	3.270E-0006
3	0 00	279 00	296 00	17 00	5.716E-0006
4	0 00	281 00	296 00	15 00	6 535E-0006
5	0 00	282 00	296 00	14 00	7.709E-0006
6	40 00	274 00	295 86	21 86	0 000E+0000
7	40 00	276 50	295 86	19.36	9 116E-0006
8	40 00	279 00	295 86	16 86	1 815E-0005
9	40 00	281 00	295 95	14 95	1 809E-0005
10	40 00	282 00	296 00	14.00	1 787E-0005
11	70 00	274 00	295 54	21 54	0 000E+0000
12	70 00	276 50	295 54	19 04	2 668E-0005
13	70 00	279 00	295 54	16 54	5.321E-0005
14	70 00	281 00	295 85	14 85	5 357E-0005
15	70.00	282.00	296 00	14 00	5.371E-0005
16	100 00	274 00	294 57	20 57	0 000E+0000
17	100 00	276 50	294 57	18.07	6.305E-0005
18	100 00	279 00	294 59	15 59	1 260E-0004
19	100 00	281 00	295 52	14.52	1.270E-0004
20	100 00	282 00	296.00	14 00	1 274E-0004
21	100 00	284 00	296 00	12 00	1 742E-0004
22	120 00	274 00	293 21	19 21	0 000E+0000
23	120 00	276 50	293 21	16 71	8 911E-0005
24	120 00	279 00	293 21	14 21	1 789E-0004
25	120 00	281 00	293 07	12 07	1.808E-0004
26	120 00	282 00	292 99	10 99	1.820E-0004
27	120 00	284 00	296 00	12.00	1.743E-0004
28	140 00	274 00	291 83	17 83	0 000E+0000
29	140 00	276 50	291 83	15 33	8.594E-0005
30	140 00	279 00	291 83	12 83	1 717E-0004
31	140 00	281 00	291 86	10 86	1 729E-0004
32	140 00	282 00	291 87	9 87	1 734E-0004
33	140 00	284 00	296 00	12 00	1.747E-0004

34	160 00	274 00	290 45	16 45	0.000E+0000
35	160 00	276 50	290 45	13 95	8 657E-0005
36	160 00	279 00	290 45	11.45	1 732E-0004
37	160 00	281 00	290 45	9 45	1 746E-0004
38	160 00	282 00	290 45	8 45	1 754E-0004
39	160 00	284 00	296 00	12.00	1 751E-0004
40	170 00	274 00	289 75	15 75	0.000E+0000
41	170.00	276.50	289.75	13.25	8.669E-0005
42	170 00	279 00	289 75	10 75	1.734E-0004
43	170 00	281 00	289 76	8 76	1 747E-0004
44	170 00	282 00	289 76	7 76	1 754E-0004
45	170 00	284 00	296 00	12 00	1 755E-0004
46	180 00	274 00	289 06	15 06	0.000E+0000
47	180 00	276 50	289 06	12 56	8 685E-0005
48	180 00	279 00	289 06	10 06	1 737E-0004
49	180 00	281 00	289 07	8 07	1.751E-0004
50	180 00	282 00	289 07	7 07	1.758E-0004
51	180 00	284 00	296 00	12.00	1.758E-0004
52	190 00	274 00	288 36	14.36	0 000E+0000
53	190 00	276 50	288 36	11.86	8 702E-0005
54	190 00	279 00	288 36	9 36	1.740E-0004
55	190 00	281.00	288.37	7 37	1.754E-0004
56	190 00	282 00	288 38	6 38	1.761E-0004
57	190 00	284 00	296 00	12 00	1.761E-0004
58	195 00	274 00	288 02	14 02	0.000E+0000
59	195 00	276 50	288 02	11 52	8 712E-0005
60	195 00	279 00	288 02	9.02	1.743E-0004
61	195 00	281 00	288.02	7.02	1 756E-0004
62	195 00	282 00	288 03	6.03	1.763E-0004
63	195 00	284 00	296.00	12 00	1 763E-0004
64	200 00	274 00	287.67	13.67	0.000E+0000
65	200 00	276 50	287 67	11 17	8 723E-0005
66	200 00	279 00	287 67	8.67	1.745E-0004
67	200 00	281 00	287.68	6 68	1.759E-0004
68	200 00	282 00	287 68	5.68	1 766E-0004
69	200 00	284 00	296.00	12 00	1.766E-0004
70	207 00	274 00	287 18	13.18	0.000E+0000
71	207 00	276 50	287.18	10.68	8 735E-0005
72	207 00	279 00	287 18	8.18	1 747E-0004
73	207 00	281 00	287.18	6 18	1 761E-0004
74	207 00	282 00	287 18	5.18	1.768E-0004
75	207 00	284 00	296.00	12.00	1.768E-0004
76	214 00	274 00	286 69	12.69	0 000E+0000
77	214 00	276 50	286.69	10 19	8.738E-0005
78	214 00	279.00	286 69	7.69	1.748E-0004
79	214 00	281 00	286.69	5 69	1 762E-0004
80	214 00	282 00	286 69	4.69	1.768E-0004
81	221 00	274 00	286.20	12.20	0.000E+0000
82	221 00	276 50	286 20	9.70	8 738E-0005
83	221 00	279 00	286 20	7 20	1.748E-0004
84	221 00	281 00	286.20	5.20	1 762E-0004
85	221 00	282 00	286 20	4 20	1.768E-0004
86	228.00	274 00	285 71	11.71	0 000E+0000
87	228 00	276 50	285.71	9 21	8 738E-0005
88	228 00	279 00	285 71	6 71	1.748E-0004
89	228 00	281 00	285 71	4.71	1.762E-0004
90	228 00	282 00	285 71	3.71	1 768E-0004
91	235 00	274 00	285.22	11 22	0 000E+0000
92	235 00	276 50	285.22	8.72	8 738E-0005
93	235 00	279 00	285.22	6 22	1 748E-0004
94	235 00	281 00	285.22	4 22	1.762E-0004
95	235 00	282 00	285.22	3 22	1.768E-0004
96	240 50	274 00	284 84	10 84	0.000E+0000
97	240 50	276 50	284 84	8.34	8 738E-0005
98	240.50	279.00	284 84	5 84	1 748E-0004
99	240 50	281 00	284 84	3.84	1 761E-0004
100	240 50	282 00	284 84	2 84	1 768E-0004
101	246 00	274 00	284 45	10.45	0.000E+0000
102	246 00	276 50	284 45	7 95	8 718E-0005
103	246 00	279 00	284 45	5 45	1.747E-0004
104	246 00	281 00	284 45	3.45	1.762E-0004
105	246 00	282 00	284.44	2.44	1 768E-0004
106	251 00	274 00	284 10	10 10	0.000E+0000
107	251 00	276 50	284 10	7 60	8.502E-0005
108	251 00	279 00	284 10	5.10	1 717E-0004
109	251 00	281 00	284.05	3 05	1.744E-0004
110	251 00	282 00	284.12	2 12	1 768E-0004
111	256 00	274 00	283 77	9 77	0 000E+0000
112	256 00	276 50	283.77	7 27	7.776E-0005
113	256 00	279 00	283 75	4.75	1.562E-0004
114	256 00	281 00	282.64	1 64	1.579E-0004
115	256 00	282 00	282.00	0 00	1.590E-0004
116	263 50	274 00	283 35	9 35	0 000E+0000
117	263 50	276 50	283 35	6 85	6 183E-0005
118	263 50	279 00	283.33	4 33	1.234E-0004

119	263 50	281 00	282 44	1 44	1 242E-0004
120	263 50	282 00	282 00	0 00	1 244E-0004
121	271 00	274 00	283 03	9.03	0 000E+0000
122	271 00	276 50	283 02	6 52	4.731E-0005
123	271 00	279 00	283 01	4 01	9.423E-0005
124	271 00	281 00	282 34	1 34	9 471E-0005
125	271 00	282 00	282 00	0 00	9 476E-0005
126	278 50	274 00	282 78	8.78	0 000E+0000
127	278 50	276 50	282 78	6.28	3.607E-0005
128	278 50	279 00	282 77	3.77	7 185E-0005
129	278 50	281 00	282 26	1.26	7 223E-0005
130	278 50	282 00	282 00	0 00	7.226E-0005
131	286 00	274 00	282.59	8 59	0.000E+0000
132	286 00	276 50	282 59	6.09	2 731E-0005
133	286 00	279 00	282 58	3 58	5 454E-0005
134	286 00	281 00	282 20	1 20	5.495E-0005
135	286 00	282 00	282 00	0.00	5 515E-0005
136	293 50	274 00	282 45	8 45	0 000E+0000
137	293 50	276 50	282 45	5.95	1 988E-0005
138	293 50	279 00	282 44	3.44	3 941E-0005
139	293 50	281 00	282 15	1 15	3 948E-0005
140	293 50	282 00	282 00	0.00	3 933E-0005
141	310 00	274 00	282 25	8 25	0 000E+0000
142	310 00	276 50	282 25	5 75	1.182E-0005
143	310 00	279 00	282 24	3 24	2 362E-0005
144	310 00	281 00	282 08	1 08	2 381E-0005
145	310 00	282 00	282 00	0 00	2.390E-0005
146	326 50	274 00	282 14	8 14	0 000E+0000
147	326 50	276 50	282 14	5 64	6 523E-0006
148	326 50	279 00	282 13	3 13	1 298E-0005
149	326 50	281 00	282 04	1 04	1.304E-0005
150	326 50	282 00	282 00	0 00	1.304E-0005
151	343 00	274 00	282 07	8.07	0 000E+0000
152	343 00	276 50	282 07	5 57	3.525E-0006
153	343 00	279 00	282 07	3 07	7.022E-0006
154	343 00	281 00	282 02	1 02	7 061E-0006
155	343 00	282 00	282 00	0 00	7.065E-0006
156	359 50	274 00	282 04	8 04	0.000E+0000
157	359 50	276 50	282 04	5.54	1 857E-0006
158	359 50	279 00	282 04	3 04	3.700E-0006
159	359 50	281 00	282 01	1 01	3.719E-0006
160	359 50	282 00	282 00	0.00	3 736E-0006
161	376 00	274 00	282 03	8 03	0 000E+0000
162	376 00	276 50	282 03	5 53	8.693E-0007
163	376 00	279 00	282 03	3.03	1 731E-0006
164	376 00	281 00	282 01	1 01	1 740E-0006
165	376 00	282 00	282 00	0 00	1 661E-0006
166	400 00	274 00	282 02	8 02	0 000E+0000
167	400 00	276 50	282 02	5 52	0.000E+0000
168	400 00	279 00	282 02	3 02	0.000E+0000
169	400 00	281 00	282 01	1 01	-3 185E-0016
170	400 00	282 00	282 00	0 00	3.939E-0007

ANEXO 10

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=====
Barragem de Ubaldinho - Ceara - Anexo 10
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          4
NUMERO DE NOS                170
NUMERO DE ELEMENTOS         133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS	ANGULO ENTRE
	K1 K2	K1 E OX
1	1 00000E-0008 1 00000E-0008	0 00
2	1 00000E-0005 1 00000E-0005	0 00
3	1 00000E-0005 1 00000E-0005	0 00
4	5 00000E-0004 5 00000E-0004	0 00

DADOS DOS NOS

NO N R	COORDENADAS X	DOS NOS Y	COND CONT	CARGA HIDRAULICA	VAZAO
1	0 00	274 00	1	296 00	0.000
2	0 00	276 50	1	296 00	0.000
3	0 00	279 00	1	296 00	0 000
4	0 00	281 00	1	296 00	0 000
5	0 00	282.00	1	296 00	0 000
6	40 00	274 00	0	0 00	0.000
7	40 00	276 50	0	0.00	0.000
8	40 00	279 00	0	0 00	0 000
9	40 00	281 00	0	0 00	0 000
10	40 00	282 00	1	296 00	0 000
11	70 00	274 00	0	0.00	0.000
12	70.00	276 50	0	0 00	0.000
13	70 00	279 00	0	0 00	0 000
14	70 00	281 00	0	0 00	0 000
15	70 00	282 00	1	296 00	0 000
16	100 00	274 00	0	0 00	0 000
17	100 00	276 50	0	0 00	0.000
18	100 00	279 00	0	0 00	0.000
19	100 00	281 00	0	0 00	0 000
20	100 00	282 00	1	296 00	0 000
21	100 00	285 00	1	296 00	0 000
22	120 00	274 00	0	0 00	0.000
23	120 00	276 50	0	0 00	0.000
24	120 00	279 00	0	0 00	0.000
25	120 00	281 00	0	0 00	0 000
26	120 00	282 00	0	0 00	0 000
27	120 00	285 00	1	296 00	0 000
28	140 00	274 00	0	0 00	0.000
29	140 00	276 50	0	0 00	0.000
30	140 00	279 00	0	0 00	0 000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0 00	0 000
33	140 00	285 00	1	296 00	0 000
34	160 00	274 00	0	0 00	0 000
35	160 00	276 50	0	0 00	0 000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	282 00	0	0 00	0 000
39	160 00	285 00	1	296 00	0 000
40	170 00	274 00	0	0 00	0 000
41	170 00	276 50	0	0 00	0.000
42	170 00	279 00	0	0 00	0.000
43	170 00	281 00	0	0 00	0.000
44	170 00	282 00	0	0 00	0 000
45	170 00	285.00	1	296 00	0.000
46	180 00	274 00	0	0 00	0 000
47	180 00	276 50	0	0 00	0 000
48	180 00	279 00	0	0 00	0.000
49	180 00	281 00	0	0 00	0.000
50	180 00	282 00	0	0.00	0.000
51	180 00	285 00	1	296 00	0.000
52	190 00	274 00	0	0 00	0.000
53	190 00	276 50	0	0 00	0 000
54	190 00	279 00	0	0 00	0 000

55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	285.00	1	296 00	0.000
58	195 00	274.00	0	0 00	0.000
59	195 00	276 50	0	0 00	0.000
60	195 00	279 00	0	0 00	0.000
61	195 00	281 00	0	0 00	0.000
62	195 00	282 00	0	0 00	0 000
63	195 00	285 00	1	296 00	0 000
64	200 00	274.00	0	0 00	0.000
65	200 00	276 50	0	0.00	0.000
66	200 00	279 00	0	0.00	0.000
67	200 00	281 00	0	0.00	0.000
68	200 00	282 00	0	0 00	0.000
69	200 00	285 00	1	296 00	0.000
70	207 00	274 00	0	0 00	0.000
71	207 00	276 50	0	0 00	0 000
72	207.00	279 00	0	0 00	0.000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0.000
75	207 00	285 00	1	296 00	0 000
76	214 00	274 00	0	0 00	0 000
77	214 00	276 50	0	0 00	0 000
78	214 00	281 00	0	0 00	0.000
79	214 00	282 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0.000
81	221 00	274 00	0	0 00	0.000
82	221 00	276 50	0	0 00	0.000
83	221 00	279 00	0	0 00	0.000
84	221 00	281.00	0	0 00	0 000
85	221 00	282 00	0	0 00	0 000
86	228 00	274 00	0	0.00	0.000
87	228 00	276 50	0	0.00	0.000
88	228 00	279 00	0	0 00	0 000
89	228 00	281.00	0	0.00	0 000
90	228 00	282 00	0	0 00	0.000
91	235 00	274.00	0	0 00	0 000
92	235 00	276 50	0	0 00	0 000
93	235 00	279 00	0	0.00	0.000
94	235 00	281 00	0	0 00	0.000
95	235 00	282 00	0	0.00	0.000
96	240 50	274 00	0	0.00	0.000
97	240 50	276.50	0	0 00	0 000
98	240 50	279.00	0	0 00	0.000
99	240 50	281 00	0	0.00	0.000
100	240 50	282 00	0	0.00	0.000
101	246 00	274 00	0	0.00	0.000
102	246.00	276 50	0	0 00	0.000
103	246.00	279.00	0	0 00	0.000
104	246 00	281 00	0	0 00	0.000
105	246 00	282 00	0	0 00	0.000
106	251 00	274 00	0	0.00	0.000
107	251 00	276 50	0	0 00	0 000
108	251 00	279 00	0	0.00	0.000
109	251 00	281 00	0	0 00	0.000
110	251 00	282 00	0	0 00	0 000
111	256 00	274 00	0	0 00	0 000
112	256 00	276 50	0	0 00	0 000
113	256 00	279.00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282.00	1	282 00	0.000
116	263 50	274 00	0	0 00	0.000
117	263 50	276 50	0	0 00	0.000
118	263 50	279 00	0	0 00	0.000
119	263 50	281 00	0	0.00	0.000
120	263 50	282 00	1	282 00	0 000
121	271 00	274.00	0	0 00	0.000
122	271 00	276 50	0	0 00	0.000
123	271 00	279 00	0	0.00	0.000
124	271 00	281 00	0	0.00	0.000
125	271 00	282 00	1	282 00	0 000
126	278 50	274.00	0	0 00	0 000
127	278 50	276.50	0	0 00	0 000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0.00	0.000
130	278 50	282.00	1	282 00	0.000
131	286 00	274 00	0	0 00	0 000
132	286 00	276 50	0	0 00	0.000
133	286 00	279 00	0	0 00	0.000
134	286 00	281 00	0	0 00	0 000
135	286 00	282.00	1	282 00	0 000
136	293 50	274 00	0	0 00	0.000
137	293 50	276 50	0	0.00	0 000
138	293 50	279 00	0	0 00	0 000
139	293 50	281 00	0	0.00	0.000

140	293 50	282 00	1	282 00	0 000
141	310 00	274 00	0	0 00	0 000
142	310 00	276 50	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0.000
145	310 00	282 00	1	282 00	0 000
146	326 50	274 00	0	0 00	0 000
147	326 50	276 50	0	0 00	0 000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0 000
150	326 50	282 00	1	282 00	0 000
151	343 00	274 00	0	0 00	0.000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0 00	0 000
158	359 50	279 00	0	0.00	0 000
159	359 50	281 00	0	0.00	0.000
160	359 50	282 00	1	282 00	0 000
161	376 00	274 00	0	0 00	0 000
162	376 00	276 50	0	0 00	0 000
163	376 00	279 00	0	0 00	0.000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0 000
166	400 00	274 00	0	0 00	0.000
167	400 00	276 50	0	0 00	0.000
168	400 00	279 00	0	0 00	0 000
169	400 00	281 00	0	0 00	0 000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4
49	59	65	66	60	4

50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	90	95	96	91	3
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	4
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	4
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
	1	1 644E-0006
	2	3 270E-0006
	3	1 636E-0006
	4	6 285E-0009
	5	2 348E-0006
	10	1 802E-0005
	15	5 386E-0005
	20	9 388E-0005
	21	2 572E-0008
	27	1 851E-0007
	33	2 797E-0007
	15	0.00E+0000
	51	2 316E-0007
	57	1 889E-0007
	63	1 331E-0007
	69	1 674E-0007
	75	1 013E-0007
	115	-3 555E-0005
	120	-3 361E-0005
	125	-2 550E-0005
	130	-1 941E-0005
	135	-1 475E-0005
	140	-1 681E-0005
	145	-1.399E-0005
	150	-7 680E-0006
	155	-4 245E-0006
	160	-2 399E-0006
	165	-1 742E-0006
	170	-7 861E-0007

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 1 765E-0004
SAINDO = -1 765E-0004

NO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	274 00	296 00	22.00	8.221E-0007
2	0 00	276 50	296 00	19.50	3 279E-0006
3	0 00	279 00	296 00	17.00	5 732E-0006
4	0 00	281 00	296 00	15 00	6.553E-0006
5	0 00	282 00	296 00	14 00	7.731E-0006
6	40 00	274 00	295.86	21.86	0 000E+0000
7	40 00	276 50	295 86	19 36	9.142E-0006
8	40 00	279 00	295 86	16 86	1 820E-0005
9	40 00	281 00	295 95	14 95	1 814E-0005
10	40 00	282 00	296.00	14.00	1 792E-0005
11	70 00	274 00	295 53	21 53	0.000E+0000
12	70 00	276 50	295 54	19 04	2.676E-0005
13	70 00	279 00	295 54	16 54	5 337E-0005
14	70 00	281 00	295 85	14.85	5 372E-0005
15	70 00	282 00	296 00	14.00	5 386E-0005
16	100 00	274 00	294 56	20.56	0 000E+0000
17	100 00	276 50	294 57	18 07	6.323E-0005
18	100 00	279 00	294 59	15 59	1 264E-0004
19	100 00	281 00	295 52	14.52	1 273E-0004
20	100 00	282 00	296 00	14.00	1 277E-0004
21	100 00	285 00	296 00	11.00	1 747E-0004
22	120 00	274 00	293 20	19.20	0 000E+0000
23	120 00	276 50	293 20	16 70	8 915E-0005
24	120 00	279 00	293 20	14 20	1.790E-0004
25	120 00	281 00	293 06	12.06	1 808E-0004
26	120 00	282 00	292.98	10.98	1.821E-0004
27	120 00	285 00	296.00	11 00	1.748E-0004
28	140 00	274 00	291 82	17 82	0 000E+0000
29	140 00	276 50	291 82	15.32	8.616E-0005
30	140 00	279 00	291 82	12 82	1.721E-0004
31	140 00	281 00	291 84	10 84	1 734E-0004
32	140 00	282 00	291 86	9.86	1 739E-0004
33	140 00	285 00	296 00	11.00	1 750E-0004

34	160 00	274 00	290 43	16 43	0 000E+0000
35	160 00	276 50	290 43	13 93	8.665E-0005
36	160 00	279 00	290 43	11 43	1 734E-0004
37	160 00	281 00	290 43	9 43	1.748E-0004
38	160 00	282 00	290 43	8 43	1 755E-0004
39	160 00	285 00	296 00	11 00	1.753E-0004
40	170 00	274 00	289 74	15 74	0.000E+0000
41	170 00	276 50	289 74	13 24	8 673E-0005
42	170 00	279 00	289 74	10 74	1 734E-0004
43	170 00	281 00	289 75	8 75	1 748E-0004
44	170 00	282 00	289 75	7 75	1.755E-0004
45	170 00	285 00	296 00	11 00	1 755E-0004
46	180 00	274 00	289 05	15 05	0 000E+0000
47	180 00	276 50	289 05	12.55	8 683E-0005
48	180 00	279 00	289 05	10.05	1 737E-0004
49	180 00	281 00	289 05	8.05	1 751E-0004
50	180 00	282 00	289 05	7 05	1 758E-0004
51	180 00	285 00	296 00	11 00	1 758E-0004
52	190 00	274 00	288 35	14 35	0 000E+0000
53	190 00	276 50	288 35	11 85	8 695E-0005
54	190 00	279 00	288 35	9 35	1 739E-0004
55	190 00	281 00	288 36	7 36	1 753E-0004
56	190 00	282 00	288 36	6 36	1 760E-0004
57	195 00	274 00	289 00	11 00	1.760E-0004
58	195 00	276 50	289 00	14 00	0 000E+0000
59	195 00	279 00	289 00	11 50	8 702E-0005
60	195 00	281 00	289 00	9 00	1.740E-0004
61	195 00	282 00	289 01	7 01	1.754E-0004
62	195 00	285 00	289 01	6 01	1 761E-0004
63	195 00	285 00	296 00	11 00	1 761E-0004
64	200 00	274 00	287 65	13 65	0 000E+0000
65	200 00	276 50	287 65	11 15	8.709E-0005
66	200 00	279 00	287 65	8 65	1 742E-0004
67	200 00	281 00	287 66	6 66	1 756E-0004
68	200 00	282 00	287 66	5 66	1.763E-0004
69	200 00	285 00	296 00	11 00	1.763E-0004
70	207 00	274 00	287 17	13 17	0 000E+0000
71	207 00	276 50	287 17	10 67	8 717E-0005
72	207 00	279 00	287 17	8 17	1 743E-0004
73	207 00	281 00	287 17	6 17	1.758E-0004
74	207 00	282 00	287 17	5 17	1.765E-0004
75	207 00	285 00	296 00	11 00	1 764E-0004
76	214 00	274 00	286 68	12.68	0 000E+0000
77	214 00	276 50	286 68	10 18	8 718E-0005
78	214 00	279 00	286 68	7 68	1.744E-0004
79	214 00	281 00	286 68	5 68	1.758E-0004
80	214 00	282 00	286 68	4 68	1 765E-0004
81	221 00	274 00	286 19	12 19	0 000E+0000
82	221 00	276 50	286 19	9 69	8 718E-0005
83	221 00	279 00	286 19	7 19	1.744E-0004
84	221 00	281 00	286 19	5 19	1 758E-0004
85	221 00	282 00	286 19	4.19	1 765E-0004
86	228 00	274 00	285 70	11 70	0 000E+0000
87	228 00	276 50	285 70	9 20	8.718E-0005
88	228 00	279 00	285 70	6 70	1 744E-0004
89	228 00	281 00	285 70	4 70	1 758E-0004
90	228 00	282 00	285 70	3 70	1 765E-0004
91	235 00	274 00	285 21	11.21	0.000E+0000
92	235 00	276 50	285 21	8.71	8.718E-0005
93	235 00	279 00	285 21	6 21	1 744E-0004
94	235 00	281 00	285 21	4 21	1 758E-0004
95	235 00	282 00	285 21	3 21	1 765E-0004
96	240 50	274 00	284 83	10 83	0 000E+0000
97	240 50	276 50	284 83	8 33	8 719E-0005
98	240 50	279 00	284 83	5 83	1 744E-0004
99	240 50	281 00	284 83	3 83	1.758E-0004
100	240 50	282 00	284 83	2 83	1 765E-0004
101	246 00	274 00	284 45	10 45	0 000E+0000
102	246 00	276 50	284 45	7 95	8 699E-0005
103	246 00	279 00	284 45	5 45	1.743E-0004
104	246 00	281 00	284 45	3 45	1 758E-0004
105	246 00	282 00	284 44	2.44	1 765E-0004
106	251 00	274 00	284 10	10 10	0 000E+0000
107	251 00	276 50	284 10	7.60	8 483E-0005
108	251 00	279 00	284 10	5 10	1 713E-0004
109	251 00	281 00	284 05	3 05	1 740E-0004
110	251 00	282 00	284 12	2 12	1.765E-0004
111	256 00	274 00	283 77	9 77	0 000E+0000
112	256 00	276 50	283 76	7 26	7.759E-0005
113	256 00	279 00	283 74	4 74	1 559E-0004
114	256 00	281 00	282 64	1 64	1 576E-0004
115	256 00	282 00	282 00	0.00	1.587E-0004
116	263 50	274 00	283 35	9 35	0.000E+0000
117	263 50	276 50	283 34	6 84	6 170E-0005
118	263 50	279 00	283 33	4 33	1 231E-0004

119	263 50	281 00	282 43	1 43	1 239E-0004
120	263 50	282 00	282 00	0 00	1 241E-0004
121	271 00	274 00	283 03	9 03	0 000E+0000
122	271 00	276 50	283 02	6.52	4.721E-0005
123	271 00	279 00	283 01	4 01	9 402E-0005
124	271 00	281 00	282 34	1 34	9.451E-0005
125	271 00	282 00	282 00	0 00	9 456E-0005
126	278 50	274 00	282 78	8 78	0.000E+0000
127	278 50	276 50	282.78	6 28	3 599E-0005
128	278 50	279 00	282 77	3 77	7 170E-0005
129	278 50	281 00	282 26	1 26	7.207E-0005
130	278 50	282 00	282 00	0 00	7 210E-0005
131	286 00	274 00	282 59	8 59	0 000E+0000
132	286 00	276 50	282 59	6.09	2 725E-0005
133	286 00	279 00	282 58	3 58	5.442E-0005
134	286 00	281 00	282 19	1 19	5.483E-0005
135	286 00	282 00	282 00	0 00	5 503E-0005
136	293 50	274 00	282 45	8 45	0 000E+0000
137	293 50	276 50	282 45	5.95	1.983E-0005
138	293 50	279 00	282 41	3 41	3 932E-0005
139	293 50	281 00	282 15	1 15	3 939E-0005
140	293 50	282 00	282 00	0 00	3 925E-0005
141	310 00	274 00	282 25	8 25	0.000E+0000
142	310 00	276 50	282 25	5.75	1.179E-0005
143	310 00	279 00	282 24	3 24	2 357E-0005
144	310 00	281 00	282 08	1 08	2.376E-0005
145	310 00	282 00	282 00	0 00	2 385E-0005
146	326 50	274 00	282 14	8 14	0 000E+0000
147	326 50	276 50	282 13	5.63	6 509E-0006
148	326 50	279 00	282 13	3 13	1 295E-0005
149	326 50	281 00	282 04	1 04	1.301E-0005
150	326 50	282 00	282 00	0 00	1.301E-0005
151	343 00	274 00	282 07	8 07	0.000E+0000
152	343 00	276 50	282 07	5.57	3 517E-0006
153	343 00	279 00	282 07	3 07	7 007E-0006
154	343 00	281 00	282 02	1 02	7 045E-0006
155	343 00	282 00	282 00	0 00	7 049E-0006
156	359 50	274 00	282 04	8 04	0.000E+0000
157	359 50	276 50	282 04	5 54	1.853E-0006
158	359 50	279 00	282 04	3.04	3 691E-0006
159	359 50	281 00	282 01	1.01	3 711E-0006
160	359 50	282 00	282 00	0 00	3.727E-0006
161	376 00	274 00	282 03	8.03	0 000E+0000
162	376 00	276 50	282 03	5 53	8.674E-0007
163	376 00	279 00	282 03	3 03	1.727E-0006
164	376 00	281 00	282 01	1 01	1.736E-0006
165	376 00	282 00	282 00	0 00	1.657E-0006
166	400 00	274 00	282 02	8.02	0 000E+0000
167	400 00	276 50	282 02	5 52	0 000E+0000
168	400 00	279 00	282 02	3 02	0 000E+0000
169	400 00	281 00	282 01	1.01	-1 440E-0015
170	400 00	282 00	282 00	0.00	3.930E-0007

ANEXO 11

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=====
Barragem de Ubaldinho - Ceara - Anexo 11
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          5
NUMERO DE NOS                170
NUMERO DE ELEMENTOS         133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS		ANGULO ENTRE K1 E OX
	K1	K2	
1	1 00000E-0008	1 00000E-0008	0 00
	1 00000E-0008	1 00000E-0008	0 00
	1 00000E-0005	1 00000E-0005	0 00
4	5 00000E-0004	5 00000E-0004	0 00
5	1 00000E-0003	1 00000E-0003	0 00

DADOS DOS NOS

NO N P	COORDENADAS DOS NOS		COND CONT	CARGA HIDRAULICA	VAZAO
	X	Y			
1	0 00	274 00	1	296 00	0.000
2	0 00	276 50	1	296 00	0.000
3	0 00	279 00	1	296.00	0.000
4	0 00	281 00	1	296.00	0.000
5	0 00	282.00	1	296 00	0.000
6	40 00	274 00	0	0 00	0 000
7	40 00	276 50	0	0 00	0.000
8	40 00	279 00	0	0.00	0.000
9	40 00	281 00	0	0.00	0 000
10	40 00	282 00	1	296 00	0 000
11	80 00	274 00	0	0.00	0.000
12	80 00	276 50	0	0.00	0.000
13	80 00	279 00	0	0 00	0 000
14	80 00	281 00	0	0 00	0 000
15	80 00	282 00	1	296 00	0.000
16	120 00	274 00	0	0.00	0.000
17	120 00	276.50	0	0.00	0.000
18	120 00	279 00	0	0 00	0 000
19	120 00	281 00	0	0 00	0.000
20	120 00	282 00	1	296 00	0.000
21	120 00	284 00	1	296.00	0.000
22	130 00	274 00	0	0.00	0.000
23	130 00	276 50	0	0 00	0.000
24	130 00	279 00	0	0 00	0.000
25	130 00	281 00	0	0 00	0.000
26	130 00	282 00	0	0 00	0.000
27	130 00	284 00	1	296 00	0.000
28	140 00	274 00	0	0.00	0.000
29	140 00	276 50	0	0 00	0 000
30	140 00	279 00	0	0 00	0 000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0 00	0.000
33	140 00	284 00	1	296.00	0.000
34	160 00	274 00	0	0 00	0.000
35	160 00	276 50	0	0 00	0.000
36	160 00	279 00	0	0.00	0 000
37	160 00	281 00	0	0 00	0.000
38	160 00	282 00	0	0 00	0 000
39	160 00	284 00	1	296 00	0 000
40	170 00	274 00	0	0.00	0.000
41	170 00	276 50	0	0 00	0.000
42	170 00	279 00	0	0 00	0 000
43	170 00	281.00	0	0 00	0.000
44	170 00	282 00	0	0 00	0 000
45	170 00	284 00	1	296 00	0.000
46	180 00	274 00	0	0.00	0.000
47	180 00	276 50	0	0 00	0 000
48	180 00	279 00	0	0 00	0 000
49	180.00	281 00	0	0.00	0.000
50	180 00	282 00	0	0 00	0 000
51	180 00	284 00	1	296 00	0.000
52	190 00	274 00	0	0 00	0 000
53	190 00	276 50	0	0 00	0 000

54	190 00	279 00	0	0 00	0 000
55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	284 00	1	296 00	0 000
58	195 00	274 00	0	0 00	0 000
59	195 00	276 50	0	0 00	0 000
60	195 00	279 00	0	0 00	0 000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0 00	0 000
63	195 00	284 00	1	296 00	0 000
64	200 00	274 00	0	0 00	0 000
65	200 00	276 50	0	0 00	0 000
66	200 00	279 00	0	0 00	0 000
67	200 00	281 00	0	0 00	0 000
68	200 00	282 00	0	0 00	0 000
69	200 00	284 00	1	296 00	0 000
70	207 00	274 00	0	0 00	0 000
71	207 00	276 50	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0 000
75	207 00	284 00	1	296 00	0 000
76	214 00	274 00	0	0 00	0 000
77					
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0 000
81	221 00	274 00	0	0 00	0 000
82	221 00	276 50	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0 000
86	228 00	274 00	0	0 00	0 000
87	228 00	276 50	0	0 00	0 000
88	228 00	279 00	0	0 00	0 000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	274 00	0	0 00	0 000
92	235 00	276 50	0	0 00	0 000
93	235 00	279 00	0	0 00	0 000
94	235 00	281 00	0	0 00	0 000
95	235 00	282 00	0	0 00	0 000
96	240 50	274 00	0	0 00	0 000
97	240 50	276 50	0	0 00	0 000
98	240 50	279 00	0	0 00	0 000
99	240 50	281 00	0	0 00	0 000
100	240 50	282 00	0	0 00	0 000
101	246 00	274 00	0	0 00	0 000
102	246 00	276 50	0	0 00	0 000
103	246 00	279 00	0	0 00	0 000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0 000
106	251 00	274 00	0	0 00	0 000
107	251 00	276 50	0	0 00	0 000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	274 00	0	0 00	0 000
112	256 00	276 50	0	0 00	0 000
113	256 00	279 00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0 000
116	263 50	274 00	0	0 00	0 000
117	263 50	276 50	0	0 00	0 000
118	263 50	279 00	0	0 00	0 000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0 000
121	271 00	274 00	0	0 00	0 000
122	271 00	276 50	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282 00	0 000
126	278 50	274 00	0	0 00	0 000
127	278 50	276 50	0	0 00	0 000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0 000
130	278 50	282 00	1	282 00	0 000
131	286 00	274 00	0	0 00	0 000
132	286 00	276 50	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282 00	0 000
136	293 50	274 00	0	0 00	0 000
137	293 50	276 50	0	0 00	0 000
138	293 50	279 00	0	0 00	0 000

139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0.000
141	310 00	274 00	0	0.00	0 000
142	310 00	276 50	0	0 00	0.000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0.00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	274 00	0	0.00	0.000
147	326 50	276 50	0	0.00	0 000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0.000
150	326 50	282 00	1	282 00	0 000
151	343 00	274 00	0	0 00	0 000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0.000
154	343 00	281 00	0	0 00	0.000
155	343 00	282 00	1	282 00	0 000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0 00	0 000
158	359 50	279 00	0	0 00	0 000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	274 00	0	0 00	0 000
162	376 00	276 50	0	0 00	0.000
163	376 00	279 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282.00	0 000
166	400 00	274 00	0	0.00	0.000
167	400 00	276 50	0	0 00	0.000
168	400 00	279 00	0	0 00	0 000
169	400 00	281 00	0	0 00	0.000
170	400 00	282 00	1	282.00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4

49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	6	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
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65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
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85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
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90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
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95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
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105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
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109	134	139	140	135	5
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
 LBMED 5 94

FLUXO ATRAVES DAS FRONTIERAS

NO	NUMERO	VAZAO
	1	2 463E-0005
	2	4 926E-0005
	3	2 501E-0005
	4	3 887E-0007
	5	7 790E-0007
	10	6 277E-0006
	15	1 295E-0005
	20	1 104E-0005
	21	4 033E-0008
	22	4 033E-0008
	23	4 033E-0008
	24	5 079E-0007
	45	3 696E-0007
	51	3 945E-0007
	57	3 122E-0007
	63	2 159E-0007
	69	2 677E-0007
	75	1 628E-0007
	115	-9 011E-0007
	120	-9 562E-0007
	125	-6.689E-0007
	130	-3 777E-0007
	135	-8 260E-0005
	140	-4 759E-0005
	145	-4 045E-0008
	150	-3 900E-0008
	155	-3.741E-0008
	160	-3 630E-0008
	165	-4 361E-0008
	170	-2 562E-0008

FLUXOS TOTAIS DO SISTEMA
 ENTRANDO = 1 333E-0004
 SAINDO = -1 333E-0004

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	274 00	296 00	22.00	1 232E-0005
2	0 00	276 50	296 00	19 50	4.926E-0005
3	0 00	279 00	296 00	17.00	8.639E-0005
4	0 00	281 00	296 00	15 00	9 909E-0005
5	0 00	282 00	296.00	14.00	9 968E-0005
6	40 00	274 00	294 41	20.41	0 000E+0000
7	40 00	276 50	294 41	17 91	5 228E-0005
8	40 00	279 00	294 41	15 41	1.045E-0004
9	40.00	281 00	294 44	13 44	1.033E-0004
10	40 00	282 00	296 00	14.00	1 032E-0004
11	80 00	274 00	292 72	18.72	0 000E+0000
12	80 00	276 50	292 72	16 22	5.577E-0005
13	80 00	279.00	292 72	13 72	1 115E-0004
14	80.00	281 00	292 79	11 79	1 128E-0004
15	80 00	282 00	296.00	14.00	1 128E-0004
16	120 00	274 00	290 83	16 83	0.000E+0000
17	120 00	276 50	290 83	14.33	6.202E-0005
18	120 00	279 00	290 83	11.83	1 240E-0004
19	120 00	281 00	290 93	9.93	1 248E-0004
20	120 00	282 00	296.00	14 00	1 248E-0004
21	120 00	284 00	296 00	12 00	1 303E-0004
22	130 00	274 00	290 31	16 31	0.000E+0000
23	130 00	276 50	290 31	13.81	6 486E-0005
24	130 00	279 00	290 31	11 31	1.300E-0004
25	130 00	281 00	290 31	9 31	1 312E-0004
26	130 00	282 00	289 80	7.80	1 313E-0004
27	130 00	284 00	296 00	12 00	1.305E-0004
28	140 00	274 00	289 79	15 79	0 000E+0000
29	140 00	276 50	289 79	13.29	6.491E-0005
30	140 00	279 00	289 79	10 79	1.298E-0004
31	140 00	281 00	289 80	8 80	1 308E-0004
32	140 00	282 00	290 18	8.18	1 308E-0004
33	140 00	284 00	296 00	12 00	1.309E-0004

34	160 00	274 00	288 75	14 75	0 000E+0000
35	160 00	276 50	288 75	12.25	6.515E-0005
36	160 00	279 00	288 75	9 75	1.303E-0004
37	160 00	281 00	288 76	7 76	1 314E-0004
38	160 00	282 00	289 09	7 09	1 314E-0004
39	160 00	284 00	296 00	12 00	1.313E-0004
40	170 00	274 00	288 23	14 23	0 000E+0000
41	170 00	276 50	288 23	11 73	6 536E-0005
42	170 00	279 00	288 23	9 23	1 307E-0004
43	170 00	281 00	288.24	7 24	1 318E-0004
44	170 00	282 00	288 61	6 61	1 318E-0004
45	170 00	284 00	296 00	12 00	1 318E-0004
46	180 00	274 00	287 71	13.71	0 000E+0000
47	180 00	276 50	287 71	11 21	6.555E-0005
48	180 00	279 00	287.71	8 71	1.311E-0004
49	180 00	281 00	287 72	6 72	1 322E-0004
50	180 00	282 00	288 11	6 11	1 322E-0004
51	180 00	284 00	296 00	12 00	1.322E-0004
52	190 00	274 00	287 18	13 18	0 000E+0000
53	190 00	276 50	287 18	10 68	6 574E-0005
54	190 00	279 00	287 18	8 18	1 315E-0004
55	190 00	281 00	287 19	6 19	1 325E-0004
56	190 00	282 00	287 61	5 61	1 325E-0004
57	190 00	284 00	296 00	12 00	1 325E-0004
58	195 00	274 00	286 92	12 92	0 000E+0000
59	195 00	276 50	286 92	10 42	6 586E-0005
60	195 00	279 00	286 92	7 92	1.317E-0004
61	195 00	281 00	286 93	5 93	1 328E-0004
62	195 00	282 00	287 36	5.36	1 328E-0004
63	195 00	284 00	296 00	12 00	1 328E-0004
64	200 00	274 00	286 66	12 66	0 000E+0000
65	200 00	276 50	286 66	10 16	6 597E-0005
66	200 00	279 00	286 66	7 66	1 319E-0004
67	200 00	281 00	286.67	5.67	1 330E-0004
68	200 00	282 00	287 15	5 15	1.330E-0004
69	200 00	284 00	296 00	12 00	1 330E-0004
70	207 00	274 00	286.29	12 29	0 000E+0000
71	207 00	276 50	286 29	9 79	6.611E-0005
72	207 00	279 00	286 29	7 29	1.322E-0004
73	207 00	281 00	286 29	5 29	1 333E-0004
74	207 00	282 00	286.53	4 53	1 333E-0004
75	207 00	284 00	296 00	12 00	1 332E-0004
76	214 00	274 00	285.92	11 92	0 000E+0000
77	214 00	276 50	285.92	9.42	6.613E-0005
78	214 00	279 00	285 92	6 92	1.323E-0004
79	214 00	281 00	285 92	4 92	1 333E-0004
80	214 00	282 00	285.88	3.88	1 333E-0004
81	221 00	274 00	285 55	11 55	0 000E+0000
82	221 00	276 50	285 55	9 05	6 613E-0005
83	221 00	279 00	285.55	6 55	1 323E-0004
84	221 00	281 00	285 55	4 55	1 333E-0004
85	221 00	282 00	285 55	3 55	1 333E-0004
86	228 00	274 00	285 18	11 18	0 000E+0000
87	228 00	276 50	285 18	8 68	6.613E-0005
88	228 00	279 00	285 18	6 18	1 323E-0004
89	228 00	281 00	285 18	4 18	1.333E-0004
90	228 00	282 00	285 17	3.17	1.333E-0004
91	235 00	274 00	284 81	10 81	0.000E+0000
92	235 00	276 50	284 81	8 31	6 613E-0005
93	235 00	279 00	284 81	5 81	1.323E-0004
94	235 00	281 00	284.81	3 81	1 333E-0004
95	235 00	282 00	284 80	2 80	1 333E-0004
96	240 50	274 00	284 51	10 51	0 000E+0000
97	240 50	276 50	284 51	8 01	6 613E-0005
98	240 50	279 00	284.51	5 51	1 323E-0004
99	240 50	281 00	284 51	3 51	1 333E-0004
100	240 50	282 00	284 52	2.52	1.333E-0004
101	246 00	274 00	284 22	10 22	0 000E+0000
102	246 00	276 50	284 22	7.72	6.613E-0005
103	246 00	279 00	284 22	5 22	1.323E-0004
104	246 00	281 00	284 22	3 22	1 333E-0004
105	246 00	282 00	284 19	2 19	1 333E-0004
106	251 00	274 00	283 96	9.96	0 000E+0000
107	251 00	276 50	283.96	7 46	6 608E-0005
108	251 00	279 00	283 96	4 96	1 322E-0004
109	251 00	281 00	283 96	2.96	1 333E-0004
110	251 00	282 00	284 20	2 20	1 333E-0004
111	256 00	274 00	283.69	9 69	0 000E+0000
112	256 00	276 50	283 69	7 19	6 588E-0005
113	256 00	279 00	283 69	4 69	1 318E-0004
114	256 00	281 00	283 66	2.66	1 329E-0004
115	256 00	282 00	282 00	0 00	1 329E-0004
116	263 50	274 00	283 30	9 30	0.000E+0000
117	263 50	276 50	283 30	6.80	6 545E-0005
118	263 50	279 00	283 30	4 30	1 309E-0004

110	263 50	281 00	283 27	2 27	1 319E-0004
120	263 50	282 00	282 00	0 00	1 319E-0004
121	271 00	274 00	282 91	8 91	0 000E+0000
122	271 00	276 50	282 91	6.41	6.519E-0005
123	271 00	279 00	282 91	3 91	1.304E-0004
124	271 00	281 00	282 89	1 89	1 312E-0004
125	271 00	282 00	282 00	0.00	1 311E-0004
126	278 50	274 90	282 52	8 52	0 000E+0000
127	278 50	276 50	282 52	6.02	6.249E-0005
128	278 50	279 00	282 52	3 52	1 268E-0004
129	278 50	281 00	282 52	1 52	1 299E-0004
130	278 50	282 00	282 00	0 00	1.306E-0004
131	286 00	274 00	282 16	8 16	0 000E+0000
132	286 00	276 50	282 14	5 64	4 509E-0005
133	286 00	279 00	282 08	3 08	9 266E-0005
134	286 00	281 00	282 03	1.03	9 032E-0005
135	286 00	282 00	282 00	0 00	8 911E-0005
136	293 50	274 00	282 03	8.03	0 000E+0000
137	293 50	276 50	282 03	5.53	1 292E-0005
138	293 50	279 00	282 02	3 02	2 304E-0005
139	293 50	281 00	282 01	1 01	2 387E-0005
140	293 50	282 00	282 00	0 00	2 402E-0005
141	310 00	274 00	282 02	8.02	0.000E+0000
:	:	276 50	282 02	5.52	2.622E-0007
143	310 00	279 00	282 03	3 03	6.259E-0007
144	310 00	281 00	282 03	1 03	2 894E-0007
145	310 00	282 00	282 00	0 00	2 022E-0007
146	326 50	274 00	282 02	8 02	0 000E+0000
147	326 50	276 50	282 02	5.52	5 906E-0008
148	326 50	279 00	282 02	3.02	9 334E-0008
149	326 50	281 00	282 02	1 02	1.477E-0007
150	326 50	282 00	282.00	0.00	1 624E-0007
151	343 00	274 00	282 02	8.02	0.000E+0000
152	343 00	276 50	282 02	5 52	6 443E-0008
153	343 00	279 00	282 02	3.02	1 341E-0007
154	343 00	281 00	282 02	1 02	1.268E-0007
155	343 00	282 00	282.00	0 00	1.242E-0007
156	359 50	274 00	282 02	8 02	0 000E+0000
157	359 50	276 50	282 02	5 52	4.279E-0008
158	359 50	279 00	282 02	3.02	8 453E-0008
159	359 50	281 00	282 02	1.02	8.652E-0008
160	359 50	282 00	282.00	0 00	8 738E-0008
161	376 00	274 00	282 02	8.02	0 000E+0000
162	376 00	276 50	282 02	5 52	2.487E-0008
163	376 00	279 00	282.02	3.02	4 987E-0008
164	376 00	281 00	282 02	1.02	5 008E-0008
165	376 00	282 00	282 00	0 00	4.742E-0008
166	400 00	274 00	282 02	8 02	0.000E+0000
167	400 00	276 50	282 02	5.52	0.000E+0000
168	400 00	279 00	282 02	3 02	0 000E+0000
169	400 00	281 00	282 02	1 02	-2.351E-0015
170	400 00	282 00	282 00	0 00	1 281E-0008

ANEXO 11A

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=====
Barragem de Ubaldinho - Ceara - Anexo 11A
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          5
NUMERO DE NOS                170
NUMERO DE ELEMENTOS         133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS	ANGULO ENTRE K1 E OX
	K1 K2	
1	1 00000E-0008 1 00000E-0008	0 00
2	1 00000E-0008 1 00000E-0008	0 00
3	1 00000E-0005 1 00000E-0005	0 00
4	5 00000E-0004 5 00000E-0004	0 00
5	1 00000E-0003 1 00000E-0003	0 00

DADOS DOS NOS

NO N R	COORDENADAS DOS NOS X	Y	COND CONT	CARGA HIDRAULICA	VAZAO
1	0 00	274.00	0	0 00	0.000
2	0 00	276 50	0	0 00	0.000
3	0 00	279 00	0	0 00	0 000
4	0 00	281 00	0	0.00	0 000
5	0 00	282 00	1	296.00	0 000
6	40 00	274.00	0	0 00	0.000
7	40 00	276.50	0	0 00	0.000
8	40 00	279 00	0	0 00	0.000
9	40 00	281 00	0	0 00	0.000
10	40 00	282 00	1	296.00	0 000
11	80 00	274 00	0	0 00	0.000
12	80 00	276 50	0	0 00	0.000
13	80 00	279 00	0	0 00	0 000
14	80 00	281 00	0	0.00	0.000
15	80 00	282 00	1	296 00	0.000
16	120 00	274 00	0	0 00	0 000
17	120 00	276 50	0	0.00	0 000
18	120 00	279 00	0	0 00	0.000
19	120 00	281 00	0	0 00	0 000
20	120 00	282 00	1	296 00	0 000
21	120 00	284 00	1	296.00	0.000
22	130 00	274 00	0	0.00	0 000
23	130 00	276 50	0	0 00	0 000
24	130 00	279 00	0	0 00	0 000
25	130 00	281.00	0	0 00	0.000
26	130 00	282 00	0	0 00	0 000
27	130 00	284 00	1	296 00	0 000
28	140 00	274 00	0	0 00	0 000
29	140 00	276 50	0	0 00	0 000
30	140 00	279 00	0	0.00	0 000
31	140 00	281.00	0	0 00	0.000
32	140 00	282 00	0	0 00	0.000
33	140 00	284 00	1	296 00	0.000
34	160 00	274 00	0	0 00	0 000
35	160 00	276.50	0	0 00	0.000
36	160 00	279 00	0	0 00	0.000
37	160 00	281 00	0	0 00	0 000
38	160 00	282 00	0	0 00	0 000
39	160 00	284 00	1	296 00	0 000
40	170 00	274 00	0	0 00	0.000
41	170 00	276 50	0	0 00	0.000
42	170 00	279 00	0	0 00	0 000
43	170 00	281.00	0	0.00	0 000
44	170 00	282 00	0	0 00	0.000
45	170 00	284 00	1	296.00	0 000
46	180 00	274 00	0	0.00	0 000
47	180 00	276 50	0	0.00	0 000
48	180 00	279 00	0	0 00	0.000
49	180 00	281 00	0	0.00	0.000
50	180 00	282 00	0	0.00	0 000
51	180 00	284 00	1	296 00	0.000
52	190 00	274 00	0	0 00	0.000
53	190 00	276 50	0	0 00	0.000

54	190 00	279 00	0	0 00	0.000
55	190 00	281 00	0	0 00	0 000
56	190 30	282 00	0	0 00	0 000
57	190 30	284 00	1	296 00	0.000
58	195 00	274 00	0	0 00	0.000
59	195 00	276 50	0	0 00	0 000
60	195 00	279 00	0	0 00	0 000
61	195 30	281 00	0	0 00	0 000
62	195 00	282 00	0	0 00	0 000
63	195 00	284 00	1	296 00	0.000
64	200 00	274 00	0	0 00	0 000
65	200 00	276 50	0	0 00	0 000
66	200 00	279 00	0	0 00	0 000
67	200 00	281 00	0	0 00	0 000
68	200 00	282 00	0	0 00	0 000
69	200 00	284 00	1	296 00	0 000
70	207 00	274 00	0	0 00	0 000
71	207 00	276 50	0	0 00	0 000
72	207 00	279 00	0	0 00	0.000
73	207 00	281 00	0	0.00	0.000
74	207 00	282 00	0	0 00	0 000
75	207 00	284 00	1	296 00	0 000
76	214 00	274 00	0	0 00	0 000
77	214 00	276 50	0	0 00	0.000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0 000
81	221 00	274 00	0	0 00	0.000
82	221 00	276 50	0	0 00	0.000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0 000
86	228 00	274 00	0	0.00	0 000
87	228 00	276 50	0	0 00	0.000
88	228 00	279 00	0	0 00	0 000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	274 00	0	0 00	0 000
92	235 00	276 50	0	0 00	0 000
93	235 00	279 00	0	0.00	0 000
94	235 00	281 00	0	0 00	0.000
95	235 00	282 00	0	0 00	0 000
96	240 50	274 00	0	0 00	0 000
97	240 50	276 50	0	0 00	0 000
98	240 50	279 00	0	0 00	0 000
99	240 50	281 00	0	0.00	0.000
100	240 50	282 00	0	0 00	0.000
101	246 00	274 00	0	0 00	0 000
102	246 00	276 50	0	0 00	0 000
103	246 00	279 00	0	0 00	0.000
104	246 00	281 00	0	0 00	0.000
105	246 00	282 00	0	0 00	0 000
106	251 00	274 00	0	0 00	0 000
107	251 00	276 50	0	0 00	0 000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0.000
111	256 00	274 00	0	0 00	0.000
112	256 00	276 50	0	0 00	0.000
113	256 00	279 00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0 000
116	263 50	274 00	0	0 00	0 000
117	263 50	276 50	0	0 00	0.000
118	263 50	279 00	0	0 00	0.000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0 000
121	271 00	274 00	0	0 00	0 000
122	271 00	276 50	0	0 00	0.000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282 00	0 000
126	278 50	274 00	0	0 00	0 000
127	278 50	276 50	0	0 00	0 000
128	278 50	279 00	0	0 00	0.000
129	278 50	281 00	0	0 00	0 000
130	278 50	282 00	1	282 00	0 000
131	286 00	274 00	0	0 00	0.000
132	286 00	276 50	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282 00	0 000
136	293 50	274 00	0	0 00	0 000
137	293 50	276 50	0	0 00	0.000
138	293 50	279 00	0	0 00	0 000

139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0.000
141	310 00	274 00	0	0 00	0 000
142	310 00	276 50	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	274 00	0	0 00	0 000
147	326 50	276 50	0	0.00	0.000
148	326 50	279 00	0	0 00	0.000
149	326 50	281 00	0	0 00	0.000
150	326 50	282 00	1	282 00	0 000
151	343 00	274 00	0	0 00	0 000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282.00	0.000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0 00	0 000
158	359 50	279.00	0	0 00	0 000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282.00	0.000
161	376 00	274 00	0	0 00	0.000
162	376 00	276 50	0	0 00	0 000
163	376 00	279 00	0	0.00	0.000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0.000
166	400 00	274 00	0	0 00	0 000
167	400 00	276 50	0	0.00	0 000
168	400 00	279 00	0	0.00	0 000
169	400 00	281 00	0	0 00	0.000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4

49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	69	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	4
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	4
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	4
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	5
109	134	139	140	135	5
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 6 07

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
	5	1 247E-0005
	10	2 572E-0005
	15	2 812E-0005
	20	1 838E-0005
	21	6 074E-0008
	27	3 996E-0007
	33	6 378E-0007
	39	6 735E-0007
	45	4 694E-0007
	51	4 858E-0007
	57	7 57E-0007
	63	5 52E-0007
	69	3 121E-0007
	75	1 877E-0007
	115	-5 985E-0007
	120	-6 352E-0007
	125	-4 443E-0007
	130	-2 509E-0007
	135	-5 487E-0005
	140	-3 161E-0005
	145	-2 687E-0008
	150	-2 591E-0008
	155	-2 485E-0008
	160	-2 411E-0008
	165	-2 897E-0008
	170	-1 702E-0008

FLUXOS TOTAIS DO SISTEMA
ENTRANDO = 8 856E-0005
SAINDO = -8 856E-0005

CARGAS HIDRAULICAS E PRESSOES NEUTRAS:

NO	COORDENADAS DOS NOS		CARGA	PRESSAO NEUTRA	FUNCAO
NUMERO	X	Y	HIDRAULICA	(UNID DE CARGA)	FLUXO
1	0 00	274 00	289 69	15 69	0.000E+0000
2	0 00	276 50	289 69	13 19	0 000E+0000
3	0 00	279 00	289 69	10 69	0.000E+0000
4	0 00	281 00	289 81	8 81	0 000E+0000
5	0 00	282 00	296 00	14 00	6.235E-0006
6	40 00	274 00	289 49	15 49	0.000E+0000
7	40 00	276 50	289 49	12 99	1 310E-0005
8	40 00	279 00	289 49	10 49	2 620E-0005
9	40 00	281 00	289 62	8 62	2 640E-0005
10	40 00	282 00	296 00	14 00	2 533E-0005
11	80 00	274 00	288 88	14 88	0.000E+0000
12	80 00	276 50	288 88	12 38	2.581E-0005
13	80 00	279 00	288 89	9 89	5 163E-0005
14	80 00	281 00	289 03	8 03	5.206E-0005
15	80 00	282 00	296 00	14 00	5 225E-0005
16	120 00	274 00	287 83	13 83	0 000E+0000
17	120 00	276 50	287 83	11 33	3.757E-0005
18	120 00	279 00	287 83	8 83	7 505E-0005
19	120 00	281 00	287 99	6 99	7 557E-0005
20	120 00	282 00	296 00	14 00	7 551E-0005
21	120 00	284 00	296 00	12 00	8.473E-0005
22	130 00	274 00	287 50	13 50	0.000E+0000
23	130 00	276 50	287 50	11 00	4 236E-0005
24	130 00	279 00	287 50	8 50	8 516E-0005
25	130 00	281 00	287 48	6 48	8 616E-0005
26	130 00	282 00	286 65	4 65	8 626E-0005
27	130 00	284 00	296 00	12 00	8 496E-0005
28	140 00	274 00	287 16	13 16	0 000E+0000
29	140 00	276 50	287 16	10 66	4.240E-0005
30	140 00	279 00	287 16	8 16	8 473E-0005
31	140 00	281 00	287 17	6 17	8 536E-0005
32	140 00	282 00	287 73	5 73	8.535E-0005
33	140 00	284 00	296 00	12 00	8 548E-0005
34	160 00	274 00	286 48	12 48	0 000E+0000
35	160 00	276 50	286 48	9 98	4 273E-0005
36	160 00	279 00	286 48	7 48	8 547E-0005
37	160 00	281 00	286 49	5 49	8 616E-0005

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38	160 00	282 00	286 91	4 91	8.617E-0005
39	160 00	284 00	296 00	12 00	8 613E-0005
40	170 00	274 00	286 13	12 13	0 000E+0000
41	170 00	276 50	286 13	9 63	4.300E-0005
42	170 00	279 00	286 13	7 13	8 601E-0005
43	170 00	281 00	286 14	5 14	8.669E-0005
44	170 00	282 00	286 62	4 62	8.670E-0005
45	170 00	284 00	296 00	12 00	8 671E-0005
46	180 00	274 00	285 79	11 79	0 000E+0000
47	180 00	276 50	285 79	9 29	4 324E-0005
48	180 00	279 00	285 79	6.79	8 648E-0005
49	180 00	281 00	295 80	4 80	8 718E-0005
50	180 00	282 00	286 28	4 28	8.718E-0005
51	180 00	284 00	296 00	12 00	8.718E-0005
52	190 00	274 00	285 44	11 44	0.000E+0000
53	190 00	276 50	285 44	8 94	4 347E-0005
54	190 00	279 00	285 44	6 44	8 693E-0005
55	190 00	281 00	285 45	4 45	8.762E-0005
56	190 00	282 00	285 95	3 95	8.762E-0005
57	190 00	284 00	296 00	12 00	8.761E-0005
58	195 00	274 00	285 27	11 27	0.000E+0000
59	195 00	276 50	285 27	8 27	4 362E-0005
60	195 00	279 00	285 27	6 27	8 722E-0005
61	195 00	281 00	285.27	4 27	8.722E-0005
62	195 00	282 00	285 78	3 78	8 792E-0005
63	195 00	284 00	296 00	12 00	8 793E-0005
64	200 00	274 00	285 09	11 09	0 000E+0000
65	200 00	276 50	285 09	8 59	4.378E-0005
66	200 00	279 00	285 09	6 09	8.760E-0005
67	200 00	281 00	285 10	4.10	8 825E-0005
68	200 00	282.00	285 67	3 67	8 822E-0005
69	200 00	284 00	296 00	12 00	8 821E-0005
70	207 00	274 00	284 85	10 85	0.000E+0000
71	207 00	276 50	284 85	8 35	4 296E-0005
72	207 00	279 00	284 85	5 85	8.675E-0005
73	207 00	281 00	284.85	3 85	8.811E-0005
74	207 00	282 00	285 12	3 12	8 830E-0005
75	207 00	284 00	296 00	12 00	8.846E-0005
76	214 00	274 00	284 60	10 60	0 000E+0000
77	214 00	276 50	284 60	8.10	3.741E-0005
78	214 00	279 00	284 60	5.60	7 480E-0005
79	214 00	281 00	284 60	3 60	7 532E-0005
80	214 00	282 00	284 56	2 56	7.529E-0005
81	221 00	274 00	284.36	10 36	0.000E+0000
82	221 00	276 50	284 36	7 86	3 103E-0005
83	221 00	279 00	284 36	5 36	6 205E-0005
84	221 00	281 00	284 36	3 36	6 255E-0005
85	221 00	282 00	284 36	2 36	6 256E-0005
86	228 00	274 00	284 11	10 11	0 000E+0000
87	228 00	276 50	284 11	7 61	2.477E-0005
88	228 00	279 00	284 11	5 11	4 953E-0005
89	228 00	281 00	284 11	3 11	4 992E-0005
90	228 00	282 00	284 11	2 11	4 992E-0005
91	235 00	274 00	283 86	9 86	0 000E+0000
92	235 00	276 50	283 86	7 36	1 855E-0005
93	235 00	279 00	283 86	4 86	3 709E-0005
94	235 00	281 00	283 86	2.86	3 739E-0005
95	235 00	282 00	283 86	1.86	3 739E-0005
96	240 50	274 00	283 67	9 67	0 000E+0000
97	240 50	276 50	283.67	7 17	1 369E-0005
98	240 50	279 00	283 67	4 67	2 737E-0005
99	240 50	281 00	283 67	2 67	2 759E-0005
100	240 50	282 00	283 67	1.67	2 759E-0005
101	246 00	274 00	283 48	9 48	0 000E+0000
102	246 00	276 50	283 48	6 98	8.838E-0006
103	246 00	279 00	283 48	4 48	1 768E-0005
104	246 00	281 00	283 48	2 48	1 782E-0005
105	246 00	282 00	283 46	1 46	1 782E-0005
106	251 00	274 00	283 30	9 30	0 000E+0000
107	251 00	276 50	283 30	6 80	4 465E-0006
108	251 00	279 00	283 30	4 30	8 839E-0006
109	251 00	281 00	283.30	2 30	8.946E-0006
110	251 00	282 00	283 46	1 46	8.979E-0006
111	256 00	274 00	283 13	9 13	0 000E+0000
112	256 00	276 50	283 13	6 63	8.586E-0007
113	256 00	279 00	283 13	4 13	8 849E-0007
114	256 00	281 00	283 11	2 11	2 028E-0007
115	256 00	282 00	282 00	0 00	0 000E+0000
116	263 50	274 00	282 86	8 86	0 000E+0000
117	263 50	276 50	282 86	6 36	-5 570E-0008
118	263 50	279 00	282 86	3 86	-1.024E-0007
119	263 50	281 00	282 85	1 85	-3 189E-0008
120	263 50	282 00	282 00	0 00	0.000E+0000
121	271 00	274 00	282 60	8 60	0 000E+0000
122	271 00	276 50	282 60	6 10	1 967E-0009

123	271 00	279 00	282 60	3 60	1.168E-0008
124	271 00	281 00	282 59	1 59	5 029E-0009
125	271 00	282 00	282 00	0 00	0.000E+0000
126	278 50	274 00	282 34	8 34	0 000E+0000
127	278 50	276 50	282 34	5 84	2 316E-0010
128	278 50	279 00	282 35	3 35	-1 314E-0009
129	278 50	281 00	282.34	1 34	-8 135E-0010
130	278 50	282 00	282 00	0 00	0.000E+0000
131	286 00	274 00	282 11	8 11	0.000E+0000
132	286 00	276 50	282 09	5 59	-1 518E-0011
133	286 00	279 00	282 06	3 06	2 750E-0010
134	286.00	281 00	282.02	1 02	2.509E-0010
135	286 00	282 00	282 00	0.00	0.000E+0000
136	293 50	274 00	282 02	8.02	0 000E+0000
137	293 50	276 50	282 02	5 52	1 666E-0011
138	293 50	279 00	282 01	3 01	-4.400E-0014
139	293 50	281 00	282 01	1 01	-3.222E-0015
140	293.50	282 00	282.00	0 00	0 000E+0000
141	310 00	274 00	282.02	8 02	0 000E+0000
142	310 00	276 50	282 02	5 52	-2.586E-0012
143	310 00	279 00	282 02	3 02	1 268E-0014
144	310 00	281 00	282 02	1.02	5 685E-0016
145	310 00	282 00	282 00	0 00	0 000E+0000
146	326 50	274 00	282 02	8 02	0 000E+0000
147	326 50	276 50	282 02	5 52	4 014E-0013
148	326 50	279 00	282 02	3.02	-2.909E-0015
149	326 50	281 00	282.02	1 02	-9.939E-0017
150	326 50	282 00	282.00	0 00	0 000E+0000
151	343 00	274 00	282.02	8 02	0 000E+0000
152	343 00	276 50	282 02	5 52	-6.232E-0014
153	343 00	279 00	282 02	3 02	6 026E-0016
154	343 00	281 00	282 02	1 02	1 724E-0017
155	343.00	282 00	282.00	0 00	0 000E+0000
156	359 50	274 00	282 01	8.01	0.000E+0000
157	359 50	276 50	282 01	5 51	9 631E-0015
158	359 50	279 00	282 01	3 01	-1 170E-0016
159	359 50	281 00	282 01	1.01	-2.954E-0018
160	359 50	282 00	282 00	0.00	0.000E+0000
161	376 00	274 00	282.01	8 01	0 000E+0000
162	376 00	276 50	282 01	5 51	-1 199E-0015
163	376 00	279 00	282 01	3.01	1.729E-0017
164	376 00	281 00	282.01	1 01	4 012E-0019
165	376 00	282.00	282 00	0 00	0 000E+0000
166	400 00	274 00	282 01	8.01	0.000E+0000
167	400 00	276 50	282 01	5 51	0.000E+0000
168	400 00	279 00	282.01	3 01	0 000E+0000
169	400 00	281 00	282.01	1 01	0 000E+0000
170	400 00	282 00	282 00	0 00	0 000E+0000

ANEXO 12

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=====
Barragem de Ubaldinho - Ceara - Anexo 12
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          5
NUMERO DE NOS                170
NUMERO DE ELEMENTOS          133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS	ANGULO ENTRE K1 E OX
	K1 K2	
1	1 00000E-0008 1 00000E-0008	0 00
2	1 00000E-0008 1 00000E-0008	0 00
3	1 00000E-0005 1 00000E-0005	0 00
4	5 00000E-0004 5 00000E-0004	0 00
5	1 00000E-0003 1 00000E-0003	0 00

DADOS DOS NOS

NO N R	COORDENADAS DOS NOS X Y	COND CONT	CARGA HIDRAULICA	VAZAO
1	0 00 274 00	1	296 00	0 000
2	0 00 276 50	1	296 00	0 000
3	0 00 279 00	1	296 00	0 000
4	0 00 281 00	1	296 00	0 000
5	0 00 282 00	1	296 00	0 000
6	40 00 274 00	0	0 00	0 000
7	40 00 276 50	0	0 00	0 000
8	40 00 279 00	0	0 00	0 000
9	40 00 281 00	0	0 00	0 000
10	40 00 282 00	1	296 00	0 000
11	80 00 274 00	0	0 00	0 000
12	80 00 276 50	0	0 00	0 000
13	80 00 279 00	0	0 00	0 000
14	80 00 281 00	0	0 00	0 000
15	80 00 282 00	1	296 00	0 000
16	120 00 274 00	0	0 00	0 000
17	120 00 276 50	0	0 00	0 000
18	120 00 279 00	0	0 00	0 000
19	120 00 281 00	0	0 00	0 000
20	120 00 282 00	1	296 00	0 000
21	120 00 284 00	1	296 00	0 000
22	130 00 274 00	0	0 00	0 000
23	130 00 276 50	0	0 00	0 000
24	130 00 279 00	0	0 00	0 000
25	130 00 281 00	0	0 00	0 000
26	130 00 282 00	0	0 00	0 000
27	130 00 284 00	1	296 00	0 000
28	140 00 274 00	0	0 00	0 000
29	140 00 276 50	0	0 00	0 000
30	140 00 279 00	0	0 00	0 000
31	140 00 281 00	0	0 00	0 000
32	140 00 282 00	0	0 00	0 000
33	140 00 284 00	1	296 00	0 000
34	160 00 274 00	0	0 00	0 000
35	160 00 276 50	0	0 00	0 000
36	160 00 279 00	0	0 00	0 000
37	160 00 281 00	0	0 00	0 000
38	160 00 282 00	0	0 00	0 000
39	160 00 284 00	1	296 00	0 000
40	170 00 274 00	0	0 00	0 000
41	170 00 276 50	0	0 00	0 000
42	170 00 279 00	0	0 00	0 000
43	170 00 281 00	0	0 00	0 000
44	170 00 282 00	0	0 00	0 000
45	170 00 284 00	1	296 00	0 000
46	180 00 274 00	0	0 00	0 000
47	180 00 276 50	0	0 00	0 000
48	180 00 279 00	0	0 00	0 000
49	180 00 281 00	0	0 00	0 000
50	180 00 282 00	0	0 00	0 000
51	180 00 284 00	1	296 00	0 000
52	190 00 274 00	0	0 00	0 000
53	190 00 276 50	0	0 00	0 000

54	190 00	279 00	0	0 00	0.000
55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0.000
57	190 00	284 00	1	296 00	0 000
58	195 00	274 00	0	0 00	0 000
59	195 00	276 50	0	0 00	0.000
60	195 00	279 00	0	0.00	0.000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0 00	0 000
63	195 00	284 00	1	296 00	0 000
64	200 00	274 00	0	0 00	0 000
65	200 00	276 50	0	0 00	0 000
66	200 00	279 00	0	0 00	0.000
67	200 00	281 00	0	0 00	0 000
68	200 00	282 00	0	0 00	0 000
69	200 00	284 00	1	296 00	0 000
70	207 00	274 00	0	0 00	0.000
71	207 00	276 50	0	0 00	0.000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0 000
75	207 00	284 00	1	296 00	0 000
76	214 00	274 00	0	0 00	0 000
77	214 00	276 50	0	0 00	0 000
78	214 00	279 00	0	0 00	0.000
79	214 00	281 00	0	0.00	0.000
80	214 00	282 00	0	0.00	0 000
81	221 00	274 00	0	0 00	0 000
82	221 00	276 50	0	0 00	0 000
83	221 00	279 00	0	0.00	0.000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0.000
86	228 00	274 00	0	0.00	0.000
87	228 00	276 50	0	0 00	0.000
88	228 00	279 00	0	0.00	0.000
89	228 00	281 00	0	0.00	0.000
90	228 00	282 00	0	0 00	0 000
91	235 00	274 00	0	0 00	0.000
92	235 00	276 50	0	0.00	0.000
93	235 00	279 00	0	0 00	0.000
94	235 00	281 00	0	0.00	0.000
95	235 00	282 00	0	0 00	0 000
96	240 50	274 00	0	0.00	0.000
97	240 50	276 50	0	0.00	0.000
98	240 50	279 00	0	0 00	0.000
99	240 50	281 00	0	0 00	0.000
100	240 50	282 00	0	0.00	0.000
101	246 00	274 00	0	0.00	0 000
102	246 00	276 50	0	0 00	0.000
103	246 00	279 00	0	0.00	0.000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0.000
106	251 00	274 00	0	0.00	0 000
107	251 00	276 50	0	0 00	0 000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	274 00	0	0 00	0.000
112	256 00	276 50	0	0 00	0.000
113	256 00	279 00	0	0.00	0 000
114	256 00	281 00	0	0 00	0.000
115	256 00	282 00	1	282 00	0.000
116	263 50	274 00	0	0.00	0 000
117	263 50	276 50	0	0 00	0 000
118	263 50	279 00	0	0 00	0.000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0.000
121	271 00	274 00	0	0 00	0.000
122	271 00	276 50	0	0.00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0.000
125	271 00	282 00	1	282 00	0 000
126	278 50	274 00	0	0 00	0 000
127	278 50	276 50	0	0.00	0.000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0.000
130	278 50	282 00	1	282 00	0 000
131	286 00	274 00	0	0 00	0.000
132	286 00	276 50	0	0 00	0 000
133	286 00	279 00	0	0.00	0 000
134	286 00	281 00	0	0 00	0.000
135	286 00	282 00	1	282 00	0 000
136	293 50	274 00	0	0.00	0.000
137	293 50	276 50	0	0 00	0 000
138	293 50	279 00	0	0 00	0.000

139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0 000
141	310 00	274 00	0	0 00	0 000
142	310 00	276 50	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	274 00	0	0 00	0 000
147	326 50	276 50	0	0 00	0 000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0 000
150	326 50	282 00	1	282 00	0 000
151	343 00	274 00	0	0 00	0 000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0 00	0 000
158	359 50	279 00	0	0 00	0 000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	274 00	0	0 00	0 000
162	376 00	276 50	0	0 00	0 000
163	376 00	279 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0 000
166	400 00	274 00	0	0 00	0 000
167	400 00	276 50	0	0 00	0 000
168	400 00	279 00	0	0 00	0 000
169	400 00	281 00	0	0 00	0 000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4

49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	4
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	4
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	4
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	5
109	134	139	140	135	5
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
 LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
1	8	807E-0007
2	1	744E-0006
3	8.612E-0007	
4	-1	219E-0008
5	1	258E-0006
10	1	350E-0005
15	6.550E-0005	
20	1	132E-0004
21	1	728E-0008
33	5.79E-0007	
39	3	451E-0007
45	2	788E-0007
51	3	179E-0007
57	2	641E-0007
63	1	883E-0007
69	2	389E-0007
75	1	457E-0007
115	-3	356E-0005
120	-2	952E-0005
125	-1	928E-0005
130	-1	051E-0005
135	-6	725E-0005
140	-3	754E-0005
145	-6	302E-0007
150	-3	493E-0007
155	-1	925E-0007
160	-1	089E-0007
165	-7	905E-0008
170	-3	568E-0008

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 1 991E-0004
 SAINDO = -1 991E-0004

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS	CARGA	PRESSAO NEUTRA	FUNCAO	
NUMERO	X Y	HIDRAULICA	(UNID DE CARGA)	FLUXO	
1	0 00	274 00	296 00	22 00	4 403E-0007
2	0 00	276 50	296 00	19 50	1 753E-0006
3	0 00	279 00	296 00	17 00	3.055E-0006
4	0 00	281 00	296 00	15 00	3.480E-0006
5	0 00	282 00	296 00	14.00	4 103E-0006
6	40 00	274 00	295 92	21 92	0 000E+0000
7	40 00	276 50	295 92	19.42	5 857E-0006
8	40 00	279 00	295 93	16.93	1 164E-0005
9	40 00	281 00	295 97	14.97	1 161E-0005
10	40 00	282 00	296 00	14 00	1.148E-0005
11	80 00	274 00	295 63	21 63	0.000E+0000
12	80 00	276 50	295 63	19 13	2 516E-0005
13	80 00	279 00	295 64	16 64	5 032E-0005
14	80 00	281 00	295 88	14 88	5 074E-0005
15	80 00	282 00	296 00	14 00	5 098E-0005
16	120 00	274 00	294 29	20.29	0.000E+0000
17	120 00	276 50	294 30	17 80	7.029E-0005
18	120 00	279 00	294 32	15 32	1 398E-0004
19	120 00	281 00	295 43	14 43	1 404E-0004
20	120 00	282 00	296 00	14 00	1 403E-0004
21	120 00	284 00	296 00	12 00	1 969E-0004
22	130 00	274 00	293 54	19 54	0 000E+0000
23	130 00	276 50	293 54	17 04	9 790E-0005
24	130 00	279 00	293 54	14 54	1 984E-0004
25	130 00	281 00	293 42	12 42	2 019E-0004
26	130 00	282 00	293 34	11 34	2 050E-0004
27	130 00	284 00	296 00	12 00	1 970E-0004
28	140 00	274 00	292 76	18 76	0 000E+0000
29	140 00	276 50	292 76	16 26	9 753E-0005
30	140 00	279 00	292 76	13.76	1 947E-0004
31	140 00	281 00	292 77	11 77	1 960E-0004
32	140 00	282 00	292 78	10 78	1 963E-0004
33	140 00	284 00	296 00	12 00	1 971E-0004

34	160 00	274.00	291.20	17 20	0 000E+0000
35	160 00	276 50	291 20	14 70	9 752E-0005
36	160 00	279 00	291.20	12.20	1 951E-0004
37	160 00	281 00	291 20	10.20	1 967E-0004
38	160 00	282 00	291 20	9 20	1 976E-0004
39	160 00	284 00	296 00	12 00	1.974E-0004
40	170 00	274 00	290 42	16 42	0 000E+0000
41	170 00	276 50	290 42	13 92	9 771E-0005
42	170 00	279 00	290 42	11 42	1 954E-0004
43	170 00	281 00	290 42	9 42	1 970E-0004
44	170 00	282.00	290 42	8 42	1.977E-0004
45	170 00	284 00	296 00	12 00	1.978E-0004
46	180 00	274 00	289.63	15.63	0 000E+0000
47	180 00	276 50	289 63	13 13	9.785E-0005
48	180 00	279 00	289 63	10.63	1.957E-0004
49	180 00	281 00	289 64	8 64	1 973E-0004
50	180 00	282 00	289 64	7 64	1 981E-0004
51	180 00	284 00	296 00	12 00	1 981E-0004
52	190 00	274 00	288 85	14.85	0 000E+0000
53	190 00	276 50	288 85	12.35	9 801E-0005
54	190 00	279 00	288.85	9.85	1 960E-0004
55	190 00	281 00	288 86	7 86	1.976E-0004
56	190 00	282 00	288 86	6 86	1.983E-0004
57	195 00	274 00	296 00	12 00	1.983E-0004
58	195 00	276 50	288 16	14 46	0 000E+0000
59	195 00	276 50	288 16	11 96	9 811E-0005
60	195 00	279.00	288 46	9 46	1.962E-0004
61	195 00	281 00	288 47	7 47	1.978E-0004
62	195 00	282 00	288 47	6.47	1.986E-0004
63	195 00	284 00	296 00	12.00	1 986E-0004
64	200 00	274 00	288 07	14 07	0 000E+0000
65	200 00	276 50	288.07	11 57	9.821E-0005
66	200 00	279 00	288 07	9 07	1.964E-0004
67	200 00	281 00	288 07	7.07	1.980E-0004
68	200 00	282 00	288.08	6.08	1 988E-0004
69	200 00	284 00	296 00	12 00	1 988E-0004
70	207 00	274 00	287 51	13 51	0.000E+0000
71	207 00	276 50	287 51	11 01	9.832E-0005
72	207 00	279 00	287 51	8.51	1.967E-0004
73	207 00	281 00	287 52	6.52	1 982E-0004
74	207.00	282 00	287 52	5.52	1.991E-0004
75	207 00	284 00	296.00	12 00	1.990E-0004
76	214 00	274 00	286.96	12.96	0.000E+0000
77	214 00	276 50	286 96	10 46	9.835E-0005
78	214 00	279 00	286 96	7.96	1.967E-0004
79	214 00	281 00	286 96	5.96	1.983E-0004
80	214 00	282 00	286.96	4.96	1 991E-0004
81	221 00	274 00	286.41	12 41	0 000E+0000
82	221 00	276 50	286 41	9 91	9.835E-0005
83	221 00	279 00	286 41	7.41	1.967E-0004
84	221 00	281 00	286 41	5 41	1 983E-0004
85	221 00	282 00	286 41	4 41	1 991E-0004
86	228 00	274 00	285 86	11 86	0.000E+0000
87	228 00	276 50	285 86	9 36	9.835E-0005
88	228 00	279 00	285 86	6 86	1.967E-0004
89	228 00	281 00	285 86	4 86	1 983E-0004
90	228 00	282 00	285.86	3 86	1 991E-0004
91	235 00	274 00	285.31	11 31	0 000E+0000
92	235 00	276 50	285 31	8 81	9 834E-0005
93	235 00	279 00	285 31	6 31	1.967E-0004
94	235 00	281 00	285 31	4 31	1.983E-0004
95	235 00	282 00	285 31	3.31	1 991E-0004
96	240 50	274 00	284 88	10.88	0 000E+0000
97	240 50	276 50	284 88	8 38	9 835E-0005
98	240 50	279 00	284 88	5 88	1 967E-0004
99	240 50	281 00	284 88	3.88	1.983E-0004
100	240 50	282 00	284 88	2.88	1.991E-0004
101	246 00	274 00	284 45	10.45	0.000E+0000
102	246 00	276 50	284 45	7 95	9 816E-0005
103	246 00	279 00	284.45	5 45	1 966E-0004
104	246 00	281 00	284 45	3 45	1 983E-0004
105	246 00	282.00	284 44	2.44	1 991E-0004
106	251 00	274 00	284 06	10.06	0.000E+0000
107	251 00	276 50	284 05	7 55	9 613E-0005
108	251 00	279 00	284 05	5 05	1 938E-0004
109	251 00	281 00	284 01	3.01	1 966E-0004
110	251 00	282 00	284 07	2 07	1 991E-0004
111	256 00	274 00	283 68	9 68	0 000E+0000
112	256 00	276 50	283 67	7 17	8.936E-0005
113	256 00	279 00	283 65	4.65	1 794E-0004
114	256 00	281 00	282 61	1 61	1 812E-0004
115	256 00	282 00	282 00	0.00	1.823E-0004
116	263 50	274 00	283 18	9.18	0.000E+0000
117	263 50	276 50	283 18	6 68	7 500E-0005
118	263 50	279 00	283 16	4 16	1 496E-0004

119	263 50	281 00	282 38	1 38	1.505E-0004
120	263 50	282 00	282 00	0 00	1 507E-0004
121	271 00	274 00	282 78	8 78	0 000E+0000
122	271 00	276 50	282 77	6 27	6 310E-0005
123	271 00	279 00	282 76	3 76	1 258E-0004
124	271 00	281 00	282 26	1 26	1 264E-0004
125	271 00	282 00	282 00	0 00	1 263E-0004
126	278 50	274 00	282 42	8 42	0.000E+0000
127	278 50	276 50	282 42	5 92	5.344E-0005
128	278 50	279 00	282 42	3.42	1 075E-0004
129	278 50	281 00	282 14	1 14	1 094E-0004
130	278 50	282 00	282 00	0 00	1 114E-0004
131	286 00	274 00	282 13	8 13	0 000E+0000
132	286 00	276 50	282 11	5 61	3 788E-0005
133	286 00	279 00	282 07	3 07	7 790E-0005
134	286 00	281 00	282 02	1 02	7 611E-0005
135	286 00	282 00	282 00	0 00	7 256E-0005
136	293 50	274 00	282 02	8.02	0.000E+0000
137	293 50	276 50	282 02	5.52	1 066E-0005
138	293 50	279 00	282 01	3 01	1.889E-0005
139	293 50	281 00	282 01	1 01	1.953E-0005
140	293 50	282 00	282 00	0 00	2 017E-0005
141	310 00	274 00	282 01	8 01	0 000E+0000
142	310 00	276 50	282 01	5 51	7 472E-0007
143	310 00	279 00	282 01	3 01	1 626E-0006
144	310 00	281 00	282 00	1 00	1 384E-0006
145	310 00	282 00	282 00	0 00	1 081E-0006
146	326 50	274 00	282 01	8.01	0 000E+0000
147	326 50	276 50	282 01	5 51	2 705E-0007
148	326 50	279 00	282 01	3 01	5 061E-0007
149	326 50	281 00	282 00	1 00	5.449E-0007
150	326 50	282 00	282 00	0 00	5 908E-0007
151	343 00	274 00	282 00	8 00	0 000E+0000
152	343 00	276 50	282 00	5 50	1 623E-0007
153	343 00	279 00	282 00	3 00	3.301E-0007
154	343 00	281 00	282 00	1.00	3.266E-0007
155	343 00	282 00	282 00	0 00	3 199E-0007
156	359 50	274 00	282 00	8 00	0 000E+0000
157	359 50	276 50	282 00	5 50	8 387E-0008
158	359 50	279 00	282 00	3 00	1.658E-0007
159	359 50	281 00	282 00	1.00	1 674E-0007
160	359 50	282 00	282 00	0 00	1 692E-0007
161	376 00	274 00	282 00	8 00	0.000E+0000
162	376 00	276 50	282 00	5.50	3 938E-0008
163	376 00	279 00	282 00	3 00	7 860E-0008
164	376 00	281 00	282 00	1 00	7 891E-0008
165	376 00	282 00	282 00	0 00	7.520E-0008
166	400 00	274 00	282 00	8 00	0.000E+0000
167	400 00	276 50	282 00	5.50	0 000E+0000
168	400 00	279 00	282 00	3 00	0.000E+0000
169	400 00	281 00	282 00	1 00	-2.153E-0015
170	400 00	282 00	282 00	0.00	1 784E-0008

ANEXO 12A

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=====
Barragem de Ubaldinho - Ceara - Anexo 12 A
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          5
NUMERO DE NOS                170
NUMERO DE ELEMENTOS         133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS	ANGULO ENTRE
	K1 K2	K1 F OX
1	1 00000E-0008 1 00000E-0008	0 00
2	1 00000E-0005 1 00000E-0005	0 00
3	1 00000E-0005 1 00000E-0005	0 00
4	5 00000E-0004 5 00000E-0004	0 00
5	1 00000E-0003 1 00000E-0003	0 00

DADOS DOS NOS

NO N R	COORDENADAS DOS NOS	COND	CARGA	VAZAO
	X Y	CONT	HIDRAULICA	
1	0 00 274 00	0	0 00	0.000
2	0 00 276 50	0	0 00	0 000
3	0 00 279 00	0	0 00	0 000
4	0 00 281 00	0	0 00	0.000
5	0 00 282 00	1	296 00	0 000
6	40 00 274 00	0	0 00	0 000
7	40 00 276 50	0	0 00	0 000
8	40 00 279 00	0	0.00	0.000
9	40 00 281 00	0	0 00	0.000
10	40 00 282 00	1	296 00	0 000
11	80 00 274 00	0	0 00	0 000
12	80 00 276 50	0	0 00	0.000
13	80 00 279 00	0	0 00	0.000
14	80 00 281 00	0	0 00	0 000
15	80 00 282 00	1	296 00	0 000
16	120 00 274 00	0	0 00	0 000
17	120 00 276.50	0	0 00	0.000
18	120 00 279 00	0	0 00	0 000
19	120 00 281 00	0	0 00	0 000
20	120 00 282 00	1	296 00	0 000
21	120 00 284 00	1	296 00	0 000
22	130 00 274.00	0	0 00	0.000
23	130 00 276.50	0	0 00	0.000
24	130 00 279 00	0	0 00	0 000
25	130 00 281 00	0	0 00	0 000
26	130 00 282 00	0	0 00	0 000
27	130 00 284 00	1	296 00	0 000
28	140 00 274 00	0	0 00	0.000
29	140 00 276 50	0	0 00	0 000
30	140 00 279 00	0	0 00	0 000
31	140 00 281 00	0	0 00	0 000
32	140 00 282.00	0	0.00	0.000
33	140 00 284 00	1	296.00	0.000
34	160 00 274 00	0	0 00	0 000
35	160 00 276 50	0	0 00	0 000
36	160 00 279 00	0	0 00	0.000
37	160 00 281 00	0	0 00	0.000
38	160 00 282 00	0	0 00	0 000
39	160 00 284 00	1	296 00	0 000
40	170 00 274 00	0	0 00	0 000
41	170 00 276 50	0	0 00	0.000
42	170 00 279 00	0	0 00	0 000
43	170 00 281 00	0	0 00	0 000
44	170 00 282 00	0	0 00	0.000
45	170 00 284 00	1	296 00	0 000
46	180 00 274 00	0	0.00	0 000
47	180 00 276 50	0	0 00	0.000
48	180 00 279 00	0	0 00	0 000
49	180 00 281 00	0	0 00	0 000
50	180 00 282 00	0	0 00	0.000
51	180 00 284 00	1	296 00	0 000
52	190 00 274 00	0	0 00	0 000
53	190 00 276 50	0	0 00	0.000

54	190 00	279 00	0	0 00	0.000
55	190 00	281 00	0	0 00	0.000
56	190 00	282 00	0	0 00	0.000
57	190 00	284 00	1	296.00	0.000
58	195 00	274 00	0	0.00	0.000
59	195 00	276 50	0	0 00	0.000
60	195 00	279 00	0	0.00	0.000
61	195 00	281 00	0	0 00	0.000
62	195 00	282 00	0	0 00	0.000
63	195 00	284 00	1	296.00	0.000
64	200 00	274 00	0	0 00	0.000
65	200 00	276 50	0	0.00	0.000
66	200 00	279 00	0	0 00	0.000
67	200 00	281 00	0	0 00	0.000
68	200 00	282 00	0	0 00	0.000
69	200.00	284 00	1	296 00	0.000
70	207 00	274 00	0	0 00	0.000
71	207.00	276 50	0	0 00	0.000
72	207 00	279 00	0	0 00	0.000
73	207 00	281 00	0	0 00	0.000
74	207 00	282 00	0	0 00	0.000
75	207 00	284 00	1	296 00	0.000
76	214 00	274 00	0	0 00	0.000
77	214 00	276 50	0	0 00	0.000
78	214 00	279 00	0	0 00	0.000
79	214 00	281 00	0	0 00	0.000
80	214 00	282 00	0	0.00	0.000
81	221 00	274 00	0	0.00	0.000
82	221 00	276 50	0	0 00	0.000
83	221 00	279 00	0	0.00	0.000
84	221 00	281 00	0	0.00	0.000
85	221 00	282 00	0	0 00	0.000
86	228 00	274 00	0	0 00	0.000
87	228 00	276 50	0	0 00	0.000
88	228 00	279 00	0	0 00	0.000
89	228 00	281 00	0	0 00	0.000
90	228 00	282 00	0	0 00	0.000
91	235 00	274.00	0	0 00	0.000
92	235 00	276 50	0	0 00	0.000
93	235 00	279 00	0	0 00	0.000
94	235 00	281 00	0	0 00	0.000
95	235 00	282 00	0	0 00	0.000
96	240 50	274 00	0	0 00	0.000
97	240 50	276 50	0	0 00	0.000
98	240 50	279 00	0	0.00	0.000
99	240.50	281 00	0	0 00	0.000
100	240 50	282.00	0	0 00	0.000
101	246 00	274 00	0	0.00	0.000
102	246 00	276 50	0	0 00	0.000
103	246 00	279 00	0	0 00	0.000
104	246 00	281 00	0	0.00	0.000
105	246 00	282 00	0	0 00	0.000
106	251 00	274 00	0	0 00	0.000
107	251.00	276 50	0	0 00	0.000
108	251 00	279 00	0	0 00	0.000
109	251 00	281 00	0	0 00	0.000
110	251 00	282 00	0	0 00	0.000
111	256 00	274 00	0	0 00	0.000
112	256 00	276 50	0	0.00	0.000
113	256 00	279 00	0	0.00	0.000
114	256 00	281 00	0	0 00	0.000
115	256 00	282 00	1	282 00	0.000
116	263 50	274.00	0	0.00	0.000
117	263.50	276 50	0	0 00	0.000
118	263 50	279.00	0	0 00	0.000
119	263 50	281 00	0	0.00	0.000
120	263 50	282 00	1	282 00	0.000
121	271 00	274 00	0	0.00	0.000
122	271 00	276 50	0	0 00	0.000
123	271 00	279 00	0	0 00	0.000
124	271 00	281 00	0	0 00	0.000
125	271 00	282 00	1	282.00	0.000
126	278 50	274.00	0	0 00	0.000
127	278 50	276 50	0	0.00	0.000
128	278 50	279 00	0	0 00	0.000
129	278 50	281 00	0	0 00	0.000
130	278.50	282 00	1	282.00	0.000
131	286 00	274 00	0	0 00	0.000
132	286 00	276 50	0	0 00	0.000
133	286 00	279 00	0	0 00	0.000
134	286 00	281 00	0	0 00	0.000
135	286 00	282 00	1	282 00	0.000
136	293 50	274 00	0	0 00	0.000
137	293 50	276 50	0	0.00	0.000
138	293 50	279 00	0	0 00	0.000

139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0 000
141	310 00	274 90	0	0 00	0.000
142	310 00	276 50	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	274 00	0	0 00	0.000
147	326 50	276 50	0	0 00	0 000
148	326 50	279 00	0	0 00	0.000
149	326 50	281 00	0	0 00	0.000
150	326 50	282 00	1	282 00	0.000
151	343 00	274 00	0	0 00	0 000
152	343 00	276 50	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	274 00	0	0 00	0 000
157	359 50	276 50	0	0 00	0.000
158	359 50	279 00	0	0 00	0.000
159	359 50	281 00	0	0 00	0.000
160	359 50	282 00	1	282 00	0.000
161	376 00	274 00	0	0 00	0.000
162	376 00	276 50	0	0 00	0 000
163	376 00	279 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0 000
166	400 00	274 00	0	0 00	0.000
167	400 00	276 50	0	0 00	0 000
168	400 00	279 00	0	0 00	0 000
169	400 00	281 00	0	0 00	0 000
170	400 00	282 00	1	282 00	0.000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	4
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	4
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	4
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	4
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	4
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	4
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	4
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	4
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	4
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	4
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	4

49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	4
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	4
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	4
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	4
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	4
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	4
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	4
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	4
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	4
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	4
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	4
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	4
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	4
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	4
107	132	137	138	133	4
108	133	138	139	134	5
109	134	139	140	135	5
110	136	141	142	137	4
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	4
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	4
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	4
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	4
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	4
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 6 07

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
	5	3 053E-0006
	10	1 482E-0005
	15	6 579E-0005
	20	1 132E-0004
	21	1 728E-0008
	27	1.193E-0007
	33	2 579E-0007
	39	3 451E-0007
	45	2 788E-0007
	51	1 411E-0007
	63	1 883E-0007
	69	2 389E-0007
	75	1 457E-0007
	115	-3 356E-0005
	120	-2 952E-0005
	125	-1 928E-0005
	130	-1 051E-0005
	135	-6 725E-0005
	140	-3 754E-0005
	145	-6 302E-0007
	150	-3 493E-0007
	155	-1 925E-0007
	160	-1 089E-0007
	165	-7.904E-0008
	170	-3 568E-0008

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 1 990E-0004
SAINDO = -1 990E-0004

NO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID.DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	274 00	295 97	21.97	0.000E+0000
2	0 00	276 50	295.97	19.47	0 000E+0000
3	0 00	279 00	295 97	16 97	0.000E+0000
4	0 00	281.00	295 99	14.99	0.000E+0000
5	0.00	282.00	296.00	14.00	1.527E-0006
6	40 00	274 00	295.92	21.92	0.000E+0000
7	40.00	276 50	295.92	19 42	5.392E-0006
8	40 00	279 00	295.92	16 92	1.071E-0005
9	40 00	281 00	295.97	14 97	1.074E-0005
10	40 00	282 00	296 00	14.00	1.046E-0005
11	80 00	274 00	295 63	21.63	0 000E+0000
12	80.00	276 50	295 63	19.13	2.504E-0005
13	80 00	279 00	295.64	16.64	5.009E-0005
14	80 00	281 00	295 88	14.88	5 050E-0005
15	80 00	282 00	296 00	14 00	5 076E-0005
16	120 00	274 00	294.29	20.29	0.000E+0000
17	120 00	276 50	294 30	17 80	7.027E-0005
18	120 00	279 00	294 32	15.32	1 398E-0004
19	120 00	281 00	295.43	14 43	1 404E-0004
20	120 00	282 00	296.00	14 00	1.403E-0004
21	120 00	284 00	296 00	12.00	1 969E-0004
22	130.00	274.00	293 54	19 54	0.000E+0000
23	130 00	276 50	293.54	17 04	9.790E-0005
24	130 00	279 00	293 53	14.53	1 984E-0004
25	130 00	281 00	293 42	12 42	2.018E-0004
26	130 00	282 00	293.34	11 34	2.050E-0004
27	130 00	284 00	296.00	12.00	1 969E-0004
28	140 00	274.00	292.76	18 76	0.000E+0000
29	140 00	276 50	292 76	16.26	9 752E-0005
30	140 00	279.00	292.76	13.76	1.947E-0004
31	140 00	281 00	292 77	11.77	1.960E-0004
32	140 00	282.00	292 78	10.78	1.963E-0004
33	140 00	284 00	296.00	12 00	1.971E-0004
34	160 00	274 00	291 20	17.20	0 000E+0000
35	160 00	276 50	291.20	14 70	9.752E-0005
36	160 00	279 00	291 20	12 20	1 951E-0004

37	160 00	281 00	291 20	10 20	1 967E-0004
38	160 00	282 00	291 20	9 20	1.976E-0004
39	160 00	284 00	296 00	12 00	1 974E-0004
40	170 00	274 00	290 42	16 42	0.000E+0000
41	170 00	276 50	290 42	13 92	9 771E-0005
42	170 00	279 00	290 42	11 42	1 954E-0004
43	170 00	281 00	290 42	9 42	1.970E-0004
44	170 00	282 00	290 42	8 42	1 977E-0004
45	170 00	284 00	296 00	12 00	1.977E-0004
46	180 00	274 00	289 63	15.63	0.000E+0000
47	180 00	276 50	289 63	13 13	9 785E-0005
48	180 00	279 00	289 63	10 63	1 957E-0004
49	180 00	281 00	289 64	8.64	1.973E-0004
50	180 00	282 00	289 64	7 64	1 980E-0004
51	180 00	284 00	296 00	12 00	1 980E-0004
52	190 00	274 00	288 85	14 85	0 000E+0000
53	190 00	276 50	288 85	12 35	9 800E-0005
54	190 00	279 00	288 85	9 85	1 960E-0004
55	190 00	281 00	288 86	7 86	1 976E-0004
56	190 00	282 00	288 86	6 86	1 983E-0004
57	190 00	284 00	296 00	12 00	1.983E-0004
58	195 00	274 00	288 46	14.46	0 000E+0000
59	195 00	276 50	288 46	11 96	9 813E-0005
60	195 00	279 00	288 46	9 46	1 962E-0004
61	195 00	281 00	288 47	7 47	1 978E-0004
62	195 00	282 00	288 47	6 47	1 986E-0004
63	195 00	284 00	296 00	12 00	1 986E-0004
64	200 00	274 00	288 06	14 06	0 000E+0000
65	200 00	276 50	288 06	11 56	9 825E-0005
66	200 00	279 00	288 07	9.07	1 967E-0004
67	200 00	281 00	288 07	7 07	1.982E-0004
68	200 00	282 00	288 08	6 08	1 988E-0004
69	200 00	284 00	296 00	12.00	1 988E-0004
70	207 00	274 00	287 51	13 51	0 000E+0000
71	207 00	276 50	287 51	11 01	9 415E-0005
72	207 00	279 00	287 51	8.51	1 912E-0004
73	207 00	281 00	287 52	6 52	1.951E-0004
74	207 00	282 00	287 52	5 52	1 989E-0004
75	207 00	284 00	296.00	12.00	1 990E-0004
76	214 00	274 00	286 96	12 96	0.000E+0000
77	214 00	276 50	286 96	10 46	7 423E-0005
78	214 00	279 00	286 96	7 96	1 478E-0004
79	214 00	281 00	286 96	5.96	1.482E-0004
80	214 00	282 00	286 96	4 96	1 477E-0004
81	221 00	274 00	286.41	12 41	0.000E+0000
82	221 00	276 50	286 41	9 91	5 559E-0005
83	221 00	279 00	286 41	7 41	1 107E-0004
84	221 00	281 00	286 41	5 41	1.113E-0004
85	221 00	282 00	286 41	4 41	1.115E-0004
86	228 00	274 00	285 86	11 86	0.000E+0000
87	228 00	276 50	285 86	9 36	4 080E-0005
88	228 00	279 00	285 86	6 86	8 126E-0005
89	228 00	281 00	285 86	4 86	8.169E-0005
90	228 00	282 00	285 86	3 86	8 173E-0005
91	235 00	274 00	285 31	11 31	0 000E+0000
92	235 00	276 50	285 31	8 81	2.863E-0005
93	235 00	279 00	285 31	6 31	5 703E-0005
94	235 00	281 00	285 31	4 31	5 734E-0005
95	235 00	282 00	285 31	3 31	5 737E-0005
96	240 50	274 00	284 88	10 88	0 000E+0000
97	240 50	276 50	284 88	8 38	2 041E-0005
98	240 50	279 00	284 88	5 88	4 065E-0005
99	240 50	281 00	284 88	3.88	4.086E-0005
100	240 50	282 00	284 88	2 88	4.089E-0005
101	246 00	274 00	284 45	10 45	0 000E+0000
102	246 00	276 50	284 45	7.95	1.299E-0005
103	246 00	279 00	284 45	5 45	2 589E-0005
104	246 00	281 00	284 45	3 45	2 602E-0005
105	246 00	282 00	284 44	2 44	2.602E-0005
106	251 00	274 00	284 06	10 06	0 000E+0000
107	251 00	276 50	284 05	7 55	6 721E-0006
108	251 00	279 00	284 05	5.05	1.330E-0005
109	251 00	281 00	284 01	3 01	1 344E-0005
110	251 00	282 00	284 07	2 07	1 362E-0005
111	256 00	274 00	283 68	9 68	0 000E+0000
112	256 00	276 50	283 67	7 17	1 594E-0006
113	256 00	279 00	283 65	4.65	2.086E-0006
114	256 00	291 00	282 61	1 61	1 197E-0006
115	256 00	282 00	282 00	0 00	0 000E+0000
116	263 50	274 00	283 18	9 18	0 000E+0000
117	263 50	276 50	283 18	6 68	-4 589E-0008
118	263 50	279 00	283 16	4 16	-1.418E-0007
119	263 50	281 00	282 38	1 38	-9.748E-0008
120	263 50	282 00	282 00	0 00	0 000E+0000
121	271 00	274 00	282 78	8 78	0.000E+0000

122	271 00	276 50	282 77	6.27	-3 486E-0009
123	271 00	279 00	282 76	3 76	8 923E-0009
124	271 00	281 00	282 26	1.26	8.780E-0009
125	271 00	282 00	282 00	0.00	0.000E+0000
126	278 50	274 00	282 42	8 42	0 000E+0000
127	278 50	276 50	282 42	5 92	9 174E-0010
128	278 50	279 00	282 42	3.42	-4 329E-0010
129	278 50	281 00	282 14	1.14	-9.161E-0010
130	278 50	282 00	282 00	0 00	0 000E+0000
131	286 00	274 00	282 13	8 13	0.000E+0000
132	286 00	276 50	282 11	5 61	-1 297E-0010
133	286 00	279 00	282.07	3.07	-2.385E-0012
134	286 00	281 00	282 02	1 02	2.108E-0010
135	286 00	282 00	282 00	0.00	0 000E+0000
136	293 50	274 00	282.02	8.02	0 000E+0000
137	293 50	276 50	282 02	5.52	8.657E-0012
138	293 50	279 00	282 01	3.01	-1 349E-0013
139	293 50	281 00	282 01	1.01	-3.434E-0013
140	293 50	282 00	282 00	0 00	0.000E+0000
141	310 00	274 00	282 01	8.01	0.000E+0000
142	310 00	276 50	282 01	5 51	-1 346E-0012
143	310 00	279 00	282 01	3 01	2.076E-0014
144	310 00	281 00	282 00	1 00	5.616E-0014
145	310 00	282 00	282 00	0 00	0.000E+0000
146	310 50	274 00	282 01	8 01	0 000E+0000
147	326 50	276 50	282 01	5.51	2 094E-0013
148	326 50	279 00	282 01	3 01	-3.159E-0015
149	326 50	281 00	282 00	1 00	-9 182E-0015
150	326 50	282 00	282.00	0.00	0 000E+0000
151	343 00	274 00	282 00	8 00	0.000E+0000
152	343 00	276.50	282 00	5.50	-3.258E-0014
153	343 00	279.00	282.00	3.00	4 751E-0016
154	343.00	281 00	282 00	1 00	1.501E-0015
155	343 00	282 00	282.00	0.00	0 000E+0000
156	359 50	274 00	282 00	8 00	0.000E+0000
157	359 50	276 50	282.00	5.50	5.044E-0015
158	359 50	279.00	282 00	3 00	-7.020E-0017
159	359 50	281 00	282 00	1 00	-2.441E-0016
160	359 50	282 00	282 00	0.00	0 000E+0000
161	376 00	274 00	282 00	8 00	0.000E+0000
162	376 00	276 50	282.00	5.50	-6 286E-0016
163	376 00	279 00	282 00	3.00	8.286E-0018
164	376 00	281 00	282.00	1.00	3 178E-0017
165	376 00	282 00	282 00	0 00	0.000E+0000
166	400 00	274 00	282 00	8.00	0.000E+0000
167	400 00	276 50	282 00	5.50	0 000E+0000
168	400 00	279 00	282 00	3 00	0.000E+0000
169	400 00	281 00	282.00	1.00	0.000E+0000
170	400 00	282 00	282 00	0.00	0 000E+0000

ANEXO 13

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=====
Barragem de Ubaldinho - Ceara - Anexo 13
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          5
NUMERO DE NOS                170
NUMERO DE ELEMENTOS          133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS	ANGULO ENTRE K1 E OX
	K1 K2	
1	5 00000E-0004 5 00000E-0004	0 00
2	5 00000E-0004 5 00000E-0004	0 00
3	5 00000E-0004 5 00000E-0004	0 00
4	1 00000E-0005 1 00000E-0005	0 00
5	1 00000E-0005 1 00000E-0005	0 00

DADOS DOS NOS

NO	COORDENADAS	DOS NOS	COND	CARGA	VAZAO
N R	X Y		CONT	HIDRAULICA	
1	0.00	263 00	1	296 00	0 000
2	0 00	274 00	1	296 00	0 000
3	0 00	279 00	1	296 00	0.000
4	0 00	281 00	1	296 00	0 000
5	0 00	282 00	1	296 00	0 000
6	40 00	263 00	0	0 00	0.000
7	40 00	274 00	0	0 00	0.000
8	40 00	279 00	0	0 00	0 000
9	40 00	281 00	0	0 00	0 000
10	40 00	282 00	1	296 00	0.000
11	80 00	263 00	0	0.00	0.000
12	80 00	274 00	0	0 00	0.000
13	80 00	279 00	0	0 00	0.000
14	80 00	281 00	0	0 00	0 000
15	80.00	282 00	1	296 00	0.000
16	120 00	263 00	0	0 00	0.000
17	120 00	274.00	0	0 00	0.000
18	120 00	279 00	0	0 00	0 000
19	120.00	281 00	0	0 00	0 000
20	120 00	281 90	0	0 00	0.000
21	120 00	282.00	1	296.00	0.000
22	130 00	263.00	0	0 00	0.000
23	130 00	274 00	0	0 00	0.000
24	130 00	279 00	0	0 00	0.000
25	130 00	281 00	0	0 00	0 000
26	130 00	281 50	0	0 00	0.000
27	130 00	282.00	1	296 00	0.000
28	140 00	263 00	0	0 00	0.000
29	140 00	274 00	0	0.00	0 000
30	140 00	279 00	0	0 00	0 000
31	140 00	281 00	0	0 00	0 000
32	140 00	281 50	0	0 00	0 000
33	140 00	282 00	1	296 00	0.000
34	160 00	263 00	0	0 00	0 000
35	160 00	274 00	0	0 00	0 000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	281 50	0	0 00	0.000
39	160 00	282 00	1	296 00	0 000
40	170 00	263 00	0	0 00	0 000
41	170 00	274 00	0	0 00	0.000
42	170 00	279 00	0	0 00	0.000
43	170 00	281 00	0	0 00	0 000
44	170 00	281 50	0	0 00	0.000
45	170 00	282 00	1	296 00	0 000
46	180 00	263 00	0	0 00	0 000
47	180 00	274 00	0	0 00	0 000
48	180 00	279 00	0	0 00	0 000
49	180 00	281 00	0	0 00	0 000
50	180 00	281 50	0	0 00	0.000
51	180 00	282 00	1	296 00	0 000
52	190 00	263 00	0	0 00	0 000
53	190 00	274 00	0	0 00	0.000

54	190 00	279 00	0	0 00	0.000
55	190 00	281 00	0	0 00	0 000
56	190 00	281 50	0	0 00	0 000
57	190 00	282 00	1	296 00	0.000
58	195 00	263 00	0	0 00	0 000
59	195 00	274 00	0	0 00	0.000
60	195 00	279 00	0	0 00	0.000
61	195 00	281 00	0	0 00	0 000
62	195 00	281 50	0	0 00	0 000
63	195 00	282 00	1	296 00	0 000
64	200 00	263 00	0	0 00	0 000
65	200 00	274 00	0	0 00	0 000
66	200 00	279 00	0	0 00	0.000
67	200 00	281 00	0	0 00	0 000
68	200 00	281 50	0	0 00	0 000
69	200 00	282 00	1	296 00	0 000
70	207 00	263 00	0	0 00	0 000
71	207 00	274 00	0	0 00	0.000
72	207 00	279 00	0	0 00	0.000
73	207 00	281 00	0	0 00	0.000
74	207 00	281 90	0	0 00	0 000
75	207 00	282 00	1	296 00	0 000
76	214 00	263 00	0	0 00	0 000
77	214 00	274 00	0	0 00	0.000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0.000
81	221 00	263 00	0	0 00	0.000
82	221 00	274 00	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0 000
86	228 00	263 00	0	0.00	0 000
87	228 00	274 00	0	0 00	0 000
88	228 00	279 00	0	0 00	0.000
89	228 00	281 00	0	0 00	0.000
90	228 00	282 00	0	0.00	0 000
91	235 00	263 00	0	0 00	0 000
92	235 00	274 00	0	0 00	0 000
93	235 00	279 00	0	0 00	0.000
94	235 00	281 00	0	0.00	0.000
95	235 00	282 00	0	0 00	0 000
96	240 50	263 00	0	0 00	0.000
97	240 50	274 00	0	0 00	0.000
98	240 50	279 00	0	0 00	0 000
99	240 50	281 00	0	0 00	0 000
100	240 50	282 00	0	0 00	0 000
101	246 00	263 00	0	0 00	0.000
102	246 00	274 00	0	0 00	0.000
103	246 00	279 00	0	0 00	0 000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0 000
106	251 00	263 00	0	0 00	0 000
107	251 00	274 00	0	0 00	0 000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0.000
111	256 00	263 00	0	0 00	0.000
112	256 00	274 00	0	0 00	0 000
113	256 00	279 00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0 000
116	263 50	263 00	0	0 00	0 000
117	263 50	274 00	0	0 00	0.000
118	263 50	279 00	0	0 00	0.000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0 000
121	271 00	263 00	0	0 00	0 000
122	271 00	274 00	0	0 00	0.000
123	271 00	279 00	0	0.00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282 00	0 000
126	278 50	263 00	0	0 00	0 000
127	278 50	274 00	0	0 00	0 000
128	278 50	279 00	0	0 00	0.000
129	278 50	281 00	0	0.00	0 000
130	278 50	282 00	1	282 00	0 000
131	286 00	263 00	0	0 00	0 000
132	286 00	274 00	0	0 00	0.000
133	286 00	279 00	0	0.00	0 000
134	286 00	281 00	0	0.00	0 000
135	286 00	282 00	1	282 00	0.000
136	293 50	263 00	0	0 00	0 000
137	293 50	274 00	0	0 00	0 000
138	293 50	279 00	0	0 00	0 000

139	293 50	281 00	0	0 00	0.000
140	293 50	282 00	1	282 00	0 000
141	310 00	263 00	0	0 00	0 000
142	310 00	274 00	0	0 00	0.000
143	310 00	279 00	0	0 00	0.000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	263 00	0	0 00	0.000
147	326 50	274 00	0	0 00	0.000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0.00	0.000
150	326 50	282 00	1	282 00	0 000
151	343 00	263 00	0	0 00	0 000
152	343 00	274 00	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0.000
155	343 00	282 00	1	282 00	0 000
156	359 50	263 00	0	0 00	0.000
157	359 50	274 00	0	0 00	0 000
158	359 50	279 00	0	0 00	0.000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	263 00	0	0 00	0 000
162	376 00	274 00	0	0 00	0 000
163	376 00	279 00	0	0.00	0.000
164	376 00	281 00	0	0.00	0 000
165	376 00	282 00	1	282.00	0 000
166	400 00	263 00	0	0.00	0.000
167	400 00	274 00	0	0 00	0.000
168	400 00	279 00	0	0 00	0 000
169	400.00	281.00	0	0.00	0.000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	5
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	5
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	5
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	5
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	5
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	5
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	5
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	5
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	5
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	5
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	5

49	50	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	5
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	5
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	5
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	5
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	5
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	5
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	5
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	5
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	5
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	5
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	5
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	5
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	5
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	5
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	5
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	5
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	5
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	5
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	5
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	5
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 97

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
1	-9	815E-0013
2	-8	508E-0013
3	1	622E-0014
4	2	479E-0013
5	3	452E-0012
10	-2	945E-0011
15	4	079E-0010
21	3	246E-0009
27	5	974E-0009
33	2	11E-0007
39	5	013E-0007
51	1	433E-0006
57	2	543E-0006
63	4	015E-0007
69	4	726E-0005
75	4	026E-0004
115	-4	066E-0004
120	-4	419E-0005
125	-1	017E-0006
130	-1	825E-0006
135	-7	235E-0007
140	-4	644E-0007
145	-1	672E-0007
150	-2	732E-0008
155	-4	458E-0009
160	-7	273E-0010
165	-1	271E-0010
170	-1	644E-0011

FLUXOS TOTAIS DO SISTEMA
ENTRANDO = 4 550E-0004
SAINDO = -4 550E-0004

NO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	263 00	296 00	33 00	-4 907E-0013
2	0 00	274 00	296 00	22 00	-1 407E-0012
3	0 00	279 00	296 00	17 00	-1 824E-0012
4	0 00	281 00	296 00	15 00	-1 692E-0012
5	0 00	282 00	296 00	14 00	1 579E-0013
6	40 00	263 00	296 00	33 00	0 000E+0000
7	40 00	274 00	296 00	22 00	1 220E-0011
8	40 00	279 00	296 00	17 00	1 337E-0011
9	40 00	281 00	296 00	15 00	-3 914E-0012
10	40 00	282 00	296 00	14 00	-1 284E-0011
11	80 00	263 00	296 00	33 00	0 000E+0000
12	80 00	274 00	296 00	22 00	-1 488E-0010
13	80 00	279 00	296 00	17 00	-1 610E-0010
14	80 00	281 00	296 00	15 00	6 418E-0011
15	80 00	282 00	296 00	14 00	1 764E-0010
16	120 00	263 00	296 00	33 00	0 000E+0000
17	120 00	274 00	296 00	22 00	2 152E-0009
18	120 00	279 00	296 00	17 00	2 391E-0009
19	120 00	281 00	296 00	15 00	1 036E-0009
20	120 00	281 90	296 00	14 10	3 804E-0010
21	120 00	282 00	296 00	14 00	2 003E-0009
22	130 00	263 00	296 00	33 00	0 000E+0000
23	130 00	274 00	296 00	22 00	7 703E-0009
24	130 00	279 00	296 00	17 00	8 719E-0009
25	130 00	281 00	296 00	15 00	7 831E-0009
26	130 00	281 50	296 00	14 50	7 549E-0009
27	130 00	282 00	296 00	14 00	6 613E-0009
28	140 00	263 00	296 00	33 00	0 000E+0000
29	140 00	274 00	296 00	22 00	2 157E-0008
30	140 00	279 00	296 00	17 00	2 467E-0008
31	140 00	281 00	296 00	15 00	3 237E-0008
32	140 00	281 50	296 00	14 50	3 390E-0008
33	140 00	282 00	296 00	14 00	3 648E-0008

Anexos Fl 119/186

000150

34	160 00	263 00	295 99	32 99	0.000E+0000
35	160 00	274 00	295 99	21 99	1 872E-0007
36	160 00	279 00	296 00	17 00	2.113E-0007
37	160 00	281 00	296 00	15 00	1 893E-0007
38	160 00	281 50	296 00	14 50	1 841E-0007
39	160 00	282 00	296 00	14 00	1 741E-0007
40	170 00	263 00	295 96	32 96	0 000E+0000
41	170 00	274 00	295 98	21 98	5 459E-0007
42	170.00	279 00	296.00	17 00	6 169E-0007
43	170 00	281 00	296 00	15 00	5 612E-0007
44	170 00	281 50	296 00	14 50	5 300E-0007
45	170 00	282 00	296 00	14 00	5 354E-0007
46	180 00	263 00	295 87	32 87	0 000E+0000
47	180 00	274 00	295 94	21.94	1 507E-0006
48	180 00	279 00	296 00	17 00	1 701E-0006
49	180 00	281 00	296 00	15 00	1 631E-0006
50	180 00	281 50	296 00	14 50	1 682E-0006
51	180 00	282 00	296 00	14 00	1 503E-0006
52	190 00	263 00	295 65	32 65	0.000E+0000
53	190.00	274 00	295 83	21 83	4 136E-0006
54	190 00	279 00	296 00	17 00	4 668E-0006
55	190 00	281 00	296 00	15 00	3 584E-0006
56	190 00	281 50	296 00	14 50	2 868E-0006
57	190 00	282 00	296 00	14 00	3 491E-0006
58	195 00	263 00	295 11	32 41	0 000E+0000
59	195 00	274 00	295 71	21 71	6 873E-0006
60	195 00	279 00	296 00	17 00	7 806E-0006
61	195 00	281 00	296 00	15 00	1 030E-0005
62	195 00	281 50	296 00	14 50	1 377E-0005
63	195 00	282 00	296 00	14 00	4.963E-0006
64	200.00	263 00	295 04	32 04	0 000E+0000
65	200 00	274 00	295 49	21 49	1 114E-0005
66	200 00	279 00	296 01	17 01	1.349E-0005
67	200 00	281 00	296 01	15 01	-1 065E-0005
68	200 00	281 50	296 00	14 50	-2 872E-0005
69	200 00	282 00	296 00	14 00	2 879E-0005
70	207 00	263 00	294 21	31 21	0 000E+0000
71	207 00	274 00	294 80	20 80	1 884E-0005
72	207 00	279 00	295 74	16 74	3 006E-0005
73	207 00	281 00	295 85	14 85	3 189E-0004
74	207 00	281 90	295 96	14 06	4 550E-0004
75	207 00	282 00	296.00	14.00	2.537E-0004
76	214 00	263 00	293 03	30 03	0 000E+0000
77	214 00	274 00	293 43	19 43	2 435E-0005
78	214 00	279 00	293 83	14 83	3 751E-0005
79	214 00	281 00	293 82	12 82	3.166E-0004
80	214 00	282 00	293 80	11.80	4 550E-0004
81	221 00	263 00	291 53	28 53	0 000E+0000
82	221 00	274 00	291 72	17 72	2 702E-0005
83	221 00	279 00	291 87	12 87	4 040E-0005
84	221 00	281 00	291 88	10 88	3 167E-0004
85	221 00	282 00	291 88	9 88	4 550E-0004
86	228 00	263 00	289 85	26 85	0 000E+0000
87	228 00	274 00	289 90	15 90	2 796E-0005
88	228 00	279 00	289 94	10 94	4 144E-0005
89	228 00	281 00	289 94	8 94	3 172E-0004
90	228 00	282 00	289 94	7 94	4 550E-0004
91	235 00	263 00	288 12	25 12	0 000E+0000
92	235 00	274 00	288 06	14 06	2 771E-0005
93	235 00	279 00	288 01	9 01	4.116E-0005
94	235 00	281 00	288.01	7 01	3 171E-0004
95	235 00	282 00	288 01	6 01	4 550E-0004
96	240 50	263 00	286 79	23 79	0 000E+0000
97	240 50	274 00	286 63	12 63	2.660E-0005
98	240 50	279 00	286 50	7 50	3.993E-0005
99	240 50	281 00	286 50	5 50	3 165E-0004
100	240 50	282 00	286 50	4 50	4 550E-0004
101	246 00	263 00	285 56	22 56	0.000E+0000
102	246 00	274 00	285 25	11 25	2 435E-0005
103	246 00	279 00	284 97	5 97	3 734E-0005
104	246 00	281 00	284 97	3 97	3 165E-0004
105	246 00	282 00	284 97	2 97	4 550E-0004
106	251 00	263 00	284.58	21.58	0 000E+0000
107	251 00	274 00	284 11	10 11	2 093E-0005
108	251 00	279 00	283 57	4.57	3.258E-0005
109	251 00	281 00	283 57	2.57	3 080E-0004
110	251 00	282 00	283 59	1 59	4 550E-0004
111	256 00	263 00	283.77	20 77	0 000E+0000
112	256 00	274 00	283 19	9 19	1 633E-0005
113	256 00	279 00	282 26	3 26	2.403E-0005
114	256 00	281 00	282 15	1 15	1 772E-0004
115	256 00	282 00	282 00	0 00	2 517E-0004
116	263 50	263 00	282 91	19 91	0 000E+0000
117	263 50	274 00	282 47	8.47	9 220E-0006
118	263 50	279 00	281 99	2 99	1 141E-0005

119	263 50	281 00	281 99	0 99	2.393E-0005
120	263 50	282 00	282 00	0 00	2.632E-0005
121	271 00	263 00	282 43	19 43	0.000E+0000
122	271 00	274 00	282 20	8 20	4.535E-0006
123	271 00	279 00	282 00	3 00	5.150E-0006
124	271 00	281 00	282 00	1 00	4.141E-0006
125	271 00	282 00	282 00	0 00	3.721E-0006
126	278 50	263 00	282 20	19 20	0.000E+0000
127	278 50	274 00	282 09	8 09	2.148E-0006
128	278 50	279 00	282 00	3.00	2.426E-0006
129	278 50	281 00	282.00	1 00	2.364E-0006
130	278 50	282 00	282 00	0 00	2.300E-0006
131	286 00	263 00	282 09	19 09	0.000E+0000
132	286 00	274 00	282 04	8 04	1.008E-0006
133	286 00	279 00	282 00	3 00	1.140E-0006
134	286 00	281 00	282 00	1 00	1.075E-0006
135	286 00	282 00	282 00	0 00	1.026E-0006
136	293 50	263 00	282 04	19 04	0.000E+0000
137	293 50	274 00	282 02	8 02	4.574E-0007
138	293 50	279 00	282 00	3 00	5.165E-0007
139	293 50	281 00	282 00	1 00	4.655E-0007
140	293 50	282 00	282 00	0 00	4.320E-0007
141	310 00	263 00	282 01	19 01	0.000E+0000
142	310 00	274 00	282 00	8 00	9.058E-0008
143	310 00	279 00	282 00	3 00	9.179E-0008
144	310 00	281 00	282 00	1 00	1.085E-0007
145	310 00	282 00	282 00	0 00	1.162E-0007
146	326 50	263 00	282 00	19 00	0.000E+0000
147	326 50	274 00	282 00	8 00	1.443E-0008
148	326 50	279 00	282 00	3.00	1.645E-0008
149	326 50	281 00	282 00	1 00	1.843E-0008
150	326 50	282 00	282 00	0 00	1.899E-0008
151	343 00	263 00	282 00	19 00	0.000E+0000
152	343 00	274 00	282 00	8.00	2.565E-0009
153	343 00	279 00	282 00	3 00	2.909E-0009
154	343 00	281 00	282 00	1 00	3.049E-0009
155	343 00	282 00	282 00	0 00	3.100E-0009
156	359 50	263 00	282 00	19 00	0.000E+0000
157	359 50	274 00	282 00	8 00	4.509E-0010
158	359 50	279 00	282 00	3 00	5.114E-0010
159	359 50	281 00	282 00	1 00	5.164E-0010
160	359 50	282 00	282 00	0 00	5.072E-0010
161	376 00	263 00	282 00	19 00	0.000E+0000
162	376 00	274 00	282 00	8 00	7.427E-0011
163	376 00	279 00	282 00	3.00	8.407E-0011
164	376 00	281 00	282 00	1 00	8.288E-0011
165	376 00	282 00	282 00	0 00	8.001E-0011
166	400 00	263 00	282 00	19 00	0.000E+0000
167	400 00	274 00	282 00	8 00	0.000E+0000
168	400 00	279 00	282.00	3 00	0.000E+0000
169	400 00	281 00	282 00	1 00	1.055E-0014
170	400 00	282 00	282.00	0.00	8.232E-0012

ANEXO 14

```

=====
Barragem de Ubaldinho - Ceara - Anexo 14
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
  
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          5
NUMERO DE NOS                170
NUMERO DE ELFMENTOS          133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
  
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS	ANGULO ENTRE
	K1 K2	K1 F. OX
1	1 00000E-0008 1 00000E-0008	0 00
2	1 00000E-0004 1 00000E-0004	0 00
3	1 00000E-0001 1 00000E-0001	0 00
4	1 00000E-0005 1 00000E-0005	0 00
5	1 00000E-0005 1 00000E-0005	0 00

DADOS DOS NOS

NO	COORDENADAS DOS NOS		COND	CARGA	VAZAO
N R	X	Y	CONT	HIDRAULICA	
1	0 00	263 00	1	296 00	0 000
2	0 00	274 00	1	296 00	0 000
3	0 00	279 00	1	296 00	0 000
4	0 00	281 00	1	296 00	0 000
5	0 00	282 00	1	296 00	0 000
6	40 00	263 00	0	0 00	0 000
7	40 00	274 00	0	0 00	0 000
8	40 00	279 00	0	0 00	0 000
9	40 00	281 00	0	0 00	0 000
10	40 00	282 00	1	296 00	0 000
11	80 00	263 00	0	0 00	0 000
12	80 00	274 00	0	0 00	0 000
13	80 00	279 00	0	0 00	0 000
14	80 00	281 00	0	0 00	0 000
15	80 00	282 00	1	296 00	0 000
16	120 00	263 00	0	0 00	0 000
17	120 00	274 00	0	0 00	0 000
18	120 00	279 00	0	0 00	0 000
19	120 00	281 00	0	0 00	0 000
20	120 00	282 00	1	296 00	0 000
21	120 00	284 00	1	296 00	0 000
22	130 00	263 00	0	0 00	0 000
23	130 00	274 00	0	0 00	0 000
24	130 00	279 00	0	0 00	0 000
25	130 00	281 00	0	0 00	0 000
26	130 00	282 00	0	0 00	0 000
27	130 00	284 00	1	296 00	0 000
28	140 00	263 00	0	0 00	0 000
29	140 00	274 00	0	0 00	0 000
30	140 00	279 00	0	0 00	0 000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0 00	0 000
33	140 00	284 00	1	296 00	0 000
34	160 00	263 00	0	0 00	0 000
35	160 00	274 00	0	0 00	0 000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	282 00	0	0 00	0 000
39	160 00	284 00	1	296 00	0 000
40	170 00	263 00	0	0 00	0 000
41	170 00	274 00	0	0 00	0 000
42	170 00	279 00	0	0 00	0 000
43	170 00	281 00	0	0 00	0 000
44	170 00	282 00	0	0 00	0 000
45	170 00	284 00	1	296 00	0 000
46	180 00	263 00	0	0 00	0 000
47	180 00	274 00	0	0 00	0 000
48	180 00	279 00	0	0 00	0 000
49	180 00	281 00	0	0 00	0 000
50	180 00	282 00	0	0 00	0 000
51	180 00	284 00	1	296 00	0 000
52	190 00	263 00	0	0 00	0 000
53	190 00	274 00	0	0 00	0 000

54	190 00	279 00	0	0 00	0.000
55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	284 00	1	296 00	0.000
58	195 00	263 00	0	0 00	0 000
59	195 00	274 00	0	0 00	0.000
60	195 00	279 00	0	0 00	0.000
61	195 00	281 00	0	0.00	0.000
62	195 00	282 00	0	0 00	0 000
63	195 00	284 00	1	296 00	0 000
64	200 00	263 00	0	0 00	0 000
65	200 00	274 00	0	0 00	0 000
66	200 00	279 00	0	0.00	0.000
67	200 00	281 00	0	0 00	0.000
68	200 00	282 00	0	0.00	0 000
69	200 00	284 00	1	296 00	0.000
70	207 00	263 00	0	0 00	0 000
71	207 00	274 00	0	0 00	0.000
72	207 00	279 00	0	0.00	0.000
73	207 00	281 00	0	0 00	0 000
74	207 00	282.00	0	0 00	0 000
75	207 00	284 00	1	296 00	0 000
76	214 00	263 00	0	0 00	0 000
77	214 00	274 00	0	0 00	0 000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0.00	0 000
80	214 00	282 00	0	0.00	0.000
81	221 00	263 00	0	0 00	0.000
82	221 00	274 00	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0.00	0.000
85	221 00	282.00	0	0 00	0 000
86	228 00	263 00	0	0 00	0.000
87	228 00	274 00	0	0 00	0 000
88	228 00	279 00	0	0.00	0 000
89	228 00	281 00	0	0.00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	263 00	0	0.00	0 000
92	235 00	274 00	0	0.00	0.000
93	235 00	279 00	0	0 00	0.000
94	235 00	281.00	0	0 00	0.000
95	235 00	282 00	0	0 00	0 000
96	240 50	263 00	0	0 00	0 000
97	240 50	274 00	0	0.00	0 000
98	240 50	279 00	0	0 00	0.000
99	240 50	281 00	0	0 00	0.000
100	240 50	282 00	0	0 00	0 000
101	246 00	263 00	0	0.00	0 000
102	246 00	274 00	0	0.00	0.000
103	246 00	279 00	0	0 00	0.000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0 000
106	251 00	263 00	0	0.00	0 000
107	251 00	274 00	0	0 00	0 000
108	251 00	279 00	0	0 00	0.000
109	251.00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256.00	263 00	0	0 00	0 000
112	256 00	274 00	0	0 00	0 000
113	256 00	279 00	0	0.00	0 000
114	256 00	281 00	0	0.00	0.000
115	256 00	282.00	1	282 00	0 000
116	263 50	263.00	0	0.00	0.000
117	263 50	274.00	0	0.00	0.000
118	263 50	279 00	0	0.00	0 000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0.000
121	271 00	263 00	0	0.00	0 000
122	271 00	274 00	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282.00	1	282.00	0.000
126	278 50	263 00	0	0 00	0.000
127	278 50	274 00	0	0 00	0 000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0.00	0 000
130	278.50	282 00	1	282 00	0 000
131	286 00	263 00	0	0 00	0 000
132	286 00	274.00	0	0.00	0.000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282.00	0.000
136	293 50	263 00	0	0 00	0 000
137	293 50	274 00	0	0 00	0 000
138	293 50	279.00	0	0 00	0.000

139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0 000
141	310 00	263 00	0	0 00	0 000
142	310 00	274 00	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	263 00	0	0 00	0 000
147	326 50	274 00	0	0 00	0 000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0 000
150	326 50	282 00	1	282 00	0 000
151	343 00	263 00	0	0 00	0 000
152	343 00	274 00	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	263 00	0	0 00	0 000
157	359 50	274 00	0	0 00	0 000
158	359 50	279 00	0	0 00	0 000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	263 00	0	0 00	0 000
162	376 00	274 00	0	0 00	0 000
163	376 00	279 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0 000
166	400 00	263 00	0	0 00	0 000
167	400 00	274 00	0	0 00	0 000
168	400 00	279 00	0	0 00	0 000
169	400 00	281 00	0	0 00	0 000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	5
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	5
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	5
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	5
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	5
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	5
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	5
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	5
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	5
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	5
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	5

49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	5
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	5
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	5
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	5
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	5
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	90	95	96	91	5
75	91	96	97	92	4
76	92	97	98	93	3
77	93	98	99	94	2
78	94	99	100	95	5
79	96	101	102	97	4
80	97	102	103	98	3
81	98	103	104	99	2
82	99	104	105	100	5
83	101	106	107	102	4
84	102	107	108	103	3
85	103	108	109	104	2
86	104	109	110	105	5
87	106	111	112	107	4
88	107	112	113	108	3
89	108	113	114	109	2
90	109	114	115	110	5
91	111	116	117	112	4
92	112	117	118	113	3
93	113	118	119	114	2
94	114	119	120	115	5
95	116	121	122	117	4
96	117	122	123	118	3
97	118	123	124	119	2
98	119	124	125	120	5
99	121	126	127	122	4
100	122	127	128	123	3
101	123	128	129	124	2
102	124	129	130	125	5
103	126	131	132	127	4
104	127	132	133	128	3
105	128	133	134	129	2
106	129	134	135	130	5
107	131	136	137	132	4
108	132	137	138	133	3
109	133	138	139	134	2
110	134	139	140	135	5
111	136	141	142	137	4
112	137	142	143	138	3
113	138	143	144	139	2
114	139	144	145	140	5
115	141	146	147	142	4
116	142	147	148	143	3
117	143	148	149	144	2
118	144	149	150	145	5
119	146	151	152	147	4
120	147	152	153	148	3
121	148	153	154	149	2
122	149	154	155	150	5
123	151	156	157	152	4
124	152	157	158	153	3
125	153	158	159	154	2
126	154	159	160	155	5
127	156	161	162	157	4
128	157	162	163	158	3
129	158	163	164	159	2
130	159	164	165	160	5
131	161	166	167	162	4
132	162	167	168	163	3
133	163	168	169	164	2
134	164	169	170	165	

CICLO NUMERO 1

PASSO 1

LBMAY 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NUMERO	VAZAO
1	4 269E-0009
2	-1 258E-0008
3	-3 918E-0007
4	-5 920E-0007
5	1 017E-0006
10	-2 517E-0007
15	2 357E-0006
20	1 659E-0004
21	6 836E-0009
27	5 235E-0008
3	5 4 7 6 6 6 6
35	5 3 8 E-0007
45	2 558E-0007
51	3 065E-0007
57	2 633E-0007
63	1 915E-0007
69	2 466E-0007
75	1 521E-0007
115	-1 518E-0004
120	-1 651E-0005
125	-3 859E-0007
130	-6 843E-0007
135	-2 714E-0007
140	-1 742E-0007
145	-6 272E-0008
150	-1 025E-0008
155	-1 673E-0009
160	-2 729E-0010
165	-4 769E-0011
170	-6 169E-0012

FLUXOS TOTAIS DO SISTEMA
ENTRANDO = 1 712E-0004
SAINDO = -1 712E-0004

CARGAS HIDRAULICAS E PRESSOES NEUTRAS				PRESSAO NEUTRA	FUNCAO
NO	COORDENADAS DOS NOS		CARGA	(UNID DE CARGA)	FLUXO
NUMERO	X	Y	HIDRAULICA		
1	0 00	263 00	296 00	33 00	2.134E-0009
2	0 00	274 00	296 00	22 00	-2.021E-0009
3	0 00	279 00	296 00	17 00	-2.042E-0007
4	0 00	281 00	296 00	15 00	-6 961E-0007
5	0 00	282 00	296 00	14 00	-4 838E-0007
6	40 00	263 00	296 00	33 00	0 000E+0000
7	40 00	274 00	296 00	22 00	-3.664E-0008
8	40 00	279 00	296 00	17 00	-1.140E-0008
9	40 00	281 00	296 00	15 00	-1.785E-0008
10	40 00	282 00	296 00	14 00	-1 014E-0007
11	80 00	263 00	296 00	33 03	0 000E+0000
12	80 00	274 00	296 02	22 02	4.184E-0007
13	80 00	279 00	296 00	17 00	4 793E-0007
14	80 00	281 00	296 00	15 00	7 792E-0007
15	80 00	282 00	296 00	14 00	9.510E-0007
16	120 00	263 00	295 51	32 51	0.000E+0000
17	120 00	274 00	295 72	21 72	6.545E-0006
18	120 00	279 00	295 97	16 97	9 273E-0006
19	120 00	281 00	295 98	14 98	6 010E-0005
20	120 00	282 00	296 00	14 00	9.504E-0005
21	130 00	263 00	296 00	12 00	1 680E-0004
22	130 00	274 00	294 78	31 78	0 000E+0000
23	130 00	279 00	294 87	20 87	9 253E-0006
24	130 00	279 00	294 95	15 95	1.418E-0005
25	130 00	281 00	294 95	13 95	1.237E-0004
26	130 00	282 00	294 95	12 95	1.799E-0004
27	130 00	284 00	296 00	12 00	1 680E-0004
28	140 00	263 00	293 88	30 88	0 000E+0000
29	140 00	274 00	293 91	19 91	1 054E-0005
30	140 00	279 00	293 93	14 93	1.555E-0005
31	140 00	281 00	293 93	12 93	1.167E-0004
32	140 00	282 00	293 93	11 93	1 670E-0004
33	140 00	284 00	296 00	12 00	1 681E-0004
34	160 00	263 00	291 90	28 90	0 000E+0000
35	160 00	274 00	291 90	17 90	1.110E-0005
36	160 00	279 00	291 90	12 90	1.617E-0005
37	160 00	281 00	291 90	10 90	1 178E-0004
38	160 00	282 00	291 90	9 90	1 686E-0004
39	160 00	284 00	296 00	12 00	1 684E-0004
40	170 00	263 00	290 88	27 88	0 000E+0000
41	170 00	274 00	290 89	16 89	1 116E-0005
42	170 00	279 00	290 89	11 89	1.623E-0005
43	170 00	281 00	290 89	9 89	1.178E-0004
44	170 00	282 00	290 89	8 89	1.686E-0004
45	170 00	284 00	296 00	12 00	1.686E-0004
46	180 00	263 00	289 87	26 87	0 000E+0000
47	180 00	274 00	289 87	15 87	1 119E-0005
48	180 00	279 00	289 87	10 87	1 627E-0005
49	180 00	281 00	289 87	8 87	1 180E-0004
50	180 00	282 00	289 87	7 87	1.689E-0004
51	180 00	284 00	296 00	12 00	1 689E-0004
52	190 00	263 00	288 85	25 85	0 000E+0000
53	190 00	274 00	288 85	14 85	1 121E-0005
54	190 00	279 00	288 85	9 85	1 630E-0005
55	190 00	281 00	288 85	7 85	1.182E-0004
56	190 00	282 00	288 85	6 85	1 692E-0004
57	190 00	284 00	296 00	12 00	1 692E-0004
58	195 00	263 00	288 34	25 34	0 000E+0000
59	195 00	274 00	288 34	14 34	1 121E-0005
60	195 00	279 00	288 34	9 34	1 632E-0005
61	195 00	281 00	288 34	7 34	1 184E-0004
62	195 00	282 00	288 34	6 34	1 694E-0004
63	195 00	284 00	296 00	12 00	1 694E-0004
64	200 00	263 00	287 83	24 83	0.000E+0000
65	200 00	274 00	287 83	13 83	1.122E-0005
66	200 00	279 00	287 83	8 83	1 632E-0005
67	200 00	281 00	287 83	6 83	1 185E-0004
68	200 00	282 00	287 83	5 83	1 696E-0004
69	200 00	284 00	296 00	12 00	1 697E-0004
70	207 00	263 00	287 12	24 12	0 000E+0000
71	207 00	274 00	287 12	13 12	1 121E-0005
72	207 00	279 00	287 11	8 11	1.632E-0005
73	207 00	281 00	287 11	6 11	1 187E-0004
74	207 00	282 00	287 11	5 11	1 699E-0004
75	207 00	284 00	296 00	12 00	1.699E-0004
76	214 00	263 00	286 40	23 40	0 000E+0000
77	214 00	274 00	286 40	12 40	1 118E-0005
78	214 00	279 00	286 40	7 40	1.629E-0005
79	214 00	281 00	286 40	5 40	1 187E-0004
80	214 00	282 00	286 40	4 40	1 699E-0004
81	221 00	263 00	285 70	22 70	0.000E+0000

82	221 00	274 00	285 69	11 69	1 110E-0005
83	221 00	279 00	285 68	6 68	1 620E-0005
84	221 00	281 00	285 68	4 68	1 187E-0004
85	221 00	282 00	285 68	3 68	1 699E-0004
86	228 00	263 00	285 00	22 00	0 000E+0000
87	228 00	274 00	284 98	10 98	1 093E-0005
88	228 00	279 00	284 96	5 96	1 602E-0005
89	228 00	281 00	284 96	3 96	1 186E-0004
90	228 00	282 00	284 96	2 96	1 699E-0004
91	235 00	263 00	284 32	21.32	0.000E+0000
92	235 00	274 00	284 28	10.28	1 059E-0005
93	235 00	279 00	284 24	5 24	1 563E-0005
94	235 00	281 00	284 24	3 24	1 185E-0004
95	235 00	282 00	284 24	2 24	1 699E-0004
96	240 50	263 00	283 81	20 81	0 000E+0000
97	240 50	274 00	283 74	9 74	1 007E-0005
98	240 50	279 00	283 69	4 68	1 506E-0005
99	240 50	281 00	283 68	2.68	1 183E-0004
100	240 50	282 00	283.68	1.68	1 699E-0004
101	246 00	263 00	283 34	20 34	0 000E+0000
102	246 00	274 00	283 22	9 22	9 171E-0006
103	246 00	279 00	283 11	4 11	1 403E-0005
104	246 00	291 00	283 11	2 11	1 182E-0004
105	251 00	263 00	282 97	19 97	0 000E+0000
107	251 00	274 00	282 79	8 79	7 862E-0006
108	251 00	279 00	282 59	3 59	1.222E-0005
109	251 00	281 00	282 59	1 59	1 151E-0004
110	251 00	282 00	282 60	0.60	1.699E-0004
111	256 00	263 00	282 66	19.66	0.000E+0000
112	256 00	274 00	282 45	8.45	6.126E-0006
113	256 00	279 00	282 10	3 10	9 004E-0006
114	256 00	281 00	282 05	1.05	6 621E-0005
115	256 00	282 00	282 00	0 00	9 402E-0005
116	263 50	263 00	282 34	19 34	0 000E+0000
117	263 50	274 00	282 18	8 18	3 456E-0006
118	263 50	279 00	282 00	3 00	4 276E-0006
119	263 50	281 00	282 00	1 00	8.951E-0006
120	263 50	282 00	282 00	0 00	9 847E-0006
121	271 00	263 00	282 16	19 16	0 000E+0000
122	271 00	274 00	282 08	8 08	1.700E-0006
123	271 00	279 00	282 00	3.00	1.930E-0006
124	271 00	281 00	282 00	1 00	1 554E-0006
125	271 00	282 00	282 00	0 00	1 398E-0006
126	278 50	263 00	282 08	19 08	0 000E+0000
127	278 50	274 00	282 04	8 04	8 052E-0007
128	278 50	279 00	282 00	3.00	9 095E-0007
129	278.50	281 00	282 00	1 00	8 867E-0007
130	278 50	282.00	282 00	0 00	8.628E-0007
131	286 00	263 00	282 03	19 03	0 000E+0000
132	286 00	274 00	282 02	8 02	3 780E-0007
133	286 00	279 00	282 00	3 00	4 275E-0007
134	286 00	281 00	282 00	1 00	4 034E-0007
135	286 00	282 00	282 00	0 00	3 849E-0007
136	293 50	263 00	282 02	19.02	0 000E+0000
137	293 50	274 00	282 01	8.01	1.715E-0007
138	293 50	279 00	282 00	3 00	1 936E-0007
139	293 50	281 00	282 00	1 00	1 746E-0007
140	293 50	282 00	282 00	0 00	1 621E-0007
141	310 00	263 00	282 00	19 00	0 000E+0000
142	310 00	274 00	282 00	8 00	3 021E-0008
143	310 00	279 00	282 00	3 00	3 441E-0008
144	310 00	281 00	282 00	1 00	4 070E-0008
145	310 00	282 00	282 00	0 00	4 361E-0008
146	326 50	263 00	282 00	19 00	0 000E+0000
147	326 50	274 00	282 00	8 00	5 412E-0009
148	326 50	279 00	282 00	3 00	6 167E-0009
149	326 50	281 00	282 00	1.00	6 912E-0009
150	326 50	282 00	282 00	0 00	7 123E-0009
151	343 00	263 00	282 00	19.00	0.000E+0000
152	343 00	274 00	282 00	8 00	9 619E-0010
153	343 00	279 00	282 00	3 00	1 091E-0009
154	343 00	281 00	282 00	1 00	1 144E-0009
155	343 00	282 00	282 00	0 00	1 163E-0009
156	359 50	263 00	282 00	19 00	0.000E+0000
157	359 50	274 00	282 00	8 00	1 691E-0010
158	359 50	279 00	282 00	3 00	1 918E-0010
159	359 50	281 00	282 00	1 00	1 937E-0010
160	359.50	282 00	282 00	0 00	1 903E-0010
161	376 00	263 00	282 00	19.00	0.000E+0000
162	376 00	274 00	282 00	8 00	2 785E-0011
163	376 00	279 00	282 00	3 00	3 153E-0011
164	376 00	281 00	282 00	1 00	3 110E-0011
165	376 00	282 00	282 00	0 00	3 003E-0011
166	400 00	263 00	282 00	19 00	0 000E+0000

167	400 00	274 00	282 00	8 00	0.000E+0000
168	400 00	279 00	282 00	3 00	0 000E+0000
169	400 00	281 00	282 00	1 00	1 758E-0014
170	400 00	282 00	282 00	0 00	3 102E-0012

ANEXO 15

```
=====
Barragem de Ubaldinho - Ceara - Anexo i5
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```
NUMERO DE MATERIAIS          5
NUMERO DE NOS                170
NUMERO DE ELEMENTOS          133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS	ANGULO ENTRE K1 E OX
	K1 K2	
1	1 00000E-0008 1 00000E-0008	0 00
4	5 00000E-0004	0 00
5	5 00000E-0004	0 00
;	1 00000E-0005	0 00
5	1 00000E-0005	0 00

DADOS DOS NOS

NO N R	COORDENADAS DOS NOS	COND CONT	CARGA HIDRAULICA	VAZAO
	X Y			
1	0 00 263 00	1	296.00	0.000
2	0 00 274 00	1	296.00	0 000
3	0 00 279.00	1	296 00	0 000
4	0 00 281 00	1	296 00	0 000
5	0 00 282 00	1	296 00	0 000
6	40 00 263 00	0	0 00	0 000
7	40 00 274 00	0	0 00	0 000
8	40 00 279 00	0	0 00	0 000
9	40 00 281 00	0	0 00	0.000
10	40 00 282 00	1	296.00	0 000
11	80 00 263 00	0	0 00	0 000
12	80 00 274 00	0	0 00	0 000
13	80 00 279 00	0	0 00	0 000
14	80 00 281 00	0	0 00	0.000
15	80 00 282 00	1	296 00	0.000
16	120 00 263 00	0	0.00	0.000
17	120 00 274 00	0	0.00	0.000
18	120 00 279 00	0	0 00	0 000
19	120 00 281 00	0	0 00	0 000
20	120 00 282 00	1	296 00	0 000
21	120 00 285 00	1	296 00	0 000
22	130 00 263 00	0	0.00	0 000
23	130 00 274 00	0	0 00	0 000
24	130 00 279 00	0	0 00	0.000
25	130 00 281 00	0	0 00	0 000
26	130 00 282 00	0	0 00	0 000
27	130 00 285 00	1	296 00	0 000
28	140 00 263 00	0	0 00	0 000
29	140 00 274 00	0	0 00	0 000
30	140 00 279 00	0	0 00	0 000
31	140 00 281 00	0	0 00	0 000
32	140 00 282 00	0	0 00	0 000
33	140 00 285 00	1	296 00	0 000
34	160 00 263 00	0	0 00	0.000
35	160 00 274 00	0	0 00	0.000
36	160 00 279 00	0	0 00	0 000
37	160 00 281 00	0	0 00	0 000
38	160 00 282 00	0	0 00	0 000
39	160 00 285 00	1	296 00	0 000
40	170 00 263 00	0	0.00	0 000
41	170 00 274 00	0	0 00	0 000
42	170 00 279 00	0	0 00	0 000
43	170 00 281 00	0	0 00	0.000
44	170 00 282 00	0	0 00	0.000
45	170 00 285 00	1	296 00	0.000
46	180 00 263 00	0	0 00	0.000
47	180 00 274 00	0	0 00	0 000
48	180 00 279 00	0	0 00	0 000
49	180 00 281 00	0	0.00	0 000
50	180 00 282 00	0	0 00	0.000
51	180 00 285 00	1	296 00	0.000
52	190 00 263 00	0	0 00	0 000
53	190 00 274 00	0	0 00	0 000

54	190 00	279 00	0	0 00	0 000
55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	285 00	1	296 00	0.000
58	195 00	263 00	0	0 00	0 000
59	195 00	274 00	0	0 00	0 000
60	195 00	279 00	0	0 00	0.000
61	195 00	281 00	0	0 00	0.000
62	195 00	282 00	0	0 00	0 000
63	195 00	285 00	1	296 00	0 000
64	200 00	263 00	0	0 00	0 000
65	200 00	274 00	0	0 00	0 000
66	200 00	279 00	0	0 00	0 000
67	200 00	281 00	0	0 00	0 000
68	200 00	282 00	0	0 00	0 000
69	200 00	285 00	1	296 00	0 000
70	207 00	263 00	0	0 00	0 000
71	207 00	274 00	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0 000
75	207 00	285 00	1	296 00	0 000
76	214 00	263 00	0	0 00	0 000
77	214 00	274 00	0	0 00	0 000
78	214 00	281 00	0	0 00	0 000
79	214 00	282 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0 000
81	221 00	263 00	0	0 00	0 000
82	221 00	274 00	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0.000
86	228 00	263 00	0	0 00	0 000
87	228 00	274 00	0	0 00	0 000
88	228 00	279 00	0	0 00	0 000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	263 00	0	0 00	0.000
92	235 00	274 00	0	0 00	0.000
93	235 00	279 00	0	0 00	0.000
94	235 00	281 00	0	0 00	0 000
95	235 00	282 00	0	0 00	0 000
96	240 50	263 00	0	0 00	0 000
97	240 50	274 00	0	0 00	0 000
98	240 50	279 00	0	0 00	0 000
99	240 50	281 00	0	0 00	0 000
100	240 50	282 00	0	0 00	0 000
101	246 00	263 00	0	0 00	0 000
102	246 00	274 00	0	0 00	0 000
103	246 00	279 00	0	0 00	0 000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0 000
106	251 00	263 00	0	0 00	0.000
107	251 00	274 00	0	0 00	0.000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	263 00	0	0 00	0.000
112	256 00	274 00	0	0 00	0.000
113	256 00	279 00	0	0 00	0.000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0 000
116	263 50	263 00	0	0 00	0 000
117	263 50	274 00	0	0 00	0 000
118	263 50	279 00	0	0 00	0 000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0 000
121	271 00	263 00	0	0 00	0 000
122	271 00	274 00	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282 00	0 000
126	278 50	263 00	0	0 00	0 000
127	278 50	274 00	0	0 00	0.000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0 000
130	278 50	282 00	1	282 00	0 000
131	286 00	263 00	0	0 00	0 000
132	286 00	274 00	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282 00	0 000
136	293 50	263 00	0	0 00	0 000
137	293 50	274 00	0	0 00	0 000
138	293 50	279 00	0	0 00	0 000

139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0 000
141	310 00	263 00	0	0 00	0 000
142	310 00	274 00	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	263 00	0	0 00	0 000
147	326 50	274 00	0	0 00	0 000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0 000
150	326 50	282 00	1	282 00	0 000
151	343 00	263 00	0	0 00	0 000
152	343 00	274 00	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	263 00	0	0 00	0.000
157	359 50	274 00	0	0 00	0.000
158	359 50	279 00	0	0 00	0.000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	263 00	0	0 00	0 000
162	376 00	274 00	0	0 00	0 000
163	376 00	279 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0.000
166	400 00	263 00	0	0 00	0.000
167	400 00	274 00	0	0 00	0.000
168	400 00	279 00	0	0 00	0.000
169	400 00	281 00	0	0 00	0.000
170	400 00	282 00	1	282.00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	5
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	5
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	5
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	5
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	5
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	5
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	5
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	5
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	5
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	5
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	5

49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	5
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	5
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	5
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	5
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	5
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	5
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	5
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	5
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	5
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	5
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	5
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	5
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	5
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	5
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	5
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	5
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	5
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	5
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	5
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	5
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
1	4	278E-0009
2	-1	261E-0008
3	-3	926E-0007
4	-5	933E-0007
5	1	019E-0006
10	-2	523E-0007
15	2	362E-0006
20	1	662E-0004
21	4	787E-0009
22	4	457E-0006
23	1	161E-0007
33	1	926E-0007
45	1	707E-0007
51	2	047E-0007
57	1	758E-0007
63	1	278E-0007
69	1	646E-0007
75	1	013E-0007
115	-1	516E-0004
120	-1	649E-0005
125	-3	853E-0007
130	-6	832E-0007
135	-2	710E-0007
140	-1	739E-0007
145	-6	262E-0008
150	-1	023E-0008
155	-1	670E-0009
160	-2	724E-0010
165	-4	761E-0011
170	-6	159E-0012

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 1 709E-0004
SAINDO = -1 709E-0004

NO	COORDENADAS		CARGA	PRESSAO NEUTRA	FUNCAO
	X	Y			
1	0 00	263 00	296 00	33 00	2 139E-0009
2	0 00	274 00	296 00	22 00	-2 025E-0009
3	0 00	279 00	296 00	17 00	-2 046E-0007
4	0 00	281 00	296 00	15 00	-6 976E-0007
5	0 00	282 00	296 00	14 00	-4 849E-0007
6	40 00	263 00	296 00	33 00	0 000E+0000
7	40 00	274 00	296 00	22 00	-3 684E-0008
8	40 00	279 00	296 00	17 00	-1 163E-0008
9	40 00	281 00	296 00	15 00	-1 828E-0008
10	40 00	282 00	296 00	14 00	-1 016E-0007
11	80 00	263 00	296 03	33 03	0 000E+0000
12	80 00	274 00	296 02	22 02	4 211E-0007
13	80 00	279 00	296 00	17 00	4 828E-0007
14	80 00	281 00	296 00	15 00	7 836E-0007
15	80 00	282 00	296 00	14 00	9 531E-0007
16	120 00	263 00	295 51	32 51	0 000E+0000
17	120 00	274 00	295 71	21 71	6 535E-0006
18	120 00	279 00	295 97	16 97	9 264E-0006
19	120 00	281 00	295 98	14 98	6 021E-0005
20	120 00	282 00	296 00	14 00	8 525E-0005
21	120 00	285 00	296 00	11 00	1 684E-0004
22	130 00	263 00	294 78	31 78	0 000E+0000
23	130 00	274 00	294 87	20 87	9 223E-0006
24	130 00	279 00	294 95	15 95	1 411E-0005
25	130 00	281 00	294 95	13 95	1 223E-0004
26	130 00	282 00	294 95	12 95	1 778E-0004
27	130 00	285 00	296 00	11 00	1 684E-0004
28	140 00	263 00	293 87	30 87	0 000E+0000
29	140 00	274 00	293 90	19 90	1 054E-0005
30	140 00	279 00	293 93	14 93	1 556E-0005
31	140 00	281 00	293 93	12 93	1 171E-0004
32	140 00	282 00	293 93	11 93	1 677E-0004
33	140 00	285 00	296 00	11 00	1 685E-0004

34	160 00	263 00	291 89	28 89	0 000E+0000
35	160 00	274 00	291 89	17 89	1 111E-0005
36	160 00	279 00	291 89	12 89	1 618E-0005
37	160 00	281 00	291 89	10 89	1 179E-0004
38	160 00	282 00	291 89	9 89	1 688E-0004
39	160 00	285 00	296 00	11 00	1 686E-0004
40	170 00	263 00	290 88	27 98	0 000E+0000
41	170 00	274 00	290 88	16 88	1 116E-0005
42	170 00	279 00	290 88	11 88	1 625E-0005
43	170 00	281 00	290 88	9 88	1 179E-0004
44	170 00	282 00	290 88	8 88	1 688E-0004
45	170 00	285 00	296 00	11 00	1 688E-0004
46	180 00	263 00	289 86	26 86	0 000E+0000
47	180 00	274 00	289 86	15 86	1 119E-0005
48	180 00	279 00	289 86	10 86	1 628E-0005
49	180 00	281 00	289 86	8 86	1 181E-0004
50	180 00	282 00	289 86	7 86	1 690E-0004
51	180 00	285 00	296 00	11 00	1 690E-0004
52	190 00	263 00	288 84	25 84	0 000E+0000
53	190 00	274 00	288 84	14 84	1 120E-0005
54	190 00	279 00	288 84	9 84	1 630E-0005
55	190 00	281 00	288 84	7 84	1 182E-0004
56	190 00	282 00	288 84	6 84	1 692E-0004
58	195 00	263 00	288 33	25 33	0 000E+0000
59	195 00	274 00	288 33	14 33	1 121E-0005
60	195 00	279 00	288 33	9 33	1 631E-0005
61	195 00	281 00	288 33	7 33	1 183E-0004
62	195 00	282 00	288 33	6 33	1 693E-0004
63	195 00	285 00	296 00	11 00	1 693E-0004
64	200 00	263 00	287 82	24 82	0 000E+0000
65	200 00	274 00	287 82	13 82	1 121E-0005
66	200 00	279 00	287 82	8 82	1 631E-0005
67	200 00	281 00	287 82	6 82	1 184E-0004
68	200 00	282 00	287 82	5 82	1 695E-0004
69	200 00	285 00	296 00	11 00	1 695E-0004
70	207 00	263 00	287 11	24 11	0 000E+0000
71	207 00	274 00	287 11	13 11	1 120E-0005
72	207 00	279 00	287 11	8 11	1 630E-0005
73	207 00	281 00	287 11	6 11	1 185E-0004
74	207 00	282 00	287 11	5 11	1 697E-0004
75	207 00	285 00	296 00	11 00	1 696E-0004
76	214 00	263 00	286 40	23 40	0 000E+0000
77	214 00	274 00	286 39	12 39	1 116E-0005
78	214 00	279 00	286 39	7 39	1 626E-0005
79	214 00	281 00	286 39	5 39	1 185E-0004
80	214 00	282 00	286 39	4 39	1 697E-0004
81	221 00	263 00	285 69	22 69	0 000E+0000
82	221 00	274 00	285 68	11 68	1 108E-0005
83	221 00	279 00	285 68	6 68	1 618E-0005
84	221 00	281 00	285 67	4 67	1 185E-0004
85	221 00	282 00	285 67	3 67	1 697E-0004
86	228 00	263 00	284 99	21 99	0 000E+0000
87	228 00	274 00	284 97	10 97	1 092E-0005
88	228 00	279 00	284 96	5 96	1 599E-0005
89	228 00	281 00	284 96	3 96	1 184E-0004
90	228 00	282 00	284 96	2 96	1 697E-0004
91	235 00	263 00	284 31	21 31	0 000E+0000
92	235 00	274 00	284 27	10 27	1 057E-0005
93	235 00	279 00	284 24	5 24	1 561E-0005
94	235 00	281 00	284 24	3 24	1 183E-0004
95	235 00	282 00	284 24	2 24	1 697E-0004
96	240 50	263 00	283 80	20 80	0 000E+0000
97	240 50	274 00	283 74	9 74	1 005E-0005
98	240 50	279 00	283 68	4 68	1 504E-0005
99	240 50	281 00	283 68	2 68	1 181E-0004
100	240 50	282 00	283 68	1 68	1 697E-0004
101	246 00	263 00	283 34	20 34	0 000E+0000
102	246 00	274 00	283 22	9 22	9 156E-0006
103	246 00	279 00	283 11	4 11	1 401E-0005
104	246 00	281 00	283 11	2 11	1 180E-0004
105	246 00	282 00	283 11	1 11	1 697E-0004
106	251 00	263 00	282 97	19 97	0 000E+0000
107	251 00	274 00	282 79	8 79	7 849E-0006
108	251 00	279 00	282 58	3 58	1 220E-0005
109	251 00	281 00	282 59	1 59	1 149E-0004
110	251 00	282 00	282 59	0 59	1 697E-0004
111	256 00	263 00	282 66	19 66	0 000E+0000
112	256 00	274 00	282 45	8 45	6 116E-0006
113	256 00	279 00	282 10	3 10	8 990E-0006
114	256 00	281 00	282 05	1 05	6 610E-0005
115	256 00	282 00	282 00	0 00	9 387E-0005
116	263 50	263 00	282 34	19 34	0 000E+0000
117	263 50	274 00	282 18	8 18	3 451E-0006
118	263 50	279 00	282 00	3 00	4 269E-0006

119	263 50	281 00	282 00	1 00	8 937E-0006
120	263 50	282 00	282 00	0 00	9 831E-0006
121	271 00	263 00	282 16	19 16	0 000E+0000
122	271 00	274 00	282 08	8 08	1 697E-0006
123	271 00	279 00	282 00	3 00	1 927E-0006
124	271 00	281 00	282 00	1 00	1 552E-0006
125	271 00	282 00	282 00	0.00	1 396E-0006
126	278 50	263 00	282 08	19 08	0.000E+0000
127	278 50	274 00	282 03	8.03	8 039E-0007
128	278 50	279 00	282 00	3.00	9.080E-0007
129	278 50	281 00	282 00	1 00	8 852E-0007
130	278 50	282 00	282 00	0 00	8 614E-0007
131	286 00	263 00	282 03	19.03	0 000E+0000
132	286 00	274 00	282 02	8 02	3 174E-0007
133	286 00	279 00	282 00	3 00	4 268E-0007
134	286 00	281 00	282 00	1 00	4 027E-0007
135	286 00	282 00	282 00	0.00	3 843E-0007
136	293 50	263 00	282 02	19.02	0 000E+0000
137	293 50	274 00	282 01	8.01	1 712E-0007
138	293 50	279 00	282 00	3 00	1 933E-0007
139	293 50	281 00	282 00	1.00	1 743E-0007
140	293 50	282 00	282 00	0 00	1 618E-0007
141	310 00	263 00	282 00	19 00	0 000E+0000
142	310 00	274 00	282 00	8 00	3 016E-0008
143	310 00	279 00	282 00	3.00	3 436E-0008
144	310 00	281 00	282 00	1.00	4 063E-0008
145	310 00	282 00	282 00	0.00	4 354E-0008
146	326 50	263 00	282 00	19 00	0 000E+0000
147	326 50	274 00	282 00	8 00	5 403E-0009
148	326 50	279 00	282 00	3 00	6.157E-0009
149	326 50	281 00	282 00	1 00	6 901E-0009
150	326 50	282 00	282 00	0.00	7 112E-0009
151	343 00	263 00	282 00	19.00	0 000E+0000
152	343 00	274 00	282 00	8 00	9.603E-0010
153	343 00	279 00	282 00	3 00	1.089E-0009
154	343 00	281 00	282 00	1 00	1.142E-0009
155	343 00	282 00	282 00	0 00	1.161E-0009
156	359 50	263 00	282 00	19 00	0 000E+0000
157	359 50	274 00	282 00	8.00	1 688E-0010
158	359 50	279 00	282 00	3.00	1 915E-0010
159	359 50	281 00	282 00	1.00	1 934E-0010
160	359 50	282 00	282 00	0 00	1.900E-0010
161	376 00	263 00	282 00	19.00	0.000E+0000
162	376 00	274 00	282 00	8 00	2.781E-0011
163	376 00	279 00	282 00	3.00	3 148E-0011
164	376 00	281 00	282 00	1.00	3 105E-0011
165	376 00	282.00	282.00	0.00	2 998E-0011
166	400 00	263 00	282 00	19.00	0.000E+0000
167	400 00	274 00	282 00	8.00	0.000E+0000
168	400 00	279 00	282 00	3 00	0 000E+0000
169	400 00	281 00	282 00	1 00	1 600E-0014
170	400 00	282 00	282.00	0.00	3 096E-0012

ANEXO 16

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Barragem de Ubaldinho - Ceara - Anexo 16
 *** ENGEOS *** Engenharia e Geotecnia S/C Ltda
 PERCPPLAN - programa de analise de percolacao plana - MEF
 G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737

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TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

NUMERO DE MATERIAIS	5
NUMERO DE NOS	170
NUMERO DE ELEMENIOS	133
LARGURA DE BANDA MAXIMA	9
LARGURA DE BANDA MEDIA	6 98

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS	ANGULO ENTRE K1 E OX
	K1 K2	
1	1 00000E-0008 1 00000E-0008	0 00
2	5 00000E-0004 1 00000E-0004	0 00
3	5 00000E-0001 5 00000E-0004	0 00
4	1 00000E-0005 1 00000E-0005	0 00
5	1 00000E-0005 1 00000E-0005	0 00

DADOS DOS NOS

NO N R	COORDENADAS X	DOS NOS Y	COND CONT	CARGA HIDRAULICA	VAZAO
1	0 00	263 00	1	296.00	0 000
2	0 00	274 00	1	296 00	0 000
3	0 00	279 00	1	296 00	0 000
4	0 00	281 00	1	296 00	0 000
5	0 00	282 00	1	296.00	0.000
6	40 00	263 00	0	0.00	0.000
7	40 00	274 00	0	0.00	0 000
8	40 00	279 00	0	0 00	0 000
9	40 00	281 00	0	0 00	0 000
10	40 00	282 00	1	296.00	0.000
11	70 00	263 00	0	0.00	0.000
12	70 00	274 00	0	0.00	0.000
13	70 00	279 00	0	0.00	0 000
14	70 00	281 00	0	0.00	0.000
15	70 00	282 00	1	296 00	0 000
16	100 00	263 00	0	0.00	0 000
17	100 00	274 00	0	0 00	0 000
18	100 00	279 00	0	0.00	0 000
19	100 00	281 00	0	0 00	0.000
20	100 00	282 00	1	296 00	0.000
21	100 00	284 00	1	296 00	0 000
22	120 00	263 00	0	0 00	0 000
23	120 00	274 00	0	0 00	0 000
24	120 00	279 00	0	0 00	0 000
25	120 00	281 00	0	0.00	0 000
26	120 00	282 00	0	0.00	0.000
27	120 00	284 00	1	296.00	0 000
28	140 00	263 00	0	0 00	0 000
29	140 00	274 00	0	0 00	0.000
30	140 00	279 00	0	0 00	0.000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0 00	0 000
33	140 00	284 00	1	296 00	0.000
34	160 00	263 00	0	0 00	0 000
35	160 00	274 00	0	0.00	0.000
36	160 00	279 00	0	0 00	0.000
37	160 00	281 00	0	0.00	0.000
38	160 00	282 00	0	0 00	0.000
39	160 00	284 00	1	296 00	0.000
40	170 00	263 00	0	0 00	0 000
41	170 00	274 00	0	0 00	0 000
42	170 00	279 00	0	0.00	0 000
43	170 00	281 00	0	0 00	0 000
44	170 00	282 00	0	0 00	0 000
45	170 00	284 00	1	296 00	0 000
46	180 00	263 00	0	0.00	0 000
47	180 00	274 00	0	0 00	0.000
48	180 00	279 00	0	0 00	0 000
49	180 00	281 00	0	0 00	0 000
50	180 00	282 00	0	0.00	0 000
51	180 00	284 00	1	296 00	0 000
52	190 00	263 00	0	0 00	0 000
53	190 00	274 00	0	0 00	0 000

54	190 00	279 00	0	0.00	0.000
55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	284 00	1	296 00	0 000
58	195 00	263 00	0	0 00	0 000
59	195 00	274 00	0	0 00	0.000
60	195 00	279.00	0	0 00	0.000
61	195 00	281 00	0	0 00	0.000
62	195 00	282 00	0	0 00	0.000
63	195 00	284 00	1	296 00	0 000
64	200 00	263 00	0	0.00	0 000
65	200 00	274 00	0	0.00	0.000
66	200 00	279 00	0	0 00	0.000
67	200.00	281 00	0	0 00	0.000
68	200.00	282 00	0	0 00	0 000
69	200 00	284 00	1	296 00	0 000
70	207 00	263 00	0	0 00	0.000
71	207 00	274 00	0	0 00	0.000
72	207 00	279 00	0	0 00	0.000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0 000
75	207 00	284 00	1	296 00	0 000
76	214 00	263 00	0	0 00	0 000
77	214 00	274 00	0	0 00	0.000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0.000
80	214 00	282 00	0	0 00	0 000
81	221 00	263 00	0	0.00	0.000
82	221 00	274 00	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0.000
86	228 00	263 00	0	0.00	0.000
87	228 00	274.00	0	0 00	0 000
88	228.00	279 00	0	0.00	0 000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	263 00	0	0 00	0.000
92	235 00	274 00	0	0.00	0.000
93	235 00	279 00	0	0.00	0 000
94	235 00	281 00	0	0 00	0.000
95	235.00	282.00	0	0 00	0.000
96	240 50	263.00	0	0.00	0 000
97	240 50	274 00	0	0 00	0 000
98	240 50	279 00	0	0 00	0.000
99	240 50	281.00	0	0 00	0.000
100	240.50	282.00	0	0.00	0.000
101	246 00	263 00	0	0 00	0 000
102	246 00	274 00	0	0 00	0.000
103	246.00	279.00	0	0 00	0.000
104	246 00	281 00	0	0.00	0.000
105	246 00	282 00	0	0 00	0 000
106	251 00	263 00	0	0 00	0 000
107	251 00	274 00	0	0 00	0 000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0 00	0.000
110	251 00	282 00	0	0 00	0 000
111	256.00	263 00	0	0 00	0.000
112	256.00	274 00	0	0 00	0 000
113	256 00	279 00	0	0 00	0.000
114	256 00	281.00	0	0.00	0.000
115	256 00	282.00	1	282.00	0.000
116	263 50	263 00	0	0 00	0 000
117	263 50	274 00	0	0 00	0 000
118	263 50	279 00	0	0 00	0 000
119	263 50	281 00	0	0 00	0.000
120	263 50	282 00	1	282.00	0 000
121	271 00	263 00	0	0 00	0 000
122	271 00	274 00	0	0 00	0 000
123	271 00	279 00	0	0 00	0.000
124	271 00	281.00	0	0.00	0.000
125	271 00	282 00	1	282.00	0.000
126	278 50	263 00	0	0 00	0 000
127	278 50	274.00	0	0 00	0 000
128	278 50	279 00	0	0.00	0.000
129	278 50	281 00	0	0.00	0.000
130	278 50	282 00	1	282 00	0.000
131	286 00	263.00	0	0 00	0.000
132	286 00	274.00	0	0 00	0 000
133	286 00	279 00	0	0.00	0 000
134	286 00	281 00	0	0.00	0 000
135	286 00	282 00	1	282.00	0.000
136	293 50	263 00	0	0 00	0 000
137	293 50	274 00	0	0 00	0 000
138	293 50	279 00	0	0 00	0.000

139	293 50	281 00	0	0 00	0.000
140	293 50	282 00	1	282 00	0 000
141	310 00	263 00	0	0 00	0.000
142	310 00	274 00	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281.00	0	0 00	0.000
145	310 00	282 00	1	282 00	0 000
146	326 50	263 00	0	0 00	0.000
147	326 50	274 00	0	0.00	0.000
148	326 50	279 00	0	0.00	0 000
149	326 50	281 00	0	0 00	0.000
150	326 50	282 00	1	282 00	0 000
151	343 00	263 00	0	0 00	0.000
152	343 00	274 00	0	0 00	0.000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0.00	0.000
155	343 00	282.00	1	282 00	0.000
156	359 50	263 00	0	0.00	0.000
157	359 50	274 00	0	0.00	0.000
158	359 50	279 00	0	0 00	0.000
159	359 50	281 00	0	0 00	0.000
160	359 50	282 00	1	282 00	0.000
161	376 00	263 00	0	0 00	0 000
162	376 00	274 00	0	0 00	0 000
163	376 00	281 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0.000
166	400 00	263 00	0	0 00	0 000
167	400.00	274 00	0	0.00	0.000
168	400 00	279 00	0	0 00	0.000
169	400 00	281 00	0	0.00	0.000
170	400 00	282 00	1	282 00	0.000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	5
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	5
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	5
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	5
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	5
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	5
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	5
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	5
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	5
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	5
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	5

49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	5
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	5
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	5
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	5
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	5
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	90	95	96	91	1
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	5
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	5
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	5
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	5
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	5
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	5
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	5
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	5
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	5
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	5
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	5
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	5
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	5
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	5
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
	1	4 908E-0009
	2	-5.752E-0009
	3	-2 778E-0007
	4	-4 250E-0007
	5	7 165E-0007
	10	-1 785E-0007
	15	2.602E-0006
	20	1 438E-0004
	21	2 277E-0008
	25	3 568E-0007
	34	3 836E-0007
	45	3 111E-0007
	51	3 556E-0007
	57	2 959E-0007
	63	2 112E-0007
	69	2 682E-0007
	75	1 637E-0007
	115	-1 329E-0004
	120	-1 446E-0005
	125	-3 379E-0007
	130	-5 991E-0007
	135	-2 376E-0007
	140	-1 525E-0007
	145	-5 491E-0008
	150	-8 972E-0009
	155	-1 464E-0009
	160	-2 389E-0010
	165	-4 175E-0011
	170	-5 401E-0012

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 1 497E-0004
SAINDO = -1 497E-0004

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS		CARGA	PRESSAO NEUTRA	FUNCAO
NUMERO	X	Y	HIDRAULICA	(UNID DE CARGA)	FLUXO
1	0 00	263 00	296 00	33.00	2 454E-0009
2	0 00	274 00	296.00	22.00	2.032E-0009
3	0 00	279 00	296.00	17.00	-1.398E-0007
4	0 00	281 00	296 00	15.00	-4 912E-0007
5	0 00	282.00	296 00	14 00	-3 455E-0007
6	40 00	263 00	296 00	33 00	0.000E+0000
7	40 00	274 00	296 00	22 00	-1 290E-0008
8	40 00	279 00	296 00	17 00	7 188E-0009
9	40 00	281 00	296 00	15.00	-1 363E-0008
10	40 00	282 00	296 00	14.00	-7.646E-0008
11	70 00	263 00	296 00	33.00	0.000E+0000
12	70 00	274 00	296.01	22.01	6.530E-0007
13	70 00	279 00	296.00	17 00	7.585E-0007
14	70 00	281 00	296.00	15 00	1.057E-0006
15	70 00	282 00	296 00	14 00	1.135E-0006
16	100 00	263.00	295 56	32 56	0 000E+0000
17	100 00	274.00	295 74	21 74	5 255E-0006
18	100 00	279 00	295 97	16.97	7.548E-0006
19	100 00	281 00	295.99	14 99	5.215E-0005
20	100 00	282 00	296 00	14 00	7.434E-0005
21	100 00	284 00	296 00	12 00	1.462E-0004
22	120 00	263 00	294 16	31 16	0.000E+0000
23	120 00	274.00	294 18	20 18	9 138E-0006
24	120 00	279 00	294 20	15.20	1 370E-0005
25	120 00	281 00	294.20	13.20	1.098E-0004
26	120 00	282 00	294 20	12.20	1 582E-0004
27	120 00	284 00	296 00	12.00	1.463E-0004
28	140 00	263 00	292 43	29.43	0.000E+0000
29	140 00	274 00	292.43	18 43	9.685E-0006
30	140 00	279 00	292 43	13 43	1 407E-0005
31	140 00	281 00	292 43	11.43	1 012E-0004
32	140 00	282 00	292 43	10 43	1.447E-0004
33	140 00	284 00	296 00	12 00	1 466E-0004

34	160 00	263 00	290 66	27 66	0 000E+0000
35	160 00	274 00	290 66	16 66	9 738E-0006
36	160 00	279 00	290 66	11 66	1 417E-0005
37	160 00	281 00	290 66	9 66	1.030E-0004
38	160 00	282 00	290 66	8 66	1 474E-0004
39	160 00	284 00	296 00	12 00	1 470E-0004
40	170 00	263 00	289 77	26 77	0 000E+0000
41	170 00	274 00	289 78	15 78	9.762E-0006
42	170 00	279 00	289 78	10 78	1.420E-0005
43	170 00	281 00	289 78	8 78	1 029E-0004
44	170 00	282 00	289 78	7 78	1 473E-0004
45	170 00	284 00	296 00	12 00	1 473E-0004
46	180 00	263 00	288 89	25 89	0 000E+0000
47	180 00	274 00	288 89	14 89	9 784E-0006
48	180 00	279 00	288 89	9 89	1 423E-0005
49	180 00	281 00	288 89	7 89	1 032E-0004
50	180 00	282 00	288.89	6 89	1.477E-0004
51	180 00	284 00	296 00	12.00	1.477E-0004
52	190 00	263.00	288.00	25 00	0 000E+0000
53	190 00	274 00	288 00	14 00	9 803E-0006
54	190 00	279 00	288 00	9 00	1 426E-0005
55	190 00	281 00	288 00	7 00	1 034E-0004
56	190 00	282 00	288 00	6.00	1.480E-0004
57	195 00	263 00	287 55	12.00	1.480E-0004
58	195 00	274 00	287 55	24 55	0.000E+0000
59	195 00	279 00	287 55	13.55	9.811E-0006
60	195 00	279 00	287 55	8.55	1.427E-0005
61	195 00	281 00	287 55	6.55	1.036E-0004
62	195 00	282 00	287 55	5.55	1 482E-0004
63	195.00	284 00	296 00	12 00	1.482E-0004
64	200 00	263 00	287 10	24 10	0 000E+0000
65	200 00	274 00	287 10	13 10	9 816E-0006
66	200 00	279 00	287 10	8 10	1.429E-0005
67	200 00	281 00	287 11	6.11	1.037E-0004
68	200 00	282 00	287 11	5.11	1 485E-0004
69	200 00	284 00	296 00	12.00	1 485E-0004
70	207.00	263 00	286 48	23.48	0 000E+0000
71	207 00	274 00	286 48	12 48	9 811E-0006
72	207 00	279 00	286 48	7 48	1 429E-0005
73	207 00	281 00	286 48	5 48	1.039E-0004
74	207 00	282 00	286.48	4 48	1.488E-0004
75	207 00	284 00	296 00	12 00	1.487E-0004
76	214 00	263 00	285 86	22.86	0 000E+0000
77	214 00	274 00	285 85	11 85	9 784E-0006
78	214 00	279 00	285.85	6 85	1 426E-0005
79	214 00	281 00	285 85	4 85	1 039E-0004
80	214 00	282 00	285 85	3 85	1 488E-0004
81	221 00	263 00	285.24	22.24	0.000E+0000
82	221 00	274 00	285 23	11.23	9.717E-0006
83	221 00	279 00	285 22	6 22	1 418E-0005
84	221 00	281 00	285 22	4 22	1 039E-0004
85	221 00	282 00	285 22	3 22	1 488E-0004
86	228 00	263 00	284 62	21 62	0 000E+0000
87	228 00	274 00	284 61	10 61	9 571E-0006
88	228 00	279 00	284 59	5.59	1 402E-0005
89	228 00	281 00	284 59	3 59	1 039E-0004
90	228 00	282 00	284 59	2 59	1.488E-0004
91	235 00	263 00	284 03	21 03	0 000E+0000
92	235 00	274.00	283 99	9 99	9 268E-0006
93	235 00	279 00	283 97	4 97	1 369E-0005
94	235 00	281 00	283.97	2 97	1.038E-0004
95	235 00	282 00	283 97	1 97	1.488E-0004
96	240 50	263 00	283 58	20 58	0.000E+0000
97	240.50	274 00	283 52	9.52	8 816E-0006
98	240 50	279 00	283 47	4 47	1 319E-0005
99	240 50	281 00	283 47	2 47	1 035E-0004
100	240 50	282 00	283.47	1 47	1 488E-0004
101	246.00	263 00	283 17	20 17	0.000E+0000
102	246 00	274 00	283 07	9.07	8 029E-0006
103	246 00	279 00	282 97	3.97	1 228E-0005
104	246 00	281 00	282 97	1.97	1 035E-0004
105	246.00	282 00	282 97	0 97	1 488E-0004
106	251 00	263 00	282 85	19 85	0 000E+0000
107	251 00	274 00	282.69	8 69	6 883E-0006
108	251 00	279 00	282 51	3 51	1 070E-0005
109	251 00	281 00	282 51	1 51	1 007E-0004
110	251 00	282 00	282 52	0 52	1 488E-0004
111	256 00	263 00	282 58	19 58	0 000E+0000
112	256 00	274 00	282 39	8 39	5.363E-0006
113	256 00	279.00	282.08	3.08	7.883E-0006
114	256 00	281 00	282 05	1.05	5.797E-0005
115	256 00	282 00	282 00	0 00	8 232E-0005
116	263 50	263 00	282 30	19 30	0 000E+0000
117	263 50	274 00	282 15	8 15	3.026E-0006
118	263 50	279 00	282 00	3 00	3 744E-0006

119	263 50	281 00	282 00	1 00	7 837E-0006
120	263 50	282 00	282 00	0 00	8 621E-0006
121	271 00	263 00	282 14	19 14	0 000E+0000
122	271 00	274 00	282 07	8 07	1 488E-0006
123	271 00	279 00	282 00	3 00	1 690E-0006
124	271 00	281 00	282 00	1 00	1 361E-0006
125	271 00	282 00	282 00	0 00	1 224E-0006
126	278 50	263 00	282 07	19 07	0 000E+0000
127	278 50	274 00	282 03	8 03	7 049E-0007
128	278 50	279 00	282 00	3 00	7 963E-0007
129	278 50	281 00	282 00	1 00	7 763E-0007
130	278 50	282 00	282 00	0 00	7 554E-0007
131	286 00	263 00	282 03	19 03	0 000E+0000
132	286 00	274 00	282 01	8 01	3 309E-0007
133	286 00	279 00	282 00	3 00	3 742E-0007
134	286 00	281 00	282 00	1 00	3 532E-0007
135	286 00	282 00	282 00	0 00	3 370E-0007
136	293 50	263 00	282 01	19 01	0 000E+0000
137	293 50	274 00	282 01	8 01	1 501E-0007
138	293 50	279 00	282 00	3 00	1 695E-0007
139	293 50	281 00	282 00	1 00	1 528E-0007
140	293 50	282 00	282 00	0 00	1 419E-0007
141	310 00	263 00	282 00	19 00	0 000E+0000
142	310 00	274 00	282 00	9 00	2 445E-0008
143	310 00	279 00	282 00	3 00	3 013E-0008
144	310 00	281 00	282 00	1 00	3 563E-0008
145	310 00	282 00	282 00	0 00	3 818E-0008
146	326 50	263 00	282 00	19 00	0 000E+0000
147	326 50	274 00	282 00	8 00	4 738E-0009
148	326 50	279 00	282 00	3 00	5 399E-0009
149	326 50	281 00	282 00	1 00	6 051E-0009
150	326 50	282 00	282 00	0 00	6 236E-0009
151	343 00	263 00	282 00	19 00	0 000E+0000
152	343 00	274 00	282 00	8 00	8 421E-0010
153	343 00	279 00	282 00	3 00	9 551E-0010
154	343 00	281 00	282 00	1 00	1 001E-0009
155	343 00	282 00	282 00	0 00	1 018E-0009
156	359 50	263 00	282 00	19 00	0 000E+0000
157	359 50	274 00	282 00	8 00	1 480E-0010
158	359 50	279 00	282 00	3 00	1 679E-0010
159	359 50	281 00	282 00	1 00	1 696E-0010
160	359 50	282 00	282 00	0 00	1 666E-0010
161	376 00	263 00	282 00	19 00	0 000E+0000
162	376 00	274 00	282 00	8 00	2 438E-0011
163	376 00	279 00	282 00	3 00	2 760E-0011
164	376 00	281 00	282 00	1 00	2 722E-0011
165	376 00	282 00	282 00	0 00	2 629E-0011
166	400 00	263 00	282 00	19 00	0 000E+0000
167	400 00	274 00	282 00	8 00	0 000E+0000
168	400 00	279 00	282 00	3 00	0 000E+0000
169	400 00	281 00	282 00	1 00	8 411E-0015
170	400 00	282 00	282 00	0 00	2 709E-0012

ANEXO 17

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=====
Barragem de Ubaldinho - Ceara - Anexo 17
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PEPCPLAN - programa de analise de percolacao plana - MEF
G E O E Y P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          5
NUMERO DE NOS                170
NUMERO DE ELEMENTOS         133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS	ANGULO ENTRE
	K1 K2	K1 E OX
1	1 00000E-0008 1 00000E-0008	0 00
2	5 00000E-0004 5 00000E-0004	0 00
3	5 00000E-0004 5 00000E-0004	0 00
4	1 00000E-0005 1 00000E-0005	0 00
5	1 00000E-0005 1 00000E-0005	0 00

DADOS DOS NOS

NO	COORDENADAS DOS NOS	COND.	CARGA	VAZAO
N R	X Y	CONT	HIDRAULICA	
1	0 00 263 00	1	296 00	0.000
2	0 00 274 00	1	296.00	0.000
3	0 00 279 00	1	296.00	0.000
4	0 00 281 00	1	296.00	0 000
5	0 00 282 00	1	296 00	0 000
6	40.00 263 00	0	0.00	0 000
7	40 00 274 00	0	0.00	0.000
8	40 00 279 00	0	0.00	0.000
9	40 00 281 00	0	0.00	0.000
10	40.00 282 00	1	296 00	0 000
11	70.00 263 00	0	0.00	0.000
12	70 00 274 00	0	0.00	0 000
13	70 00 279 00	0	0.00	0.000
14	70 00 281 00	0	0.00	0.000
15	70.00 282 00	1	296.00	0.000
16	100.00 263.00	0	0 00	0.000
17	100 00 274 00	0	0.00	0.000
18	100 00 279 00	0	0.00	0.000
19	100 00 281 00	0	0.00	0.000
20	100 00 282.00	1	296 00	0.000
21	100 00 285 00	1	296 00	0 000
22	120 00 263 00	0	0 00	0 000
23	120 00 274 00	0	0 00	0 000
24	120 00 279 00	0	0 00	0 000
25	120.00 281.00	0	0 00	0 000
26	120 00 282 00	0	0 00	0 000
27	120 00 285 00	1	296 00	0 000
28	140 00 263 00	0	0.00	0.000
29	140 00 274 00	0	0.00	0.000
30	140.00 279 00	0	0.00	0.000
31	140 00 281 00	0	0 00	0 000
32	140 00 282 00	0	0 00	0 000
33	140 00 285 00	1	296 00	0.000
34	160 00 263 00	0	0.00	0.000
35	160 00 274 00	0	0 00	0 000
36	160 00 279 00	0	0 00	0 000
37	160 00 281 00	0	0 00	0 000
38	160 00 282 00	0	0 00	0.000
39	160 00 285 00	1	296 00	0 000
40	170 00 263 00	0	0 00	0 000
41	170 00 274 00	0	0 00	0 000
42	170 00 279 00	0	0.00	0.000
43	170 00 281 00	0	0 00	0 000
44	170 00 282 00	0	0 00	0 000
45	170 00 285 00	1	296 00	0 000
46	180 00 263 00	0	0.00	0.000
47	180 00 274 00	0	0 00	0 000
48	180 00 279 00	0	0 00	0 000
49	180 00 281 00	0	0.00	0.000
50	180 00 282 00	0	0 00	0 000
51	180 00 285 00	1	296.00	0 000
52	190.00 263 00	0	0.00	0.000
53	190 00 274 00	0	0 00	0 000

Açude Ubaldinho
Cálculos de Percolação
nov/96

1 1 7

54	190 00	279 00	0	0 00	0 000
55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	285 00	1	296 00	0 000
58	195 00	263 00	0	0 00	0 000
59	195 00	274 00	0	0 00	0 000
60	195 00	279 00	0	0 00	0 000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0 00	0 000
63	195 00	285 00	1	296 00	0 000
64	200 00	263 00	0	0 00	0 000
65	200 00	274 00	0	0 00	0 000
66	200 00	279 00	0	0 00	0 000
67	200 00	281 00	0	0 00	0 000
68	200 00	282 00	0	0 00	0 000
69	200 00	285 00	1	296 00	0 000
70	207 00	263 00	0	0 00	0 000
71	207 00	274 00	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0 000
75	207 00	285 00	1	296 00	0 000
76	214 00	263 00	0	0 00	0 000
77	214 00	274 00	0	0 00	0 000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0 000
81	221 00	263 00	0	0 00	0 000
82	221 00	274 00	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0 000
86	228 00	263 00	0	0 00	0 000
87	228 00	274 00	0	0 00	0 000
88	228 00	279 00	0	0 00	0 000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	263 00	0	0 00	0 000
92	235 00	274 00	0	0 00	0 000
93	235 00	279 00	0	0 00	0 000
94	235 00	281 00	0	0 00	0 000
95	235 00	282 00	0	0 00	0 000
96	240 50	263 00	0	0 00	0 000
97	240 50	274 00	0	0 00	0 000
98	240 50	279 00	0	0 00	0 000
99	240 50	281 00	0	0 00	0 000
100	240 50	282 00	0	0 00	0 000
101	246 00	263 00	0	0 00	0 000
102	246 00	274 00	0	0 00	0 000
103	246 00	279 00	0	0 00	0 000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0 000
106	251 00	263 00	0	0 00	0 000
107	251 00	274 00	0	0 00	0 000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	263 00	0	0 00	0 000
112	256 00	274 00	0	0 00	0 000
113	256 00	279 00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0 000
116	263 50	263 00	0	0 00	0 000
117	263 50	274 00	0	0 00	0 000
118	263 50	279 00	0	0 00	0 000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0 000
121	271 00	263 00	0	0 00	0 000
122	271 00	274 00	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282 00	0 000
126	278 50	263 00	0	0 00	0 000
127	278 50	274 00	0	0 00	0 000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0 000
130	278 50	282 00	1	282 00	0 000
131	286 00	263 00	0	0 00	0 000
132	286 00	274 00	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282 00	0 000
136	293 50	263 00	0	0 00	0 000
137	293 50	274 00	0	0 00	0 000
138	293 50	279 00	0	0 00	0 000

139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0 000
141	310 00	263 00	0	0 00	0 000
142	310 00	274 00	0	0 00	0 000
143	310 00	279 00	0	0.00	0 000
144	310 00	281 00	0	0.00	0 000
145	310 00	282 00	1	282.00	0 000
146	326 50	263 00	0	0.00	0 000
147	326 50	274 00	0	0.00	0 000
148	326 50	279 00	0	0.00	0 000
149	326 50	281 00	0	0 00	0 000
150	326 50	282 00	1	282 00	0.000
151	343 00	263 00	0	0.00	0.000
152	343 00	274 00	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0.000
156	359 50	263 00	0	0 00	0 000
157	359 50	274.00	0	0.00	0 000
158	359.50	279 00	0	0.00	0 000
159	359 50	281 00	0	0 00	0.000
160	359 50	282.00	1	282.00	0 000
161	376 00	263 00	0	0 00	0 000
162	376 00	274 00	0	0 00	0 000
163	376 00	279 00	0	0.00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0 000
166	400 00	263 00	0	0 00	0 000
167	400 00	274 00	0	0 00	0 000
168	400 00	279 00	0	0 00	0 000
169	400 00	281 00	0	0 00	0 000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	5
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	5
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	5
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	5
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	5
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	5
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	5
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	5
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	5
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	5
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	5

49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	5
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	5
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	5
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	5
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	5
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	5
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	5
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	5
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	5
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	5
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	5
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	5
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	5
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	5
107	132	137	138	133	4
108	133	138	139	134	3
109	134	139	140	135	2
110	136	141	142	137	5
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	5
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	5
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	5
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	5
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	5
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
1	4	923E-0009
2	-5	770E-0009
3	-2	787E-0007
4	-4	264E-0007
5	7	188E-0007
10	-1	791E-0007
15	2	610E-0006
20	1	442E-0004
21	1	542E-0008
27	1	202E-0007
30	2	564E-0007
35	1	079E-0007
51	2	375E-0007
57	1	976E-0007
63	1	410E-0007
69	1	791E-0007
75	1	091E-0007
115	-1	326E-0004
120	-1	442E-0005
125	-3	370E-0007
130	-5	976E-0007
135	-2	370E-0007
140	-1	521E-0007
145	-5	477E-0008
150	-8	949E-0009
155	-1	461E-0009
160	-2	383E-0010
165	-4	164E-0011
170	-5	387E-0012

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 1 493E-0004
SAINDO = -1 493E-0004

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS		CARGA	PRESSAO NEUTRA	FUNCAO
NUMERO	X	Y	HIDRAULICA	(UNID.DE CARGA)	FLUXO
1	0 00	263 00	296 00	33.00	2 462E-0009
2	0 00	274 00	296 00	22.00	2 038E-0009
3	0 00	279 00	296 00	17.00	-1.402E-0007
4	0 00	281 00	296 00	15.00	-4 928E-0007
5	0.00	282 00	296.00	14 00	-3 465E-0007
6	40 00	263 00	296.00	33 00	0 000E+0000
7	40.00	274 00	296 00	22 00	-1 294E-0008
8	40 00	279 00	296 00	17 00	7 201E-0009
9	40 00	281 00	296 00	15 00	-1 371E-0008
10	40 00	282 00	296 00	14.00	-7 670E-0008
11	70 00	263 00	296 00	33.00	0.000E+0000
12	70 00	274 00	296 01	22 01	6.552E-0007
13	70 00	279 00	296 00	17 00	7.611E-0007
14	70 00	281 00	296 00	15 00	1.061E-0006
15	70 00	282 00	296 00	14 00	1.139E-0006
16	100 00	263 00	295 56	32 56	0 000E+0000
17	100 00	274 00	295 74	21 74	5 264E-0006
18	100 00	279 00	295 97	16 97	7 563E-0006
19	100 00	281 00	295 99	14.99	5.231E-0005
20	100 00	282 00	296 00	14 00	7 457E-0005
21	100 00	285 00	296 00	11 00	1 467E-0004
22	120 00	263 00	294 15	31 15	0.000E+0000
23	120 00	274 00	294 18	20 18	9 141E-0006
24	120 00	279 00	294 19	15 19	1 370E-0005
25	120 00	281 00	294 19	13 19	1.097E-0004
26	120 00	282 00	294 19	12 19	1.580E-0004
27	120 00	285 00	296 00	11.00	1 468E-0004
28	140 00	263 00	292 42	29.42	0 000E+0000
29	140 00	274 00	292 42	18 42	9.706E-0006
30	140 00	279 00	292 42	13.42	1 410E-0005
31	140 00	281 00	292 42	11.42	1 016E-0004
32	140 00	282 00	292.42	10 42	1.452E-0004
33	140 00	285 00	296 00	11 00	1 469E-0004
34	160 00	263 00	290 65	27 65	0 000E+0000

35	160 00	274 00	290 65	16 65	9 750E-0006
36	160 00	279 00	290 65	11 65	1 419E-0005
37	160 00	281 00	290 65	9 65	1 031E-0004
38	160 00	287 00	290 65	8 65	1 475E-0004
39	160 00	285 00	296 00	11 00	1 472E-0004
40	170 00	263 00	289 76	26 76	0 000E+0000
41	170 00	274 00	289 76	15 76	9 768E-0006
42	170 00	279 00	289 76	10 76	1 421E-0005
43	170 00	281 00	289 76	8 76	1 030E-0004
44	170 00	282 00	289 76	7 76	1 474E-0004
45	170 00	285 00	296 00	11 00	1 474E-0004
46	180 00	263 00	288 87	25 87	0 000E+0000
47	180 00	274 00	288 87	14 87	9 782E-0006
48	180 00	279 00	288 87	9 87	1 423E-0005
49	180 00	281 00	288 87	7 87	1 032E-0004
50	180 00	282 00	288 87	6 87	1 477E-0004
51	180 00	285 00	296 00	11 00	1 477E-0004
52	190 00	263 00	287 98	24 98	0 000E+0000
53	190 00	274 00	287 98	13 98	9 794E-0006
54	190 00	279 00	287 98	8 98	1 425E-0005
55	190 00	281 00	287 98	6 98	1 033E-0004
56	190 00	287 00	287 98	5 98	1 479E-0004
57	190 00	285 00	296 00	11 00	1 479E-0004
58	190 00	287 00	297 54	24 54	0 000E+0000
59	195 00	274 00	287 54	13 54	9 799E-0006
60	195 00	279 00	287 54	8 54	1 426E-0005
61	195 00	281 00	287 54	6 54	1 034E-0004
62	195 00	282 00	287 54	5 54	1 480E-0004
63	195 00	285 00	296 00	11 00	1 480E-0004
64	200 00	263 00	287 09	24 09	0 000E+0000
65	200 00	274 00	287 09	13 09	9 799E-0006
66	200 00	279 00	287 09	8 09	1 426E-0005
67	200 00	281 00	287 09	6 09	1 035E-0004
68	200 00	282 00	287 09	5 09	1 482E-0004
69	200 00	285 00	296 00	11 00	1 482E-0004
70	207 00	263 00	286 47	23 47	0 000E+0000
71	207 00	274 00	286 47	12 47	9 791E-0006
72	207 00	279 00	286 47	7 47	1 426E-0005
73	207 00	281 00	286 47	5 47	1 037E-0004
74	207 00	282 00	286 47	4 47	1 484E-0004
75	207 00	285 00	296 00	11 00	1 483E-0004
76	214 00	263 00	285 85	22 85	0 000E+0000
77	214 00	274 00	285 84	11 84	9 761E-0006
78	214 00	279 00	285 84	6 84	1 422E-0005
79	214 00	281 00	285 84	4 84	1 037E-0004
80	214 00	282 00	285 84	3 84	1 484E-0004
81	221 00	263 00	285 23	22 23	0 000E+0000
82	221 00	274 00	285 22	11 22	9 693E-0006
83	221 00	279 00	285 21	6 21	1 415E-0005
84	221 00	281 00	285 21	4 21	1 036E-0004
85	221 00	282 00	285 21	3 21	1 484E-0004
86	228 00	263 00	284 62	21 62	0 000E+0000
87	228 00	274 00	284 60	10 60	9 547E-0006
88	228 00	279 00	284 59	5 59	1 399E-0005
89	228 00	281 00	284 59	3 59	1 036E-0004
90	228 00	282 00	284 59	2 59	1 484E-0004
91	235 00	263 00	284 02	21 02	0 000E+0000
92	235 00	274 00	283 99	9 99	9 245E-0006
93	235 00	279 00	283 96	4 96	1 365E-0005
94	235 00	281 00	283 96	2 96	1 035E-0004
95	235 00	282 00	283 96	1 96	1 484E-0004
96	240 50	263 00	283 58	20 58	0 000E+0000
97	240 50	274 00	283 52	9 52	8 794E-0006
98	240 50	279 00	283 47	4 47	1 315E-0005
99	240 50	281 00	283 47	2 47	1 033E-0004
100	240 50	282 00	283 47	1 47	1 484E-0004
101	246 00	263 00	283 17	20 17	0 000E+0000
102	246 00	274 00	283 07	9 07	8 008E-0006
103	246 00	279 00	282 97	3 97	1 225E-0005
104	246 00	281 00	282 97	1 97	1 032E-0004
105	246 00	282 00	282 97	0 97	1 484E-0004
106	251 00	263 00	282 85	19 85	0 000E+0000
107	251 00	274 00	282 69	8 69	6 865E-0006
108	251 00	279 00	282 51	3 51	1 067E-0005
109	251 00	281 00	282 51	1 51	1 005E-0004
110	251 00	282 00	282 52	0 52	1 484E-0004
111	256 00	263 00	282 58	19 58	0 000E+0000
112	256 00	274 00	282 39	8 39	5 349E-0006
113	256 00	279 00	282 08	3 08	7 863E-0006
114	256 00	281 00	282 05	1 05	5 782E-0005
115	256 00	282 00	282 00	0 00	8 210E-0005
116	263 50	263 00	282 30	19 30	0 000E+0000
117	263 50	274 00	282 15	8 15	3 018E-0006
118	263 50	279 00	282 00	3 00	3 734E-0006
119	263 50	281 00	282 00	1 00	7 816E-0006

120	263 50	282 00	282 00	0 00	8 599E-0006
121	271 00	263 00	282 14	19 14	0 000E+0000
122	271 00	274 00	282 07	8.07	1 484E-0006
123	271 00	279 00	282 00	3 00	1 686E-0006
124	271 00	281 00	282 00	1.00	1 357E-0006
125	271 00	282 00	282 00	0 00	1 221E-0006
126	278 50	263 00	282 07	19 07	0 000E+0000
127	278 50	274 00	282 03	8 03	7 031E-0007
128	278 50	279 00	282 00	3 00	7.942E-0007
129	278 50	281 00	282 00	1.00	7 743E-0007
130	278 50	282 00	282 00	0 00	7 534E-0007
131	286 00	263 00	282 03	19 03	0 000E+0000
132	286 00	274 00	282 01	8 01	3.301E-0007
133	286 00	279 00	282 00	3 00	3.733E-0007
134	286 00	281 00	282 00	1.00	3 522E-0007
135	286 00	282 00	282 00	0.00	3 361E-0007
136	293 50	263 00	282 01	19 01	0.000E+0000
137	293 50	274 00	282 01	8.01	1.497E-0007
138	293 50	279 00	282 00	3 00	1.691E-0007
139	293 50	281.00	282 00	1 00	1 524E-0007
140	293 50	282.00	282.00	0 00	1 415E-0007
141	310 00	263 00	282 00	19.00	0 000E+0000
142	310 00	274 00	282 00	8 00	2 638E-0008
143	310 00	281 00	282 00	1 00	3 554E-0008
144	310 00	282 00	282 00	0 00	3 808E-0008
145	310 00	282 00	282 00	0 00	0.000E+0000
146	326 50	263 00	282 00	19.00	0.000E+0000
147	326 50	274 00	282.00	8 00	4.726E-0009
148	326 50	279 00	282 00	3 00	5 385E-0009
149	326 50	281 00	282 00	1 00	6.035E-0009
150	326 50	282 00	282 00	0 00	6.220E-0009
151	343 00	263.00	282.00	19.00	0.000E+0000
152	343 00	274 00	282 00	8.00	8.399E-0010
153	343 00	279 00	282 00	3 00	9.526E-0010
154	343 00	281 00	282 00	1 00	9.988E-0010
155	343 00	282.00	282 00	0 00	1 016E-0009
156	359 50	263 00	282 00	19 00	0 000E+0000
157	359 50	274 00	282 00	8 00	1.477E-0010
158	359 50	279.00	282 00	3.00	1 675E-0010
159	359 50	281 00	282 00	1 00	1 692E-0010
160	359 50	282 00	282 00	0 00	1 662E-0010
161	376 00	263.00	282.00	19.00	0.000E+0000
162	376.00	274 00	282.00	8 00	2.432E-0011
163	376 00	279 00	282 00	3 00	2 753E-0011
164	376 00	281 00	282 00	1 00	2 715E-0011
165	376 00	282 00	282 00	0 00	2 622E-0011
166	400 00	263 00	282.00	19 00	0 000E+0000
167	400 00	274 00	282.00	8 00	0.000E+0000
168	400 00	279 00	282.00	3.00	0.000E+0000
169	400 00	281 00	282 00	1 00	1 184E-0014
170	400 00	282 00	282 00	0 00	2 705E-0012

ANEXO 18

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Barragem de Ubaldinho - Ceara - Anexo 18
 *** ENGEOS *** Engenharia e Geotecnia S/C Ltda
 PERCLAN - programa de analise de percolacao plana - MEF
 G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737

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TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

NUMERO DE MATERIAIS 6
 NUMERO DE NOS 170
 NUMERO DE ELEMENTOS 133
 LARGURA DE BANDA MAXIMA 8
 LARGURA DE BANDA MEDIA 6 98

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS		ANGULO ENTRE K1 E OX
	K1	K2	
1	1 00000E-0008	1 00000E-0008	0 00
2	1 00000E-0004	1 00000E-0004	0 00
3	1 00000E-0001	1 00000E-0001	0 00
4	1 00000E-0005	1 00000E-0005	0 00
5	1 00000E-0005	1 00000E-0005	0 00
6	1 00000E-0003	1 00000E-0003	0 00

DADOS DOS NOS

NO N R	COORDENADAS DOS NOS		COND CONT	CARGA HIDRAULICA	VAZAO
	X	Y			
1	0 00	263 00	1	296 00	0.000
2	0 00	274 00	1	296 00	0.000
3	0 00	279 00	1	296 00	0.000
4	0 00	281 00	1	296 00	0.000
5	0 00	282 00	1	296 00	0.000
6	40 00	263 00	0	0 00	0.000
7	40 00	274 00	0	0 00	0.000
8	40 00	279 00	0	0 00	0.000
9	40 00	281 00	0	0 00	0.000
10	40 00	282 00	1	296 00	0.000
11	70 00	263 00	0	0.00	0.000
12	70 00	274 00	0	0.00	0.000
13	70 00	279 00	0	0 00	0.000
14	70 00	281 00	0	0 00	0.000
15	70 00	282 00	1	296 00	0.000
16	100 00	263 00	0	0 00	0.000
17	100 00	274 00	0	0 00	0.000
18	100 00	279 00	0	0 00	0.000
19	100 00	281 00	0	0 00	0.000
20	100 00	282 00	1	296 00	0.000
21	100 00	284 00	1	296 00	0.000
22	120 00	263 00	0	0 00	0.000
23	120 00	274 00	0	0 00	0.000
24	120 00	279 00	0	0 00	0.000
25	120 00	281 00	0	0.00	0.000
26	120 00	282 00	0	0 00	0.000
27	120 00	284 00	1	296 00	0.000
28	140 00	263 00	0	0.00	0.000
29	140 00	274 00	0	0 00	0.000
30	140 00	279 00	0	0 00	0.000
31	140 00	281 00	0	0 00	0.000
32	140 00	282 00	0	0 00	0.000
33	140 00	284 00	1	296 00	0.000
34	160 00	263 00	0	0 00	0.000
35	160 00	274 00	0	0 00	0.000
36	160 00	279 00	0	0 00	0.000
37	160 00	281 00	0	0 00	0.000
38	160 00	282 00	0	0 00	0.000
39	160 00	284 00	1	296 00	0.000
40	170 00	263 00	0	0 00	0.000
41	170 00	274 00	0	0 00	0.000
42	170 00	279 00	0	0 00	0.000
43	170 00	281 00	0	0 00	0.000
44	170 00	282 00	0	0 00	0.000
45	170 00	284 00	1	296 00	0.000
46	180 00	263 00	0	0 00	0.000
47	180 00	274 00	0	0 00	0.000
48	180 00	279 00	0	0 00	0.000
49	180 00	281 00	0	0 00	0.000
50	180 00	282 00	0	0 00	0.000
51	180 00	284 00	1	296.00	0.000
52	190 00	263 00	0	0 00	0.000

53	190 00	274 00	0	0 00	0 000
54	190 00	279 00	0	0 00	0.000
55	190 00	281 00	0	0.00	0.000
56	190 00	282 00	0	0.00	0 000
57	190 00	284 00	1	296 00	0 000
58	195 00	263.00	0	0 00	0 000
59	195 00	274 00	0	0 00	0 000
60	195 00	279 00	0	0 00	0 000
61	195 00	281 00	0	0 00	0 000
62	195 00	282.00	0	0.00	0.000
63	195 00	284.00	1	296.00	0.000
64	200 00	263 00	0	0.00	0.000
65	200 00	274 00	0	0.00	0.000
66	200 00	279.00	0	0.00	0.000
67	200 00	281 00	0	0.00	0.000
68	200 00	282 00	0	0 00	0 000
69	200 00	284 00	1	296 00	0.000
70	207 00	263.00	0	0 00	0.000
71	207 00	274 00	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0 000
75	207 00	284 00	1	296.00	0 000
76	214 00	263 00	0	0 00	0 000
77	214 00	271 00	0	0 00	0 000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0.00	0 000
80	214 00	282.00	0	0.00	0 000
81	221 00	263 00	0	0.00	0.000
82	221 00	274 00	0	0 00	0.000
83	221.00	279 00	0	0 00	0.000
84	221 00	281 00	0	0 00	0.000
85	221 00	282 00	0	0 00	0 000
86	228 00	263.00	0	0.00	0 000
87	228 00	274.00	0	0.00	0.000
88	228 00	279 00	0	0 00	0.000
89	228 00	281 00	0	0 00	0.000
90	228 00	282 00	0	0 00	0.000
91	235 00	263 00	0	0 00	0 000
92	235 00	274 00	0	0.00	0 000
93	235 00	279 00	0	0 00	0 000
94	235 00	281.00	0	0.00	0.000
95	235.00	282 00	0	0 00	0.000
96	240.50	263 00	0	0 00	0.000
97	240 50	274 00	0	0 00	0.000
98	240 50	279 00	0	0.00	0 000
99	240 50	281 00	0	0.00	0 000
100	240 50	282.00	0	0.00	0 000
101	246 00	263.00	0	0.00	0.000
102	246.00	274 00	0	0 00	0.000
103	246 00	279 00	0	0 00	0 000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0 000
106	251 00	263 00	0	0 00	0.000
107	251 00	274 00	0	0 00	0 000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0.00	0.000
110	251 00	282.00	0	0.00	0 000
111	256 00	263.00	0	0.00	0 000
112	256 00	274 00	0	0.00	0 000
113	256 00	279 00	0	0.00	0 000
114	256 00	281 00	0	0 00	0.000
115	256 00	282 00	1	282.00	0 000
116	263 50	263 00	0	0 00	0.000
117	263 50	274 00	0	0 00	0.000
118	263 50	279 00	0	0 00	0.000
119	263 50	281 00	0	0 00	0.000
120	263 50	282 00	1	282.00	0 000
121	271.00	263 00	0	0.00	0 000
122	271 00	274 00	0	0.00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281.00	0	0.00	0.000
125	271 00	282 00	1	282 00	0.000
126	278 50	263.00	0	0.00	0 000
127	278 50	274 00	0	0.00	0 000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0.000
130	278 50	282 00	1	282 00	0.000
131	286 00	263.00	0	0.00	0 000
132	286 00	274 00	0	0.00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0.00	0 000
135	286 00	282 00	1	282 00	0 000
136	293 50	263 00	0	0 00	0 000
137	293 50	274 00	0	0 00	0 000

138	293 50	279 00	0	0 00	0 000
139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0 000
141	310 00	263 00	0	0 00	0 000
142	310 00	274 00	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	263 00	0	0 00	0 000
147	326 50	274 00	0	0 00	0 000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0 000
150	326 50	282 00	1	282 00	0 000
151	343 00	263 00	0	0 00	0 000
152	343 00	274 00	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	263 00	0	0 00	0 000
157	359 50	274 00	0	0 00	0 000
158	359 50	279 00	0	0 00	0 000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	263 00	0	0 00	0 000
162	376 00	279 00	0	0 00	0 000
163	376 00	281 00	0	0 00	0 000
164	376 00	282 00	1	282 00	0 000
165	400 00	263 00	0	0 00	0 000
166	400 00	274 00	0	0 00	0 000
167	400 00	279 00	0	0 00	0 000
168	400 00	281 00	0	0 00	0 000
169	400 00	282 00	1	282 00	0 000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	5
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	5
6	7	12	13	9	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	5
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	5
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	5
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	5
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	5
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	5
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	5
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	5
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1

48	58	64	65	59	5
49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	5
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	5
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	5
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	5
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	5
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	5
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	5
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	5
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	5
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	5
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	5
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	5
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	5
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	5
107	132	137	138	133	4
108	133	138	139	134	6
109	134	139	140	135	6
110	136	141	142	137	5
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	5
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	5
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	5
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	5
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	5
131	162	167	168	163	4
132	163	168	169	164	3

133 164 169 170 165 2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
1	4	908E-0009
2	-5	752E-0009
3	-2	778E-0007
4	-4	250E-0007
5	7	165E-0007
10	-1	785E-0007
15	2	602E-0006
20	1	438E-0004
21	2	217E-0008
22	1	111E-0007
33	1	565E-0007
39	1	836E-0007
45	3	111E-0007
51	3	556E-0007
57	2	959E-0007
63	2	112E-0007
69	2	682E-0007
75	1	637E-0007
115	-1	329E-0004
120	-1	446E-0005
125	-3	383E-0007
130	-5	917E-0007
135	-2	425E-0007
140	-1	561E-0007
145	-5	341E-0008
150	-9	154E-0009
155	-1	432E-0009
160	-2	426E-0010
165	-4	108E-0011
170	-5	444E-0012

FLUXOS TOTAIS DO SISTEMA
ENTRANDO = 1 497E-0004
SAINDO = -1 497E-0004

NO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	263 00	296 00	33 00	2 454E-0009
2	0 00	274 00	296 00	22 00	2 032E-0009
3	0 00	279 00	296 00	17 00	-1 398E-0007
4	0 00	281 00	296 00	15 00	-4 912E-0007
5	0 00	282 00	296 00	14 00	-3 455E-0007
6	40 00	263 00	296 00	33 00	0 000E+0000
7	40 00	274 00	296 00	22 00	-1 290E-0008
8	40 00	279 00	296 00	17 00	7 188E-0009
9	40 00	281 00	296 00	15 00	-1 363E-0008
10	40 00	282 00	296 00	14 00	-7 646E-0008
11	70 00	263 00	296 00	33 00	0 000E+0000
12	70 00	274 00	296 01	22 01	6 530E-0007
13	70 00	279 00	296 00	17 00	7 585E-0007
14	70 00	281 00	296 00	15 00	1 057E-0006
15	70 00	282 00	296 00	14 00	1 135E-0006
16	100 00	263 00	295 56	32 56	0 000E+0000
17	100 00	274 00	295 74	21 74	5 255E-0006
18	100 00	279 00	295 97	16 97	7 548E-0006
19	100 00	281 00	295 99	14 99	5 215E-0005
20	100 00	282 00	296 00	14 00	7 434E-0005
21	100 00	284 00	296 00	12 00	1 462E-0004
22	120 00	263 00	294 16	31 16	0 000E+0000
23	120 00	274 00	294 18	20 18	9 138E-0006
24	120 00	279 00	294 20	15 20	1 370E-0005
25	120 00	281 00	294 20	13 20	1 098E-0004
26	120 00	282 00	294 20	12 20	1 582E-0004
27	120 00	284 00	296 00	12 00	1 463E-0004
28	140 00	263 00	292 43	29 43	0 000E+0000
29	140 00	274 00	292 43	18 43	9 685E-0006
30	140 00	279 00	292 43	13 43	1 407E-0005
31	140 00	281 00	292 43	11 43	1 012E-0004
32	140 00	282 00	292 43	10 43	1 447E-0004
33	140 00	284 00	296 00	12 00	1 466E-0004

Anexos Fl 160/186

34	160 00	263 00	290 66	27 66	0.000E+0000
35	160 00	274 00	290 66	16 66	9 738E-0006
36	160 00	279.00	290 66	11.66	1.417E-0005
37	160 00	281 00	290 66	9 66	1 030E-0004
38	160 00	282.00	290 66	8 66	1 474E-0004
39	160 00	284 00	296 00	12 00	1 470E-0004
40	170 00	263 00	289 77	26 77	0 000E+0000
41	170 00	274 00	289 78	15 78	9 762E-0006
42	170 00	279 00	289 78	10 78	1 420E-0005
43	170 00	281 00	289 78	8.78	1 029E-0004
44	170 00	282 00	289 78	7.78	1 473E-0004
45	170 00	284 00	296 00	12.00	1 473E-0004
46	180 00	263 00	288.89	25 89	0.000E+0000
47	180 00	274 00	288 89	14.89	9.784E-0006
48	180 00	279 00	288 89	9.89	1 423E-0005
49	180 00	281 00	288 89	7 89	1 032E-0004
50	180 00	282 00	288 89	6 89	1.477E-0004
51	180 00	284 00	296 00	12.00	1 477E-0004
52	190 00	263 00	288 00	25 00	0 000E+0000
53	190 00	274 00	288.00	14 00	9.803E-0006
54	190 00	279 00	288 00	9.00	1.426E-0005
55	190 00	281 00	288.00	7 00	1 034E-0004
56	190 00	282 00	288 00	6 00	1 480E-0004
57	190 00	284 00	296 00	12 00	1.480E-0004
58	195 00	274 00	287.55	24 55	0 000E+0000
59	195 00	279 00	287 55	13 55	9 811E-0006
60	195 00	281 00	287 55	8.55	1 427E-0005
61	195 00	281 00	287.55	6.55	1 036E-0004
62	195 00	282 00	287 55	5.55	1 482E-0004
63	195 00	284.00	296 00	12.00	1 482E-0004
64	200 00	263 00	287.10	24.10	0.000E+0000
65	200 00	274 00	287 10	13.10	9.816E-0006
66	200 00	279 00	287 10	8.10	1 429E-0005
67	200 00	281 00	287 11	6.11	1.037E-0004
68	200 00	282 00	287.11	5 11	1.485E-0004
69	200 00	284 00	296 00	12 00	1.485E-0004
70	207 00	263 00	286 48	23 48	0.000E+0000
71	207 00	274 00	286.48	12 48	9.811E-0006
72	207 00	279 00	286 48	7 48	1.429E-0005
73	207 00	281 00	286 48	5 48	1.039E-0004
74	207 00	282 00	286 48	4.48	1.488E-0004
75	207 00	284 00	296 00	12 00	1.487E-0004
76	214 00	263 00	285.86	22 86	0 000E+0000
77	214 00	274.00	285 85	11 85	9 784E-0006
78	214 00	279.00	285 85	6 85	1.426E-0005
79	214 00	281 00	285 85	4 85	1 039E-0004
80	214 00	282 00	285 85	3.85	1 488E-0004
81	221 00	263.00	285 24	22.24	0.000E+0000
82	221 00	274.00	285.23	11 23	9 717E-0006
83	221 00	279 00	285.22	6.22	1.418E-0005
84	221 00	281 00	285 22	4.22	1 039E-0004
85	221 00	282 00	285.22	3.22	1.488E-0004
86	228 00	263 00	284.62	21.62	0.000E+0000
87	228 00	274 00	284 61	10.61	9 571E-0006
88	228 00	279.00	284 59	5 59	1 402E-0005
89	228 00	281 00	284 59	3.59	1.039E-0004
90	228 00	282 00	284.59	2.59	1 488E-0004
91	235 00	263 00	284.03	21 03	0 000E+0000
92	235 00	274 00	283 99	9.99	9.268E-0006
93	235 00	279 00	283.97	4.97	1 369E-0005
94	235 00	281 00	283 97	2.97	1.038E-0004
95	235 00	282 00	283 97	1.97	1.488E-0004
96	240 50	263 00	283 58	20.58	0.000E+0000
97	240 50	274 00	283 52	9.52	8.816E-0006
98	240 50	279 00	283 47	4.47	1.319E-0005
99	240 50	281 00	283 47	2 47	1 035E-0004
100	240 50	282 00	283 47	1 47	1 488E-0004
101	246 00	263 00	283 17	20 17	0 000E+0000
102	246 00	274 00	283.07	9 07	8 029E-0006
103	246 00	279 00	282 97	3.97	1 228E-0005
104	246 00	281 00	282 97	1.97	1 035E-0004
105	246 00	282 00	282 97	0.97	1.488E-0004
106	251 00	263 00	282.85	19 85	0.000E+0000
107	251 00	274 00	282 69	8.69	6.883E-0006
108	251 00	279 00	282 51	3 51	1.070E-0005
109	251 00	281 00	282 51	1 51	1.007E-0004
110	251 00	282 00	282 52	0 52	1 488E-0004
111	256 00	263 00	282 58	19 58	0 000E+0000
112	256 00	274 00	282.39	8.39	5.363E-0006
113	256 00	279 00	282.08	3.08	7.884E-0006
114	256 00	281 00	282 05	1.05	5.797E-0005
115	256.00	282 00	282.00	0 00	8 232E-0005
116	263 50	263 00	282.30	19.30	0 000E+0000
117	263 50	274 00	282 15	8.15	3.026E-0006
118	263 50	279 00	282 00	3 00	3 744E-0006

119	263 50	281 00	282 00	1 00	7.837E-0006
120	263 50	282 00	282 00	0.00	8 621E-0006
121	271 00	263 00	282 14	19 14	0 000E+0000
122	271 00	274 00	282 07	8 07	1 488E-0006
123	271 00	279 00	282 00	3 00	1 690E-0006
124	271 00	281 00	282 00	1 00	1 361E-0006
125	271 00	282 00	282 00	0 00	1 224E-0006
126	278 50	263 00	282 07	19 07	0 000E+0000
127	278 50	274 00	282 03	8 03	7 052E-0007
128	278 50	279 00	282 00	3 00	7 967E-0007
129	278 50	281 00	282 00	1 00	7.779E-0007
130	278 50	282 00	282 00	0 00	7 587E-0007
131	286 00	263 00	282 03	19 03	0.000E+0000
132	286 00	274 00	282 01	8 01	3.314E-0007
133	286 00	279 00	282 00	3 00	3 752E-0007
134	286 00	281 00	282 00	1 00	3 612E-0007
135	286 00	282 00	282 00	0 00	3.416E-0007
136	293 50	263 00	282 01	19 01	0 000E+0000
137	293 50	274 00	282 01	8 01	1 504E-0007
138	293 50	279 00	282.00	3 00	1.698E-0007
139	293 50	281 00	282 00	1 00	1 517E-0007
140	293 50	282 00	282 00	0 00	1 423E-0007
141	310 00	263 00	282 00	19 00	0 000E+0000
:	:	:	:	:	2 647E-0008
142	310 00	279 00	282 00	3 00	3 014E-0008
143	310 00	281 00	282 00	1 00	3 549E-0008
145	310 00	282 00	282 00	0 00	3 758E-0008
146	326 50	263 00	282 00	19.00	0 000E+0000
147	326 50	274 00	282 00	8.00	4 740E-0009
148	326 50	279 00	282 00	3 00	5 402E-0009
149	326 50	281 00	282 00	1 00	6 049E-0009
150	326 50	282 00	282 00	0 00	6 298E-0009
151	343 00	263 00	282 00	19 00	0 000E+0000
152	343 00	274 00	282 00	8 00	8 423E-0010
153	343 00	279 00	282 00	3 00	9 552E-0010
154	343 00	281 00	282 00	1 00	1 000E-0009
155	343 00	282 00	282 00	0 00	1 005E-0009
156	359 50	263 00	282 00	19 00	0 000E+0000
157	359 50	274 00	282 00	8 00	1 480E-0010
158	359 50	279 00	282 00	3 00	1 679E-0010
159	359 50	281 00	282 00	1 00	1 691E-0010
160	359 50	282 00	282 00	0.00	1 678E-0010
161	376 00	263 00	282 00	19.00	0.000E+0000
162	376 00	274 00	282 00	8 00	2.438E-0011
163	376 00	279 00	282 00	3 00	2.759E-0011
164	376 00	281 00	282 00	1 00	2.720E-0011
165	376 00	282 00	282 00	0 00	2.599E-0011
166	400 00	263 00	282 00	19 00	0 000E+0000
167	400 00	274 00	282.00	8.00	0 000E+0000
168	400 00	279 00	282.00	3.00	0 000E+0000
169	400 00	281 00	282 00	1 00	1.031E-0014
170	400 00	282 00	282 00	0.00	2 732E-0012

ANEXO 18A

```

=====
Barragem de Ubaldinho - Ceara - Anexo 18 A
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCLPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          6
NUMERO DE NOS                170
NUMERO DE ELEMENTOS          133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS K1	K2	ANGULO ENTRE K1 E OX
1	1 00000E-0008	1 00000E-0008	0 00
2	5 00000E-0004	5 00000E-0004	0 00
3	5 00000E-0004	5 00000E-0004	0 00
4	1 00000E-0005	1 00000E-0005	0 00
5	1 00000E-0005	1 00000E-0005	0 00
6	1 00000E-0003	1 00000E-0003	0 00

DADOS DOS NOS

NO N R	COORDENADAS DOS NOS X	Y	COND CONT	CARGA HIDRAULICA	VAZAO
1	0 00	263 00	0	0 00	0 000
2	0 00	274 00	0	0 00	0 000
3	0 00	279 00	0	0 00	0 000
4	0 00	281 00	0	0 00	0 000
5	0 00	282 00	1	296 00	0 000
6	40 00	263 00	0	0 00	0 000
7	40 00	274 00	0	0 00	0 000
8	40 00	279 00	0	0 00	0 000
9	40 00	281 00	0	0 00	0 000
10	40 00	282 00	1	296 00	0 000
11	70 00	263 00	0	0 00	0 000
12	70 00	274 00	0	0 00	0 000
13	70 00	279 00	0	0 00	0 000
14	70 00	281 00	0	0 00	0 000
15	70 00	282 00	1	296 00	0 000
16	100 00	263 00	0	0 00	0 000
17	100 00	274 00	0	0 00	0 000
18	100 00	279 00	0	0 00	0 000
19	100 00	281 00	0	0 00	0 000
20	100 00	282 00	1	296 00	0 000
21	100 00	284 00	1	296 00	0 000
22	120 00	263 00	0	0 00	0 000
23	120 00	274 00	0	0 00	0 000
24	120 00	279 00	0	0 00	0 000
25	120 00	281 00	0	0 00	0 000
26	120 00	282 00	0	0 00	0 000
27	120 00	284 00	1	296 00	0 000
28	140 00	263 00	0	0 00	0 000
29	140 00	274 00	0	0 00	0 000
30	140 00	279 00	0	0 00	0 000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0 00	0 000
33	140 00	284 00	1	296 00	0 000
34	160 00	263 00	0	0 00	0 000
35	160 00	274 00	0	0 00	0 000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	282 00	0	0 00	0 000
39	160 00	284 00	1	296 00	0 000
40	170 00	263 00	0	0 00	0 000
41	170 00	274 00	0	0 00	0 000
42	170 00	279 00	0	0 00	0 000
43	170 00	281 00	0	0 00	0 000
44	170 00	282 00	0	0 00	0 000
45	170 00	284 00	1	296 00	0 000
46	180 00	263 00	0	0 00	0 000
47	180 00	274 00	0	0 00	0 000
48	180 00	279 00	0	0 00	0 000
49	180 00	281 00	0	0 00	0 000
50	180 00	282 00	0	0 00	0 000
51	180 00	284 00	1	296 00	0 000
52	190 00	263 00	0	0 00	0 000
53	190 00	274 00	0	0 00	0 000

54	190 00	279 00	0	0 00	0 000
55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	284 00	1	296 00	0 000
58	195 00	263 00	0	0 00	0 000
59	195 00	274 00	0	0 00	0 000
60	195 00	279 00	0	0 00	0 000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0 00	0 000
63	195 00	284 00	1	296 00	0 000
64	200 00	263 00	0	0 00	0 000
65	200 00	274 00	0	0 00	0 000
66	200 00	279 00	0	0 00	0 000
67	200 00	281 00	0	0 00	0 000
68	200 00	282 00	0	0 00	0 000
69	200 00	284 00	1	296 00	0 000
70	207 00	263 00	0	0 00	0 000
71	207 00	274 00	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0 000
75	207 00	284 00	1	296 00	0 000
76	214 00	263 00	0	0 00	0 000
77	214 00	274 00	0	0 00	0 000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0 000
81	221 00	263 00	0	0 00	0 000
82	221 00	274 00	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0 000
86	228 00	263 00	0	0 00	0 000
87	228 00	274 00	0	0 00	0 000
88	228 00	279 00	0	0 00	0 000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	263 00	0	0 00	0 000
92	235 00	274 00	0	0 00	0 000
93	235 00	279 00	0	0 00	0 000
94	235 00	281 00	0	0 00	0 000
95	235 00	282 00	0	0 00	0 000
96	240 50	263 00	0	0 00	0 000
97	240 50	274 00	0	0 00	0 000
98	240 50	279 00	0	0 00	0 000
99	240 50	281 00	0	0 00	0 000
100	240 50	282 00	0	0 00	0 000
101	246 00	263 00	0	0 00	0 000
102	246 00	274 00	0	0 00	0 000
103	246 00	279 00	0	0 00	0 000
104	246 00	281 00	0	0 00	0 000
105	246 00	282 00	0	0 00	0 000
106	251 00	263 00	0	0 00	0 000
107	251 00	274 00	0	0 00	0 000
108	251 00	279 00	0	0 00	0 000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	263 00	0	0 00	0 000
112	256 00	274 00	0	0 00	0 000
113	256 00	279 00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0 000
116	263 50	263 00	0	0 00	0 000
117	263 50	274 00	0	0 00	0 000
118	263 50	279 00	0	0 00	0 000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0 000
121	271 00	263 00	0	0 00	0 000
122	271 00	274 00	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282 00	0 000
126	278 50	263 00	0	0 00	0 000
127	278 50	274 00	0	0 00	0 000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0 000
130	278 50	282 00	1	282 00	0 000
131	286 00	263 00	0	0 00	0 000
132	286 00	274 00	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282 00	0 000
136	293 50	263 00	0	0 00	0 000
137	293 50	274 00	0	0 00	0 000
138	293 50	279 00	0	0 00	0 000

139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0 000
141	310 00	263 00	0	0 00	0 000
142	310 00	274 00	0	0 00	0 000
143	310 00	279 00	0	0 00	0.000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	263 00	0	0 00	0 000
147	326 50	274 00	0	0 00	0 000
148	326 50	279 00	0	0 00	0.000
149	326 50	281 00	0	0 00	0.000
150	326 50	282 00	1	282 00	0.000
151	343 00	263 00	0	0 00	0 000
152	343 00	274 00	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	263 00	0	0 00	0 000
157	359 50	274 00	0	0 00	0 000
158	359 50	279 00	0	0 00	0 000
159	359 50	281 00	0	0 00	0.000
160	359 50	282 00	1	282 00	0 000
161	376 00	262 00	0	0 00	0 000
162	376 00	274 00	0	0 00	0 000
163	376 00	279 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0 000
166	400 00	263 00	0	0 00	0 000
167	400 00	274 00	0	0 00	0 000
168	400 00	279 00	0	0.00	0 000
169	400 00	281 00	0	0 00	0 000
170	400 00	282 00	1	282 00	0.000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	5
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	5
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	5
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	5
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	5
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	5
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	5
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	5
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	5
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	5
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	5

49	59	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	5
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	5
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	5
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	5
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	5
71	87	92	93	88	4
72	88	93	94	89	3
73	89	94	95	90	2
74	91	96	97	92	5
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	5
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	5
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	5
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	5
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	5
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	5
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	5
103	127	132	133	128	4
104	128	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	5
107	132	137	138	133	4
108	133	138	139	134	6
109	134	139	140	135	6
110	136	141	142	137	5
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	5
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	5
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	5
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	5
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	5
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 6 07

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
5	1	799E-0008
10	-1	850E-0007
15	2	604E-0006
20	1	438E-0004
21	2	277E-0008
27	1	799E-0007
33	3	568E-0007
39	3	936E-0007
45	2	111E-0007
51	1	157E-0007
57	1	117E-0007
63	2	682E-0007
69	1	637E-0007
75	-1	329E-0004
115	-1	446E-0005
120	-3	383E-0007
125	-5	917E-0007
130	-2	425E-0007
135	-1	561E-0007
140	-5	341E-0008
145	-9	154E-0009
150	-1	432E-0009
155	-2	426E-0010
160	-4	108E-0011
165	-5	444E-0012
170		

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 1 490E-0004
SAINDO = -1 490E-0004

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	263 00	296 00	33 00	0.000E+0000
2	0 00	274 00	296 00	22 00	0.000E+0000
3	0 00	279 00	296 00	17 00	0.000E+0000
4	0 00	281 00	296 00	15 00	0.000E+0000
5	0 00	282 00	296 00	14 00	8.997E-0009
6	40 00	263 00	296 00	33 00	0.000E+0000
7	40 00	274 00	296 00	22 00	-5.179E-0009
8	40 00	279 00	296 00	17 00	-9.092E-0009
9	40 00	281 00	296 00	15 00	-5.792E-0008
10	40 00	282 00	296 00	14 00	-7.450E-0008
11	70 00	263 00	296 00	33 00	0.000E+0000
12	70 00	274 00	296 01	22 01	6.518E-0007
13	70 00	279 00	296 00	17 00	7.612E-0007
14	70 00	281 00	296 00	15 00	1.065E-0006
15	70 00	282 00	296 00	14 00	1.135E-0006
16	100 00	263 00	295 56	32 56	0.000E+0000
17	100 00	274 00	295.74	21 74	5.255E-0006
18	100 00	279 00	295 97	16 97	7.548E-0006
19	100 00	281 00	295 99	14 99	5.215E-0005
20	100 00	282 00	296 00	14 00	7.434E-0005
21	100 00	284 00	296 00	12 00	1.462E-0004
22	120 00	263 00	294 16	31 16	0.000E+0000
23	120 00	274 00	294 18	20 18	9.138E-0006
24	120 00	279 00	294 20	15 20	1.370E-0005
25	120 00	281 00	294 20	13 20	1.098E-0004
26	120 00	282 00	294 20	12 20	1.582E-0004
27	120 00	284 00	296 00	12 00	1.463E-0004
28	140 00	263 00	292 43	29 43	0.000E+0000
29	140 00	274 00	292 43	18 43	9.683E-0006
30	140 00	279 00	292 43	13 43	1.407E-0005
31	140 00	281 00	292 43	11 43	1.012E-0004
32	140 00	282 00	292 43	10 43	1.447E-0004
33	140 00	284 00	296 00	12 00	1.466E-0004
34	160 00	263 00	290 66	27 66	0.000E+0000
35	160 00	274 00	290 66	16 66	9.712E-0006
36	160 00	279 00	290 66	11 66	1.414E-0005
37	160 00	281 00	290 66	9 66	1.030E-0004

38	160 00	282 00	290 66	8 66	1 474E-0004
39	160 00	284 00	296 00	12 00	1 470E-0004
40	170 00	263 00	289 77	26 77	0 000E+0000
41	170 00	274 00	289 78	15 78	9 682E-0006
42	170 00	279 00	289 78	10 78	1 411E-0005
43	170 00	281 00	289 78	8 78	1 029E-0004
44	170 00	282 00	289 78	7 78	1 473E-0004
45	170 00	284 00	296 00	12 00	1 473E-0004
46	180 00	263 00	288 89	25 89	0 000E+0000
47	180 00	274 00	288 89	14 89	9 553E-0006
48	180 00	279 00	288 89	9 89	1 398E-0005
49	180 00	281 00	288 89	7 89	1 031E-0004
50	180 00	282 00	288 89	6 89	1 477E-0004
51	180 00	284 00	296 00	12 00	1 477E-0004
52	190 00	263 00	288 00	25 00	0 000E+0000
53	190 00	274 00	288 00	14 00	9 145E-0006
54	190 00	279 00	288 00	9 00	1 353E-0005
55	190 00	281 00	288 00	7 00	1 032E-0004
56	190 00	282 00	288 00	6 00	1 480E-0004
57	190 00	284 00	296 00	12 00	1 480E-0004
58	195 00	263 00	287 55	24 55	0 000E+0000
59	195 00	274 00	287 55	13 55	8 694E-0006
60	195 00	279 00	287 55	8 55	1 304E-0005
61	195 00	281 00	287 55	6 55	1 021E-0004
62	195 00	284 00	296 00	12 00	1 482E-0004
63	200 00	263 00	287 10	24 10	0 000E+0000
64	200 00	274 00	287 10	13 10	7 938E-0006
65	200 00	279 00	287 10	8 10	1 221E-0005
66	200 00	281 00	287 11	6 11	1 035E-0004
67	200 00	282 00	287 11	5 11	1 485E-0004
68	200 00	284 00	296 00	12 00	1 485E-0004
69	207 00	263 00	286 48	23 48	0 000E+0000
70	207 00	274 00	286 48	12 48	6 107E-0006
71	207 00	279 00	286 48	7 48	9 669E-0006
72	207 00	281 00	286 48	5 48	9 947E-0005
73	207 00	282 00	286 48	4 48	1 487E-0004
74	207 00	284 00	296 00	12 00	1 487E-0004
75	214 00	263 00	285 86	22 86	0 000E+0000
76	214 00	274 00	285 85	11 85	3 631E-0006
77	214 00	279 00	285 85	6 85	4 434E-0006
78	214 00	281 00	285 85	4 85	7 385E-0007
79	214 00	282 00	285 85	3 85	-5 618E-0006
80	221 00	263 00	285 24	22 24	0 000E+0000
81	221 00	274 00	285 23	11 23	1 856E-0006
82	221 00	279 00	285 22	6 22	2 087E-0006
83	221 00	281 00	285 22	4 22	2 232E-0006
84	221 00	282 00	285 22	3 22	3 194E-0006
85	228 00	263 00	284 62	21 62	0 000E+0000
86	228 00	274 00	284 61	10 61	9 289E-0007
87	228 00	279 00	284 59	5 59	1 055E-0006
88	228 00	281 00	284 59	3 59	1 121E-0006
89	228 00	282 00	284 59	2 59	9 762E-0007
90	235 00	263 00	284 03	21 03	0 000E+0000
91	235 00	274 00	283 99	9 99	4 674E-0007
92	235 00	279 00	283 97	4 97	5 303E-0007
93	235 00	281 00	283 97	2 97	5 444E-0007
94	235 00	282 00	283 97	1 97	5 738E-0007
95	240 50	263 00	283 58	20 58	0 000E+0000
96	240 50	274 00	283 52	9 52	2 719E-0007
97	240 50	279 00	283 47	4 47	3 085E-0007
98	240 50	281 00	283 47	2 47	3 220E-0007
99	240 50	282 00	283 47	1 47	3 194E-0007
100	246 00	263 00	283 17	20 17	0 000E+0000
101	246 00	274 00	283 07	9 07	1 579E-0007
102	246 00	279 00	282 97	3 97	1 791E-0007
103	246 00	281 00	282 97	1 97	1 861E-0007
104	246 00	282 00	282 97	0 97	1 872E-0007
105	251 00	263 00	282 85	19 85	0 000E+0000
106	251 00	274 00	282 69	8 69	9 571E-0008
107	251 00	279 00	282 51	3 51	1 083E-0007
108	251 00	281 00	282 51	1 51	1 108E-0007
109	251 00	282 00	282 52	0 52	1 138E-0007
110	256 00	263 00	282 58	19 58	0 000E+0000
111	256 00	274 00	282 39	8 39	5 739E-0008
112	256 00	279 00	282 08	3 08	6 397E-0008
113	256 00	281 00	282 05	1 05	2 453E-0008
114	256 00	282 00	282 00	0 00	0 000E+0000
115	263 50	263 00	282 30	19 30	0 000E+0000
116	263 50	274 00	282 15	8 15	2 647E-0008
117	263 50	279 00	282 00	3 00	2 925E-0008
118	263 50	281 00	282 00	1 00	9 451E-0009
119	263 50	282 00	282 00	0 00	0 000E+0000
120	271 00	263 00	282 14	19 14	0 000E+0000
121	271 00	274 00	282 07	8 07	1 217E-0008
122	271 00	274 00	282 07	8 07	1 217E-0008

123	271 00	279 00	282 00	3 00	1 346E-0008
124	271 00	281 00	282 00	1 00	4 607E-0009
125	271 00	282 00	282 00	0 00	0 000E+0000
126	278 50	263 00	282 07	19 07	0 000E+0000
127	278 50	274 00	282 03	8 03	5.597E-0009
128	278 50	279 00	282 00	3 00	6 185E-0009
129	278 50	281 00	282 00	1 00	2 077E-0009
130	278 50	282 00	282 00	0 00	0 000E+0000
131	286 00	263 00	282 03	19 03	0 000E+0000
132	286 00	274 00	282 01	8 01	2 562E-0009
133	286 00	279 00	282 00	3 00	2.847E-0009
134	286 00	281 00	282 00	1 00	9.784E-0010
135	286 00	282 00	282 00	0 00	0 000E+0000
136	293 50	263 00	282 01	19 01	0 000E+0000
137	293 50	274 00	282 01	8 01	1 131E-0009
138	293 50	279 00	282 00	3 00	1 257E-0009
139	293 50	281 00	282 00	1 00	4 191E-0010
140	293 50	282 00	282 00	0 00	0 000E+0000
141	310 00	263 00	282 00	19 00	0 000E+0000
142	310 00	274 00	282 00	8 00	1 815E-0010
143	310 00	279 00	282 00	3 00	1 998E-0010
144	310 00	281 00	282 00	1 00	6 836E-0011
145	310 00	282 00	282 00	0 00	0 000E+0000
146	310 00	282 00	282 00	19 00	0 000E+0000
147	310 00	271 00	282 00	8 00	2 997E-0011
148	326 50	279 00	282 00	3 00	3 213E-0011
149	326 50	281 00	282 00	1 00	1 070E-0011
150	326 50	282 00	282 00	0 00	0 000E+0000
151	343 00	263 00	282 00	19 00	0 000E+0000
152	343 00	274 00	282 00	8 00	4 645E-0012
153	343 00	279 00	282 00	3 00	5.118E-0012
154	343 00	281 00	282 00	1 00	1 754E-0012
155	343 00	282 00	282 00	0 00	0 000E+0000
156	359 50	263 00	282 00	19 00	0 000E+0000
157	359 50	274 00	282 00	8 00	7.406E-0013
158	359 50	279 00	282 00	3 00	8.206E-0013
159	359 50	281 00	282 00	1 00	2 729E-0013
160	359 50	282 00	282 00	0 00	0 000E+0000
161	376 00	263 00	282 00	19 00	0 000E+0000
162	376 00	274 00	282 00	8 00	1 111E-0013
163	376 00	279 00	282 00	3 00	1.225E-0013
164	376 00	281 00	282 00	1 00	4 193E-0014
165	376 00	282 00	282 00	0 00	0 000E+0000
166	400 00	263 00	282 00	19 00	0 000E+0000
167	400 00	274 00	282 00	8 00	0 000E+0000
168	400 00	279 00	282 00	3 00	0 000E+0000
169	400 00	281 00	282 00	1 00	0 000E+0000
170	400 00	282 00	282 00	0 00	0 000E+0000

ANEXO 19

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=====
Barragem de Ubaldinho - Ceara - Anexo 19
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          6
NUMERO DE NOS                170
NUMERO DE ELEMENTOS         133
LARGURA DE BANHA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS KJ	K2	ANGULO ENTRE K1 E OX
1	1 00000E-0008	1 00000E-0008	0 00
2	1 00000E-0008	1 00000E-0008	0 00
3	1 00000E-0001	1 00000E-0001	0 00
4	1 00000E-0005	1 00000E-0005	0 00
5	1 00000E-0005	1 00000E-0005	0 00
6	1 00000E-0003	1 00000E-0003	0 00

DADOS DOS NOS

NO N R	COORDENADAS X	DOS NOS Y	COND CONT	CARGA HIDRAULICA	VAZAO
1	0 00	263 00	1	296 00	0.000
2	0 00	274 00	1	296 00	0.000
3	0 00	279 00	1	296 00	0.000
4	0 00	281 00	1	296 00	0.000
5	0 00	282 00	1	296 00	0 000
6	40 00	263 00	0	0 00	0 000
7	40 00	274 00	0	0 00	0 000
8	40 00	279 00	0	0 00	0 000
9	40 00	281 00	0	0 00	0 000
10	40 00	282 00	1	296 00	0 000
11	70 00	263 00	0	0 00	0 000
12	70 00	274 00	0	0 00	0 000
13	70 00	279 00	0	0 00	0 000
14	70 00	281 00	0	0 00	0.000
15	70 00	282 00	1	296 00	0 000
16	100 00	263 00	0	0 00	0 000
17	100 00	274 00	0	0 00	0 000
18	100 00	279 00	0	0 00	0 000
19	100 00	281 00	0	0 00	0 000
20	100 00	282 00	1	296 00	0 000
21	100 00	284 00	1	296 00	0 000
22	120 00	263 00	0	0 00	0 000
23	120 00	274 00	0	0 00	0 000
24	120 00	279 00	0	0 00	0 000
25	120 00	281 00	0	0 00	0 000
26	120 00	282 00	0	0 00	0 000
27	120 00	284 00	1	296 00	0 000
28	140 00	263 00	0	0.00	0 000
29	140 00	274 00	0	0 00	0 000
30	140 00	279 00	0	0 00	0 000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0 00	0 000
33	140 00	284 00	1	296 00	0 000
34	160 00	263 00	0	0 00	0 000
35	160 00	274 00	0	0 00	0.000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	282 00	0	0 00	0 000
39	160 00	284 00	1	296 00	0 000
40	170 00	263 00	0	0 00	0 000
41	170 00	274 00	0	0 00	0 000
42	170 00	279 00	0	0 00	0 000
43	170 00	281 00	0	0 00	0 000
44	170 00	282 00	0	0 00	0.000
45	170 00	284 00	1	296.00	0 000
46	180 00	263 00	0	0.00	0 000
47	180 00	274 00	0	0 00	0 000
48	180 00	279 00	0	0 00	0 000
49	180 00	281 00	0	0 00	0 000
50	180 00	282 00	0	0 00	0 000
51	180 00	284 00	1	296 00	0 000
52	190 00	263 00	0	0 00	0 000

53	190 00	274 00	0	0 00	0 000
54	190 00	279 00	0	0 00	0 000
55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	284 00	1	296 00	0 000
58	195 00	263 00	0	0 00	0 000
59	195 00	274 00	0	0 00	0 000
60	195 00	279 00	0	0 00	0.000
61	195 00	281 00	0	0 00	0 000
62	195 00	282 00	0	0 00	0 000
63	195 00	284 00	1	296 00	0 000
64	200 00	263 00	0	0 00	0.000
65	200 00	274 00	0	0 00	0 000
66	200 00	279 00	0	0 00	0 000
67	200 00	281 00	0	0 00	0 000
68	200 00	282 00	0	0 00	0 000
69	200 00	284 00	1	296 00	0 000
70	207 00	263 00	0	0 00	0.000
71	207 00	274 00	0	0 00	0 000
72	207 00	279 00	0	0 00	0 000
73	207 00	281 00	0	0 00	0 000
74	207 00	282 00	0	0 00	0 000
75	207 00	284 00	1	296 00	0 000
76	211 00	263 00	0	0 00	0.000
77	211 00	274 00	0	0 00	0 000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0.000
80	214 00	282 00	0	0 00	0 000
81	221 00	263 00	0	0.00	0 000
82	221 00	274 00	0	0 00	0 000
83	221 00	279 00	0	0 00	0 000
84	221 00	281 00	0	0 00	0.000
85	221 00	282 00	0	0.00	0 000
86	228 00	263 00	0	0 00	0 000
87	228 00	274 00	0	0 00	0 000
88	228 00	279 00	0	0.00	0 000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	263 00	0	0 00	0.000
92	235 00	274 00	0	0 00	0 000
93	235 00	279 00	0	0.00	0.000
94	235 00	281 00	0	0 00	0.000
95	235 00	282 00	0	0 00	0.000
96	240 50	263 00	0	0 00	0.000
97	240 50	274 00	0	0 00	0.000
98	240 50	279 00	0	0 00	0.000
99	240 50	281 00	0	0 00	0.000
100	240 50	282 00	0	0.00	0 000
101	246 00	263 00	0	0.00	0 000
102	246 00	274 00	0	0.00	0.000
103	246 00	279 00	0	0 00	0.000
104	246 00	281 00	0	0 00	0.000
105	246 00	282 00	0	0 00	0 000
106	251 00	263 00	0	0.00	0 000
107	251 00	274 00	0	0 00	0 000
108	251 00	279 00	0	0 00	0.000
109	251 00	281 00	0	0 00	0.000
110	251 00	282 00	0	0 00	0.000
111	256 00	263 00	0	0.00	0.000
112	256 00	274 00	0	0.00	0 000
113	256 00	279 00	0	0 00	0 000
114	256 00	281 00	0	0 00	0 000
115	256 00	282 00	1	282 00	0 000
116	263 50	263 00	0	0 00	0.000
117	263 50	274 00	0	0 00	0.000
118	263 50	279 00	0	0 00	0 000
119	263 50	281 00	0	0 00	0 000
120	263 50	282 00	1	282 00	0 000
121	271 00	263 00	0	0 00	0 000
122	271 00	274 00	0	0 00	0.000
123	271 00	279 00	0	0 00	0.000
124	271 00	281 00	0	0 00	0 000
125	271 00	282 00	1	282.00	0 000
126	278 50	263 00	0	0 00	0 000
127	278 50	274 00	0	0 00	0.000
128	278 50	279 00	0	0.00	0.000
129	278 50	281 00	0	0 00	0 000
130	278 50	282 00	1	282 00	0 000
131	286 00	263 00	0	0 00	0.000
132	286 00	274 00	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0 000
135	286 00	282 00	1	282.00	0 000
136	293 50	263 00	0	0 00	0 000
137	293 50	274 00	0	0 00	0 000

138	293 50	279 00	0	0 00	0 000
139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0 000
141	310 00	263 00	0	0 00	0 000
142	310 00	274 00	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	263 00	0	0 00	0 000
147	326 50	274 00	0	0 00	0 000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0 000
150	326 50	282 00	1	282 00	0 000
151	343 00	263 00	0	0 00	0 000
152	343 00	274 00	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	263 00	0	0 00	0 000
157	359 50	274 00	0	0 00	0 000
158	359 50	279 00	0	0 00	0 000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	281 00	0	0 00	0 000
162	376 00	282 00	1	282 00	0 000
163	376 00	281 00	0	0 00	0 000
164	376 00	281 00	0	0 00	0 000
165	376 00	282 00	1	282 00	0 000
166	400 00	263 00	0	0 00	0 000
167	400 00	274 00	0	0 00	0 000
168	400 00	279 00	0	0 00	0 000
169	400 00	281 00	0	0 00	0 000
170	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	5
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	5
6	7	12	13	9	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	5
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	5
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	5
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	5
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	5
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	5
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	5
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	5
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1

133 164 169 170 165 2

CICLO NUMERO 1

PASSO 1

LBMAX 8
LBMED 5 94

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
1	8	938E-0010
2	2	577E-0009
3	-5	743E-0009
4	-1	069E-0008
5		2.901E-0008
10	3	297E-0007
15	1	680E-0005
20	1	707E-0005
25	3	828E-0007
30	3	828E-0007
33	3	828E-0007
39	3	828E-0007
45	3	062E-0007
51	3	471E-0007
57	2	873E-0007
63	2	044E-0007
69	2	589E-0007
75	1	577E-0007
115	-3	806E-0005
120	-2	861E-0005
125	-1	368E-0005
130	-5	667E-0006
135	-8	815E-0006
140	-2	043E-0006
145	-1	013E-0007
150	-5	389E-0008
155	-1	591E-0008
160	-4	096E-0009
165	-1	117E-0009
170	-2	198E-0010

FLUXOS TOTAIS DO SISTEMA

ENTRANDO = 9 707E-0005
SAINDO = -9 707E-0005

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS		CARGA HIDRAULICA	PRESSAO NEUTRA (UNID DE CARGA)	FUNCAO FLUXO
	X	Y			
1	0 00	263 00	296 00	33 00	4 469E-0010
2	0 00	274 00	296 00	22 00	2 182E-0009
3	0 00	279 00	296 00	17 00	5 993E-0010
4	0 00	281 00	296 00	15 00	-7 616E-0009
5	0 00	282 00	296 00	14 00	1 543E-0009
6	40 00	263 00	296 00	33 00	0 000E+0000
7	40 00	274 00	296 00	22 00	9 312E-0008
8	40 00	279 00	296 00	17 00	1 091E-0007
9	40 00	281 00	296 00	15 00	1 840E-0007
10	40 00	282 00	296 00	14 00	1 809E-0007
11	70 00	263 00	295 94	32 94	0 000E+0000
12	70 00	274 00	295 97	21 97	1 246E-0006
13	70 00	279 00	296 00	17 00	1 669E-0006
14	70 00	281 00	296 00	15 00	8 699E-0006
15	70 00	282 00	296 00	14 00	8 745E-0006
16	100 00	263 00	295 25	32 25	0 000E+0000
17	100 00	274 00	295 40	21 40	5 405E-0006
18	100 00	279 00	295 57	16 57	7 816E-0006
19	100 00	281 00	295 58	14 58	5 538E-0005
20	100 00	282 00	296 00	14 00	5 583E-0005
21	100 00	284 00	296 00	12 00	9 452E-0005
22	120 00	263 00	293 91	30 91	0 000E+0000
23	120 00	274 00	293 93	19 93	8 487E-0006
24	120 00	279 00	293 94	14 94	1 267E-0005
25	120 00	281 00	293 94	12 94	1 000E-0004
26	120 00	282 00	293 97	11 87	1 010E-0004
27	120 00	284 00	296 00	12 00	9 464E-0005
28	140 00	263 00	292 31	29 31	0 000E+0000
29	140 00	274 00	292 31	18 31	8 906E-0006
30	140 00	279 00	292 32	13 32	1 294E-0005
31	140 00	281 00	292 32	11 32	9 310E-0005
32	140 00	282 00	292 33	10 33	9 387E-0005

33	140 00	284 00	296 00	12 00	9 492E-0005
34	160 00	263 00	290 69	27 69	0 000E+0000
35	160 00	274 00	290 69	16 69	8 962E-0006
36	160 00	279 00	290 69	11 69	1 304E-0005
37	160 00	281 00	290 69	9.69	9 470E-0005
38	160 00	282 00	290.69	8 69	9 553E-0005
39	160 00	284 00	296 00	12 00	9.530E-0005
40	170 00	263 00	289 87	26 87	0 000E+0000
41	170 00	274 00	289 87	15.87	8 993E-0006
42	170 00	279 00	289 87	10 87	1 308E-0005
43	170 00	281 00	289 87	8 87	9.480E-0005
44	170 00	282 00	289 88	7 88	9.561E-0005
45	170 00	284 00	296 00	12.00	9 564E-0005
46	180 00	263 00	289 05	26 05	0 000E+0000
47	180 00	274 00	289 05	15.05	9 023E-0006
48	180 00	279 00	289 06	10.06	1 312E-0005
49	180 00	281 00	289 06	8 06	9 515E-0005
50	180 00	282 00	289 06	7 06	9 597E-0005
51	180 00	284 00	296 00	12 00	9.597E-0005
52	190 00	263 00	288.23	25 23	0 000E+0000
53	190 00	274 00	288 23	14 23	9 053E-0006
54	190 00	279 00	288 23	9.23	1 317E-0005
55	190 00	281 00	288 23	7.23	9 547E-0005
56	190 00	282 00	288 24	6 24	9 629E-0005
57	190 00	284 00	296 00	12 00	9 629E-0005
58	195 00	263 00	287 82	24 82	0 000E+0000
59	195 00	274 00	287 82	13.82	9.067E-0006
60	195 00	279 00	287 82	8 82	1 319E-0005
61	195 00	281 00	287 82	6.82	9 571E-0005
62	195 00	282 00	287.83	5 83	9 653E-0005
63	195 00	284 00	296 00	12 00	9 653E-0005
64	200 00	263 00	287 41	24 41	0 000E+0000
65	200 00	274 00	287 41	13.41	9 079E-0006
66	200 00	279 00	287 41	8.41	1 321E-0005
67	200 00	281 00	287 41	6 41	9 592E-0005
68	200 00	282 00	287 41	5.41	9 675E-0005
69	200 00	284 00	296.00	12.00	9.676E-0005
70	207 00	263 00	286.83	23.83	0.000E+0000
71	207 00	274 00	286 83	12 83	9 088E-0006
72	207 00	279 00	286 83	7.83	1 323E-0005
73	207 00	281 00	286 83	5 83	9 622E-0005
74	207 00	282 00	286.83	4.83	9 705E-0005
75	207 00	284 00	296 00	12 00	9 697E-0005
76	214 00	263 00	286 25	23 25	0 000E+0000
77	214 00	274 00	286 25	12.25	9.079E-0006
78	214 00	279 00	286 25	7.25	1.322E-0005
79	214 00	281 00	286.25	5.25	9 622E-0005
80	214 00	282 00	286 25	4 25	9 705E-0005
81	221 00	263 00	285 67	22 67	0 000E+0000
82	221 00	274 00	285.67	11.67	9.046E-0006
83	221 00	279 00	285.67	6.67	1 319E-0005
84	221 00	281 00	285 67	4 67	9 622E-0005
85	221 00	282 00	285 67	3 67	9 705E-0005
86	228 00	263 00	285 10	22 10	0 000E+0000
87	228 00	274 00	285 09	11 09	8 968E-0006
88	228 00	279 00	285 09	6 09	1 310E-0005
89	228 00	281 00	285.09	4 09	9 622E-0005
90	228 00	282 00	285.09	3 09	9 705E-0005
91	235 00	263 00	284 54	21 54	0 000E+0000
92	235 00	274 00	284 52	10 52	8 801E-0006
93	235 00	279 00	284 50	5.50	1 292E-0005
94	235 00	281 00	284 50	3 50	9 622E-0005
95	235 00	282 00	284 50	2 50	9 705E-0005
96	240 50	263 00	284 11	21 11	0 000E+0000
97	240 50	274 00	284 07	10.07	8.547E-0006
98	240 50	279 00	284 04	5 04	1 264E-0005
99	240 50	281 00	284.04	3 04	9 621E-0005
100	240 50	282 00	284 05	2 05	9.705E-0005
101	246 00	263 00	283 69	20.69	0.000E+0000
102	246 00	274 00	283.64	9.64	8.099E-0006
103	246 00	279 00	283.58	4 58	1 214E-0005
104	246 00	281 00	283 58	2 58	9 628E-0005
105	246 00	282 00	283 57	1 57	9 705E-0005
106	251 00	263 00	283 35	20.35	0 000E+0000
107	251 00	274 00	283 26	9 26	7 426E-0006
108	251 00	279 00	283 16	4 16	1 127E-0005
109	251 00	281 00	283 16	2.16	9 570E-0005
110	251 00	282 00	283.27	1 27	9 705E-0005
111	256 00	263 00	283 04	20 04	0 000E+0000
112	256 00	274 00	282 92	8 92	6 468E-0006
113	256 00	279 00	282 75	3.75	9.688E-0006
114	256 00	281 00	282 73	1 73	7 731E-0005
115	256 00	282 00	282 00	0 00	7 802E-0005
116	263 50	263 00	282 66	19.66	0 000E+0000
117	263 50	274 00	282 53	8 53	4 723E-0006

118	263 50	279 00	282 37	3 37	6 732E-0006
119	263 50	281 00	282 36	1 36	4 444E-0005
120	263 50	282 00	282 00	0 00	4 469E-0005
121	271 00	263 00	282 39	19 39	0 000E+0000
122	271 00	274 00	282 29	8 29	3.122E-0006
123	271 00	279 00	282 18	3 18	4 258E-0006
124	271 00	281 00	282 17	1 17	2 347E-0005
125	271 00	282 00	282 00	0 00	2 354E-0005
126	278 50	263 00	282 22	19 22	0 000E+0000
127	278 50	274 00	282 15	8 15	1 918E-0006
128	278 50	279 00	282 07	3 07	2.577E-0006
129	278 50	281 00	282 07	1 07	1.374E-0005
130	278 50	282 00	282 00	0 00	1 387E-0005
131	286 00	263 00	282 11	19 11	0.000E+0000
132	286 00	274 00	282 06	8 06	1 073E-0006
133	286 00	279 00	282 01	3 01	1 372E-0006
134	286 00	281 00	282 00	1 00	6 718E-0006
135	286 00	282 00	282 00	0 00	6.627E-0006
136	293 50	263 00	282 05	19 05	0 000E+0000
137	293 50	274 00	282 03	8 03	5 326E-0007
138	293 50	279 00	282 00	3 00	6 244E-0007
139	293 50	281 00	282 00	1 00	1 182E-0006
140	293 50	282 00	282 00	0 00	1 198E-0006
141	310 00	263 00	282 00	19 00	0 000E+0000
142	310 00	274 00	282 00	8 00	1 014E-0007
143	310 00	279 00	282 00	3 00	1 158E-0007
144	310 00	281 00	282 00	1 00	1 301E-0007
145	310 00	282 00	282 00	0 00	1 259E-0007
146	326 50	263 00	282 00	19 00	0 000E+0000
147	326 50	274 00	282 00	8 00	1 949E-0008
148	326 50	279 00	282 00	3 00	2 287E-0008
149	326 50	281 00	282 00	1 00	4.741E-0008
150	326 50	282 00	282 00	0 00	4 829E-0008
151	343 00	263 00	282 00	19 00	0 000E+0000
152	343 00	274 00	282 00	8 00	4 198E-0009
153	343 00	279 00	282 00	3 00	5 073E-0009
154	343 00	281 00	282 00	1 00	1.347E-0008
155	343 00	282 00	282 00	0 00	1.339E-0008
156	359 50	263 00	282 00	19 00	0 000E+0000
157	359 50	274 00	282 00	8 00	9 634E-0010
158	359 50	279 00	282 00	3 00	1 170E-0009
159	359 50	281 00	282 00	1 00	3.349E-0009
160	359 50	282 00	282 00	0 00	3.384E-0009
161	376 00	263 00	282 00	19 00	0.000E+0000
162	376 00	274 00	282 00	8 00	2.156E-0010
163	376 00	279 00	282 00	3 00	2.641E-0010
164	376 00	281 00	282 00	1 00	8 006E-0010
165	376 00	282 00	282 00	0 00	7 782E-0010
166	400 00	263 00	282 00	19 00	0 000E+0000
167	400 00	274 00	282 00	8 00	0 000E+0000
168	400 00	279 00	282 00	3 00	0.000E+0000
169	400 00	281 00	282 00	1 00	2 837E-0015
170	400 00	282 00	282 00	0 00	1.099E-0010

ANEXO 19A

```

=====
Ba:ragem de Ubaldinho - Ceara - Anexo 19 A
*** ENGEOS *** Engenharia e Geotecnia S/C Ltda
PERCPLAN - programa de analise de percolacao plana - MEF
G E O E X P E R T - W Hachich Engenharia S/C Ltda - (011) 570 3737
=====
    
```

TIPO DE ANALISE FLUXO BIDIMENSIONAL CONFINADO

DADOS GERAIS

```

NUMERO DE MATERIAIS          6
NUMERO DE NOS                170
NUMERO DE ELEMENTOS          133
LARGURA DE BANDA MAXIMA     8
LARGURA DE BANDA MEDIA     6 98
    
```

PROPRIEDADES DOS MATERIAIS

NUMERO DO MATERIAL	PERMEABILIDADES PRINCIPAIS KJ	PRINCIPAIS K2	ANGULO ENTRE KI F OX
1	1 00000E-0008	1 00000E-0008	0 00
2	1 00000E-0005	1 00000E-0005	0 00
3	1 00000E-0005	1 00000E-0005	0 00
4	1 00000E-0005	1 00000E-0005	0 00
5	1 00000E-0005	1 00000E-0005	0 00
6	1 00000E-0003	1 00000E-0003	0 00

DADOS DOS NOS

NO N R	COORDENADAS X	DOS NOS Y	COND CONT	CARGA HIDRAULICA	VAZAO
1	0 00	263 00	0	0 00	0 000
2	0 00	274 00	0	0 00	0 000
3	0 00	279 00	0	0 00	0 000
4	0 00	281 00	0	0 00	0 000
5	0 00	282 00	1	296 00	0 000
6	40 00	263 00	0	0 00	0 000
7	40 00	274 00	0	0 00	0 000
8	40 00	279 00	0	0 00	0 000
9	40 00	281 00	0	0 00	0 000
10	40 00	282 00	1	296 00	0 000
11	70 00	263 00	0	0 00	0 000
12	70 00	274 00	0	0 00	0 000
13	70 00	279 00	0	0 00	0 000
14	70 00	281 00	0	0 00	0 000
15	70 00	282 00	1	296 00	0 000
16	100 00	263 00	0	0 00	0 000
17	100 00	274 00	0	0 00	0 000
18	100 00	279 00	0	0 00	0 000
19	100 00	281 00	0	0 00	0 000
20	100 00	282 00	1	296 00	0 000
21	100 00	284 00	1	296 00	0 000
22	120 00	263 00	0	0 00	0 000
23	120 00	274 00	0	0 00	0 000
24	120 00	279 00	0	0 00	0 000
25	120 00	281 00	0	0 00	0 000
26	120 00	282 00	0	0 00	0 000
27	120 00	284 00	1	296 00	0 000
28	140 00	263 00	0	0 00	0 000
29	140 00	274 00	0	0 00	0 000
30	140 00	279 00	0	0 00	0 000
31	140 00	281 00	0	0 00	0 000
32	140 00	282 00	0	0 00	0 000
33	140 00	284 00	1	296 00	0 000
34	160 00	263 00	0	0 00	0 000
35	160 00	274 00	0	0 00	0 000
36	160 00	279 00	0	0 00	0 000
37	160 00	281 00	0	0 00	0 000
38	160 00	282 00	0	0 00	0 000
39	160 00	284 00	1	296 00	0 000
40	170 00	263 00	0	0 00	0 000
41	170 00	274 00	0	0 00	0 000
42	170 00	279 00	0	0 00	0 000
43	170 00	281 00	0	0 00	0 000
44	170 00	282 00	0	0 00	0 000
45	170 00	284 00	1	296 00	0 000
46	180 00	263 00	0	0 00	0 000
47	180 00	274 00	0	0 00	0 000
48	180 00	279 00	0	0 00	0 000
49	180 00	281 00	0	0 00	0 000
50	180 00	282 00	0	0 00	0 000
51	180 00	284 00	1	296 00	0 000
52	190 00	263 00	0	0 00	0 000
53	190 00	274 00	0	0 00	0 000

54	190 00	279 00	0	0 00	0.000
55	190 00	281 00	0	0 00	0 000
56	190 00	282 00	0	0 00	0 000
57	190 00	284 00	1	296 00	0 000
58	195 00	263 00	0	0 00	0 000
59	195 00	274 00	0	0 00	0 000
60	195 00	279 00	0	0 00	0.000
61	195 00	281 00	0	0 00	0.000
62	195 00	282 00	0	0 00	0 000
63	195 00	284 00	1	296 00	0.000
64	200 00	263 00	0	0 00	0 000
65	200 00	274 00	0	0 00	0 000
66	200 00	279 00	0	0 00	0.000
67	200 00	281 00	0	0 00	0.000
68	200 00	282 00	0	0 00	0.000
69	200 00	284 00	1	296 00	0 000
70	207 00	263 00	0	0.00	0 000
71	207 00	274 00	0	0.00	0 000
72	207 00	279 00	0	0 00	0.000
73	207 00	281 00	0	0 00	0.000
74	207 00	282 00	0	0 00	0 000
75	207 00	284 00	1	296 00	0 000
76	214 00	263 00	0	0 00	0 000
77	214 00	274 00	0	0.00	0 000
78	214 00	279 00	0	0 00	0 000
79	214 00	281 00	0	0 00	0 000
80	214 00	282 00	0	0 00	0.000
81	221 00	263 00	0	0 00	0.000
82	221 00	274 00	0	0.00	0.000
83	221 00	279 00	0	0.00	0.000
84	221 00	281 00	0	0 00	0 000
85	221 00	282 00	0	0 00	0 000
86	228 00	263 00	0	0 00	0 000
87	228 00	274 00	0	0 00	0.000
88	228 00	279 00	0	0 00	0 000
89	228 00	281 00	0	0 00	0 000
90	228 00	282 00	0	0 00	0 000
91	235 00	263 00	0	0 00	0 000
92	235 00	274 00	0	0.00	0.000
93	235 00	279 00	0	0.00	0 000
94	235 00	281 00	0	0 00	0 000
95	235 00	282 00	0	0 00	0 000
96	240 50	263 00	0	0 00	0.000
97	240 50	274 00	0	0 00	0.000
98	240 50	279 00	0	0 00	0.000
99	240 50	281 00	0	0 00	0.000
100	240 50	282 00	0	0.00	0.000
101	246 00	263 00	0	0 00	0 000
102	246 00	274 00	0	0 00	0 000
103	246 00	279 00	0	0 00	0 000
104	246 00	281 00	0	0 00	0.000
105	246 00	282 00	0	0 00	0.000
106	251 00	263 00	0	0 00	0 000
107	251 00	274 00	0	0.00	0 000
108	251 00	279 00	0	0 00	0.000
109	251 00	281 00	0	0 00	0 000
110	251 00	282 00	0	0 00	0 000
111	256 00	263 00	0	0 00	0 000
112	256 00	274 00	0	0 00	0 000
113	256 00	279 00	0	0 00	0.000
114	256 00	281 00	0	0 00	0.000
115	256 00	282 00	1	282 00	0 000
116	263 50	263 00	0	0 00	0 000
117	263 50	274 00	0	0 00	0 000
118	263 50	279 00	0	0.00	0 000
119	263 50	281 00	0	0.00	0 000
120	263 50	282 00	1	282 00	0 000
121	271 00	263 00	0	0 00	0 000
122	271 00	274 00	0	0 00	0 000
123	271 00	279 00	0	0 00	0 000
124	271 00	281 00	0	0 00	0.000
125	271 00	282 00	1	282 00	0.000
126	278 50	263 00	0	0 00	0 000
127	278 50	274 00	0	0 00	0 000
128	278 50	279 00	0	0 00	0 000
129	278 50	281 00	0	0 00	0.000
130	278 50	282 00	1	282.00	0 000
131	286 00	263 00	0	0 00	0 000
132	286 00	274 00	0	0 00	0 000
133	286 00	279 00	0	0 00	0 000
134	286 00	281 00	0	0 00	0.000
135	286 00	282 00	1	282 00	0 000
136	293 50	263 00	0	0 00	0 000
137	293 50	274 00	0	0 00	0 000
138	293 50	279 00	0	0.00	0.000

139	293 50	281 00	0	0 00	0 000
140	293 50	282 00	1	282 00	0 000
141	310 00	263 00	0	0 00	0 000
142	310 00	274 00	0	0 00	0 000
143	310 00	279 00	0	0 00	0 000
144	310 00	281 00	0	0 00	0 000
145	310 00	282 00	1	282 00	0 000
146	326 50	263 00	0	0 00	0 000
147	326 50	274 00	0	0 00	0 000
148	326 50	279 00	0	0 00	0 000
149	326 50	281 00	0	0 00	0 000
150	326 50	282 00	1	282 00	0 000
151	343 00	263 00	0	0 00	0 000
152	343 00	274 00	0	0 00	0 000
153	343 00	279 00	0	0 00	0 000
154	343 00	281 00	0	0 00	0 000
155	343 00	282 00	1	282 00	0 000
156	359 50	263 00	0	0 00	0 000
157	359 50	274 00	0	0 00	0 000
158	359 50	279 00	0	0 00	0 000
159	359 50	281 00	0	0 00	0 000
160	359 50	282 00	1	282 00	0 000
161	376 00	263 00	0	0 00	0 000
162	376 00	274 00	0	0 00	0 000
163	376 00	279 00	0	0 00	0 000
164	376 00	282 00	1	282 00	0 000
165	400 00	263 00	0	0 00	0 000
166	400 00	274 00	0	0 00	0 000
167	400 00	279 00	0	0 00	0 000
168	400 00	281 00	0	0 00	0 000
169	400 00	282 00	1	282 00	0 000

DADOS DOS ELEMENTOS

NUMERO DO ELEMENTO	NO I	NO J	NO K	NO L	NUMERO DO MATERIAL
1	1	6	7	2	5
2	2	7	8	3	4
3	3	8	9	4	3
4	4	9	10	5	2
5	6	11	12	7	5
6	7	12	13	8	4
7	8	13	14	9	3
8	9	14	15	10	2
9	11	16	17	12	5
10	12	17	18	13	4
11	13	18	19	14	3
12	14	19	20	15	2
13	16	22	23	17	5
14	17	23	24	18	4
15	18	24	25	19	3
16	19	25	26	20	2
17	20	26	27	21	1
18	22	28	29	23	5
19	23	29	30	24	4
20	24	30	31	25	3
21	25	31	32	26	2
22	26	32	33	27	1
23	28	34	35	29	5
24	29	35	36	30	4
25	30	36	37	31	3
26	31	37	38	32	2
27	32	38	39	33	1
28	34	40	41	35	5
29	35	41	42	36	4
30	36	42	43	37	3
31	37	43	44	38	2
32	38	44	45	39	1
33	40	46	47	41	5
34	41	47	48	42	4
35	42	48	49	43	3
36	43	49	50	44	2
37	44	50	51	45	1
38	46	52	53	47	5
39	47	53	54	48	4
40	48	54	55	49	3
41	49	55	56	50	2
42	50	56	57	51	1
43	52	58	59	53	5
44	53	59	60	54	4
45	54	60	61	55	3
46	55	61	62	56	2
47	56	62	63	57	1
48	58	64	65	59	5

49	50	65	66	60	4
50	60	66	67	61	3
51	61	67	68	62	2
52	62	68	69	63	1
53	64	70	71	65	5
54	65	71	72	66	4
55	66	72	73	67	3
56	67	73	74	68	2
57	68	74	75	69	1
58	70	76	77	71	5
59	71	77	78	72	4
60	72	78	79	73	3
61	73	79	80	74	2
62	76	81	82	77	5
63	77	82	83	78	4
64	78	83	84	79	3
65	79	84	85	80	2
66	81	86	87	82	5
67	82	87	88	83	4
68	83	88	89	84	3
69	84	89	90	85	2
70	86	91	92	87	5
71	87	92	93	88	4
			94	89	3
			95	90	2
			96	91	5
75	92	97	98	93	4
76	93	98	99	94	3
77	94	99	100	95	2
78	96	101	102	97	5
79	97	102	103	98	4
80	98	103	104	99	3
81	99	104	105	100	2
82	101	106	107	102	5
83	102	107	108	103	4
84	103	108	109	104	3
85	104	109	110	105	2
86	106	111	112	107	5
87	107	112	113	108	4
88	108	113	114	109	3
89	109	114	115	110	2
90	111	116	117	112	5
91	112	117	118	113	4
92	113	118	119	114	3
93	114	119	120	115	2
94	116	121	122	117	5
95	117	122	123	118	4
96	118	123	124	119	3
97	119	124	125	120	2
98	121	126	127	122	5
99	122	127	128	123	4
100	123	128	129	124	3
101	124	129	130	125	2
102	126	131	132	127	5
103	127	132	133	128	4
104	129	133	134	129	3
105	129	134	135	130	2
106	131	136	137	132	5
107	132	137	138	133	4
108	133	138	139	134	6
109	134	139	140	135	6
110	136	141	142	137	5
111	137	142	143	138	4
112	138	143	144	139	3
113	139	144	145	140	2
114	141	146	147	142	5
115	142	147	148	143	4
116	143	148	149	144	3
117	144	149	150	145	2
118	146	151	152	147	5
119	147	152	153	148	4
120	148	153	154	149	3
121	149	154	155	150	2
122	151	156	157	152	5
123	152	157	158	153	4
124	153	158	159	154	3
125	154	159	160	155	2
126	156	161	162	157	5
127	157	162	163	158	4
128	158	163	164	159	3
129	159	164	165	160	2
130	161	166	167	162	5
131	162	167	168	163	4
132	163	168	169	164	3
133	164	169	170	165	2

CICLO NUMERO 1

PASSO 1

LBMAX 8
 LBMED 6 07

FLUXO ATRAVES DAS FRONTEIRAS

NO	NUMERO	VAZAO
	5	1 793E-0008
	10	3 277E-0007
	15	1 680E-0005
	20	7 736E-0005
	21	2 693E-0008
	27	2 059E-0007
	33	3 683E-0007
	39	3 828E-0007
	45	3 062E-0007
	51	3 062E-0007
	57	3 062E-0007
	63	3 062E-0007
	69	2 589E-0007
	75	1 577E-0007
	115	-3 806E-0005
	120	-2 861E-0005
	125	-1 368E-0005
	130	-5 667E-0006
	135	-8 815E-0006
	140	-2 043E-0006
	145	-1 013E-0007
	150	-5 389E-0008
	155	-1 591E-0008
	160	-4 096E-0009
	165	-1 117E-0009
	170	-2 198E-0010

FLUXOS TOTAIS DO SISTEMA

ENTRANDC = 9 705E-0005
 SAINDC = -9 705E-0005

CARGAS HIDRAULICAS E PRESSOES NEUTRAS

NO	COORDENADAS DOS NOS		CARGA	PRESSAO NEUTRA	FUNCAO
	X	Y			
1	0 00	263 00	296 00	33 00	0 000E+0000
2	0 00	274 00	296 00	22 00	0 000E+0000
3	0 00	279 00	296 00	17 00	0 000E+0000
4	0 00	281 00	296 00	15 00	0 000E+0000
5	0 00	282 00	296 00	14 00	8 967E-0009
6	40 00	263 00	296 00	33 00	0 000E+0000
7	40 00	274 00	296 00	22 00	9 346E-0008
8	40 00	279 00	296 00	17 00	1 092E-0007
9	40 00	281 00	296 00	15 00	1 848E-0007
10	40 00	282 00	296 00	14 00	1 818E-0007
11	70 00	263 00	295 94	32 94	0 000E+0000
12	70 00	274 00	295 97	21 97	1 246E-0006
13	70 00	279 00	296 00	17 00	1 669E-0006
14	70 00	281 00	296 00	15 00	8 699E-0006
15	70 00	282 00	296 00	14 00	8 745E-0006
16	100 00	263 00	295 25	32 25	0 000E+0000
17	100 00	274 00	295 40	21 40	5 405E-0006
18	100 00	279 00	295 57	16 57	7 816E-0006
19	100 00	281 00	295 58	14 58	5 538E-0005
20	100 00	282 00	296 00	14 00	5 583E-0005
21	100 00	284 00	296 00	12 00	9 452E-0005
22	120 00	263 00	293 91	30 91	0 000E+0000
23	120 00	274 00	293 93	19 93	8 487E-0006
24	120 00	279 00	293 94	14 94	1 267E-0005
25	120 00	281 00	293 94	12 94	1 000E-0004
26	120 00	282 00	293 87	11 87	1 010E-0004
27	120 00	284 00	296 00	12 00	9 464E-0005
28	140 00	263 00	292 31	29 31	0 000E+0000
29	140 00	274 00	292 31	18 31	8 905E-0006
30	140 00	279 00	292 32	13 32	1 294E-0005
31	140 00	281 00	292 32	11 32	9 310E-0005
32	140 00	282 00	292 33	10 33	9 387E-0005
33	140 00	284 00	296 00	12 00	9 492E-0005
34	160 00	263 00	290 69	27 69	0 000E+0000
35	160 00	274 00	290 69	16 69	8 948E-0006
36	160 00	279 00	290 69	11 69	1 302E-0005

37	160 00	291 00	290 69	9 69	9 470E-0005
38	160 00	282 00	290 69	8 69	9 553E-0005
39	160 00	284 00	296 00	12 00	9 530E-0005
40	170 00	263 00	289 87	26 87	0 000E+0000
41	170 00	274 00	289 87	15.87	8 950E-0006
42	170 00	279 00	289 87	10 87	1 303E-0005
43	170 00	281 00	289 87	8 87	9 480E-0005
44	170 00	282 00	289 88	7 88	9 561E-0005
45	180 00	284 00	296 00	12 00	9 564E-0005
46	180 00	263 00	289 05	26.05	0 000E+0000
47	180 00	274 00	289 05	15 05	8 897E-0006
48	180 00	279 00	289 06	10 06	1 299E-0005
49	180 00	281 00	289 06	8 06	9 515E-0005
50	180 00	282 00	289 06	7 06	9 597E-0005
51	180 00	284 00	296 00	12 00	9 597E-0005
52	190 00	263 00	288 23	25 23	0 000E+0000
53	190 00	274 00	288 23	14 23	8 686E-0006
54	190 00	279 00	288 23	9 23	1 277E-0005
55	190 00	281 00	288 23	7 23	9 547E-0005
56	190 00	282 00	288 24	6 24	9 629E-0005
57	190 00	284 00	296 00	12 00	9.629E-0005
58	195 00	263 00	287 82	24 82	0.000E+0000
59	195 00	274 00	287 82	13 82	8.438E-0006
60	195 00	281 00	287 82	6 82	9 568E-0005
61	195 00	281 00	287 82	5 83	9 653E-0005
62	195 00	284 00	296 00	12 00	9 653E-0005
63	200 00	263 00	287.41	24 41	0 000E+0000
64	200 00	274 00	287 41	13 41	8 010E-0006
65	200 00	279 00	287 41	8.41	1 205E-0005
66	200 00	281 00	287 41	6.41	9 605E-0005
67	200 00	282 00	287 41	5 41	9 676E-0005
68	200 00	284 00	296 00	12 00	9 676E-0005
69	200 00	263 00	286 83	23 83	0 000E+0000
70	207 00	274 00	286.83	12 83	6.924E-0006
71	207 00	279 00	286 83	7 83	1.065E-0005
72	207 00	281 00	286 83	5.83	9 538E-0005
73	207 00	282 00	286 83	4.83	9 694E-0005
74	207 00	284 00	296 00	12 00	9 697E-0005
75	214 00	263 00	286.25	23 25	0.000E+0000
76	214 00	274 00	286 25	12 25	5 244E-0006
77	214 00	279 00	286 25	7.25	7 557E-0006
78	214 00	281 00	286 25	5.25	5 049E-0005
79	214 00	282 00	286 25	4.25	5.051E-0005
80	221 00	263 00	285 67	22 67	0.000E+0000
81	221 00	274 00	285.67	11 67	3.559E-0006
82	221 00	279 00	285.67	6 67	4.855E-0006
83	221 00	281 00	285 67	4 67	2 676E-0005
84	221 00	282 00	285 67	3.67	2 690E-0005
85	228 00	263 00	285 10	22 10	0 000E+0000
86	228 00	274 00	285.09	11 09	2.259E-0006
87	228 00	279 00	285.09	6.09	2 984E-0006
88	228 00	281 00	285 09	4.09	1 434E-0005
89	228 00	282 00	285 09	3.09	1 439E-0005
90	235 00	263 00	284 54	21.54	0 000E+0000
91	235 00	274 00	284 52	10 52	1 371E-0006
92	235 00	279 00	284 50	5 50	1.773E-0006
93	235 00	281 00	284.50	3 50	7 662E-0006
94	235 00	282 00	284 50	2 50	7 692E-0006
95	240 50	263.00	284 11	21.11	0 000E+0000
96	240 50	274 00	284 07	10.07	8 988E-0007
97	240 50	279 00	284 04	5 04	1.146E-0006
98	240 50	281 00	284 04	3 04	4.577E-0006
99	240 50	282 00	284 05	2 05	4.594E-0006
100	246 00	263 00	283 69	20 69	0.000E+0000
101	246 00	274 00	283 64	9.64	5 704E-0007
102	246 00	279 00	283 58	4 58	7 141E-0007
103	246 00	281 00	283 58	2 58	2.543E-0006
104	246 00	282 00	283 57	1 57	2 551E-0006
105	251 00	263 00	283 35	20 35	0 000E+0000
106	251 00	274 00	283 26	9 26	3 630E-0007
107	251 00	279 00	283 16	4 16	4.393E-0007
108	251 00	281 00	283 16	2 16	1 184E-0006
109	251 00	282 00	283 27	1.27	1 192E-0006
110	256 00	263 00	283 04	20 04	0 000E+0000
111	256 00	274 00	282 92	8 92	2 216E-0007
112	256 00	279 00	282 75	3.75	2 504E-0007
113	256 00	281 00	282 73	1 73	2 838E-0008
114	256 00	282 00	282 00	0 00	0 000E+0000
115	263 50	263 00	282 66	19.66	0 000E+0000
116	263 50	274 00	282 53	8 53	1 015E-0007
117	263 50	279 00	282 37	3 37	1 106E-0007
118	263 50	281 00	282 36	1 36	-2 996E-0009
119	263 50	282 00	282 00	0 00	0 000E+0000
120	271 00	263 00	282 39	19.39	0 000E+0000
121					

122	271 00	274 00	282 29	8 29	4 594E-0008
123	271 00	279 00	282 18	3 18	5 016E-0008
124	271 00	281 00	282 17	1 17	1 154E-0009
125	271 00	282 00	282 00	0 00	0 000E+0000
126	278 50	263 00	282 22	19 22	0 000E+0000
127	278 50	274 00	282 15	8 15	2 080E-0008
128	278 50	279 00	282 07	3 07	2 271E-0008
129	278 50	281 00	282 07	1 07	1 118E-0010
130	278 50	282 00	282 00	0 00	0 000E+0000
131	286 00	263 00	282 11	19 11	0 000E+0000
132	286 00	274 00	282 06	8 06	9 396E-0009
133	286 00	279 00	282 01	3 01	1 034E-0008
134	286 00	281 00	282 00	1 00	1 961E-0010
135	286 00	282 00	282 00	0 00	0 000E+0000
136	293 50	263 00	282 05	19 05	0 000E+0000
137	293 50	274 00	282 03	8 03	4 092E-0009
138	293 50	279 00	282 00	3 00	4 503E-0009
139	293 50	281 00	282 00	1 00	6 251E-0011
140	293 50	282 00	282 00	0 00	0 000E+0000
141	310 00	263 00	282 01	19 01	0 000E+0000
142	310 00	274 00	282 00	8 00	6 291E-0010
143	310 00	279 00	282 00	3 00	6 822E-0010
144	310 00	281 00	282 00	1 00	3 867E-0012
145	310 00	282 00	282 00	0 00	0 000E+0000
146	326 50	263 00	282 00	19 00	0 000E+0000
147	326 50	274 00	282 00	8 00	9 592F-0011
148	326 50	279 00	282 00	3 00	1 054E-0010
149	326 50	281 00	282 00	1 00	1 552E-0012
150	326 50	282 00	282 00	0 00	0 000E+0000
151	343 00	263 00	282 00	19 00	0 000E+0000
152	343 00	274 00	282 00	8 00	1 473E-0011
153	343 00	279 00	282 00	3 00	1 600E-0011
154	343 00	281 00	282 00	1 00	7 586E-0014
155	343 00	282 00	282 00	0 00	0 000E+0000
156	359 50	263 00	282 00	19 00	0 000E+0000
157	359 50	274 00	282 00	8 00	2 245E-0012
158	359 50	279 00	282 00	3 00	2 462E-0012
159	359 50	281 00	282 00	1 00	3 873E-0014
160	359 50	282 00	282 00	0 00	0 000E+0000
161	376 00	263 00	282 00	19 00	0 000E+0000
162	376 00	274 00	282 00	8 00	3 220E-0013
163	376 00	279 00	282 00	3 00	3 503E-0013
164	376 00	281 00	282 00	1 00	1 613E-0015
165	376 00	282 00	282 00	0 00	0 000E+0000
166	400 00	263 00	282 00	19 00	0 000E+0000
167	400 00	274 00	282 00	8 00	0 000E+0000
168	400 00	279 00	282 00	3 00	0 000E+0000
169	400 00	281 00	282 00	1 00	0 000E+0000
170	400 00	282 00	282 00	0 00	0 000E+0000

ANEXO E

**ANÁLISES DA ESTABILIDADE DOS TALUDES
MONTANTE E JUSANTE**

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ANÁLISES DE ESTABILIDADE DOS TALUDES DA BARRAGEM

O presente anexo traz os processamentos e resultados obtidos nas análises de estabilidade dos taludes da barragem, realizados para a verificação dos coeficientes de segurança e atendimento aos critérios de projeto. A discussão dos parâmetros e dos resultados encontra-se no **Relatório Final do Projeto Geotécnico de Revisão da Barragem**.

As análises de estabilidade realizadas foram feitas através do processo de equilíbrio limite proposto por Spencer e que encontra-se implantado em microcomputador, tendo sido empregado o programa ESTAVEL.

Neste programa é possível considerar-se, com as simplificações que se façam necessárias, a presença de vários materiais e diversas condições de pressão neutra. O círculo crítico, isto é, aquele que apresenta o menor coeficiente de segurança, é determinado através de pesquisa automática.

Foram realizadas análises de estabilidade para 3 situações: final de construção, operação e rebaixamento rápido do nível d'água.

Os parâmetros de resistência utilizados nas análises de estabilidade foram:

Tabela 1 - *Parâmetros de Resistência dos Materiais*

Material	Peso Específico γ (kN/m ³)	Coesão c (kPa)	Ângulo de Atrito (°)	Pressão Neutra
Barragem de Terra e Tapete impermeável de montante	19	30	26	r_u ou piezométrica dependendo da análise
Aluvião Arenoso	19	10	28	piezométrica

A análise de estabilidade na fase de operação foi realizada admitindo-se que a linha freática fosse horizontal até atingir o filtro vertical e a partir daí tivesse uma altura correspondente à subpressão existente na fundação, considerando-se a ação do tapete impermeável de montante.

A análise de estabilidade de rebaixamento rápido foi realizada considerando-se a possibilidade do nível d'água rebaixar rapidamente da cota 295,97 até a cota 285,00 e que a linha freática dentro do maciço permanecesse como estava durante a fase de operação

As figuras a seguir apresentam as convenções dos diversos materiais utilizados e os resultados das análises de estabilidade realizadas

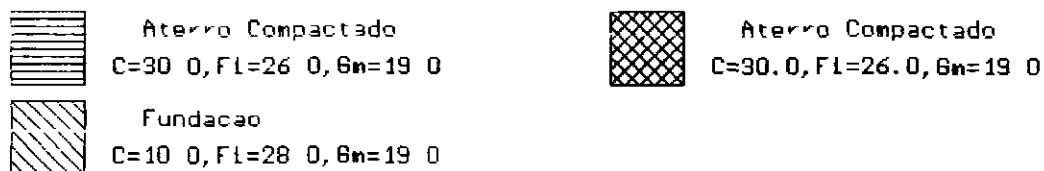


Fig 1 - Convenção dos Materiais

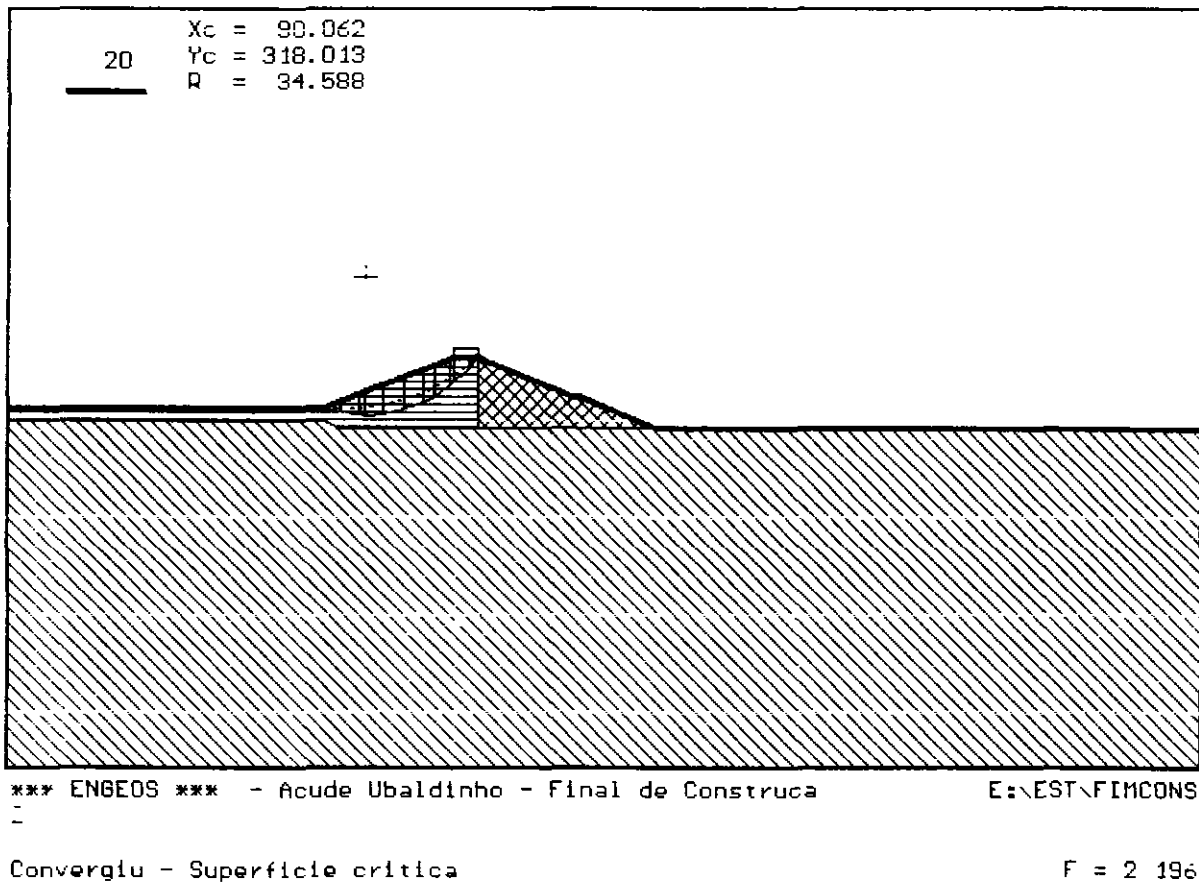
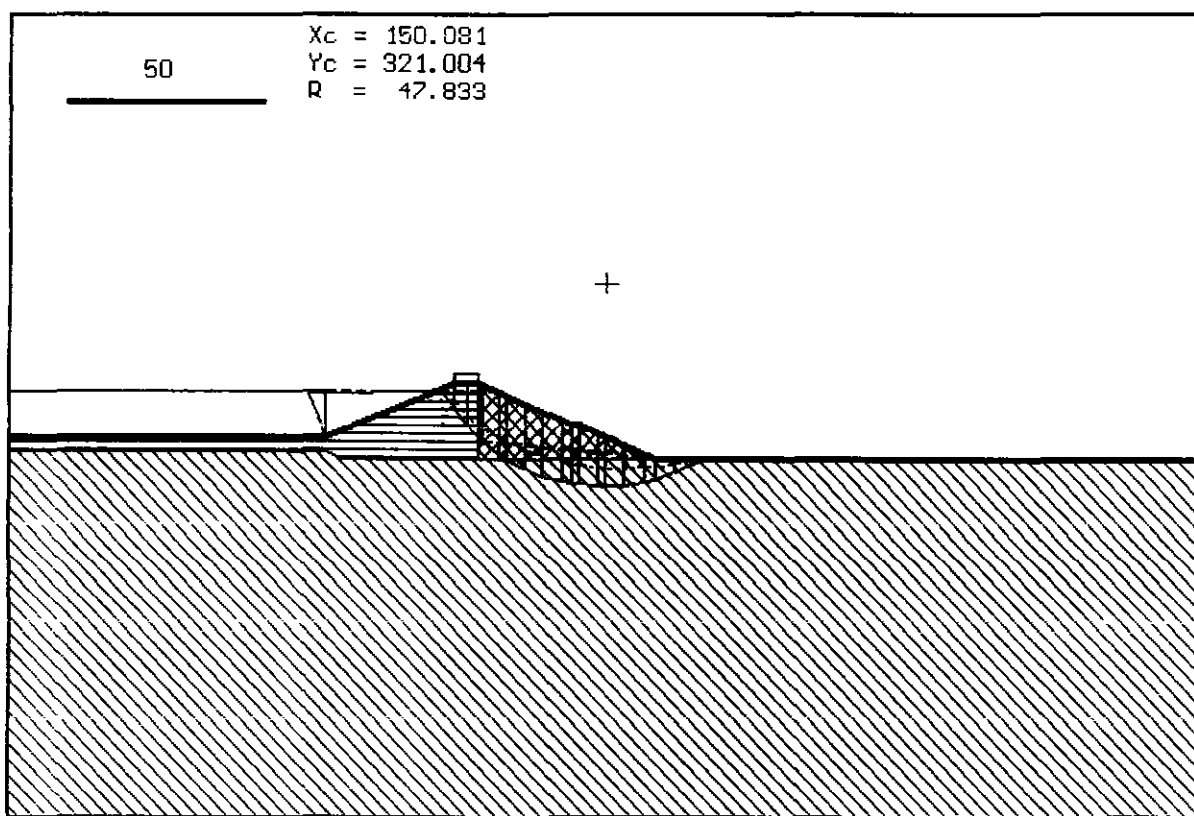


Fig 2 - Análise de estabilidade para final de período construtivo



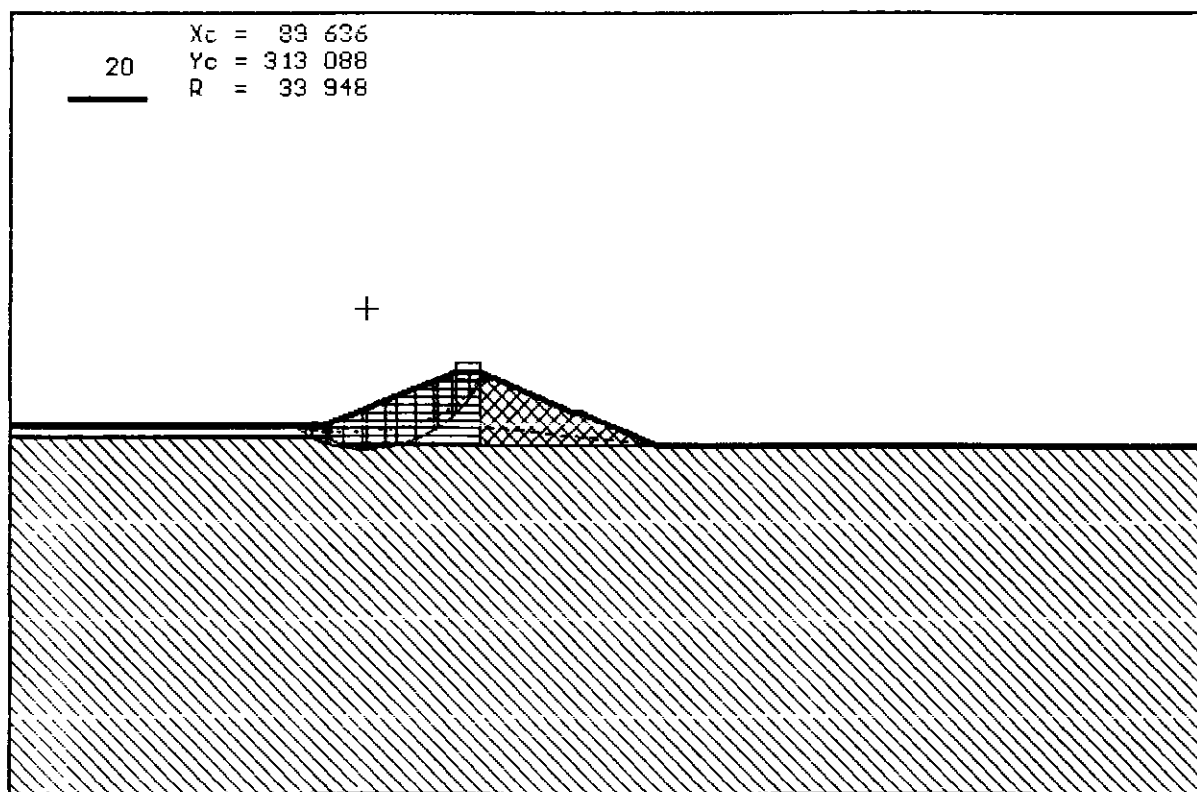
*** ENGEOS *** - Acude Ubaldinho - Operacao - Unidade
2

E:\EST\OPERA

Convergiu - Superficie critica

F = 1.724

Fig 3 - Análise de Estabilidade para condição de operação



*** ENGEO5 *** - Açude Ubaldinho - Rebaixamento Rapid
2

E:\EST\REBAIXA

Convergiu - Superficie critica

F = 1.580

Fig 4 - Análise de Estabilidade para a condição de rebaixamento rápido

Os resultados dos processamentos estão apresentados nos anexos 1, 2 e 3

PROFUNDIDADE ADMITIDA PARA TRINCA DE TRACAO - - - - -	0.00
ALTURA DE AGUA NA TRINCA DE TRACAO - - - - -	0.00
PESO ESPECIFICO DA AGUA - - - - -	10.00
VALOR INICIAL ADMITIDO PARA O FATOR DE SEGURANCA - - - -	1.00
INCLINACAO INICIALMENTE ADMITIDA DAS FORÇAS LATERAIS - - -	-10.00 graus
NUMERO LIMITE DE ITERACOES PARA CADA SUPERFICIE - - - - -	10
DESEQUILIBRIO DE FORÇAS TOLERADO - - - - -	10.00
DESEQUILIBRIO DE MOMENTOS TOLERADO - - - - -	100.00

**** CIRCULOS INTERMEDIARIOS DA BUSCA

Xc	Yc	Raio	F
85.000	320.000	45.000	2.650
90.000	315.000	50.000	3.857
90.000	320.000	40.000	2.361
85.000	315.000	45.000	2.998
83.333	321.667	36.667	2.881
87.222	326.111	36.111	12.765
85.667	318.333	42.333	2.556
90.444	317.222	48.222	3.443
85.467	320.333	40.133	2.346
89.089	319.111	36.644	2.230
91.133	318.667	32.467	2.431
90.704	321.296	35.519	2.362
86.833	320.494	34.864	2.613
89.052	320.148	38.459	2.278
85.035	318.432	41.306	2.482
89.003	320.437	37.255	2.220
92.629	319.464	34.772	2.311
85.467	320.333	40.133	2.346
90.480	319.725	36.381	2.214
89.926	319.367	35.061	2.240
89.052	320.148	38.459	2.278
89.713	319.602	36.080	2.204
90.375	320.731	36.499	2.242
89.475	319.597	36.601	2.218
90.776	319.845	35.453	2.212
91.171	319.184	35.342	2.236
89.984	319.473	36.223	2.210
89.833	318.889	35.457	2.201
89.510	318.470	34.995	2.204
88.910	319.797	36.387	2.215
90.217	319.131	35.733	2.205
89.859	318.941	35.291	2.200
89.727	318.674	34.824	2.213
89.398	319.156	35.485	2.205
90.217	319.131	35.733	2.205
89.636	319.149	35.560	2.201
89.840	318.384	34.791	2.199
89.904	317.775	34.147	2.204
89.723	318.760	34.971	2.209
89.801	318.850	35.311	2.199
90.631	318.301	34.702	2.208
89.922	318.082	34.579	2.198
89.954	317.653	34.223	2.196
89.679	318.576	35.085	2.201
89.325	318.354	34.817	2.199
89.925	318.494	35.014	2.197
89.967	318.549	35.125	2.199
90.047	317.790	34.296	2.197
90.170	317.260	33.788	2.198
90.005	317.860	34.442	2.197
90.062	318.013	34.588	2.196

**** CIRCULOS INTERMEDIARIOS DA BUSCA

Xc	Yc	Raio	F
90.133	317.979	34.593	2.196
90.151	317.282	33.870	2.196

**** CIRCULOS REFERENTES AOS 4 VERTICES DO SIMPLEX FINAL DEPOIS DE 19 MOVIMENTACOES:

Xc	Yc	Raio	F
90.062	318.013	34.588	2.196
90.151	317.282	33.870	2.196
90.047	317.790	34.296	2.197
90.005	317.860	34.442	2.197

I T E R A C O E S

TETA (graus)			DESEQUILIBRIO DE	
ITER	Fm	Ff	MOMENTOS	FORÇAS
0.00 BISHOP SIMPLIFICADO				
0	1.0000	1.0000	47503.164	1405.720
1	2.0383	2.1592	3344.974	-9.572
2	2.1869	2.0239	240.971	-110.005
3	2.1985	2.0151	17.380	-117.244
4	2.1993	2.0144	1.253	-117.766
5	2.1993	2.0144	0.093	-117.804
-10.00				
0	2.1993	2.0144	-105.147	-48.606
1	2.1943	2.1190	-2.953	-45.456
2	2.1942	2.1193	-0.077	-45.368
-5.00				
0	2.1942	2.1193	25.406	-79.706
1	2.1954	2.0655	1.277	-80.464
2	2.1954	2.0654	0.067	-80.502
-15.00				
0	2.1954	2.0654	-0.847	-10.660
1	2.1954	2.1776	-0.006	-10.635
2	2.1954	2.1776	-0.001	-10.634
-20.00				
0	2.1954	2.1776	82.441	27.954
1	2.1993	2.2424	-1.507	25.379
2	2.1993	2.2421	0.033	25.426
-15.47				
0	2.1993	2.2421	-63.081	-2.198
1	2.1962	2.1956	0.091	-0.267
2	2.1962	2.1958	0.001	-0.270
3	2.1962	2.1958	0.001	-0.270

NUMERADOR: 100511 2876
 DENOMINADOR: 45765 1310

MOMENTOS CALCULADOS X = 90.06
 EM RELACAO AO PONTO Y = 318.01

I N F O R M A C O E S D A S L A M E L A S

LAMELA NO.	X	Y	PESO	ANGULO DE ATRITO (graus)	COESAO	ANGULO DE PRESSAO NEUTRA	* FORÇAS APLIC. * * NA SUPERFICIE * * DO TALUDE *	* FORÇA X *	* FORÇA Y *
ESQUERDA	ESQUERDA	CENTRO					*****		
DIREITA	DIREITA						*****		
1	79.74	285.00	0.2	30.00	30.00	26.00	0.15	0.00	0.00
	80.00	284.92							
2	81.00	284.44	103.3	30.00	30.00	26.00	5.17	0.00	0.00
	84.00	283.96							
3	86.48	283.70	367.5	30.00	30.00	26.00	14.79	0.00	0.00
	88.97	283.44							
4	89.52	283.43	111.7	30.00	30.00	26.00	20.42	0.00	0.00
	90.06	283.43							
5	92.55	283.61	607.5	30.00	30.00	26.00	24.38	0.00	0.00
	95.05	283.79							
6	97.48	284.32	711.1	30.00	30.00	26.00	29.15	0.00	0.00
	99.92	284.86							
7	102.26	285.74	724.7	30.00	30.00	26.00	31.02	0.00	0.00
	104.60	286.63							
8	106.81	287.38	431.5	30.00	30.00	26.00	30.57	0.00	0.00
	107.42	288.10							
9	109.48	289.50	572.1	30.00	30.00	26.00	27.71	0.00	0.00
	111.55	290.91							
10	111.90	291.19	87.5	30.00	30.00	26.00	24.95	0.00	0.00
	112.25	291.48							
11	114.05	293.22	319.6	30.00	30.00	26.00	17.80	71.82	114.05
	115.84	294.95							
12	117.02	296.43	66.1	30.00	30.00	26.00	5.60	47.21	117.02
	118.20	297.90							

I N F O R M A C O E S F I N A I S

COEFICIENTE DE SEGURANCA = 2.196
 INCLINACAO DAS FORÇAS INTERLAMELARES = -16.47 graus

NUMERO DE ITERACOES = 1

LAMELA NO.	NMED	TENSÃO NORMAL EFETIVA	TENSÃO CISALH.	*INFORMACOES DAS FORÇAS INTERLAMELARES*			
				* PONTO DE APLICACAO X	* Y	* ALT. LAMELA	* COMPON. HORIZ.
0				79.74	285.00	0.0	0.00
1	79.87	11.44	16.20	80.00	285.00	98.9	5.06
2	82.00	25.00	21.43	84.00	285.04	40.7	129.37
3	86.48	73.93	30.08	88.97	285.22	34.5	324.79
4	89.52	92.88	34.29	90.06	285.33	34.0	364.25
5	92.55	102.97	36.55	95.05	286.10	32.0	500.30
6	97.48	110.40	38.18	99.92	287.34	30.6	536.57
7	102.26	105.72	37.14	104.60	289.02	29.1	468.58
8	106.01	95.13	34.78	107.42	290.31	29.1	382.18
9	109.48	77.71	30.92	111.55	292.59	25.1	213.34
10	111.90	63.96	27.86	112.25	293.06	24.6	182.11
11	114.05	53.62	25.57	115.84	295.91	32.6	25.89
12	117.02	17.28	17.50	118.20	297.90	0.0	-0.26

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*** INFORMACOES INICIAIS PARA A PESQUISA ***

COORDENADA X DO CENTRO - - - - -	135.00
COORDENADA Y DO CENTRO - - - - -	315.00
PRIMEIRO CIRCULO TANGENTE A HORIZ. DE COTA Y IGUAL A - -	275.00
LOCALIZACAO GLOBAL DAS SUPERFICIES	
NENHUMA SUPERFICIE DEVE PASSAR ABAIXO DA COTA - - - - -	-100.00
PRECISAO NAS COORDENADAS DA SUPERFICIE - - - - -	0.50
COMPRIMENTO DE ARCO ESPECIFICADO - - - - -	5.00
PROFUNDIDADE ADMITIDA PARA TRINCA DE TRACAO - - - - -	0.00
ALTURA DE AGUA NA TRINCA DE TRACAO - - - - -	0.00
PESO ESPECIFICO DA AGUA - - - - -	10.00
VALOR INICIAL ADMITIDO PARA O FATOR DE SEGURANCA - - - -	1.00
INCLINACAO INICIALMENTE ADMITIDA DAS FORÇAS LATERAIS - -	10.00 graus
NUMERO LIMITE DE ITERACOES PARA CADA SUPERFICIE - - - -	10
DESEQUILIBRIO DE FORÇAS TOLERADO - - - - -	10.00
DESEQUILIBRIO DE MOMENTOS TOLERADO - - - - -	100.00

**** CIRCULOS INTERMEDIARIOS DA BUSCA

Xc	Yc	Raio	F
135.000	315.000	40.000	2.308
130.000	310.000	45.000	2.781
130.000	315.000	35.000	3.060
135.000	310.000	40.000	2.264
136.667	308.333	48.333	2.436
141.111	312.222	40.556	1.889
146.667	313.333	38.333	1.785
141.111	317.222	30.556	3.153
138.000	311.000	43.000	2.080
144.778	307.889	40.889	1.887
151.296	311.482	41.481	1.796
157.160	310.802	37.469	1.969
138.000	311.000	43.000	2.080
151.412	310.862	39.128	1.805
154.806	315.895	36.407	2.011
147.786	310.291	40.144	1.775
145.754	312.542	40.844	1.761
142.924	313.382	41.702	1.827
142.175	312.629	38.066	1.874
148.560	311.826	40.457	1.755
148.067	309.773	42.630	1.845
147.087	312.265	39.622	1.751
146.481	314.131	40.472	1.752
148.998	312.939	39.523	1.753
146.483	314.398	39.268	1.781
147.937	312.597	40.106	1.747
145.338	313.056	40.610	1.762
147.900	312.974	39.849	1.748
148.802	311.094	39.247	1.762
147.177	313.220	40.104	1.747
148.256	313.596	40.417	1.744
148.841	314.262	40.815	1.743
148.070	313.745	40.834	1.741
148.155	314.130	41.327	1.738
149.444	314.106	41.394	1.742
149.689	315.734	42.251	1.737
150.566	317.302	43.323	1.739
149.352	315.052	42.500	1.735
149.607	315.447	43.342	1.735
148.856	316.101	43.219	1.730
148.562	317.099	44.131	1.728
150.418	318.057	45.156	1.728
149.369	318.001	46.169	1.729
149.293	319.991	46.962	1.724
149.155	322.263	48.772	1.726
149.480	318.763	44.664	1.730
149.402	318.230	45.718	1.726
147.753	318.823	46.051	1.731
149.619	318.287	45.425	1.725
150.313	320.572	47.939	1.725
150.081	321.004	47.833	1.724

**** CIRCULOS INTERMEDIARIOS DA BUSCA

Xc	Yc	Raio	F
150.420	322.390	48.890	1.726
150.173	322.758	49.731	1.726
149.785	319.628	46.717	1.724

**** CIRCULOS REFERENTES AOS 4 VERTICES DO SIMPLEX FINAL

DEPOIS DE 30 MOVIMENTACOES:

Xc	Yc	Raio	F
150.081	321.004	47.833	1.724
149.785	319.628	46.717	1.724
149.295	319.991	46.962	1.724
150.313	320.572	47.939	1.725

I T E R A C O E S

TETA (graus) DESEQUILIBRIO DE
ITER Fm Et MOMENTOS FORÇAS

B I S H O P S I M P L I F I C A D O

0.00	0	1.0000	1.0000	-103209.031	2033.834
	1	1.6207	1.6650	-8898.874	-180.425
	2	1.7075	1.5367	-802.653	-372.106
	3	1.7157	1.5268	-72.634	-389.403
	4	1.7165	1.5260	-6.556	-390.969
	5	1.7165	1.5259	-0.598	-391.109
	6	1.7165	1.5259	-0.052	-391.122
10.00	0	1.7165	1.5259	-193.338	-104.958
	1	1.7185	1.6618	-4.949	-109.217
	2	1.7186	1.6615	-0.129	-109.326
5.00	0	1.7186	1.6615	299.756	-255.618
	1	1.7155	1.5892	17.617	-249.133
	2	1.7153	1.5895	1.035	-248.751
	3	1.7153	1.5896	0.068	-248.729
15.00	0	1.7153	1.5896	-1117.381	60.640
	1	1.7268	1.7477	11.135	35.201
	2	1.7267	1.7457	-0.072	35.455
	3	1.7267	1.7458	-0.003	35.453
13.68	0	1.7267	1.7458	254.402	-9.411
	1	1.7241	1.7217	-0.054	-3.679
	2	1.7241	1.7221	-0.014	-3.680
13.81	0	1.7241	1.7221	-22.309	0.439
	1	1.7243	1.7243	0.031	-0.065
	2	1.7243	1.7243	-0.004	-0.064

NUMERADOR: -286701 5570
DENOMINADOR: -166272 3230

MOMENTOS CALCULADOS X = 150.08
EM RELACAO AO PONTO Y = 321.00

I N F O R M A C O E S D A S L A M E L A S

LAMELA NO.	X	Y	PESO	COESAO	ANGULO DE ATRITO (graus)	PRESSAO NEUTRA	* FORÇAS APLIC. * * NA SUPERFICIE * * DO TALUDE *	* FORÇA X *
108.95	296.58							
1	109.14	296.28	2.7	30.00	26.00	0.00	0.00	0.00
109.32	295.97							
2	110.74	293.91	182.3	30.00	26.00	20.58	0.00	0.00
112.16	291.85							
3	112.20	291.79	10.8	30.00	26.00	41.77	0.00	0.00
112.25	291.73							
4	113.88	289.84	499.4	30.00	26.00	61.31	65.21	113.88
115.51	287.94							
5	116.88	286.62	587.0	30.00	26.00	93.48	54.79	116.88
118.25	285.30							
6	118.26	285.30	2.4	30.00	26.00	48.85	0.00	0.00
118.26	285.29							
7	118.84	284.79	285.1	30.00	26.00	0.00	0.00	0.00
119.43	284.28							
8	121.43	282.79	1047.8	30.00	26.00	13.01	0.00	0.00
123.43	281.29							
9	124.44	280.64	564.7	30.00	26.00	31.45	0.00	0.00
125.45	280.00							

10	127.66	278.83	1270.5	10.00	28.00	46.43	0.00	0.00
	129.86	277.65						
11	132.18	276.72	1353.9	10.00	28.00	63.05	0.00	0.00
	134.50	275.78						
12	136.90	275.09	1372.6	10.00	28.00	74.64	0.00	0.00
	139.30	274.40						
13	140.65	274.13	743.4	10.00	28.00	80.54	0.00	0.00
	142.01	273.86						
14	142.76	273.74	406.4	10.00	28.00	82.34	0.00	0.00
	143.51	273.62						
15	146.00	273.41	1282.1	10.00	28.00	82.43	0.00	0.00
	148.49	273.20						
16	149.29	273.18	375.3	10.00	28.00	81.45	0.00	0.00
	150.08	273.17						
17	152.58	273.30	1035.6	10.00	28.00	77.02	0.00	0.00
	155.07	273.43						
18	157.54	273.82	781.5	10.00	28.00	66.90	0.00	0.00
	160.01	274.21						
19	161.36	274.54	309.2	10.00	28.00	55.94	0.00	0.00
	162.71	274.87						
20	165.08	275.65	391.9	10.00	28.00	43.47	0.00	0.00
	167.45	276.44						
21	169.73	277.47	219.4	10.00	28.00	25.34	0.00	0.00
	172.01	278.49						
22	173.36	279.25	38.7	10.00	28.00	7.53	0.00	0.00
	174.71	280.00						

I N F O R M A C O E S F I N A I S

COEFICIENTE DE SEGURANCA = 1.724
 INCLINACAO DAS FORÇAS INTERLAMELARES = 13.81 graus

NUMERO DE ITERACOES = 2

LAMELA NO.	XMED	TENSÃO NORMAL EFETIVA	TENSÃO CISALH.	*INFORMACOES DAS FORÇAS INTERLAMELARES*			
				* PONTO DE APLICACAO		% ALT.	COMPON.
				X	Y	LAMELA	HORIZ.

0				108.95	296.58	0.0	0.00
1	109.14	0.00	17.40	109.32	288.02	0.0	-11.30
2	110.74	9.06	19.96	112.16	294.99	52.1	54.13
3	112.20	26.18	24.80	112.25	294.65	47.3	60.06
4	113.88	50.77	31.76	115.51	290.16	22.3	381.02
5	116.88	73.63	38.22	118.25	287.99	21.4	718.35
6	118.26	120.16	51.39	118.26	287.99	21.4	719.35
7	118.84	168.57	65.08	119.43	267.35	23.3	813.03
8	121.43	179.27	68.11	123.43	285.28	27.6	1117.16
9	124.44	186.17	70.06	125.45	284.30	28.8	1255.28
10	127.66	191.80	64.94	129.86	282.35	30.5	1527.63
11	132.18	193.32	65.41	134.50	280.70	32.0	1704.71
12	136.90	189.78	64.32	139.30	279.37	33.7	1760.45
13	140.65	183.47	62.38	142.01	278.78	34.8	1735.28
14	142.76	184.13	62.58	143.51	278.50	33.9	1703.33
15	146.00	179.31	61.09	148.49	277.86	36.6	1510.89
16	149.29	166.41	57.11	150.08	277.73	37.7	1426.55
17	152.58	148.79	51.68	155.07	277.81	42.9	1109.67
18	157.54	115.17	41.31	160.01	277.86	52.8	763.63
19	161.36	81.89	31.05	162.71	278.08	62.6	589.36
20	165.08	62.09	24.95	167.45	278.66	62.4	305.32
21	169.73	44.01	19.37	172.01	279.60	73.2	74.50
22	173.36	20.27	12.05	174.71	280.00	0.0	0.06

143.51 288.00
 162.71 280.00
 300.00 280.00

*** INFORMACOES INICIAIS PARA A PESQUISA ***

COORDENADA X DO CENTRO	90.00
COORDENADA Y DO CENTRO	315.00
PRIMEIRO CIRCULO TANGENTE A HORIZ. DE COTA Y IGUAL A LOCALIZACAO GLOBAL DAS SUPERFICIES	275.00
NENHUMA SUPERFICIE DEVE PASSAR ABAIXO DA COTA	-100.00
PRECISAO NAS COORDENADAS DA SUPERFICIE	0.50
COMPRIMENTO DE ARCO ESPECIFICADO	5.00
PROFUNDIDADE ADMITIDA PARA TRINCA DE TRACAO	0.00
ALTURA DE AGUA NA TRINCA DE TRACAO	0.00
PESO ESPECIFICO DA AGUA	10.00
VALOR INICIAL ADMITIDO PARA O FATOR DE SEGURANCA	1.00
INCLINACAO INICIALMENTE ADMITIDA DAS FORCAS LATERAIS	-10.00 graus
NUMERO LIMITE DE ITERACOES PARA CADA SUPERFICIE	10
DESEQUILIBRIO DE FORCAS TOLERADO	10.00
DESEQUILIBRIO DE MOMENTOS TOLERADO	100.00

**** CIRCULOS INTERMEDIARIOS DA BUSCA

Xc	Yc	Raio	F
90.000	315.000	40.000	1.835
95.000	310.000	45.000	3.188
95.000	315.000	35.000	1.948
90.000	310.000	40.000	2.202
88.333	316.667	31.667	1.969
92.222	321.111	31.111	3.728
90.667	313.333	37.333	1.744
95.444	312.222	43.222	2.759
90.467	315.333	35.133	1.739
85.756	314.111	39.978	1.805
87.926	313.519	34.963	1.596
86.889	312.778	32.444	1.743
93.617	314.012	31.642	1.754
85.756	314.111	39.978	1.805
91.259	314.042	34.143	1.701
89.101	315.263	32.159	1.746
90.197	313.912	35.761	1.621
89.121	312.315	34.791	1.608
86.904	312.455	36.214	1.665
91.259	314.042	34.143	1.701
88.210	312.931	35.593	1.617
86.641	311.931	34.450	1.628
89.130	313.318	35.382	1.603
89.241	313.170	34.498	1.583
89.757	313.289	33.951	1.583
88.754	314.435	34.739	1.606
89.121	312.315	34.791	1.608
88.864	313.799	34.755	1.586
88.568	313.753	33.730	1.694
88.961	313.449	34.886	1.587
90.462	313.506	34.098	1.594
87.926	313.519	34.963	1.596
89.701	313.510	34.358	1.584
89.920	313.617	33.822	1.630
89.249	313.499	34.567	1.583
90.274	313.066	39.829	1.585
88.664	313.799	34.755	1.586
89.851	313.286	34.107	1.583
89.536	313.206	34.059	1.581
89.454	313.055	33.909	1.581
89.334	313.372	34.538	1.583
89.630	313.314	34.127	1.582
89.093	313.393	34.395	1.583
89.851	313.286	34.107	1.583
89.093	313.393	34.395	1.583
89.623	313.318	34.193	1.582
89.944	313.060	33.685	1.582
89.249	313.499	34.567	1.583
89.736	313.192	33.950	1.581
89.634	313.164	34.008	1.581
89.636	313.088	33.948	1.580

**** CIRCULOS INTERMEDIARIOS DA BUSCA

Xc	Yc	Raio	F
89.648	313.006	33.778	1.581
89.478	313.009	33.907	1.580

**** CIRCULOS REFERENTES AOS 4 VERTICES DO SIMPLEX FINAL
DEPOIS DE 31 MOVIMENTACOES:

Xc	Yc	Raio	F
89.636	313.088	33.948	1.580
89.478	313.009	33.907	1.580
89.648	313.006	33.778	1.581
89.536	313.206	34.059	1.581

I T E R A C O E S

TETA (graus)	ITER		DESEQUILIBRIO DE MOMENTOS		FORÇAS	
	Fm	Ff				
0.00 B I S H O P S I M P L I F I C A D O						
0	1.0000	1.0000	35434.586	957.433		
1	1.5166	1.5402	2189.345	-153.984		
2	1.5650	1.4004	156.323	-222.786		
3	1.5686	1.3928	11.243	-227.700		
4	1.5689	1.3923	0.817	-228.053		
5	1.5689	1.3922	0.048	-228.079		
-10.00						
0	1.5689	1.3922	419.777	-1.034		
1	1.5785	1.5680	-2.696	-14.912		
2	1.5784	1.5659	0.012	-14.823		
3	1.5784	1.5659	0.007	-14.823		
-5.00						
0	1.5784	1.5659	-328.668	-133.324		
1	1.5709	1.4701	-11.321	-122.825		
2	1.5706	1.4714	-0.383	-122.464		
3	1.5706	1.4714	-0.018	-122.451		
-15.00						
0	1.5706	1.4714	1061.989	136.569		
1	1.5949	1.6896	-48.617	99.485		
2	1.5938	1.6827	2.198	101.182		
3	1.5938	1.6830	-0.096	101.105		
-10.25						
0	1.5938	1.6630	-638.762	-30.056		
1	1.5790	1.5682	1.436	-8.898		
2	1.5790	1.5715	-0.013	-8.946		
3	1.5790	1.5715	0.002	-8.945		
-10.63						
0	1.5790	1.5715	39.564	0.594		
1	1.5799	1.5795	-0.175	-0.721		
2	1.5799	1.5793	-0.004	-0.715		
3	1.5799	1.5793	0.006	-0.715		
-10.66						
0	1.5799	1.5793	3.285	0.049		
1	1.5800	1.5800	-0.016	-0.060		
2	1.5800	1.5800	0.004	-0.059		
NUMERADOR:			108369	2939		
DENOMINADOR:			68587	1860		
MOMENTOS CALCULADOS X =			89.64			
EM RELACAO AO PONTO Y =			313.09			

I N F O R M A C O E S D A S L A M E L A S

LAMELA NO.	X	Y	PESO	COESAO	ANGULO DE ATRITO (graus)	PRESSAO NEUTRA	* FORÇAS APLIC. * * NA SUPERFICIE * * DO TALUDE *	* FORÇA X *	* FORÇA Y *
70.57	285.00								
1	72.73	283.75	102.5	30.00	26.00	12.47	0.00	0.00	
74.90	282.51								
2	75.45	282.25	57.4	30.00	26.00	27.47	0.00	0.00	
76.00	282.00								
3	78.00	281.27	283.7	10.00	28.00	37.32	0.00	0.00	
80.00	280.54								
4	82.00	280.07	435.2	10.00	28.00	57.26	0.00	0.00	
84.00	279.61								
5	86.49	279.38	776.4	10.00	28.00	82.16	0.00	0.00	
88.97	279.15								
6	89.30	279.14	120.4	10.00	28.00	95.79	0.00	0.00	

ANEXO F

**MEMÓRIA DE CÁLCULO DA TOMADA
D'ÁGUA E SANGRADOURO**

000235

GOVERNO DO ESTADO DO CEARÁ
PROJETO DE DESENVOLVIMENTO URBANO
PRO-URB-CE

PROJETO UBALDINHO - MEMORIA DE CALCULO

TOMADA D'ÁGUA - BACIA DE DISSIPACÃO
TOMADA D'ÁGUA - CAIXA DE ENTRADA
SANGRADOURO LABIRINTO

AGOSTO. 97

000236

NOTA: ESTA MEMORIA DE CALCULO SUBSTITUI AS FOLHAS DE

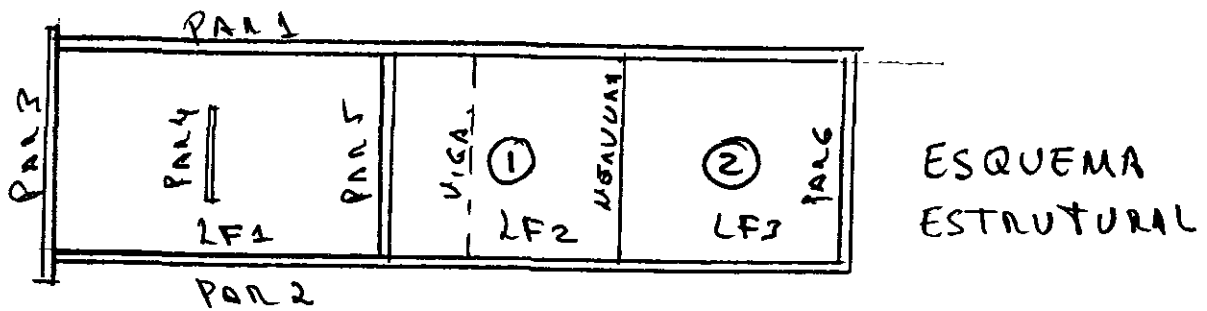
NUMEROS 194 A 220

235 A 244

254 A 260

**DO TOMO 2 , VOLUME 3 DO PROJETO BASICO DA BARRAGEM
UBALDINHO.**

10 - TOMADA D'ÁGUA - BACIA DE DISSIPACÃO



- Peso da Estrutura

- Par 1, 2 - $2 \times 8,53 \times 2,40 \times 0,30 \times 2,50$ — 30,71
- Par 3 - $4,90 \times 0,25 \times 2,70 \times 2,50$ — 8,21
- Par 4 - $1,57 \times 0,50 \times 1,60 \times 2,50$ — 3,14
- Par 5 - $2,10 \times 0,30 \times 2,80 \times 2,50$ — 4,41
- Viga - $0,30 \times 1,20 \times 2,80 \times 2,50$ — 2,52
- " - $0,45 \times 0,15 \times 2,80 \times 2,50$ — 0,47
- Nervura - $0,77 \times 0,30 \times 2,80 \times 2,50$ — 1,62
- Par 6 - $1,00 \times 0,30 \times 2,80 \times 2,50$ — 2,10
- Laje - $11,40 \times 2,80 \times 0,30 \times 2,50$ — 23,94

CAIXA VAZIA.

$V_c = 31 m^3$

77,18 tf

Admitidos Uniformemente distribuídos tem:

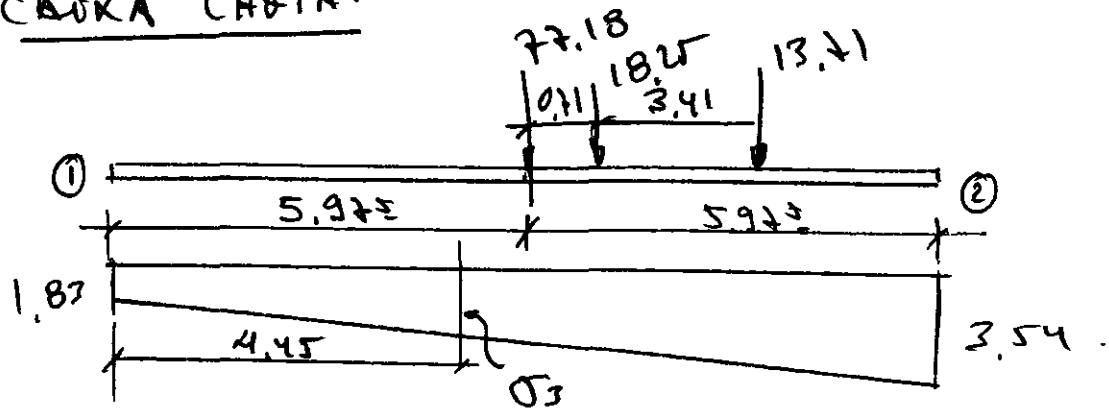
$p_s = \frac{77,18}{11,95 \times 3,40} = 1,90 \text{ tf/m}^2 \text{ (Vazia)}$

- água na câmara ① e ②

$P_{aq1} = 3,43 \times 2,80 \times 1,90 \times 1,0 = 18,25 \text{ tf}$

$P_{aq2} = 3,10 \times 2,80 \times 1,58 \times 1,0 = 13,71 \text{ tf}$

- САДКА ШЕЋА.



$$109,14 \times x = 18,25 \times 0,71 + 13,71 \times 4,12 \quad \therefore x = 0,636 \text{ (e)}$$

$$\sigma = \frac{109,14}{11,95 \times 3,40} \left(1 + \frac{6 \times 0,636}{11,95} \right) \quad \left\{ \begin{array}{l} \sigma_1 = 1,83 \text{ тт/м}^2 \\ \sigma_2 = 3,54 \text{ ''} \end{array} \right.$$

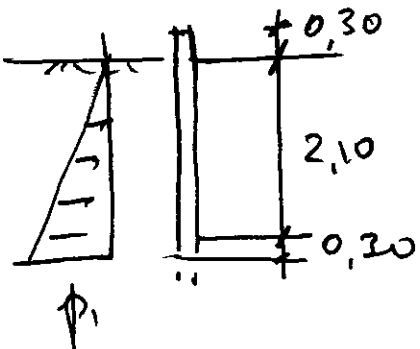
$$\sigma_3 = 1,71 \frac{4,45}{11,95} + 1,83 = 2,47 \text{ тт/м}^2$$

Пренад међа на LF1 → $\sigma_m = 2,15 \text{ тт/м}^2$
 " " на LF2 и LF3 → $\sigma_m = 3,00 \text{ ''}$

- Емпуко на тубулаџу.

NA_{реј} = 295,9т. NA_{туб} = 286,71 депресио-на ас пиди,
 $p_{ас} = 9,26 \text{ тт/м}^2 \rightarrow \text{Емпуко} = 0,283 \times 9,26 = 2,60 \text{ тт.}$

- Емпуко на Пар. 3.



$$p_1 = 2,40 \times 1,90 \times 0,37 = 1,50 \text{ тт/м}^2$$

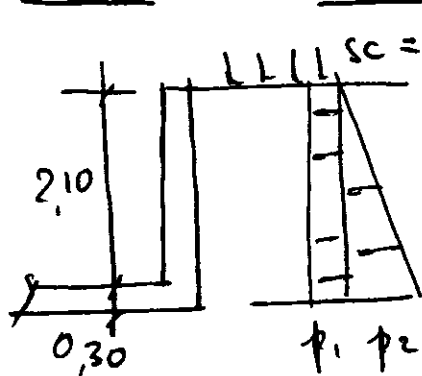
$$E = 0,5 \times 1,50 \times 2,40 \times 4,90 = 8,82 \text{ тт}$$

- Segurança ao deslizamento.

$$F.S.D = \frac{77,18 \times 0,40}{(2,60 + 8,82)} = 2,70$$

- PAROIS

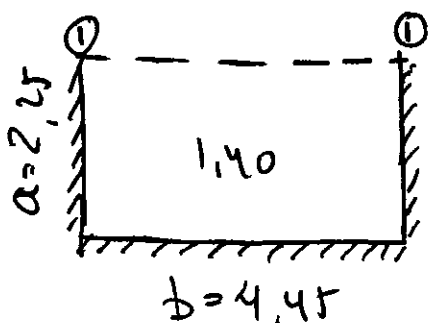
PAR 1 - Trecho A.



$$p_1 = 2,00 \times 0,33 = 0,66 \text{ t/m}^2$$

$$p_2 = 2,40 \times 1,20 \times 0,33 = 1,50 \text{ ''}$$

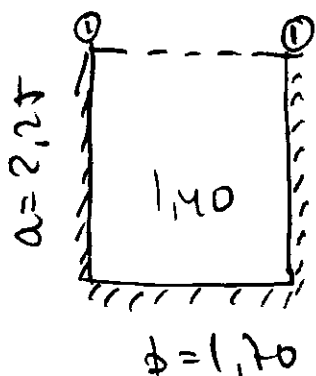
$$p_m = 1,40 \text{ t/m}^2$$



$$a/b = 0,50$$

$$\left\{ \begin{array}{l} X_a = -0,0511 \times 1,40 \times 4,45^2 = -1,42 \text{ t/m/m} \\ X_b = -0,0319 \times \text{''} = -0,88 \text{ ''} \\ M_a = 0,0029 \times \text{''} = 0,08 \text{ ''} \\ M_b = 0,0108 \times \text{''} = 0,30 \text{ ''} \\ X_{b1} = -0,0742 \times \text{''} = -2,06 \text{ ''} \\ M_x = 0,0246 \times \text{''} = 0,68 \text{ ''} \end{array} \right.$$

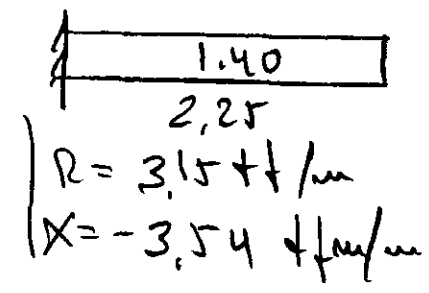
IDEM - Trecho B' (CADA VAZÃO)



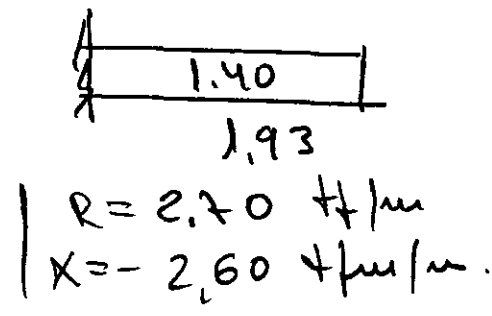
$$a/b = 1,32$$

$$\left\{ \begin{array}{l} X_a = -0,0557 \times 1,40 \times 1,70^2 = -0,22 \text{ t/m/m} \\ X_b = -0,0759 \times \text{''} = -0,31 \text{ ''} \\ M_a = 0,0067 \times \text{''} = 0,03 \text{ ''} \\ M_b = 0,0337 \times \text{''} = 0,14 \text{ ''} \\ X_{b1} = -0,0842 \times \text{''} = -0,34 \text{ ''} \\ M_x = 0,0417 \times \text{''} = 0,17 \text{ ''} \end{array} \right.$$

- IDEM - Trecho B''
(CK. VAZIA)

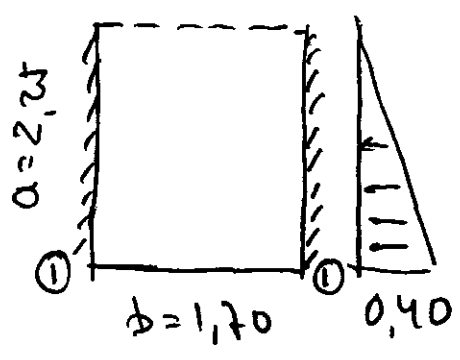


Trecho B'''
(CK. VAZIA)



PAR. 1 (CK. CHÖIA) - Trechos B', B'' e B'''

Trecho B'



$$p_s = p_2 = 1,50 \text{ tf/m}^2$$

$$p_{aq} = 1,90 \text{ "}$$

$$\Delta p = 0,40 \text{ tf/m}^2$$

$$a/b = 1,32$$

$$X_b = -0,0405 \times 0,40 \times 1,70^2 = -0,05 \text{ tfm/m}$$

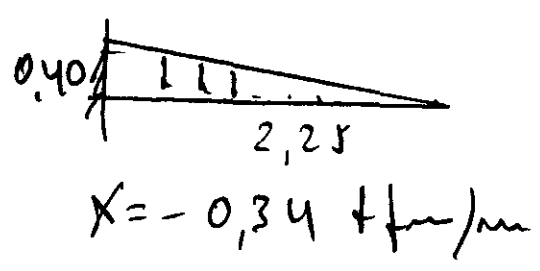
$$M_a = 0,0043 \times \text{"} = 0,01 \text{ "}$$

$$M_b = 0,0179 \times \text{"} = 0,02 \text{ "}$$

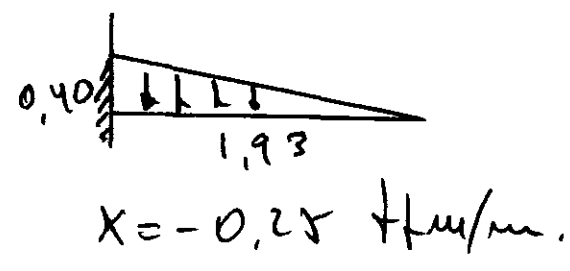
$$X_{b_1} = -0,008 \times \text{"} = -0,01 \text{ "}$$

$$M_x = 0,0072 \times \text{"} = 0,01 \text{ "}$$

Trecho B''

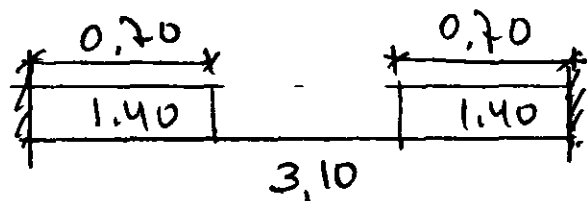


Trecho B'''



PAR 3

admitir a mesma pressão média da
PAR. 1 - $p_m = 1,40 \text{ tf/m}^2$



$$X = -\frac{1,40 \times 3,10^2}{12} + \frac{1,40 \times 1,70}{12 \times 3,10^2} [12 \times 1,55^3 + 1,70^2 (3,10 - 3 \times 1,55)]$$

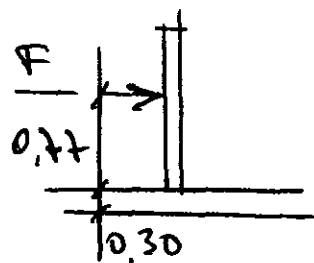
$$X = -1,12 + 0,83 = -0,29 \text{ tfm/m}$$

$$R = 0,98 \text{ tf/m}$$

$$M = 0,05 \text{ tfm/m}$$

- Engaste c/ LF 1
(desprezível.)

PAR 4 - Considerar o empuxo da tubulação absorvido integralmente pela Par.



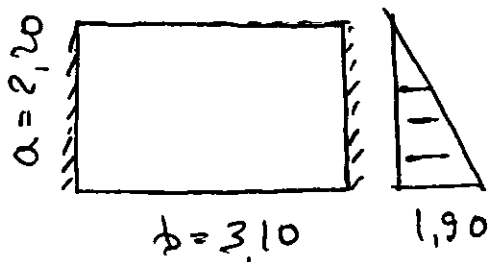
$$F = 2,60 \text{ tf (Fl. 2)}$$

$$X = -2,60 \times 0,92 = -2,39 \text{ tfm (1,50 tfm/m)}$$

PAR 5

$p_{ag} = 1,90 \text{ tf/m}^2$

$a/b = 0,70$



$X_b = -0,0506 \times 1,90 \times 2,20^2 = -0,46 \text{ tf/m/m}$

$M_a = 0,0254 \times \text{''} = 0,23 \text{ ''}$

$M_b = 0,0159 \times \text{''} = 0,15 \text{ ''}$

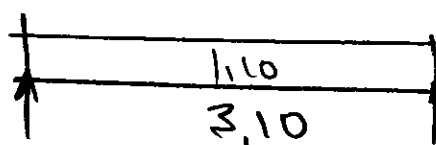
$X_{b_{max}} = -0,0522 \times \text{''} = -0,48 \text{ ''}$

$R_{aba} = 0,70 \text{ tf/m}$

Viga de Impacto

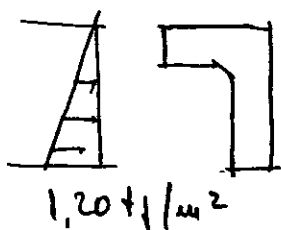
- Carregamento Vertical.

$p_p = 0,438 \times 2,50 = 1,10 \text{ tf/m}$

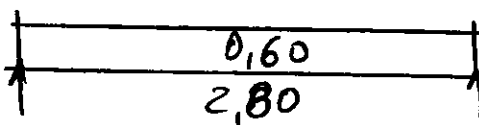


$R = 1,70 \text{ tf}$ $A_{st_{min}} = 4,2 \text{ cm}^2$
 $M = 1,32 \text{ tf/m}$ $A_{st} = 3,83 \text{ cm}^2$

- Carregamento Horizontal.



seja $p_{mh} = 0,60 \text{ tf/m}$



$R = 1,68 \text{ tf/m}$
 $M = 0,59 \text{ tf/m/m}$

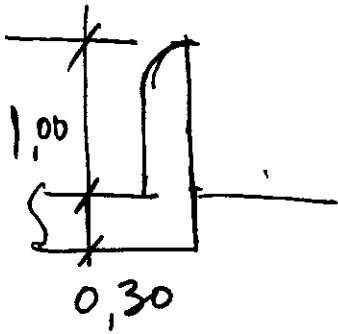
- aba (15/75) $M = 0,59 \rightarrow$ $A_{st_{min}} = 1,69 \text{ cm}^2$
 $A_{st_{m}} = 2,10 \text{ cm}^2/\text{m}$

- Laje da alma $\left\{ \begin{array}{l} b_w = 100 \quad h = 30 \\ A_{st_{min}} = 0,15 \times 30 = 4,50 \text{ cm}^2/\text{m} \end{array} \right.$

- PAR 6

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2:2

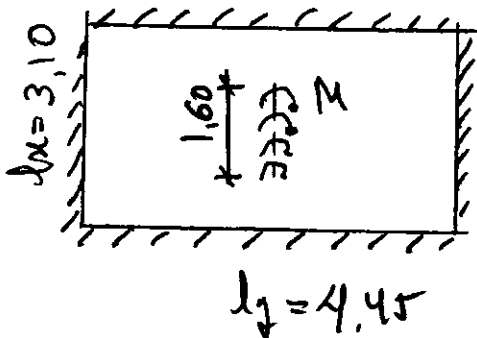


$$X = -\frac{1,0 \times 1,00^2}{6} = -0,17 \text{ tfm/m.}$$

- LAJE DE FUNDAÇÃO

LF1 - $S = 2,15 - 0,3 \times 2,50 = 1,40 \text{ tf/m}^2 \text{ (Nc1)}$

$M = 1,50 \text{ tfm/m (Nc2)}$



P/Nc1 $\lambda = 1,44.$

$R_{xe} = 1,76 \text{ tf/m}$

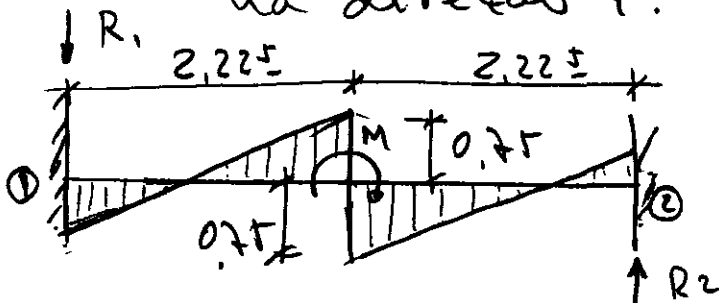
$R_{ye} = 0,59 \text{ ''}$

$M_x = 0,41 \text{ tfm/m}$ $X_x = -0,91 \text{ tfm/m.}$

$M_y = 0,20 \text{ ''}$ $X_y = -0,44 \text{ ''}$

Nc2 - admitir totalmente absorvido

na direção Y.



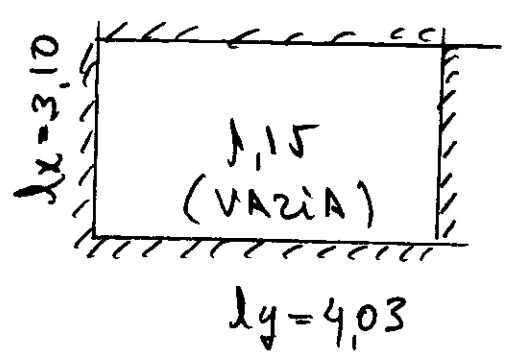
$$X_1 = X_2 = 1,50 \times \frac{2,225}{4,45} \left(2 - \frac{3 \times 2,225}{4,45} \right) = 0,375 \text{ tfm/m.}$$

$$R_1 = R_2 = 0,50 \text{ tf/m}$$

Nc1 + Nc2

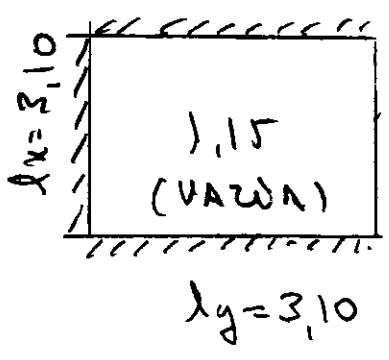
$$\left. \begin{aligned} R_{xe} &= 1,76 \text{ tf/m} \\ R_{ye} &= 0,59 + 0,50 = 1,09 \text{ tf/m} \\ M_x &= 0,41 \text{ tfm/m} \\ M_y &= 0,20 + 0,75 = 0,95 \text{ tfm/m} \\ X_x &= -0,91 \text{ tfm/m} \\ X_y^1 &= -0,44 - 0,375 = -0,815 \text{ tfm/m} \\ X_y^2 &= -0,44 + 0,375 = -0,07 \text{ ''} \end{aligned} \right\}$$

LF2 - $\left. \begin{aligned} g &= 3,00 - 1,90 \times 1,00 - 0,30 \times 2,50 = 0,35 \text{ tf/m}^2 \text{ - CHIA} \\ g &= 1,90 - 0,30 \times 2,50 = 1,15 \text{ '' - VAZIA} \end{aligned} \right\}$



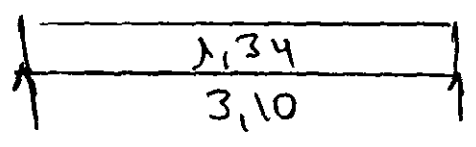
$$\left. \begin{aligned} R_{xe} &= 1,32 \text{ tf/m} \\ R_{ye} &= 0,60 \text{ ''} \\ M_x &= 0,30 \text{ tfm/m} \\ M_y &= 0,18 \text{ ''} \\ X_x &= -0,68 \text{ tfm/m} \\ X_y &= -0,40 \text{ ''} \end{aligned} \right\}$$

LF3 - $g = 1,15 \text{ tf/m}^2$



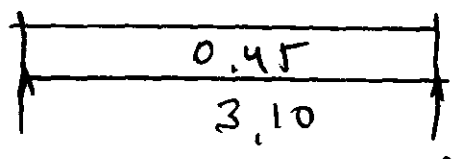
$$\left. \begin{aligned} R_{xe} &= 1,19 \text{ tf/m} \\ R_{ya} &= 0,45 \text{ ''} \\ R_{ye} &= 0,24 \text{ ''} \\ M_x &= 0,25 \text{ tfm/m} \\ M_y &= 0,22 \text{ ''} \\ X_x &= -0,61 \text{ ''} \\ X_y &= -0,46 \text{ ''} \end{aligned} \right\}$$

NERVURA (30/77) $g = (0,60 + 0,74) = 1,34 \text{ t/m}$



$R = 2,08 \text{ t} \rightarrow A_{stm} = 4,20 \text{ cm}^2/\text{m}$
 $M = 1,61 \text{ t/m} \quad A_1 = 3,47 \text{ cm}^2$

PAR 6 (30/130) $g = 0,45 \text{ t/m}$



$R = 0,70 \text{ t} \rightarrow A_{stm} = 4,20 \text{ cm}^2/\text{m}$
 $M = 0,54 \text{ t/m} \rightarrow d_{nec} = 70 \sqrt{\frac{540}{30 \times 150}} = 24$

$A_{sm} = 30 \times 24 \times 0,15 / 100 = 1,08 \text{ cm}^2$

LARGOS E PARAFOS - (DIMENSIONAMENTO) $f_{cr} > 15 \text{ MPa}$

PAR 1 (trecho A) $\phi_w = 100 \quad h = 30 \text{ cm}$
 $X = -1,42 \text{ t/m/m} \quad A_1 = 1,89 \text{ cm}^2/\text{m} \rightarrow A_{smia} = 0,10 \times 30 = 3,00 \text{ cm}^2/\text{m}$

PAR 1 Wgafos trecho A c/B' e trecho A c/Par. 3
 $X = -0,8 \times 2,06 = -1,65 \text{ t/m/m} \rightarrow A_{sm} = 3,00 \text{ cm}^2/\text{m}$

PAR 1 - trecho B''
 $X = -3,54 \text{ t/m/m} \quad A_1 = 4,71 \text{ cm}^2/\text{m} \quad \phi_{10} \quad A_{stics} = 6,73 \text{ cm}^2/\text{m}$

$A_{smia}^h = 0,10 \times 30 = 3,00 \text{ cm}^2/\text{m} \quad \text{Ext.}$
 $A_{smia}^{\#} = 0,15 \times 30 = 4,50 \text{ cm}^2/\text{m} \quad \text{Int.}$
 $A_{smia}^u = 0,15 \times 30 = 4,50 \text{ cm}^2/\text{m} \quad \text{Int.}$

PAR 1 - Trecho B'''

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$$X = -2,60 \text{ t/m/m} \quad A_s = 3,46 \text{ cm}^2/\text{m} \quad A_{\text{toss}} = 4,95 \text{ cm}^2/\text{m}$$

PAR 3 $b_w = 100 \quad h = 25 \text{ cm}$

$$X = -0,29 \text{ t/m/m} \rightarrow A_{s\text{m}} = 0,10 \times 25 = 2,50 \text{ cm}^2/\text{m} \left\{ \begin{array}{l} \text{Vert. e Hor.} \\ \text{Int. e Ext} \end{array} \right.$$

PAR 4 $b_w = 100 \quad h = 50 \text{ cm}$

$$X = -1,50 \text{ t/m/m} \quad A_{s\text{m}} = 0,10 \times 40 = 4,00 \text{ cm}^2/\text{m}$$

PAR 5 $b_w = 100 \quad h = 30 \text{ cm}$. (ligação c/ PAR 1, Trecho B')

$$X = -0,41 \text{ t/m} \rightarrow A_{s\text{m}} \text{ (ver Par 1)}$$

aba da PAR 5 (10/53)

$$R = 1,08 \text{ t} \rightarrow A_{s\text{m}} = 1,40 \text{ cm}^2/\text{m}$$

$$U = 0,84 \text{ t/m} \rightarrow A_{s\text{m}} = 0,80 \text{ cm}^2$$

PAR 6 - $b_w = 100 \quad h = 30 \text{ cm}$

$$X = -0,17 \text{ t/m/m} \quad A_{s\text{m}} = 0,15 \times 30 = 4,50 \text{ cm}^2/\text{m}$$

L F 1 - $h = 30 \text{ cm}$

$$K_{\text{max}} = -1,42 \text{ t/m/m} \text{ (ligação c/ Par 1)} \rightarrow A_{s\text{m}} \text{ m}^2$$

$$A_{s\text{min}} = 0,18 \times 30 = 5,40 \text{ cm}^2/\text{m}$$

L F 2 $h = 30$

$$X_{\text{max}} = -3,54 \text{ t/m/m} \text{ (ligação c/ Trecho B'' da Par 1)}$$

$$A_{s\text{toss}} = 6,73 \text{ cm}^2/\text{m}$$

$$U = 0,30 \text{ t/m/m} \quad A_{s\text{m}} = 0,25 \times 30 = 7,50 \text{ cm}^2/\text{m} \text{ (Int)}$$

$$A_{s\text{m}} = 0,18 \times 30 = 5,40 \text{ " (Ext)}$$

LF3 $h=30$

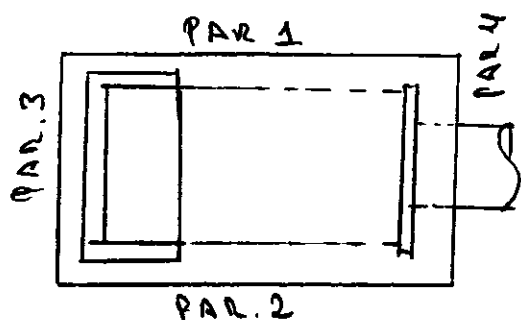
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$X_{max} = -2,60 \text{ f/m/m}$ (ligação c/ trecho B''' da Par 1)

$A_{ns1} = 4,9 \text{ cm}^2/\text{m}$

Demais momentos A_{smin} , ver LF2.

2º - TOMADA D'ÁGUA - CAIXA DE ENTRADA.

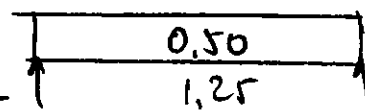


- Tampa $h=10$

$$pp = 0,25$$

$$sc = 0,25$$

$$0,50 \text{ tf/m}^2$$



$$R = 0,31 \text{ tf/m}$$

$$M = 0,10 \text{ tfm/m}$$

$$A_{sm} = 1,50 \text{ cm}^2/\text{m}$$

- Laje de Fundação

• Tampa	- 1,40 x 0,10 x 1,00 x 2,50	— 0,35 tf
• Par 1 e 2	- 2 x 1,00 x 2,00 x 0,25 x 2,50	— 2,50 "
• "	- 2 x 1,60 x 1,75 x 0,25 x 2,50	— 3,50 "
• Par 3	- 1,00 x 1,50 x 0,25 x 2,50	— 0,95 "
• Par 4	- 2,60 x 1,50 x 0,25 x 2,50	— 2,44 "
		<hr/>
		9,77 tf

$$p = \frac{9,77}{1,25 \times 2,25} = 3,47 \text{ tf/m}^2$$

do lado da muratura, admitir apoiada nos lados.



$$l_y = 2,25$$

$$M_x = 0,47 \text{ tfm/m}$$

$$M_y = 0,15 \text{ "}$$

$$R_x = 1,98 \text{ tf/m}$$

$$R_y = 0,34 \text{ "}$$

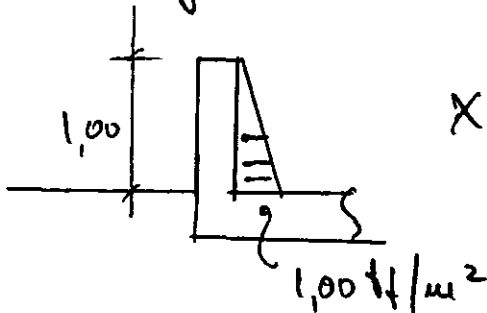
$$A_{smdu} = 9,50 \text{ cm}^2/\text{m}$$

- PAREDES- PAR 3 (25/130) - Carregamento Vertical

$$p_p = 0,81$$

$$R_L = -0,34$$

$$0,47 \text{ t/m} \rightarrow A_{smin} = 0,15 \times 25 = 3,75 \text{ cm}^2/\text{m}$$

- Carregamento Horiz

$$X = -0,17 \text{ t/m} \rightarrow A_{smin} = 3,75 \text{ cm}^2/\text{m}$$

- PAR 1, 2 e 4 - Não atua carregamento horizontal.
adotar $A_{smin} = 3,75 \text{ cm}^2/\text{m}$ - VERIFICAÇÃO DA FLUTUAÇÃO

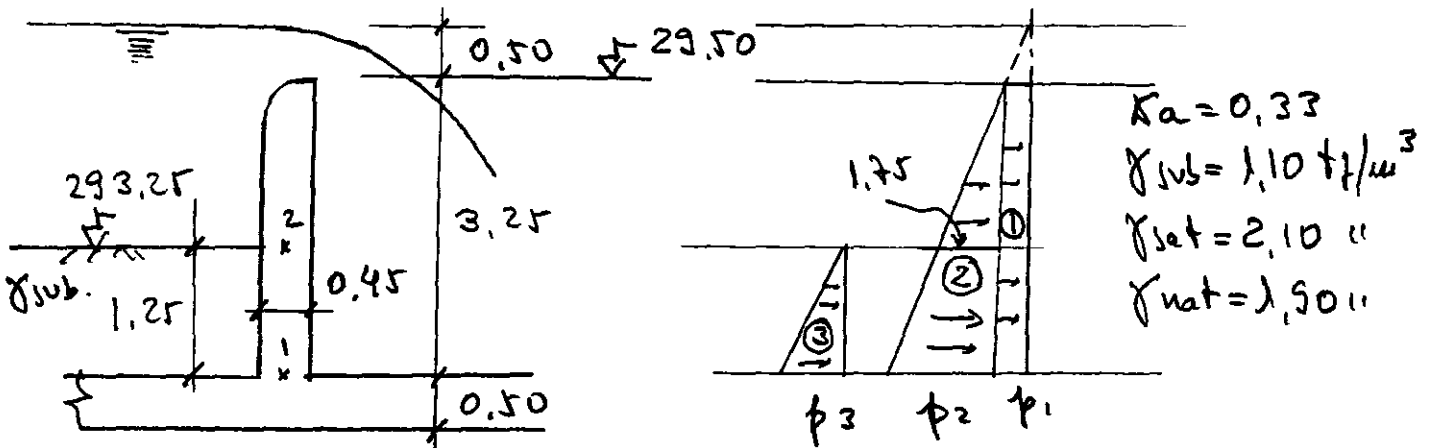
$$\text{- Sub-pressão max} = 1,30 \text{ t/m}^2$$

$$\text{- pressão max no solo } p = 3,47 \text{ t/m}^2$$

$$F.S.F = \frac{3,47}{1,30} = 2,67$$

3.0 - SANONADOURO LABIRINTO

- PAREDE DO LABIRINTO.



$$p_1 = 0,50 \text{ t/m}^2$$

$$p_2 = 3,25 \text{ "}$$

$$p_3 = 1,10 \times 3,25 \times 0,33 = 1,19 \text{ t/m}^2$$

$$X_1 = - \frac{0,50 \times 3,25^2}{2} - \frac{3,25 \times 3,25^2}{6} - \frac{1,19 \times 1,75^2}{6} = - 8,80 \text{ t/m/m.}$$

$$X_2 = - \frac{0,50 \times 1,75^2}{2} - \frac{1,75 \times 1,75^2}{6} = - 1,66 \text{ t/m/m.}$$

$$b_w = 100 \text{ cm} \quad h = 45 \text{ cm} \quad f_{cr} \geq 15 \text{ MPa.}$$

$$X = - 8,80 \text{ t/m/m} \rightarrow A_s = 7,39 \text{ cm}^2/\text{m} \quad A_s^{f_{cr}} = 11,82 \text{ cm}^2/\text{m.}$$

$$X = - 1,66 \text{ "} \rightarrow \begin{cases} A_s^{min} = 0,15 \times 40 = 6,00 \text{ cm}^2/\text{m.} \\ A_s^{max} = 0,20 \times 40 = 8,00 \text{ "} \end{cases}$$

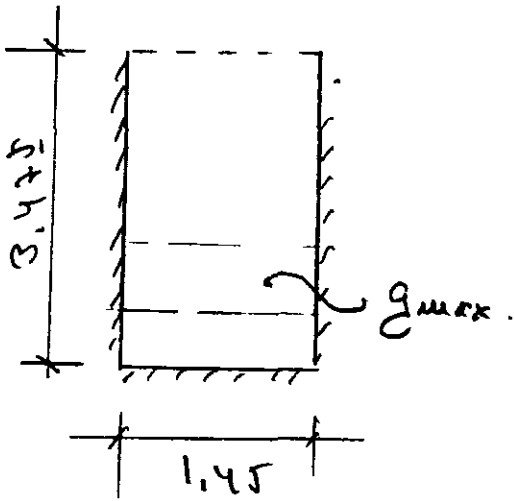
- Faixa próxima aos BICOS.

$$\text{Adota-se } X = - \frac{q l^2}{16} \quad \text{sendo } l = 3,25 \text{ m.}$$

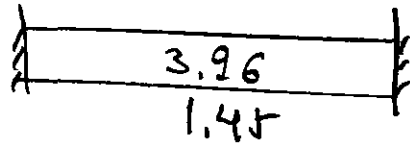
$$X = - \frac{3,96 \times 3,25^2}{16} = - 2,61 \text{ t/m/m.} \quad \begin{cases} q = 0,8 \text{ p}_{max} \\ q = 3,96 \text{ t/m}^2 \end{cases}$$

$$A_s^{min} = 8,00 \text{ cm}^2/\text{m}$$

- TRECHO DOS BICOS - JUSANTE.

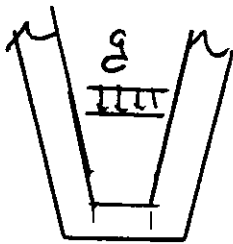


Adotar $g_{max} = 3.96 \text{ t/m}^2$

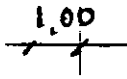


$X = -0.69 \text{ t/m (m)}$
 $N = 0.35 \text{ ''}$

$A_{smin} = 6.00 \text{ cm}^2/\text{m}$



(PLANTA)



- LAJES DE FUNDAÇÃO

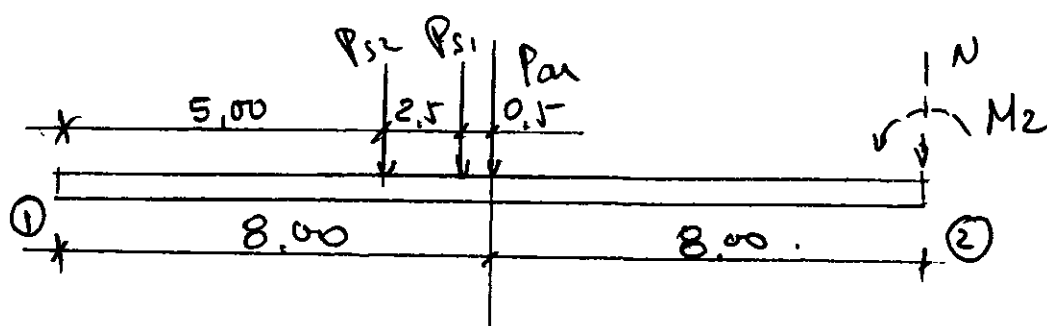
1º caso - Construção (TT + a terra)

$$P_{ax} - 231,30 \times 0,45 \times 3,25 \times 2,50 \quad \text{---} \quad 846,00 \text{ tt.}$$

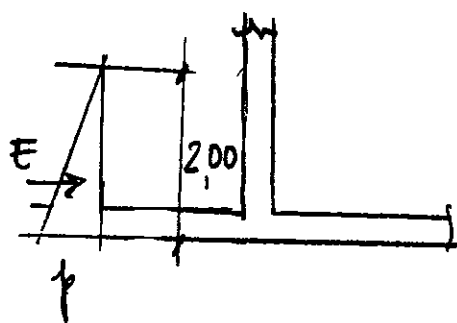
$$P_{s1} - 7 \times 1,00 \times 15,05 \times 1,50 \times 1,90 \quad \text{---} \quad 300,00 \text{ tt}$$

$$P_{s2} - 7 \times 0,5 \times 6,00 \times 15,05 \times 1,50 \times 1,90 \quad \text{---} \quad 900,00 \text{ tt}$$

$$\underline{\underline{2046,00 \text{ tt.}}}$$



- Empuxo do solo.



$$p = 2,00 \times 1,90 \times 0,33 = 1,25 \text{ tt/m}^2$$

$$E = 0,5 \times 1,25 \times 2,00 \times 57,20 = 71,50 \text{ tt/m.}$$

$$M_E = 71,50 \times \frac{2,00}{3} = 47,66 \text{ tt.m}$$

$$M_2 = 47,66 - 846,00 \times 8,00 - 300,00 \times 8,50 - 900,00 \times 11,00$$

$$M_2 = -19.170 \text{ tt} \quad \alpha = \frac{19170}{2046} = 9,37 \quad e = 1,37$$

$$\sigma = \frac{2046,00}{16,00 \times 57,2} \left(1 \pm \frac{6 \times 1,37}{16,00} \right) \quad \left. \begin{array}{l} \sigma_1 = 3,38 \text{ tt/m}^2 \\ \sigma_2 = 1,09 \text{ tt/m}^2 \end{array} \right\}$$

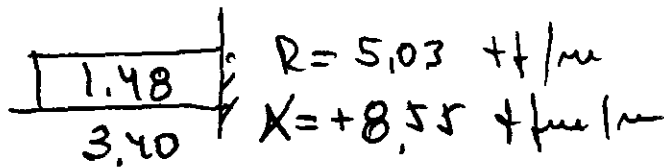
$$\sigma = \frac{2.910,90}{16,00 \times 57,20} \left(1 \pm \frac{6 \times 1,43}{16,00} \right) \begin{cases} \sigma_1 = 4,90 \text{ t/m}^2 \\ \sigma_2 = 1,48 \text{ u} \end{cases}$$

Dimensionamento

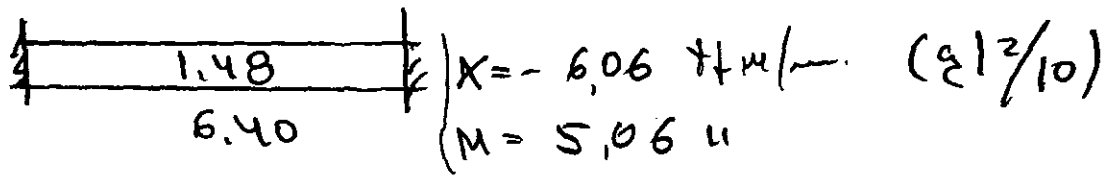
- Faixas ①, ② - (trecho de Jusante)

$$p = 1,48 \text{ t/m}^2$$

• balanço



• Vão

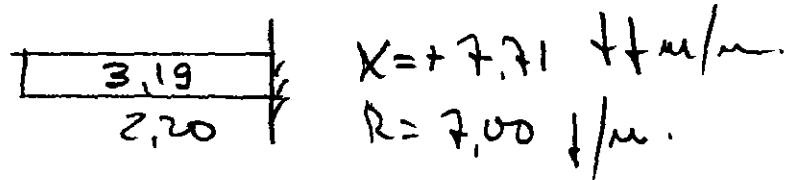


- Faixa ③ (trecho de Jusante)

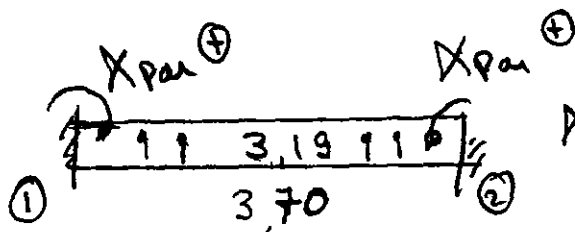
$$p = 3,19 \text{ t/m}^2$$

t/m

• balanço



• Vão



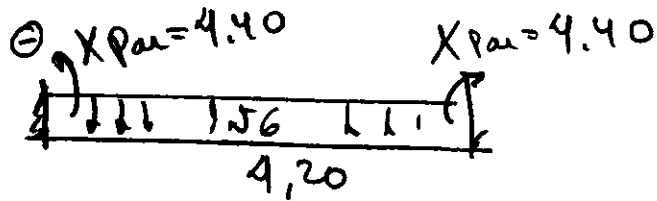
$$X_1 = X_2 = +8,80 \text{ t/m}$$

$$M = -3,30 \text{ u}$$

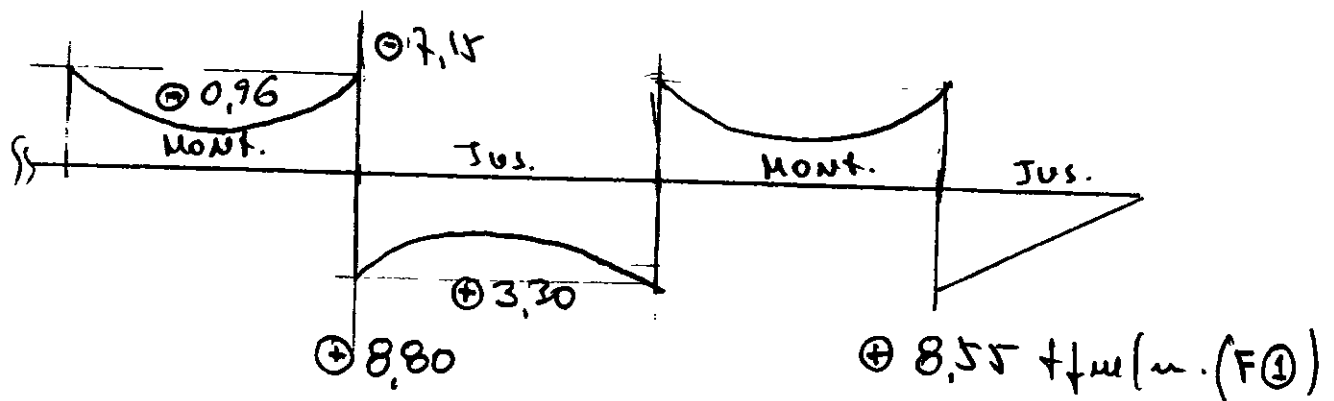
$X_{pai} = 4,40 \text{ t/m}$ (Metade do momento de engaste da parede com a laje de fundo.)

- Faixa ⑧ - (trecho de Montante)

o Vat $\phi = 3,19 - 1,10 \times 1,50 - 1,00 \times 3,25 = -1,56 \text{ t/m}^2$.



$$\begin{cases} X = -7,15 \text{ t/m/m} \\ M = -0,96 \text{ t} \end{cases}$$



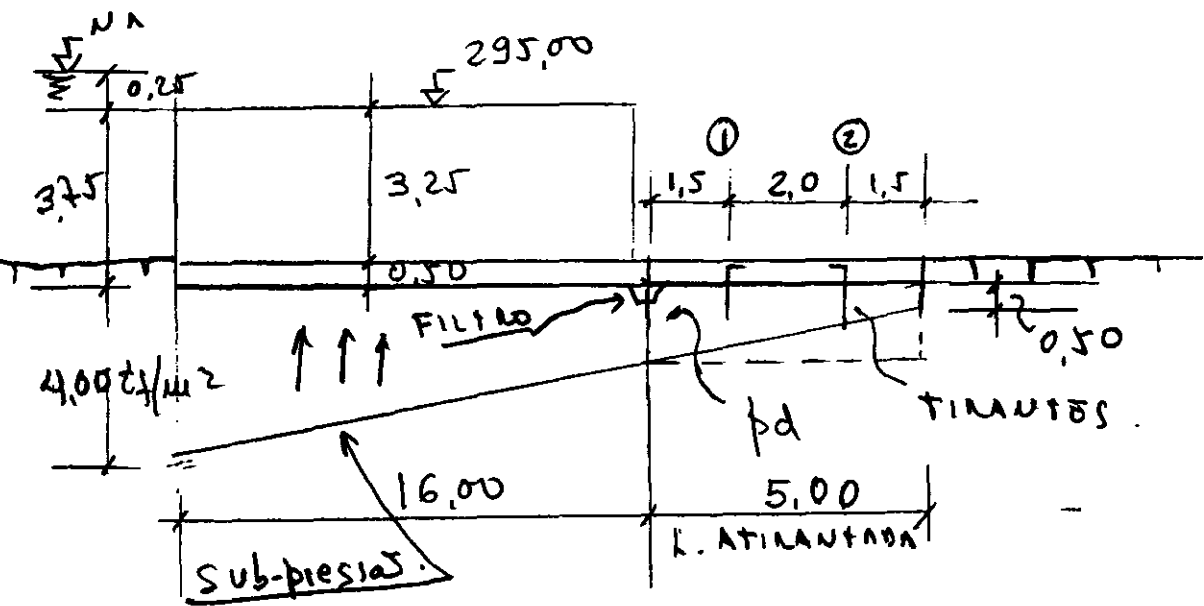
Dimensionamento. $b_w = 100$ $h = 50$

$$M = 8,80 \text{ t/m/m} \quad A_s = 6,61 \text{ cm}^2/\text{m} \quad A_{stirr} = 10,58 \text{ cm}^2/\text{m}$$

LONG. $\left\{ \begin{array}{l} \text{(F. sup.)} \quad A_{sm}d_u = 0,35 \times 40 = 14,00 \text{ cm}^2/\text{m} \\ \text{(F. INF)} \rightarrow \underline{A_{s\text{foss.}}} \end{array} \right.$

TRANSV. $\left\{ \begin{array}{l} \text{F. sup} \rightarrow A_{sm}d_u = 0,35 \times 40 = 14,00 \text{ cm}^2/\text{m} \\ \text{F. INF} \rightarrow A_{sm}d_u = 0,20 \times 40 = 8,00 \text{ ''} \end{array} \right.$

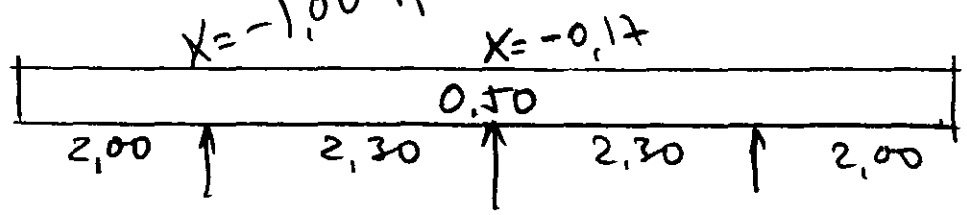
- LATE ATIRANTADA - (Saugrado c/ $k_f = 0,00$)



$$p_d = 4,00 \times \frac{5,00}{21,00} + 0,50 = 1,45 \text{ tf/m}^2$$

$$p = 1,45 - 0,5 \times 2,5 = 0,20 \text{ tf} \quad q = 0,20 \times 2,50 = 0,50$$

$X = -1,00 \text{ tfm} \rightarrow$ Asua.

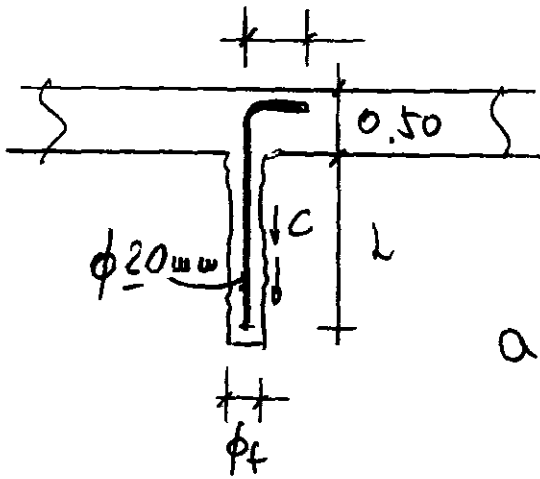


$$t = 3,15 \times 0,50 + \frac{0,83}{2,30} = 1,94 \text{ tf} \quad (2,00 \text{ tf})$$

$A_{sua} = 0,15 \times 40 = 6,00 \text{ cm}^2/\text{m} \text{ (superior)}$

- Cálculo do comprimento de ancoragem na Rocha.

Seja $F.S = 2$ $\phi_{furo} = 0,08 \text{ m}$ $C = 50,00 \text{ kg/cm}^2$ $T = 2,00 \text{ tf}$



$$2T = \pi \times \phi_f \times C \times L$$

$$L = \frac{2 \times 2,00}{\pi \times 0,08 \times 50,00} = 0,32 \text{ m}$$

Adotar $L = 1,00 \text{ m}$

- Tensão no aço $\sigma_s = \frac{2000,00}{3,15} = 635 \text{ kgf/cm}^2$
 $\phi 20 \text{ mm}$.

- Comprimento de ancoragem no Concreto.

Seja:

$$\sigma_{bm} = 0,9 \sqrt[3]{f_{cd}^2} = 0,9 \sqrt[3]{\left(\frac{150}{1,4}\right)^2} = 20,30 \text{ kgf/cm}^2$$

$$L_b = \frac{2,54}{4} \times \frac{400,00}{20,30} \times 2^* = 25 \text{ cm} < 100 \text{ (adotado)}$$

(*)- Fator de segurança.